An Investigation into Maintaining Naso-gastric Feeding for Stroke Patients: A Mixed Methods Design

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DECLARATION

I declare that this thesis is my own work and that no material contained in it has been submitted for another academic award.

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Abstract

Background

Dysphagia is common after stroke, so feeding through a naso-gastric (NG) tube may be necessary. NG tubes are frequently dislodged, potentially causing feed or fluids to enter the lungs. Interventions to prevent this include taping NG tubes to the face, hand mittens and nasal bridles.

Overall Aim

The aim of this study was to explore the opinions of staff, patients and relatives about the maintenance of NG tube feeding for stroke patients while investigating current clinical practice.

Research Design and Methods

A three-phased mixed method design was used. Phase 1 involved focus groups with multidisciplinary stroke unit staff (n=17); one-to-one interviews, with stroke patients (n=4) and relatives (n=6). Phase 2 incorporated a postal survey sent to a convenience sample (n=528) registered nurses working in the field of stroke across the UK. Phase 3 involved interviews with nurses (n=5) outside the speciality of stroke.

Findings

Phase 1 highlighted many categories, including: lack of protocols; ethical and legal concerns; training to insert NG tubes; patient dignity; patient autonomy and potential harms and benefits of interventions used. There were variations in the opinions of staff, patients and relatives concerning the effectiveness and acceptability of methods for securing NG tubes. Phase 2 achieved a response rate of 59% (n=314/528); 22% (n=68/312) of nurses used hand mittens, only 11% (n=34/312) used a protocol; 56% (n=176/314) of nurses had received formal training to insert an NG feeding tube, more senior nurses had been formally trained than junior nurses ($p<0.005$). Acceptability and effectiveness ratings for tube securing interventions varied: 50% (n=158/312) considered hand mittens to be unacceptable. However, from a total of n=92 responses about their effectiveness, 66% (n=61/92) felt they were effective. Phase 3 produced more detailed results about fear associated with NG feeding;

inconsistent approaches to training and ethical and legal issues of patient restraint.

Conclusions

Overall this study demonstrates differences in opinion about what constitutes acceptable, effective and legal practice when maintaining NG feeding for stroke patients. It also suggests that the lack of consistent nurse training affects the standards of care patients receive. Furthermore, there is a need for more robust evidence to inform clinical practice. This study culminates in a model of nursing related to the insertion and maintenance of NG feeding for stroke patients.

Acknowledgements

I would like to thank the patients, relatives and staff from NHS Lothian who gave freely of their time and experiences which made this study both possible and significant. Thanks also go to the members of the Scottish and National Stroke Nurses Forums for their time and effort in contributing to the survey; and their clear passion for improving the care of stroke patients.

I would like to thank my supervisory team: Professor Beth Alder (Director of Studies) and Dr Maureen Macmillan, for their time, wisdom and encouragement. I would like to offer special thanks to Professor Martin Dennis and Dr Anne Rowat for their supervision and expertise in the earlier stages of my study and to Dr Dorothy Horsburgh for her contribution to phase 1.

I am grateful to Professor Gillian Raab and Dr Judy Goldfinch for their statistical advice.

I would also like to acknowledge the support of Chest Heart and Stroke Scotland who funded the first two phases of this study. This funding was awarded to Dr Anne Rowat and Professor Martin Dennis.

I am deeply appreciative of the contribution that my husband Cairn has made, for his belief, encouragement and relentless support throughout the years; my brother Bernard Ward for his expertise in proof reading and my father for his endless moral support. Finally I would like to thank my friends and colleagues who helped keep me in touch with life.

This study was initially intended to follow on from the FOOD Trial (Dennis, Warlow & Lewis, 2005); however, following application to the MREC it became clear that this original plan was not tenable. This resulted in the free-standing research study reported here. To help the reader understand the various responsibilities accepted by different people, a statement follows detailing the work carried out in different phases.

Phase 1

The interview schedules (one building on the last) for the focus groups were jointly designed by the researcher and Dr Horsburgh. The focus groups were carried out by the researcher and Dr Horsburgh; Dr Horsburgh conducted the first two while the researcher took field notes and during the last one these roles were reversed. The analysis of focus group data was the responsibility of the researcher.

The one-to-one interview schedule for the initial interview was jointly designed using information from the focus groups by the researcher and Dr Horsburgh. Subsequent interview schedules were designed (following constant comparative analysis) by the researcher.

The eight interviews were conducted by the researcher who also undertook the analysis of all the data from this phase under supervisory advice.

Phase 2

In this phase the design of the questionnaire was carried out by the researcher with advice from supervisors, and the survey and analysis of the data was carried out by the researcher with advice from supervisors and statisticians.

Phase 3

The design, conduct and the analysis of this phase was the responsibility of the researcher under supervisory advice.

Dedication

This thesis is dedicated to my parents Dr John and Mrs Anne Ward

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1 Introduction and Background

1.1 Introduction

I first became interested in the area of stroke and nutrition while working as a Nutrition Nurse Specialist and undertaking Masters Level work in Nutrition Support. Experience as a staff nurse working in General Medicine had highlighted the incidence of nutritional issues for stroke patients. While working as a Nutrition Nurse Specialist, I was involved in the setting up of an acute stroke unit and during this time it became evident that nutritional support for stroke patients who had lost the ability to swallow, or whose swallow was deemed unsafe for oral nutrition, was often inadequate. Although naso-gastric (NG) feeding was common practice for these patients, the process of tube insertion was frequently delayed leaving patients at an increased risk of undernourishment. I noticed that successful NG feeding for stroke patients seemed to be the exception rather than the norm; nursing staff reported frequent NG tube dislodgement leading to disrupted nutritional intake and administration of medications leading to subsequent physical and psychological deterioration. These experiences led me to question how the process of NG feeding for stroke patients from insertion through to maintaining feeding could be improved.

1.1.1 Rationale for the Study

Every year, an estimated 150,000 people in the UK have a stroke and most of the people affected are over 65 years old. Stroke is the third most common cause of death in the UK and a leading cause of severe disability**;** more than 250,000 people live with disabilities caused by stroke (Stroke Association 2008). An unsafe swallow (dysphagia) following acute stroke is common and has been reported in 28-65% of stroke patients (Foley et al. 2008; Bath, Bath-Hextall & Smithard 1999; Gordon et al. 1987). Dysphagia may persist for days, weeks and sometimes months (Mann, Hankey & Cameron 2000; Davalos et al. 1996) and is commonly associated with poor outcomes after stroke (Martino et al 2005). Malnutrition has been found in between 16-31% of stroke patients on admission into hospital (Gariballa et al.1998a; Davalos et al. 1996) and affects almost 50% of stroke patients admitted into rehabilitation units (Gariballa et al.

1998b; Finestone et al. 1995). To prevent nutritional deterioration after stroke, feeding through an NG feeding tube inserted via the nose into the stomach or a percutaneous endoscopic gastrostomy (PEG) tube inserted directly into the stomach may be necessary (Dziewas et al. 2003). Research has shown that NG feeding tubes are not well tolerated by stroke patients (Dennis, Lewis & Warlow 2005a; Smithard et al. 2002; Park et al, 1992; Einsberg, Spies & Metheny 1987; Metheny, Spies & Einsberg 1986). Many stroke patients may not understand why they have a tube protruding from their nose, and will frequently pull it out, thus interrupting their nutrition, hydration and or medication. Alternatively patients may dislodge their tubes, which can result in feed or fluid entering the lungs with potentially serious consequences. However the FOOD (Feed or Ordinary Diet) Trial (Dennis, Lewis & Warlow 2005a; Dennis, Lewis & Warlow 2005b; Dennis et al. 2006) indicated that NG feeding in the acute stages after stroke (first 2-3 weeks) was more beneficial than PEG feeding; therefore ensuring that NG feeding is successfully maintained for stroke patients may be an important element of successful rehabilitation and forms the basis for the current study.

1.2 Background to the Study

When contextualising this study, it was necessary to clarify the relevant areas of interest within the literature. The literature was reviewed using various search engines and data bases including: MEDLINE, CINAHL, EMBASE, British Nursing Index, the Cochrane Library and JBI Connect. Broad search strategies for nutrition and stroke were designed in liaison with Cochrane search experts from the Cochrane Stroke Group (http://www.dcn.ed.ac.uk/csrg/). The search strategy used for stroke and nutrition can be seen in chapter 2. In addition to these broad searches, key word searches were carried out to ascertain more specific information. No constraints in terms of date were placed on the literature reviewed, but rather key literature was identified which contextualised the rationale for the study.

This chapter explores malnutrition in the healthcare setting from a historical perspective to the present day, nutrition screening, dysphagia screening, enteral feeding strategies for dysphagic stroke patients (timing and route), the

role of the nurse in implementing NG feeding for stroke patients, confirming NG feeding tube position, education and training in NG feeding, maintaining NG feeding (maintaining tube position), using restraint in stroke care (legal issues for nurses and the incapacitated patient) and guidelines in NG feeding. Relevant literature will also be presented within the discussion in chapter 8, in light of the research findings from the current study.

1.2.1 Malnutrition in the Healthcare Setting

Malnutrition has been well documented in the hospital setting. Stratton, Green & Elia (2003) define malnutrition as a state of nutrition in which a deficiency, excess or imbalance of protein, energy and other nutrients causes measurable adverse effects on body form, function and clinical outcome. Malnutrition in the health care setting was recognised as early as 1860 by Florence Nightingale:

> *"Every careful observer of the sick will agree in this, that thousands of patients are annually starved in the midst of plenty, from want of attention to the ways which alone make it possible for them to take food" (Nightingale, 1860, pp. 63)*

Florence Nightingale saw nutritional care of patients as a core part of the nurse's role:

> *" I would say to the nurse have a rule of thought about your patient's diet; consider, remember how much he has had, and how much he ought to have today" (Nightingale, 1860, pp.68)*

Florence Nightingale recognised that fundamental aspects of food provision such as food presentation and timing of meals were essential to ensure adequate nutritional intake for patients. Skeet (1980) reflected on the notes of Florence Nightingale in her book 'Notes on Nursing; the science and the art'. Skeet (1980) talks about the problems of providing food in the context of the hospital setting; she reflects on how often a patient's tray will be whisked away because the Doctor wants to perform an examination; and she recalls the words of Miss Nightingale:

> *"It is true, the nurse cannot give him what she has not got, but his stomach does not wait for her convenience or even her necessity" (Skeet 1980 pg.54).*

Florence Nightingale's words emphasise the importance of the patient's nutritional needs over the convenience of running the ward and other nursing duties. Indeed, the issue of malnutrition in the hospital or healthcare setting is constantly echoed in Government reports (Department of Health 2003; Scottish Government 2008a) and has been depicted as being a *'scandal'* (Age Concern 2006) with hospitals failing to implement recommended strategies (Devaney & Ambrose 2008).

Despite this longstanding recognition, the incidence of malnutrition in health care institutions in the United Kingdom has been well documented and persists to be a controversial issue (Lean & Wiseman 2008; British Dietetic Association 2006; McWhirter & Pennington 1994; Hill et al. 1977; Bistrian et al. 1976; Bistrian et al. 1974). Currently, the British Dietetic Association (2008) states that:

> "*In the UK, malnutrition risk has been identified in 20% - 60% of hospital admissions to medical, surgical, elderly and orthopaedic wards"*. *(British Dietetic Association 2008)*

In addition, studies have identified that the nutritional status of patients has often deteriorated during hospital stay. One widely recognised study was that of McWhirter & Pennington (1994). This prospective study found that from a sample of 500 patients admitted into a variety of disciplines within a British hospital, 200/500 (40%) were identified following nutritional screening as manifesting some degree of undernourishment. A variety of anthropometric measurements were used such as, body mass index, triceps skin fold thickness, mid-arm circumference, mid-arm muscle circumference and weight loss before illness. Nutritional status was reassessed in 112/500 patients on their discharge from hospital; 55/112 patients had been classified as undernourished on admission, and of those 55 patients, 41 (75%) showed further weight loss on discharge. McWhirter & Pennington (1994) concluded that malnutrition in the hospital setting remained a largely unrecognised problem highlighting a need for further education on clinical nutrition.

Various reports, initiatives and campaigns have been aimed at the British National Health Service (NHS) in an attempt to improve the nutritional care of

patients, these have included: A Positive Approach to Nutrition as Treatment; King's Fund Report (Lennard-Jones 1992), Eating Matters (Bond 1997), Essence of Care Nutrition Benchmarking (Department of Health 2003), Better Hospital Food (NHS Estates 2008), Nutrition Support in Adults (NICE 2006), The NHSQIS Clinical Standards for Food, Fluid and Nutritional Care in Hospitals: 'Food in Hospitals' (Scottish Government 2008a) and Enhancing Nutritional Care (RCN 2008a). However the NHS continues to struggle to ensure that patients receive adequate nutrition while in hospital; Perry (1997) described this issue as 'a hard nut to crack'. It is the most vulnerable patients such as elderly, orthopaedic and stroke patients who are at greatest risk of deterioration (Age Concern 2006; Sullivan, Sun & Walls 1999).

1.2.2 Nutrition Screening

Identifying the nutritional status of patients is essential in determining the most appropriate forms of nutritional support. It has been suggested that nurses working in hospital settings are best placed to carry out nutritional screening (Stratton et al. 2004; Arrowsmith 1999). Lennard-Jones (1992) in the King's Fund Centre Report recommended that only when assessment of nutritional status became routine would the full benefits of nutritional treatment be realised. In terms of nutritional screening and assessment, it seems that the search for the ideal screening tool or process has been a struggle. Holmes (2000) highlighted the difficulties in selecting the most appropriate tool for use in clinical environments, adding that the sheer variety of tools to choose from made the process even more complex. Holmes (2000) and McLaren & Green (1998) stressed that it is vital when selecting a screening tool for use in a clinical environment, to ensure that the preferred tool is not only valid and reliable but sensitive and specific if accurate diagnosis is to be made and appropriate nutritional treatment identified.

Although in essence this may sound simple, even the most scientifically robust screening tools may pose problems in terms of their application and usability within the clinical setting. The validity of any screening tool may be defined as the extent to which a tool measures what it is intended to measure (Arrowsmith 1999). The reliability of a screening tool determines the degree of consistency

with which the tool measures an attribute (McLaren & Green 1998); therefore it should be consistent in its measurement of nutritional risk (Arrowsmith 1999). The sensitivity of a nutrition screening tool may be defined as the extent to which it can discriminate between those who are malnourished and those who are at risk, more specifically the ability to detect true cases of malnutrition (Arrowsmith 1999; McLaren & Green 1998). Specificity as defined by Arrowsmith (1999) is the ability to detect those who are not malnourished or at risk of malnutrition, that is a true negative finding. The aim of every tool is that it should have a sensitivity and specificity of 100%, meaning that as an instrument it has the ability to detect absolutely true cases of malnutrition. From the perspective of the nutritional expert a screening tool may be easy to use, and interpret; however the nurse working in the clinical setting may perceive the same tool as a complex time consuming assessment amongst a multitude of clinical duties.

The Malnutrition Universal Screening Tool (MUST) first published by the Malnutrition Advisory Group (MAG) (2003) a Standing Group of the British Association of Parenteral and Enteral Nutrition (BAPEN), has become the recommended tool for assessing nutritional status for all adult patients. This tool has been rigorously tested with a variety of patients for validity, ease of use, inter-rater reliability and prediction of mortality (Stratton & Elia 2006; Stratton et al. 2006; Stratton et al 2004) and has been reproduced with minor changes since its release by MAG (2003). Stroke patients should undergo nutrition screening within 48 hours of admission (Scottish Intercollegiate Guidelines Network (SIGN) 2004; Royal College of Physicians (RCP) 2004).

1.2.3 Assessments for Dysphagia in Stroke Patients

An assessment of dysphagia must be carried out as well as nutritional screening, in order that the most applicable route of nutrition support can be established (SIGN 2004; RCP 2004). A number of methods are available for screening dysphagia including videoflouroscopy and bedside screening tests (Foley et al. 2008; Martino et al 2005; Perry & Love 2001). The incidence of dysphagia after acute stroke has been reported to vary depending on the methods of screening used. Studies have reported that the lowest incidence is

detected using cursory screening techniques (bedside screening tests) (37-45%) which is often the first stage in dysphagia screening. Higher clinical testing, usually performed by a Speech and Language Therapist, have been reported to detect an incidence of 51-55%, this level of screening may be carried out on the basis of initial bedside screening if dysphagia is suspected. Finally clinical testing may indicate the need for further instrumental testing, often videoflouroscopy, which has been reported to detect 64-75% incidence of dysphagia (Martino et al. 2005). Although Martino et al. (2005) report that instrumental screening may be the most accurate form of screening, they also suggest that studies looking at instrumental screening did not standardise interpretation of instrumental findings, thereby not differentiating between dysphagia caused by normal ageing effects and dysphagia attributed to stroke; this may account for the lower incidence of dysphagia identified with less specific testing such as bedside screening.

Nursing staff may be involved in bedside dysphagia screening. As with nutritional screening, a variety of screening tools have been used with varying sensitivity and specificity (Perry 2001; Perry & Love 2001). The Standardised Swallowing Assessment (SSA) is a water swallow test which to date is reported as being the only screening tool with published reliability data when used by nurses (Perry & Love 2001). National guidelines do not, however, recommend specific swallow tests but give examples of features that a swallow screening test should contain (SIGN 2004, RCP 2004). It has been suggested that further evaluation of dysphagia screening tests is required (Foley et al. 2008, Perry 2001).

1.2.4 Enteral Feeding Strategies for Dysphagic Stroke Patients

Malnutrition has been linked to an increased risk of death and dependency after stroke (Gariballa et al. 1998a; Davalos et al. 1996). Therefore, nutrition screening and screening for the extent of dysphagia are essential so that timely and appropriate nutritional support can be implemented to avoid nutritional deterioration. The most commonly evaluated interventions for treatment of dysphagia after acute stroke are dietary texture modification, dysphagia therapy programmes (including behavioural interventions) and enteral feeding (Foley et

al. 2008). Dependent upon the extent of swallowing difficulties, a modified or textured diet may be appropriate to meet nutritional needs; however if oral intake is considered to be unsafe, then enteral tube feeding would be considered as the next step. For the purposes of this study, I have chosen to review current evidence for enteral feeding after acute stroke.

Nutritional interventions for dysphagia in acute stroke have given rise to debate, particularly regarding the best form of enteral feeding (either NG or PEG feeding) and the speed with which feeding should be initiated following acute stroke. Bath, Bath-Hextall & Smithard (1999) carried out a systematic review looking at evidence supporting interventions for dysphagia in acute stroke. This review found only two trials specific to dysphagic stroke patients that evaluated PEG feeding versus NG feeding (Bath 1997 (as cited in Bath, Bath-Hextall & Smithard 1999); Norton et al. 1996). These trials showed that PEG was associated with lower case fatality and improved nutritional status, however, both studies were small (n=49) and poorly randomised (NG patients were older and sicker), therefore definitive conclusions regarding feeding strategies for acute dysphagic stroke patients could not be drawn. Foley et al. (2008) carried out a further systematic review re-examining recent trials. Two further randomised controlled trials were identified which compared outcomes of stroke patients fed with NG or PEG feeding (Hamidon et al. 2006; Dennis, Lewis & Warlow 2005a). The FOOD Trial (Dennis, Lewis & Warlow 2005a) was the largest and most rigorous of these trials and reported a significant difference in favour of NG feeding (p=0.05) versus PEG feeding. This trial will be discussed in more detail in the section below. Hamidon et al. (2006), assessed the nutritional status of recruits more thoroughly and in a standardised fashion in comparison to the FOOD trial, but they only recruited 23 patients from one centre, therefore findings are not comparable to the FOOD Trial which was multi-centred and employed larger samples.

1.2.5 The FOOD Trial

The FOOD (Feed or Ordinary Diet) Trial comprised three large international multi-centre randomised controlled trials investigating patient feeding strategies following acute stroke; these are the largest studies to date addressing feeding

strategies for stroke patients (Dennis et al. 2006; Dennis, Lewis & Warlow 2005a; Dennis, Lewis & Warlow 2005b). Feeding strategies that were evaluated included routine oral nutritional supplementation (trial 1) (Dennis, Lewis & Warlow 2005b), NG feeding and PEG feeding (trial 2 – early versus delayed enteral feeding); (trial 3 – NG versus PEG feeding) (Dennis, Lewis & Warlow 2005a).

Dysphagic stroke patients were enrolled for trials two and three if the clinician was uncertain about when to start tube feeding (trial 2; n=859) or if they were certain about when to start feeding but not sure about whether to use NG feeding or PEG (trial 3; n=321) (Dennis, Lewis & Warlow 2005a). The authors report that these trials were not 'sufficiently large' to give statistically significant results, however they do suggest that results provide practical information which may guide clinicians. Interpretation of the FOOD Trial results for trials 2 and 3 has been problematic (Ockenga, Pirlich & Lochs 2005; Teasell & Foley 2005). The trials did not show any significant difference between initiating early enteral tube feeding and avoiding it, leaving the decision of when to introduce enteral feeding unanswered and open to interpretation. Despite this the authors advocate early enteral feeding on the basis that it is unlikely to be harmful (Dennis, Lewis & Warlow 2005a). Trial 3 did show an absolute difference in death or poor outcome in favour of NG feeding (p=0.05) (Dennis, Lewis & Warlow 2005a); however Teasell & Foley (2005) questioned whether these findings would actually change current treatment for dypshagic stroke patients. Furthermore the FOOD trial did not record possible complications associated with NG feeding or the amount of feed delivered. Criticism has been levelled concerning a lack of essential nutritional data, nutritional status being estimated only on admission and the effects of feeding solely assessed in terms of functional outcome and survival (Ockenga, Pirlich & Lochs 2005; Teasell & Foley 2005). Despite these criticisms, the FOOD trial remains the best available evidence to date in terms of feeding strategies for dysphagic patients post acute stroke.

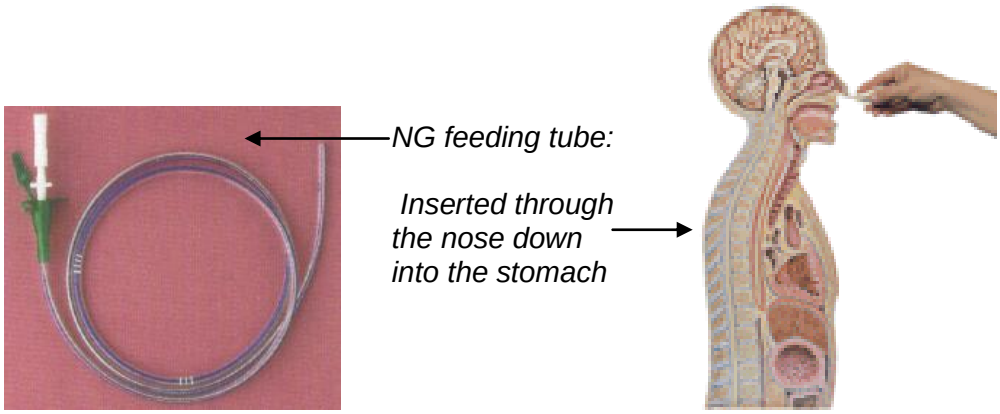
If the FOOD trial's advice is to be followed and NG feeding is to be initiated in the first 2-3 weeks post stroke (Dennis, Lewis & Warlow 2005a), then ensuring that the NG tube remains in place is important to optimise feeding. Inserting

and preventing removal and or dislodgement of NG feeding tubes in acutely ill stroke patients unable to co-operate and or with a reduced level of consciousness can be complicated (Smithard, 2002). There has been little formal research into how NG feeding can be optimised to ensure it is efficient and safe for stroke patients (Dennis et al. 2006), this therefore requires further investigation.

1.2.6 The Role of the Nurse in Implementing Naso-gastric Feeding for Stroke Patients

Nurses are regularly responsible for the insertion and management of NG feeding tubes. NG feeding tubes are commonly made of polyurethane or PVC, are radio-opaque to enable radiographic detection and stiffened with a metal guide wire (introducer) to aid insertion (Nutricia Clinical Care 2008; Merck 2007; Fresenius Kabi 2006). NG tubes are inserted up through the nostril into the nasal passage and then down through the oesophagus into the stomach to enable the delivery of liquid feed or medications bypassing the need for swallowing. When inserting an NG tube, the operator must ensure that the tube successfully passes down the oesophagus and into the stomach, not into the respiratory tract and consequently the lung. Passage into the respiratory tract may be indicated by excessive coughing and respiratory distress. Once the NG tube is inserted, its position in the stomach must be confirmed before NG feeding can commence safely (Dougherty & Lister 2008).

Figure 1: Naso-gastric feeding tube insertion



Nutricia Clinical Care (2008)

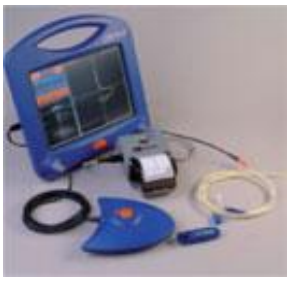
1.2.7 NG Tube Insertion in Stroke Patients

The placement and management of NG tubes in stroke patients may be complicated for a number of reasons (Dziewas, 2003). When inserting an NG tube in an acute dysphagic stroke patient, there is an increased risk of respiratory intubation without any obvious adverse response from the patient, such as excessive coughing or choking which can signify that the tube has passed into the respiratory tract (Griffiths et al. 2004). Other factors which can complicate NG tube insertion in stroke patients include patient positioning - patients may be lying flat and unable to support themselves. Commonly, stroke patients are unable to communicate effectively due to a reduced state of consciousness, aphasia (language disorder) and oral apraxia (impaired voluntary movement of the mouth) making co-operation with and comprehension of NG tube insertion difficult (Dziewas et al, 2003). Stroke patients may also manifest impaired co-operation and a reduced state of consciousness in addition to an unsafe swallow leading to inadequate airway protection (Smithard, 2002). Taking these factors into account, it is evident that the process of passing an NG tube on a stroke patient is associated with a level of clinical risk, specifically possible respiratory intubation, in which the patient may not present with obvious adverse responses, such as excessive coughing or choking.

Few alternative approaches to ensure accurate placement of NG feeding tubes in stroke patients have been offered. Dziewas et al. (2006) undertook a small study to evaluate the efficiency and tolerability of the reflex placement of NG tubes in stroke patients. This technique involves placing a thin catheter in one nostril with its tip in the oropharynx while beginning to insert the NG tube through the other nostril. The authors then induced the swallowing reflex of the patient using a small bolus injection of water through the catheter (0.5-2.0ml). At the onset of swallowing characterised by upward laryngeal movement, the NG tube was moved forward (Dziewas et al. 2006). From a selection of dysphagic stroke patients (n=16) in whom conventional tube insertion had failed, n=14 successfully received an NG feeding tube using the reflex placement. These findings support a previous study where positive results were found for this technique (Inoue et al. 2002). However neither study evaluates this technique on a large enough scale to guarantee its safety and

efficacy with stroke patients. Other NG tube insertion techniques include the use of electromagnetic transmitters (Rao et al. 2007; Phang, March & Prager, 2006). An example of this is illustrated in Figure 2.

Figure 2: CORTRAK electromagnetic transmitter



Tip of the feeding tube stylet is electromagnetic transmitter. A receiver unit is placed at the patient's xiphoid process and acquires the signal from the stylet as it moves through the patient during the placement procedure. The track of the tube is shown on the computer monitor (Merck 2007).

This equipment is not currently widely used with stroke patients. The manufacturers cite one study where it was tested on (n=25) ventilator supported critical care patients to evaluate small bowel placement of feeding tubes (Phang, March & Prager 2006). Although the study was small, results indicate high accuracy in feeding tube placement into the small bowel (n=24/25), all placements being confirmed with x-ray. This equipment has been questioned in terms of cost, as the NG feeding tubes require a magnetic tip to aid detection with the monitoring equipment. The manufacturers suggest that with the reduction in repeated tube placement and the need for x-ray confirmation, this technique should prove to be no more expensive (Merck 2007).

Guidelines for the insertion of NG feeding tubes are not specific enough for the needs of stroke patients. BAPEN, who are the leading UK group of Physicians, Nurses and Allied Health Professionals in clinical nutrition, produced a national protocol covering NG feeding tube insertion (Sizer et al. 1996). However the guideline does not refer to methods for passing tubes on patients without an intact swallow. The National Nutrition Nurses Group (NNNG) (2002), the leading UK group of Nutrition Nurse Specialist have approved protocols for NG feeding tube insertion. This guideline does state that patients without an intact swallow should not be offered a drink during tube insertion (which may be common practice to help assist the passage of the tube into the oesophagus). In addition the guideline states that if the patient is unconscious they should be placed on one side, however it does not cover what actions should be taken in the event

of tube malposition or the ease with which a tube can pass into the respiratory tract of a patient with an absent gag reflex (NNNG, 2004). Although nurses are regularly responsible for the initial placement of NG tubes, clinical guidelines on NG tube insertion, checking tube position and keeping tubes in place may not be sufficiently specific for the complex needs of the dysphagic stroke patient; this issue will be discussed further in Section 1.2.16.

1.2.8 Confirming NG Tube Position

Once the NG tube is in position, confirmation that the tube tip is lying in the stomach is the next challenge. Many methods have been used for determining NG feeding tube position, these include:

- X-ray – providing radiographic evidence that the tip of the tube is lying in the stomach (Colagiovanni 1999)
- Dipping the proximal end of the tube in water and observing for bubbles – if the tube has been placed in the respiratory tract, the bubbles will be seen at the same time as the patient exhales (Metheny, Hampton & Williams 1990; Colagiovanni 1999)
- Signs of gagging, coughing or respiratory distress – these may indicate respiratory placement (Boyes & Kruse 1992)
- Changes in speech – an NG tube placed in the respiratory tract could separate the vocal chords sufficiently to interfere with speech (Boyes & Kruse 1992)
- Visual inspection of gastric aspirate – a colour difference should be noted between respiratory, stomach and duodenal aspirate (Metheny et al. 1994a)
- Testing the pH of gastric aspirate – using pH indicator paper a pH of 4 or below indicates gastric aspirate, strongly suggesting that the NG tube is lying in the stomach (Neuman et al. 1995; Metheny et al. 1994b)
- Air auscultation – insufflating air through the NG tube and listening for gurgling sounds over the stomach with a stethoscope which should indicate that the tip of the tube is in the stomach (Metheny et al. 1998)
- Capanography – if the feeding tube is placed in the respiratory tract a characteristic exhaled carbon dioxide waveform will be revealed (Metheny & Meert 2004)

However, all these methods have limitations in practice, even x-ray which is regarded as the only accurate method for checking NG tube position (Metheny 1988; Metheny, Hampton & Williams 1990; Boyes and Kruse 1992; Pulling, 1992; Metheny & Meert 2004). Relying only on x-ray has disadvantages; they are not always practical or cost effective, carry the risk of exposure to radiation and can cause delays to the initiation of NG feeding (Metheny & Meert 2004; Metheny, Hampton & Williams 1990; Metheny et al. 1988). The most commonly used bedside technique is testing the pH of gastric aspirate; this method is cited as being the only acceptable bedside test by the National Patient Safety Agency (NPSA) (2005a). However this test has its drawbacks, research has suggested that if a pH of 4 or below is obtained using pH strips then this indicates gastric placement (Neuman et al. 1995). NPSA guidance (2005a) has recently updated this guidance to suggest that it is safe to feed at a pH of 5.5 or below as there are no known reports of pulmonary aspirates at or below this figure. This value may rise due to the use of acid inhibiting drugs, age and reflux of intestinal contents into the stomach (Metheny et al. 1994b). Furthermore, it should be noted that aspirating gastric fluid up a fine bore NG feeding tube can be difficult (NNNG 2004).

Much of the evidence cited to support confirmation of NG feeding tube position through visual inspection and pH measurement of gastric aspirate; air auscultation and x-ray have been informed by a body of work written by Professor Norma Metheny whose work spans early 1980s to the present (Metheny et al. 2005; Metheny & Meert 2004; Metheny, 1988). However, Metheny herself, in a recent review stated that there is no sure non-radiographic method for differentiating between respiratory, oesophageal, gastric and small bowel placement of small bore feeding tubes (Metheny & Meert 2004). Further specialists in the field of clinical nutrition have also suggested that the research informing confirmation of NG feeding tube position has not been properly evaluated (NNNG 2004).

The NPSA guidance (2005a) on confirming NG feeding tube position, states that the whoosh test or air auscultation should no longer be used in clinical practice. This guidance has been based on a number of clinical case reports which describe how the whoosh test failed to detect mal-positioned NG tubes

(Hendry et al. 1986). However, despite numerous anecdotal reports of the ineffectiveness of the whoosh test, there are no existing studies adequately testing its' effectiveness (Mahoney, Rowat & Dennis 2005; Metheny & Meert 2004). Furthermore, some of the referenced case reports within the NPSA Guideline (2005a) which highlights errors that have occurred due to misinterpretation of the whoosh test, report situations where it was used as the sole confirmatory bedside test of NG feeding tube position on critically ill patients (Rassias, Ball & Corwin 1998; Hendry et al. 1986). However, it has long been advised in clinical practice that the whoosh test is not adequate as a sole determinant of NG feeding tube position. Due to concerns about the quality of the existing research addressing confirmation of NG feeding tube position, the NPSA have commissioned further research to assess the accuracy of existing methods (NPSA 2005a).

1.2.9 Education and Training in NG Feeding

Since Fitness for Practice was published in 1999 by the United Kingdom Central Council for Nursing and Midwifery (UKCC) (now the NMC), it was recognised that there were shortfalls in training which were hindering newly qualified nurses from achieving an adequate level of practice at the point of registration; this included training in the area of clinical skills. Developments to overcome these deficits include simulation within skills laboratory settings for pre-registration nurses and competency based training (Longley, Shaw & Dolan 2007).

Since starting the current research in November 2004, the Nursing Midwifery Council (NMC) has introduced Essential Skills Clusters for Pre-registration Nursing Programmes (NMC 2007). These clusters were implemented into the pre-registration curriculum by Higher Education Institutions (HEI) in the United Kingdom in September 2008. The aim of the Essential Skills Clusters (NMC 2007) is to ensure that newly qualified nurses are capable of safe and effective practice at the point of registration as a qualified nurse.

The Essential Skills Clusters have been designed to complement the NMC Pre-registration Proficiencies (NMC 2004a) and to be used in conjunction with the NMC Code of Professional Conduct (2008). The Essential Skills Clusters

highlight nutrition as a specific skill within the cluster of Nutrition and Fluid Management. Pre-registration nurses must have achieved specific proficiencies in nutrition before progressing beyond foundation studies and before being accepted onto the nursing register (NMC 2007). The following statement from the Essential Skills Clusters (NMC 2007) addresses provision of nutrition for patients who are unable to take food orally.

Table 1: Essential Skills Clusters for Pre-registration Nursing Programmes (NMC 2007) pg. 23

Patients and clients can trust a newly qualified nurse to:	**For entry into branch**	**For entry onto the register**
31 Ensure that those unable to take food by mouth receive adequate nutrition.	i. Recognises, responds appropriately and reports patients who have difficulty eating and / or swallowing ii. Adheres to a plan of care that provides adequate nutrition and hydration when eating or swallowing is difficult Standard: 6a, b, c, d, 7a, b, Code: 1.2, 2.1, 4.2	iii. Takes action to ensure that, where there are problems with eating and swallowing, nutritional status is not compromised **iv. Where relevant to Branch, administers enteral feeds safely and maintains equipment in accordance with local policy (*)** **v. Where relevant to Branch safely inserts, maintains and uses naso-gastric, PEG and other feeding devices** Standard: A6, B1, 4, 5, H1, 2, 3, 4, K1, 2, 3, 4, L1, O2. Code: 1.4, 6.1, 6.2, 8.1,

This section of the NMC (2007) Essential Skills Clusters addresses nutrition and hydration skills (including managing enteral feeding equipment and specifically inserting an NG tube and maintaining NG feeding). It states that the newly qualified nurse should be able to insert an NG feeding tube, maintain NG feeding and manage enteral feeding equipment before entry onto the register, if appropriate to their branch of nursing. As patients requiring NG feeding may present within any speciality of nursing, it could be suggested that all nurses should receive training in NG feeding prior to registration.

Nurse training in insertion and maintenance of NG feeding tubes focuses upon patients who are conscious, able to sit upright and have intact swallow reflex; training is not specific to the complex needs of the stroke patient. This is reflected in many training manuals, such as The Royal Marsden Hospital Manual of Clinical Nursing Procedures (Dougherty & Lister 2008) and other training guides as shown on the following websites:

http://www.qub.ac.uk/cskills/Nasogastric/Nasogastrictube_insertion.htm (Queens University Belfast 2008) [accessed 18th November 2008], http://intermed.med.uottawa.ca/procedures/ng/ (University of Ottawa 2003) [accessed 18th November 2008], http://www.merckge.co.uk/support_01.html (Merck 2007) [accessed 18th November 2008]. None of these materials mention any potential complications which may be encountered when attempting NG feeding tube insertion on stroke patients. If, as advocated by the FOOD Trial (Dennis, Lewis & Warlow. 2005b) early NG feeding is to be achieved, then nurses need to feel confident and competent to insert NG tubes.

1.2.10 Maintaining NG Feeding for Stroke Patients

The FOOD Trial (Dennis, Lewis & Warlow. 2005a; Dennis Lewis & Warlow 2005b) reported that stroke patients pull NG tubes out; the number of NG tubes inserted per patient ranged from 1-18 and the average time that each NG tube remained in place was between 0.03-56 days (Dennis et al. 2006). To combat the problem of dislodgement some clinical areas use preventative methods. These include taping the tube to the face and/or nose, hand mittens and the nasal bridle or loop systems where tubes may be sutured or tied in place. Many health professionals question the ethical proprietary of such practices (Horsburgh, 2004). The FOOD Trial surveyed 121 UK centres and 21 non-UK centres: 16 (14%) of UK centres and 11 (55%) of non-UK centres reported using mittens or bandages on hands, 11 (9%) of UK centres reported taping tubes to the face; 7 (6%) in the UK reported tying or suturing the NG tubes in place (Dennis et al. 2006). Although there is clearly a practical argument for the employment of such methods, it is possible that preventative interventions of this kind may be deemed a form of physical restraint. Restraint is defined in the Oxford English Dictionary (2002, p.1044) as *"a device which limits or prevents freedom of movement"*. Both hand mittens and the nasal bridle restrict the patient's *freedom* to remove their NG tube and would, arguably, meet this definition of physical restraint. Physical restraint in health and social care is controversial, both legally and morally and should only be used in the best interests of the patient (RCN 2008b; Horsburgh 2004).

1.2.10.1 Tape

Taping an NG feeding tube to the face commonly involves using a piece of adhesive tape wrapped around the NG feeding tube and affixed to the patient's nose.

Figure 3: Example of Taping

(Dale Medical Products 2008)

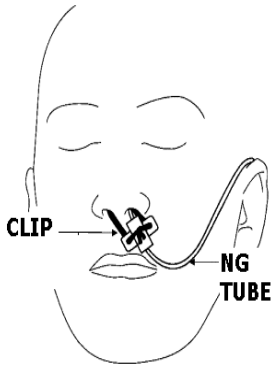
Variations around the taping technique include fixing tape to the nose and cheek, to the cheek only. Various types of taping materials can be used for securing NG feeding tubes including surgical tapes, bioclusive tapes and NG feeding tube fixation plasters or adhesive devices. However the type of tape used and optimal methods for attaching naso-enteral tubes to the face have not been widely evaluated. Burns et al. (1995) carried out a comparison of naso-enteral tube securing methods in a medical intensive care unit; they compared a tube attachment device or plaster, a pink plastic adhesive tape and a bioclusive clear tape randomly allocated to a convenience sample of 103 patients. This study showed significant differences in the length of time tape remained in place, the pink plastic adhesive tape being the most successful. However sample sizes per tape type (n=30) were small and differences between tapes were not evaluated when the reason for tube dislodgement was self-extubation; in addition the effects of patient sedation, alertness, confusion, mobility and use of restraints were not adequately reported although the authors commented that they were not significantly related to displacement.

1.2.10.2 Nasal Bridle

Nasal bridle or loop systems are now more commonly used than suturing NG tubes through the nasal septum. Since commencing this research study, it has been noted through attendance at professional conferences, in discussion with

other specialists in the field and from recent developments in research (Beavan et al. 2007) that using the nasal bridle with stroke patients is becoming more common in clinical practice. The principles of the nasal bridle are illustrated in Figure 4.

Figure 4: The Nasal Bridle



Nasal Bridle/Loop – a piece of tape is passed behind the nasal septum and forms a loop from one nostril to another; a clip secures the tape to the nasogastric tube

One of the most popular nasal bridles in the UK is the AMT Bridle (Applied Medical Technology, Inc. 2008). Evidence (quoted by the manufacturers) supporting the use of this intervention has been informed by a selection of small scale studies (Anderson et al. 2004; Popovich 2001; Popovich, Lockrem & Zivot 1996). One of these studies involves using the nasal bridle on stroke patients (Anderson et al. 2004) and is discussed in more detail in chapter 2. The remaining two studies involved small numbers of patients, 8 post operative ICU patients, 7 patients awaiting surgery (Popovich 2001) and 26 critically ill surgical patients (Popovich, Lockrem & Zivot 1996). None of these studies adequately evaluated the effectiveness or safety of the nasal bridle.

1.2.10.3 Hand Mittens

Evidence from the FOOD Trial (Dennis et al. 2006) has suggested that outside the UK hand mittens are more frequently used as a means for preventing NG feeding tube removal. However, I was aware that these interventions were being used with stroke patients within the Health Board where part of the current study was undertaken. Hand mittens may come in a variety of forms and under a variety of names and are classed as a 'limb restraining product' (Posey Company 2008; Posey Company 2007). The predominant purpose of hand mittens is to prevent patients from dislodging or removing such medical interventions as intravenous lines and tubes.

Figure 5: Hand Mittens

"Finger Control Mitts. Helps lessen contractures and prevent patient from picking, scratching or interfering with IV or catheter. Adult size; fits either hand. Mesh with padded palm and closed end".

(Posey Company 2008)

Few studies have focused on the effectiveness of hand mittens. This issue is discussed further in chapter 2.

1.2.10.4 Inserting NG Feeding Tubes on the Stroke-affected Side

This technique involves placing the NG feeding tube on the 'paretic', stroke affected side, of the stroke patient where it is common for them to experience reduced sensation and a level of blindness, referred to as 'hemianopsia' (Hickey 2003). This process aims to minimise the irritation associated with insertion and potentially reduce the patients' awareness of the tube reducing the likelihood that attempt to remove or dislodge the tube. Although this technique may be used in clinical practice, its' efficacy and the frequency of use has not been widely appraised within published literature (Horsburgh et al. 2008).

1.2.11 Using Restraint in Stroke Care

Similarly, the use of physical restraining measures to prevent NG tube dislodgement is not well documented in stroke care. The use of hand mittens with stroke patients is more commonly associated with constraint therapy (Page et al. 2008; Wolfe 2007; Taub et al. 2006; Wolfe et al. 2006; Page et al. 2002). Constraint induced movement therapy with stroke patients may involve placing a device such as a hand mitten on the unaffected stroke limb, thereby limiting the use of that limb with the aim of improving movement and use of the more affected upper extremity after stroke (Taub et al. 2006).

The use of restraint measures to prevent the dislodgement of invasive equipment such as intravenous lines and feeding tubes is more widely

documented outside the speciality of stroke, particularly within critical care, dementia care and care of the older person (Chuang & Huang 2007; Cheung & Yam 2005; Mott, Poole & Kenrick 2005; Bray et al. 2004; de Roza 2004; Hammers, Gulpers & Strik 2004; Ina 2002; Martin 2002; Finucane, Christmas & Travis 1999; Fletcher 1996; Reigle 1996; Strumpf & Evans 1988). The use of restraint measures is a subject of considerable ongoing ethical debate (RCN 2008b; Horsburgh 2004; Joanna Briggs Institute (JBI) 2002a; JBI 2002b; Evans et al. 2002).

Current thinking regarding the use of restraint suggests that use should be minimised at all costs and governed by strict guidelines and protocols (RCN 2008b; JBI 2002a; JBI 2002b). In the light of growing concern about the use of restraints in healthcare settings, the JBI commissioned a systematic review of evidence pertaining to physical restraint in acute and residential healthcare settings (Evans et al. 2002). Based on this, 'Best Practice Statements' have been produced (JBI 2002a; JBI 2002b) and the Royal College of Nursing (RCN) recently issued guidance for nurses addressing this practice (RCN 2008b).

Evidence suggests that in acute hospital settings, patients most likely to require restraint include older dependent patients and those admitted from residential care settings with a psychiatric diagnosis or cognitive impairment. Frequently cited reasons for restraint included; to help achieve staff and hospital goals, facilitate medical treatment, prevent wandering, provide physical support and manage agitation and aggression (Evans et al. 2002). Evans et al. (2002) also evaluated studies concerning incidence of injury associated with physical restraint and the patient and relative perception of restraint. Evidence indicated that in acute care settings, restrained patients were more likely to fall, acquire nosocomial infection, have an increase length of stay, were less likely to be discharged and more likely to die while in hospital than those who were not restrained. In addition, the evaluation of a small number of studies indicated the patient's experience of being restrained was a negative one characterised by physical discomfort, feeling demeaned and a restriction of freedom. Family members of restrained patients described the restraint of their family member as a source of anger, guilt and hopelessness for their relative's recovery, as

well as frustration and confusion regarding the justification and appropriateness of this practice.

Findings from this review have influenced a call for a reduction in the use of physical restraint; however evidence evaluating restraint minimisation programmes is scarce (Evans et al. 2002; Evans, Wood & Lambert 2002). From limited evidence, staff education has been identified as an important factor in reducing the use of physical restraint (Evans, Wood & Lambert 2002). Furthermore if restraint is necessary, the organisation (for example NHS) has a responsibility to ensure that the following resources listed in Table 2 are available.

Table 2: Adapted from: What Support Should Employers Provide? "Let's talk about restraint" – rights risks and responsibilities (RCN 2008b)

❖ A policy or guidance for staff on the use of restraint
❖ A multidisciplinary approach to individual care
❖ A system for reporting incidents (harm or potential harm to clients and staff) and learning from incidents
❖ Clear channels for raising concerns about possible abuse of restraints
❖ Access to individual advocates for clients
❖ Risk assessment procedures; so risks can be anticipated or reduced
❖ Appropriate education, including clinical supervision, reflective practice, learning from best practice and competency based training
❖ Regular audit related to restraint
❖ Dementia care training for all staff in all services
❖ Nursing students and healthcare workers should not be put in the position of making decisions about applying restraint
❖ Nurses are not pressured to comply with a request for restraint from a client's relative when it is not in the client's best interest

1.2.12 Issues for Registered Nurses when Applying Restraint

Registered nursing staff work within a professional Code of Conduct (NMC 2008) governing standards of conduct, performance and ethics. Registered nurses are personally accountable for their actions and omissions within their professional practice and must always be able to justify their decisions (NMC 2008). Failure to comply with the NMC Code of Conduct may endanger registration.

When evaluating the Code of Conduct (NMC 2008) in light of the decision to apply restraint to a stroke patient, many aspects of the code must be considered, for example, treat people as individuals, managing risk and act if you believe you or a colleague may be putting someone at risk (NMC 2008). Further to this, it is the nurse's responsibility to ensure that consent is gained before any treatment is started. The Code lays out the following standards for gaining consent (Table 3)**:**

Table 3: Adapted from NMC Code of Conduct (2008): Ensure you gain consent.

❖ You must ensure that you gain consent before you begin any treatment or care
❖ You must respect and support people's rights to accept or decline treatment or care
❖ You must uphold people's rights to be fully involved in decisions about their care
❖ **You must be aware of the legislation regarding mental capacity, ensuring that people who lack capacity remain at the centre of decision making and are fully safeguarded**
❖ You must be able to demonstrate that you have acted in someone's best interests if you have provided care in an emergency

The nurse has individual responsibilities which must be addressed when applying restraint to any patient. The RCN (2008b) recommend that with the help of employers, colleagues and managers, nursing staff should ensure that they understand what restraint is, provide person-centred care which minimises the need for it, understand the legal framework and ethical boundaries relevant to restraint, know what to do if they suspect inappropriate use or abuse of this practice, understand circumstances where restraint may be legally or ethically required and know how to minimise any associated risk when used.

1.2.13 Ethical Implications of Restraint

The decision to use any form of restraint with an incapacitated adult is something that must only be considered in light of both legal and ethical implications, its use should be minimised and if at all possible avoided (RCN, 2008b; Joanna Briggs Institute, 2002(a); Joanna Briggs Institute, 2002(b); Evans et al, 2002). Medical ethics operates within an established framework of values that revolve around a set of four principles used to debate the rightness or wrongness of an action (Mason & Laurie 2006). These four principles are; (i) the principle of respect for individual autonomy (respect an individuals 'right' to

choose), (ii) the principle of beneficence (to do good where possible), (iii) the principle of non-maleficence (to avoid doing harm to others) and (iv) the principle of justice (people should be treated fairly); this approach to moral reasoning within medical decision making is sometimes referred to as '*principilism'* (Mason & Laurie 2006; Bauchamp & Childress 2001).

Within the context of this study, moral reasoning and ethical values must be applied to the decision to apply such interventions as hand mittens or indeed a nasal bridle into the nose. For the incapacitated adult it is accepted that the healthcare professional must make decisions for the patient in face of potential incapacity, which challenges the principle of respect for individual autonomy, however if a patient is unable to decide for themselves then the aim is that decisions are made in their best interests, therefore the moral intention is to do good (Mason & Laurie 2006; Stauch, Wheat & Tingle 2002). This model of medical intervention is referred to as paternalism. Paternalism is defined as:

> *"The policy of restricting the freedom and responsibilities of subordinates or dependents in their supposed best interest" (Oxford English Dictionary 2002; p.1227.)*

Within a medical context, the paternalist acts for the benefit of the patient, or in their best interests, without the specific consent of the patient for whom he acts (Mason & Laurie, 2006).

1.2.14 Legal Implications of Restraint

Laws covering the use of restraint come from both criminal and civil law and various Acts of Parliament applicable to each country within the UK. These include Offences Against the Person Act (1861), Mental Capacity Act (2005), Adults with Incapacity (Scotland) Act (2000) and the Human Rights Act (1998). When considering the context of using restraint to maintain NG tube position for a stroke patient, the nurse should specifically be aware of the legal implications of restraining an incapacitated adult, as many stroke patients in the initial stages after acute stroke may have a level of incapacity.

Under civil law, if a nurse restrains a patient without a sound legal or professional basis, the client or patient may bring a claim against the nurse in negligence for harm suffered. Harm may constitute any physical or psychological effects that the patient considers may have been caused as a result of being restrained. The use of any restraint should be reasonably anticipated and fully recorded in any clinical records (RCN 2008b). Under criminal law, restraining a patient without their consent may be seen as a criminal activity (RCN 2008b). Whenever restraint is used clear justification must be given in accordance with accepted professional standards. Restraining a potentially incapacitated adult adds further complication to the issue of gaining consent to treatment.

1.2.15 Incapacitated Patients

Before examining more closely how the use of restraint relates to an incapacitated patient, it is important to consider what constitutes incapacity and how this might be applied to the case of the stroke patient. The Mental Capacity Act (2005) covers England and Wales, and defines incapacity as follows:

> *"For the purposes of this Act, a person lacks capacity in relation to a matter if at the material time he is unable to make a decision for himself in relation to the matter because of an impairment of, or a disturbance in the functioning of, the mind or brain". (Mental Capacity Act 2005 (c. 9); part 1, pg.2)*

The Adults with Incapacity (Scotland) Act (2000) defines incapacity as follows:

> *For the purposes of this Act, and unless the context otherwise requires—*
> *"adult" means a person who has attained the age of 16 years;*
> *"incapable" means incapable of—*
> *(a) acting; or*
> *(b) making decisions; or*
> *(c) communicating decisions; or*
> *(d) understanding decisions; or*
> *(e) retaining the memory of decisions*
> *(Adults with Incapacity (Scotland) Act 2000 (asp. 4); part 1, pg.2)*

Both Acts go further to emphasise that incapacity does not include those who are unable to communicate where the lack of communication can be made good by any other means, be that sign language or clear explanation which

takes into account an individual's potential deficiencies in understanding (Mental Capacity Act 2005; Adults with Incapacity (Scotland) Act 2000). These definitions can apply to many stroke patients, especially in the acute stages after stroke. Therefore medical staff have an important role to play in ensuring that before any treatment is undertaken, levels of capacity have been ascertained. Furthermore, stroke patients should be enabled to give informed consent if at all possible by the most appropriate means determined by their levels of communication.

Any intervention made in the care of an incapacitated adult (for example, NG tube insertion or the application of hand mittens or a nasal bridle) must be deemed to be in their 'best interests'. In the general principles of the Adults with Incapacity (Scotland) Act (2000), it states that:

> *"There shall be no intervention in the affairs of an adult unless the person responsible for authorising or affecting the intervention is satisfied that the intervention will benefit the adult and that such benefit cannot reasonably be achieved without the intervention". (Part 1, section 1, subsection 1, pg. 2 General principles and fundamental definitions: Adults with Incapacity (Scotland) Act 2000 (asp. 4))*

This Act goes further to state:

> *"Where it is determined that an intervention as mentioned in subsection (1) is to be made, such intervention shall be the least restrictive option in relation to the freedom of the adult, consistent with the purpose of the intervention".*
> *(Part 1, section 1, subsection 2, pg. 2 General principles and fundamental definitions: Adults with Incapacity (Scotland) Act 2000 (asp. 4))*

The Mental Capacity Act (2005) similarly advises that a person's liberty must not be compromised through restrictive measures unless those measures are in the person's best interests. However it does give more specific guidance regarding the use of restraint in 'life sustaining treatment'; this Act states that restrictive measures may be applied when:

> *"…..providing life-sustaining treatment, or*
> *(b) doing any act which he reasonably believes to be necessary to prevent a serious deterioration in P's condition,*
> *while a decision as respects any relevant issue is sought from the court".*
> *(Mental Capacity Act 2005 (c. 9); part 6; section 5; point 7)*

The purpose of any methods used to maintain NG tube position is to restrict the stroke patient from either willingly or inadvertently removing or dislodging the NG tube. Therefore methods used must be in the best interests of the stroke patient, the clinician or person providing treatment must be satisfied that it is beneficial and that treatment would not be possible using any other potentially less restrictive measures.

1.2.16 Guidelines and Protocols in NG Feeding and Stroke

The FOOD trial carried out a survey of feeding practices to assess clinicians' current views about feeding stroke patients within the UK in 2003 (Dennis et al. 2006). Part of this postal questionnaire aimed to establish what feeding protocols were being followed by clinicians (Stroke Physicians, Geriatricians and Neurologists). The mailing list was compiled from FOOD Trial collaborators database and membership of the British Association of Stroke Physicians and a list of stroke units provided by the Stroke Association. A total of 218 UK clinicians were surveyed, however, the authors do not state how representative this sample was of stroke services within the UK. Part of the questionnaire asked whether clinicians had written protocols in place within their unit, from a total of 117/218 (54%) responses, the following protocols were reported:

Table 4: Survey of Feeding Practices in the UK (Dennis et al. 2006)

Protocols	
Swallowing assessment	n=104/117 (89%)
Dietary assessment	n=69/117 (59%)
Initiating tube feeding	n=48/117 (41%)
PEG feeding	n=50/117 (43%)

This questionnaire did not ascertain whether clinicians had a written policy for NG feeding and it is not clear from this research whether written policies that were reported for initiating tube feeding and PEG feeding were specific to stroke patients. However these results do indicate that the use of written policies to guide enteral feeding for stroke patients was not adequate.

Evidence based nutrition support guidelines in stroke have been shown to make a positive difference to the outcomes of stroke patients (Perry & McLaren

2003a; Perry & McLaren 2003b). These studies also included staff education as an important part of guideline development and dissemination. National evidence based guidelines currently exist specific to the management of dysphagic stroke patients, these include; Diagnosis and Initial Management of Stroke and Transient Ischaemic Attack (NICE 2008), Management of Patients with Stroke: identification and management of dysphagia (SIGN 2004), and the National Clinical Guidelines for Stroke (RCP 2004). Both SIGN (2004) and RCP (2004) guidelines offer specific advice on the management of dysphagia in relation to nutrition; both these guidelines do advise that each clinical centre should possess guidelines applicable to their locality. The SIGN (2004) guideline states that patients who are unable to take food orally should be considered for initial NG feeding as soon as possible, the RCP (2004) guideline refers only to the appropriate use of enteral feeding tubes. This difference reflects a level of ambiguity which is evident from the reviewed research. However evidence from a postal questionnaire carried out within the FOOD Trial suggests that 46% (54/117) of the stroke centres who responded would attempt NG feeding before inserting a PEG tube, although it is not clear what percentage of stroke centres in the UK this represented (Dennis et al. 2006).

Guidelines specifically addressing the insertion and maintenance of NG feeding tubes for stroke patients do not currently exist. National guidelines produced by National Institute of Clinical Evidence (NICE) (2006) do however state that:

> *"People requiring enteral tube feeding should have their tube inserted by healthcare professionals with the relevant skills and training...*
>
> *…The position of all naso-gastric tubes should be confirmed after placement and before each use by aspiration and pH graded paper (with X-ray if necessary) as per the advice from the National Patient Safety Agency (NPSA 2005a). Local protocols should address the clinical criteria that permit enteral tube feeding. These criteria include how to proceed when the ability to make repeat checks of the tube position is limited by the inability to aspirate the tube, or the checking of pH is invalid because of gastric acid suppression". (Nutrition Support for Adults, Oral Nutrition Support, Enteral Feeding and Parenteral Nutrition NICE 2006 p.32).*

The need for local guidelines and protocols is stressed, as is adherence to the NPSA (2005a) guidance on determining NG feeding tube position.

Furthermore, this guidance outlines the need for healthcare professionals with the relevant skills and training to insert NG tubes.

1.2.17 Conclusions from the Background Literature

Malnutrition in the healthcare setting continues to be a problem especially for vulnerable patients such as stroke patients. Research shows that stroke patients are at risk of malnutrition both post acute stroke and during rehabilitation. There are many complications associated with stroke that may impact on nutritional status, in particular dysphagia (difficulty swallowing) which directly impacts on the ability to take food. Stroke patients should undergo both nutritional and dysphagia screening to determine the most appropriate route for nutritional support. NG feeding has been shown to be more beneficial in the early phases after acute stroke for dysphagic patients, this being informed by evidence from the FOOD Trials (Dennis, Lewis & Warlow 2005a). However problems exist in achieving optimal NG feeding for stroke patients. Complications include successful NG insertion, determining and maintaining NG tube position. There are no adequately tested interventions or methods for ensuring safe and effective NG insertion, tube confirmation or tube maintenance for stroke patients; some methods currently used for securing or maintaining NG tube position are controversial. Evidence as presented and discussed within this literature review illustrates that further research is required to evaluate current practice and highlights areas that require improvement and ongoing evaluation.

1.3 Summary

This chapter has introduced the rationale for doing this study and the background for it. This has included information on malnutrition in the healthcare setting and how this impacts on the care of stroke patients, it then goes on to the role of the nurse in implementing NG feeding. This includes information about the levels of education and training required for nurses to carry out this skill. Information concerning the maintenance and securing of NG tubes is discussed followed by the ethical implications of applying restraint to

incapacitated patients. The chapter concludes with a discussion of the current guidelines and protocols for NG feeding.

2 A Systematic Review of Stroke Specific Evidence about Maintaining Effective Naso-gastric (NG) Feeding for Stroke Patients

2.1 Introduction

Having carried out a general review of literature, it became apparent that there were specific problems related to NG feeding. This chapter presents a systematic review of literature concerning the effective maintenance of NG feeding. This chapter's pattern informed by the Cochrane Handbook for Systematic Reviews of Interventions (2005) include, inclusion and exclusion criteria, a search strategy, methodological quality, criteria for critical review, the results and the discussion arising from these leading to the conclusions. This review addressed the following questions:

1. What methods are available for securing NG tubes and preventing removal and or dislodgement of tubes in stroke patients?
2. How effective are these methods?

2.2 Inclusion Criteria

This review identifies published prospective and retrospective observational studies in English language literature evaluating methods available for keeping NG tubes in place for dysphagic stroke patients from 1980-2006. Studies included adults of any age or sex with ischaemic or haemorrhagic stroke and stroke associated swallowing problems (dypshagia), requiring NG or naso-duodenal feeding for nutrition, hydration and/or medication. Studies that included some nasogastrically fed dysphagic patients amongst patients with other medical conditions were eligible. Studies in stroke patients fed by other artificial or oral routes that include NG or naso-duodenal feeding were eligible. Studies included patients in the acute phase of stroke (within 7 days of stroke onset), sub acute phase (between 8 and 14 days of stroke onset) and the chronic phase (15 or more days after stroke onset).

2.3 Exclusion Criteria

This review excludes all non-human, non-English language, non-primary research, single case studies and studies carried out before 1980. Studies in patients with subarachnoid haemorrhage (SAH) or transient ischaemic attack (TIA) or dysphagia due to other medical conditions were excluded. Studies in stroke patients fed via other enteral routes such as oral feeding or percutaneous endoscopic gastrostomy (PEG); or via parenteral nutrition (PN) were excluded.

2.4 Search Strategy

The systematic search strategy was developed after discussion with Cochrane search experts and modified for each relevant electronic database. Search strategies were developed to find articles specifically related to NG feeding and dysphagic stroke patients; search strategies used for MEDLINE, CINAHL and EMBASE can be seen in Figures 6-8. The following search methods were used:

1. Electronic searches of MEDLINE (1980-2006), CINAHL (1980-2006) and EMBASE (1980-2006)
2. Hand search of a relevant journal – Journal of Parenteral and Enteral Nutrition (1995-2006)
3. Conference proceedings relevant to stroke and nutrition – Proceedings of the Nutrition Society (1995-2006)
4. Reference lists from relevant studies and reviews
5. Personal contact with other research workers in this field

Figure 6: MEDLINE search strategy

1. intubation, gastrointestinal/
2. enteral nutrition/
3. formulated food/
4. ((gastrointestinal or nose or nasal or naso-gastric or nasoenteral or intestinal or intraintestinal feed$) adj10 (intubat$ or tube$ or nutrition$)).tw.
5. ((enteral or enteric or tube$ or force$) adj5 (feed$ or nutrit$)).tw.
6. (formulated adj (food$ or feed$)).tw.
7. Nutritional Support/
8. or/1-7
9. cerebrovascular disorders/ or exp basal ganglia cerebrovascular disease/ or exp brain ischemia/ or exp carotid artery disease/ or exp "intracranial embolism and thrombosis"/ or exp intracranial hemorrhages/ or exp vasospasm, intracranial/

10. (stroke or apoplexy or cerebral vascular or cva).tw.
11. ((brain or cerebr$ or cerebell$) adj5 (ischaemi$ or infarct$ or thrombo$ or emboli$)).tw.
12. ((brain or cerebral or intracranial or subarachnoid) adj5 (hemorrhage or haemorrhage or hematoma or haematoma or aneurysm or bleed$)).tw.
13. hemiplegia/ or exp paresis/ or brain injuries/ or brain injuries, chronic/ or deglutition disorders/ or (swallowing disorder$ or deglutition disorder$).tw.
14. (hemipleg$ or hemipar$ or paresis or paretic or dysphag$ or swallowing dis$ or deglutition dis$ or (swallowing disorder$ or deglutition disorder$)).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
15. 9 or 10 or 11 or 12 or 13 or 14
16. 8 and 15

Total number of studies for feeding = 30599
Total number of studies for stroke = 231262
Total number of studies for feeding and stroke = 1144

Figure 7: EMBASE search strategy

1. artificial feeding/ or enteric feeding/ or nose feeding/ or tube feeding/
2. exp digestive tract intubation/
3. elemental diet/
4. ((gastrointestinal or nose or nasal or naso-gastric or naso gastric or naso-gastric or nasoenteral or intestinal or intraintestinal or intragastric) adj10 (feed$ or intubat$ or tube$ or nutrition$)).tw.
5. ((enteral or enteric or tube$ or force$) adj5 (feed$ or nutrit$)).tw.
6. (formulated adj (food$ or feed$)).tw.
7. nutritional support/
8. or/1-7
9. cerebrovascular disease/ or basal ganglion hemorrhage/ or cerebral artery disease/ or cerebrovascular accident/ or stroke/ or exp carotid artery disease/ or exp brain hemorrhage/ or exp brain infarction/ or exp brain ischemia/ or exp intracranial aneurysm/ or exp occlusive cerebrovascular disease/
10. (stroke or apoplexy or cerebral vascular or cva).tw.
11. ((brain or cerebr$ or cerebell$) adj5 (ischaemi$ or infarct$ or thrombo$ or emboli$)).tw.
12. ((brain or cerebral or intracranial or subarachnoid) adj5 (hemorrhage or haemorrhage or hematoma or haematoma or aneurysm or bleed$)).tw.
13. hemiplegia/ or hemiparesis/ or paresis/ or dysphagia/
14. (hemipleg$ or hemipar$ or paresis or paretic or dysphag$ or swallowing dis$ or deglutition dis$).tw.
15. or/9-14
16. 8 and 15

Figure 8: CINAHL search strategy

1. enteral nutrition/ or enteral feeding pumps/ or exp feeding tubes/
2. intubation, gastrointestinal/
3. food, formulated/
4. ((gastrointestinal or nose or nasal or naso-gastric or naso gastric or naso-gastric or nasoenteral or intestinal or intraintestinal or intragastric) adj10 (feed$ or intubat$ or tube$ or nutrition$)).tw.
5. ((enteral or enteric or tube$ or force$) adj5 (feed$ or nutrit$)).tw.
6. (formulated adj (food$ or feed$)).tw.
7. nutritional support/
8. or/1-7
9. cerebrovascular disorders/ or exp carotid artery diseases/ or cerebral aneurysm/ or "cerebral embolism and thrombosis"/ or exp cerebral ischemia/ or cerebral vascular accident/ or cerebral vasospasm/ or exp intracranial hemorrhage/ or vertebral artery dissections/
10. stroke patients/ or (stroke or apoplexy or cerebral vascular or cva).tw.
11. ((brain or cerebr$ or cerebell$) adj5 (ischaemi$ or infarct$ or thrombo$ or emboli$)).tw.
12. ((brain or cerebral or intracranial or subarachnoid) adj5 (hemorrhage or haemorrhage or hematoma or haematoma or aneurysm or bleed$)).tw.
13. hemiplegia/ or deglutition disorders/ or brain damage, chronic/
14. (hemipleg$ or hemipar$ or paresis or paretic or dysphag$ or swallowing dis$ or deglutition dis$).tw.
15. or/9-14
16. 8 and 15

2.5 Methodological Quality and Critical Review

To determine whether a study is appropriate to be included in a review, it is vital to determine how closely it matches the inclusion criteria and then assess its methodological quality (Webb & Roe 2007). It has been noted that there are several available tools to assess quality. However these instruments can give widely divergent results (Juni et al. 1999). These authors go on to point out that it may be better if the reviewer decides on the key quality aspects which are specifically related to the topic in question. These chosen aspects are then used to describe the selected studies (Juni et al. 1999). Deeks et al. (2003) noted in their systematic review, that instruments for assessing the quality of non-randomised trials have also been developed and they identified that some of these were particularly pertinent for use in systematic reviews.

In this particular instance, once the titles and abstracts of all the studies identified were reviewed, those which met the inclusion criteria were read in full. A proforma for assessing the quality of the selected studies was drawn up,

based on criteria suggested by JBI (2000) and Webb & Roe (2007). After using this for some time, it became clear that the criteria were too broad to be helpful and so the proforma was amended, see Appendix 9. Details of methodological quality for each study collected were as follows:

1. Age
2. Inclusion of control group
3. Study design
4. Inclusion and exclusion criteria
5. Data analysis and statistical tests used
6. Outcome measures stated
7. Co-interventions that may confound the results
8. Type and severity of stroke
9. Latency from stroke onset to study day (NG insertion)
10. Reason for NG tube insertion
11. Type and size of NG tube used
12. Description of intervention(s) or methods used for securing NG tubes

Having completed the general methodological review it was necessary to address the specific quality of each study as relevant to the topic of interest (NG feeding in stroke). Since there were no standard criteria available to do this, a unique selection was made of different aspects for maintaining NG feeding.

2.5.1 Criteria for Critical Review

Information on the following was sought:

1. Number of times and reason for NG tube dislodged/removed in a given period of time
2. Length of time NG tube remained in place with chosen intervention
3. Percentage of prescribed feed/hydration delivered
4. Reasons for failure of NG tube feeding with intervention in place
5. Complications associated with intervention used for securing the NG tube
6. Acceptability of intervention used to the patient
7. Continued NG feeding

8. Commencement of alternative feeding methods such as PEG or parenteral nutrition
9. Reason for ceasing NG feeding

By following these criteria, it was possible to compare, contrast and present an array of studies across the methodological spectrum. This selection has included one study (Karanth et al. 2005) which was only available in abstract form within Conference Proceedings. Further personal communication with the authors revealed that this remains unpublished work. This did not fulfil the criteria for the review (Section 2.2) because it was unpublished. However it was felt that it was important to include this because the abstract provided sufficient information for the completion of a critical review.

2.6 Results

The MEDLINE search yielded 1144 titles and abstracts; combined with EMBASE and CINAHL a further 874 titles and abstracts were found. A total of 2018 titles and abstracts were scanned from which five studies were selected as meeting the inclusion criteria for the review. These studies included primary research studies that involved stroke patients with stroke associated swallowing problems and had been given NG or naso-duodenal feeding post acute stroke. Once these five studies had been read in full, a further two were excluded. The first study excluded (Williams, Morton & Patrick 1990) looked at the use of the 'Emory cubicle bed' as an alternative to physical restraint for brain injured clients; however this was not a primary research study. The second study excluded (Mitchell & Kiely 2001), looked at a cross-national comparison of institutionalised tube-fed older persons between America and Canada. Although this study addressed the use of restraint in conjunction with tube feeding and the study population includes stroke patients, it did not state what types of tube feeding were being investigated, so it was not clear whether the study population included stroke patients who had received NG feeding.
The remaining three studies met the inclusion criteria of the review (Anderson et al 2004; Quill 1989; Ciocon et al. 1988). One further study was identified at the BAPEN Conference in November 2005 at which personal communication was made with the authors (Karanth et al. 2005). This study was published as an

abstract and is not yet available as a full publication. It has been included because of its significance to the field.

2.6.1 Description of Studies

All the identified studies included dysphagic stroke patients who required NG feeding, however only one study was specific to dysphagic stroke patients (Anderson et al. 2004). All the studies looked at methods for keeping NG tubes in place. Two of the studies evaluated the use of nasal bridle or loop systems (Karanth et al 2005; Anderson et al. 2004) and the other two look at the use of restraints (Quill 1989; Ciocon et al. 1988), however neither of these studies is specific about what method of restraint was used.

Anderson et al. (2004) describe their study as a prospective audit study. The study took place over a 6-month period and included 21 dysphagic stroke patients referred for PEG feeding in an acute hospital. Of the 21 patients, those who were unable to be continuously NG fed and who were within 28 days of stroke onset when referred, were offered a nasal loop n=14 (n=10 cerebral infarction; n=3 intracerebral haemorrhages; n=1 subdural haematoma (incorrectly classified as a stroke)). The remaining seven patients who were more than 28 days post stroke onset were offered PEG feeding (type and severity of stroke for this group not stated). Patients in the nasal loop group had a mean age of 76 years (distribution between male and female not stated). Patients in the nasal loop group were initially observed with just an NG tube; then observations continued once the nasal loop had been inserted. The potential complications of NG feeding with the nasal loop were then compared to any observed complications of the PEG fed group. Outcomes for the nasal loop group were recorded at 2 week and 3 month follow-up by ward visit or GP telephone contact. Reported outcomes included; percentage of prescribed daily feed before and after nasal loop insertion; patient outcomes included recovery of normal swallow, continued NG feeding, change from NG to PEG feeding and death. The complications of NG feeding that were specifically documented included; epistaxis, sinusitis, septal trauma and NG blockage, breakage or removal; also the opinion of patients who could communicate was sought on any potential discomfort caused by the nasal loop.

Quill (1989) carried out a retrospective chart review over a 12 month period based in a community hospital. The review looked at the use of NG feeding tubes with chronically ill elderly patients over 70 years of age with a primary diagnosis of cerebrovascular accident (CVA), organic brain syndrome or metastatic cancer. There was a total study population 55 of which 27 were stroke patients. Reported outcome measures included duration of the use of NG feeding tubes and the use of restraints to keep NG tubes in place.

Ciocon et al. (1988) reports a prospective observational study over an 11-month period in a skilled nursing facility for older people. The study included a total of 70 patients 65 years and older of which n=14 were stroke patients (eight described as CVA, five intracerebral haemorrhages and one obtundation from CVA). All the patients involved in the study required tube feeding and were split between NG and gastric or jejunal feeding; 11 of the 14 dysphagic stroke patients were NG fed. The study states that it looks at complications of tube feeding including agitation requiring multiple tube reinsertions and restraint of extremities.

In the conference abstract, Karanth et al. (2005) describe an audit over a 7 month period in an acute hospital setting looking at the use of the nasal bridle to hold NG feeding tubes in place. A total of 61 nasal bridles were placed in a study population of 43 patients of which 13 were dysphagic stroke patients. Type and severity of stroke were not stated nor latency from stroke onset to study day. Patients were observed with the nasal loop in place if they had dislodged more than two NG tubes within 48 hours, although no control group was used.

2.6.2 Methodological Quality of the Studies Identified

From the four studies selected in the initial review (Karanth et al. 2005; Anderson 2004; Quill 1989; Ciocon 1988), one was a retrospective chart review (Quill 1989); two were audits of clinical practice (Karanth et al. 2005 and Anderson et al. 2004). The final study (Ciocon et al. 1988) presents as a prospective observational study, however prospective observational data includes retrospective data from participants whose feeding tubes were passed

between one to seven years before commencement of the study. Using the criteria for assessing the quality of evidence set out by SIGN (SIGN 2001; Harbour & Miller 2001), the methodological quality of these studies is low on the hierarchical scale of study types, in that they are observational studies (Karanth et al. 2005; Anderson 2004; Quill 1989) or non-experimental studies (Ciocon 1988).

Although all of these four studies include stroke patients, only one study was specific to dysphagic stroke patients (Anderson et al. 2004), therefore reducing the applicability of the evidence to stroke patients (Harbour & Miller 2001). However from the methodological quality criteria set out in 2.5, two of the studies include the type of stroke patients studied (Anderson et al 2004; Ciocon et al. 1988); however Anderson et al (2004) in the nasal loop group incorrectly classifies a subdural haematoma as a stroke therefore reducing the study population size from 14 to 13. Quill (1989) and Ciocon et al. (1988) do not classify the type of stroke patients studied.

The severity of stroke patients studied is not stated in any of the identified studies and latency from stroke onset to study day, is only stated by Anderson et al. (2004). None of the studies identified used control groups; Anderson et al. (2004) make a comparison between the same group of patients before and after nasal loop insertion. Two studies were based in acute settings in the UK (Karanth et al. 2005; Anderson et al. 2004). The other two studies based in non-acute care facilities and were carried out in the United States of America.

All four studies include small numbers of stroke patients, the largest being Quill (1989) which included 27 stroke patients. Three of the four studies identified include the age of participants involved, this information is not available from Karanth et al. (2005). The distribution of study populations between men and women is only stated by Quill (1989) and Ciocon et al. (1988), both of which have an uneven distribution between men and women. The reason for NG tube insertion is only clearly stated by Anderson et al. (2004).

Two of the identified studies explore the use of nasal bridle/loop systems with stroke patients (Karanth et al. 2005; Anderson et al. 2004). Anderson et al.

(2004) give a clear description of the nasal loop and how it is inserted; Karanth et al. (2005) describe the nasal bridle briefly in their abstract.

Both Ciocon et al (1988) and Quill (1989) state within their study aims that they look at the use of restraints to secure naso-gastric feeding tubes; however neither study gives a clear description of what type of restraints were used. Ciocon et al (1988) refer to wrist restraints and mittens in their discussion; however they do not state whether these interventions were used in the study to help maintain NG tube position.

Anderson et al. (2004) observed 14 stroke patients who were unable to be continuously NG fed and therefore recruited for a loop, however they do not state the reason for problems in maintaining NG feeding. The nasal loop was inserted on a different day of the study for each patient ranging from day 3-14; no rationale is given for this difference. Karanth et al. (2005) observe 13 dysphagic stroke patients who were considered for a nasal bridle if they had dislodged more than two NG tubes within 48 hours. Data collection techniques are not clearly stated in either study, however it is not possible to comment fully on the study design of Karanth et al. (2005) as only the abstract was available. Anderson et al. (2004) record the percentage of daily feed that was provided for each patient before and after the insertion of the nasal loop; in addition they record complications of NG feeding at a 2 week and 3 month follow up. However it is not stated whether follow up was carried out 2 weeks/3 months after initial NG insertion or after insertion of the loop. Comparisons of complication and outcome are drawn between NG fed patients with a nasal loop and the PEG fed patients in this study. The authors state however, that these are separate groups with different inclusion criteria, the nasal loop group were <28 days post-acute stroke and the PEG group >28 days post acute stroke; therefore these groups are not directly comparable.

2.6.3 Results

Two of the studies evaluate the use of the nasal bridle/loop system (Karanth et al. 2005; Anderson et al. 2004). Ciocon et al. (1988) and Quill (1989) consider the use of restraints for keeping tubes in place (Quill 1989; Ciocon et al. 1988).

2.6.3.1 Nasal Loop or Bridle

Karanth et al. (2005) involved a total study population of 43 patients who underwent bridle insertion, of whom 37% (n=13) were dysphagic stroke patients; 61% (n=8/13) of the stroke patients survived longer than two weeks, in which time 46% (n=6/13) were successfully nasogastrically fed with the bridle in situ and 15% (n=2/13) were referred for PEG feeding. Karanth et al. (2005) report that 23% (n=10/43) of the total study population required more than one bridle insertion, however it is not clear from the abstract whether any of these were stroke patients. Anderson et al. (2004) includes 14 stroke patients given a nasal loop to maintain naso-gastric tube position; 57% (n=8/14) of patients were successfully maintained on NG tube feeding with a nasal loop in situ; 43% (n=6/14) patients were able to communicate, 28% (n=4/14) of patients reported that the nasal loop was more acceptable than repeated tube insertion, however 7% (n=1/14) complained of associated nasal discomfort. Complications were reported with the loop/bridle system in both studies. Karanth et al. (2005) reported a case of nasal over granulation, and repeated bridle insertion due to tube dislodgement and tube slippage. Anderson (2004) also reported tube dislodgement with nasal loop in situ.

2.6.3.2 Restraints

Both Ciocon et al. (1988) and Quill (1989) state that the use of restraints to secure NG tubes was addressed in their studies; however neither study evaluated their use in depth. Quill (1989) reported restraint use in 53% (29/55) of the patients studied and more frequently in those who were deemed incompetent. However the type or effectiveness of restraint used is not recorded, nor the number of stroke patients on which they were used. Ciocon et al. (1988) recorded the number of nasogastrically fed patients who self-extubated. However although he mentions the use of wrist restraints or mittens, it is not clear how and when these were used. None of the data pertaining to the use of restraints in either of these studies can be directly related to stroke patients.

2.7 Discussion

The identified studies were variable in quality, they address a limited number of interventions available to secure and maintain NG tube position in stroke patients which include the nasal bridle or loop and physical restraints.

Anderson et al. (2004) and Karanth et al. (2005) propose that the nasal bridle/loop effectively secures NG tube position for stroke patients. Anderson et al. (2004) show a 100% increase in feed delivery from before NG loop or bridle insertion compared to after insertion, however they have analysed their data using the Mann Whitney U test which may be more appropriate for comparison between two different samples; here they are comparing the same group of patients before and after an intervention. The acceptability of the nasal loop/bridle or restraints is only addressed in one study. Anderson et al. (2004) include 6 stroke patients who are able to speak, 4/6 patients reported preferring the nasal loop to having repeated NG tube insertions, 1/6 patients complained of nasal discomfort.

The use of physical restraint for maintaining NG tube position is referred to by both Ciocon et al. (1988) and Quill (1989), however neither of these studies adequately answer how effective or acceptable physical restraint such as hand mittens are for this purpose.

2.8 Conclusions Arising from the Systematic Review

This systematic review shows that methods used for keeping NG tubes in place for stroke patients have not been adequately evaluated and further, that the opinions and feelings of patients and their relatives with regard to the methods used for maintaining NG tube position have not been sought. Therefore to facilitate more effective NG feeding for dysphagic stroke patients and work towards a form and level of treatment considerate of patients' nutritional needs, dignity and comfort, it was determined that methods for keeping NG tubes in place required further evaluation.

2.9 Further Research Identified Since initial Systematic Review

In an abstract, Kee et al. (2007) described a retrospective study of hand mittens (physical restraints) in stroke patients unable to tolerate NG feeding. This was a case-control study involving 18 stroke patients 89% (n=16) of whom had suffered a total anterior circulation stroke. The study was carried out over the period of one year, 8 patients had hand mittens and 10 patients were without hand mittens. The authors collected a variety of outcome measures including: number of NG tubes inserted during patients admission, number of aspiration pneumonias treated with antibiotics, number of chest x-rays received, and amount of feed received, weight loss or gain during admission and length of stay. The authors report significant results ($p<0.05$) for hand mittens versus no hand mittens in terms of fewer NG tube re-insertions, fewer deaths, reduced weight loss, fewer episodes of aspiration pneumonia and a small reduction in length of stay (however this was not significant). The amount of feed received was not reported and reasons for this are not clear. However there is limited information in the abstract so further critical appraisal is not possible.

Johnston et al. (2007) looked at the outcome of patients fed via an NG tube retained with a bridle to evaluate whether bridles reduce the requirement for percutaneous endoscopic gastrostomy (PEG) insertion and 30 day mortality. This study is currently only available in abstract format. The authors prospectively collected data on patients as part of an in hospital nasal bridle service over a 12 month period; data included indications and outcomes for the nasal bridle and PEG related mortality rates before and during the study; nasal bridles were inserted by specially trained nutrition nurses. From a total of 53 patients referred for the nasal bridle 24 (45%) were stroke patients, type, severity of stroke, latency from stroke onset and age were not stated. Results indicated that the nasal bridle enabled nutrition in patients who would otherwise have needed a PEG and PEG related mortality fell as a result of the bridle service. Complications and issues of tolerance were reported with the nasal bridle and incidences of the NG tube being removed with the bridle remaining in situ were reported in 25/53 (47%) of cases who then required NG re-insertion, PEG insertion or progression onto oral feeding. No statistically differences were detected between those patients who had a nasal bridle and those who did not. It is not possible to ascertain from this abstract what relevance these results

bear to the stroke patients involved in the study as separate results for stroke patients are not stated.

2.9.1 Ongoing Research

Beavan et al. (2007) are currently carrying out a three centred, two armed RCT with 50 participants in each arm recruited from three centres, comparing the nasal loop to conventional NG feeding for acute dysphagic stroke patients. Each participant will be monitored over a two week period. This is an RCT and therefore methodologically superior to any other previous research studies on the nasal loop or bridle. The research team have estimated, based on their pilot data that the sample size will have sufficient power to be able to detect any significant difference in the proportion of intended feed delivered between the conventional and looped NG feeding groups (Beavan et al. 2007). This RCT will also address issues of tolerability and acceptability of both looped and conventional NG feeding using patient questionnaires; details of the questions asked within this questionnaire are not currently available.

Author	Aims	Characteristics of Study	Methodological quality of study	Results of study
Anderson M et al 2004.	Demonstrate that the nasal loop (NL) results in improved delivery of enteral feed for high risk dysphagic stroke patients Compare the outcome and complication rates of nasogastrically fed patients (where tube secured with NL), to PEG fed patients	**Size of study** Subjects n= 14 dysphagic stroke patients **Reason for NG tube insertion** - stated Method for securing tube Nasal Loop **Patient demographics** Age range 67-91 yrs Mean age = 76 yrs this is stated for NL group only No. men – unknown No. women - unknown **Stroke specific details:** *NL group* *Type of stroke* – n=10 cerebral infarction, n=3 intracerebral haemorrhages n=1 subdural haematoma – should not be included as a stroke *Stroke severity*- not stated. *Latency from stroke onset to study day*- <28days post acute stroke **Control Group** – compare before and after NL insertion	**Type of Study** 6 month prospective audit study. **Inclusion criteria** Patients <28 days after stroke unable to maintain NG feeding **Exclusion criteria** Patients >28days after stroke **Size of NG tube used** – not stated **Description of intervention** Clear description of NL **Assessment methods** – not clearly stated **Complications of NG feeding measured** - epistaxis, sinusitis, septal trauma, NG blockage breakage or removal, rationale and evidence for complications chosen not stated **Outcome measures stated** Percentage of prescribed daily feed before/after nasal loop recovery of normal swallow continued NG feeding change to PEG death Outcomes recorded at 2 week and 3 month follow up by ward visit/GP phone contact (not clear if this is 2 week/3 months from NG insertion or NL insertion).	**No. times NG tube dislodged/removed/re-passed** Median no. NG tubes used before NL =4 (range 2-7) 2/14 removed NG within 24hrs of NL being inserted No of NG tubes used after insertion NL not stated **Length of time NG remained in place with/without intervention** With NL - Median 15 days, Range 1-46 Without – not stated **Reason for tube dislodgement** 2/14 pt dislodged tubes **Delivery of feed** – found 100% increase in feed delivery from no NL to NL in situ. However the *before* and *after group are* the same group of patients and authors use the Mann-Whitney test to compare groups; should be used to compare two *independent* groups of sampled data **Reason for failure NG feeding with intervention in place** 2/14 pulled NG out **Complications of intervention** 1 complaint of nasal discomfort **Acceptability of intervention** 6 patients able to speak 4/6 preferred NL to NG tube being re-passed 1 patient complained of nasal discomfort **Continued NG Feeding** 8/14 managed solely by nasal loop (4/8 recovered normal swallow) **Commence alternative feeding method** 6/14 proceeded to PEG (1/6 recovered normal swallow) **Reason for ceasing NG feeding** 4 recovered normal swallow 2 dislodged NL 8/14 patients died by 3 month follow up

Table 5: Critical Analysis Anderson et al (2004)

Author	Aims	Study Characteristics	Methodological quality of study	Results
Quill 1989	Retrospective chart review in a community hospital looking at use of NG feeding tubes and restraints to keep tubes in place	**Size** Total study sample n=55 Reason for NG tube insertion - stated Method for securing tube Restraint **Patient demographics** Age range – not stated No. of men – 21 No. women – 34 **Stroke specific details** Total no. stroke patients n=27 (49%) of which number of men/women not stated *Type and severity of stroke* Classified as CVA patients only, type and severity of stroke not stated *Latency from stroke onset to study day* - not stated **Control Group** - none	**Type of study** Retrospective chart review **Inclusion criteria** Patients = or >70 yrs Main diagnosis – CVA, organic brain syndrome or metastatic cancer (although participants may have more than one of the above conditions) Received enteral nutrition over specified 12month period **Exclusion criteria** Not stated **Size of NG used** – not stated **Description of intervention** – none given referred to as restraint **Assessment methods** – methods used described **Outcome measures stated** Duration of the use of NG feeding tube Use of restraints to keep the tube in place	**No of times NG tube dislodged/removed/re-passed** 6/55 patients pulled tubes out (does not state whether any of these were stroke patients) 19/55 patients had tube replaced at least once in the 12 month period **Length of time NG remain in place with/without intervention** Restraints used in 29/55 (53%) patients, however does not state how long for or no. of stroke patients **Reason for tube dislodgement** 19/55 patients tube replaced, most common reason for replacement tube pulled out; does not state how many of 19 patients were stroke patients **Percentage of feed delivered** – not stated **Reason for failure NG feeding with intervention in place** - Not stated **Complications of intervention** - not stated **Acceptability of intervention** - Not stated **Continued NG feeding** 14/55 patients NG fed till death 14/55 discharged with NG tube (total 28/55) **Commence alternative feeding method** - Not stated **Reason for ceasing NG feeding** 2/27 patient improvement 6/27 continual tube pulling 1/27 family request 11/27 medical deterioration 4/27 unclear

Table 6: Critical Analysis Quill (1989)

Author	Aims	Study Characteristics	Methodological quality of study	Results
Author	Aims	Study characteristics	Methodological quality of study	Results
Ciocon et al. 1988	Exploring evidence of agitation requiring multiple tube reinsertions and restraint of extremities	**Size** Total study sample n=70 Reason for NG tube insertion-stated Method for securing tube Restraint of extremities **Patient demographics** No. men 10 No. women 60 Age range 60-95yrs Mean age 82yrs **Stroke specific details** Stroke patients n=14 (18% of total study population) 11/14 stroke patients were NG fed (47% of NG fed patients in the study) *Type of stroke* CVA n=8 Intracerebral haemorrhage n=5 Obtundation from CVA n=1 *Latency of stroke onset to study day*-not stated	**Type of study** Prospective study **Inclusion criteria** Patients aged ≥65 requiring tube feeding over a period of 11 months **Exclusion criteria** 7 patients excluded due to COAD, therefore total study sample n=63 Size of NG tube used 12-18F (large gauge tubes for feeding tubes, but old study) **Description of intervention** Not given **Assessment methods** Mix prospective and retrospective data collection to increase time base of observation **Outcome measures stated** Nutritional indices - Weight, haemoglobin level, haematocrit, serum albumin Complications of NG tube feeding	**No of times NG tube dislodged/removed/re-passed** 36/54 patients self extubate, 1/54 tube misplaced in first two weeks 21/54 patients self extubate after two weeks **Length of time NG remain in place with/without intervention** Not stated **Reason for tube dislodgement** Self extubation was highest in the NG fed patients, however not stated how many of this group were stroke patients or whether restraints were used to help reduce the incidence of tube displacement. **Percentage of feed delivered** – not stated **Reason for failure NG feeding with intervention in place** - Not stated **Complications of intervention** - not stated **Acceptability of intervention** - not stated **Continued NG feeding** – not clear **Commence alternative feeding method** – not clear **Reason for ceasing NG feeding** – not clear NB Results tables based on n=70, should be n=63; none of the results are stroke specific; use of restraints although listed as a complication of NG feeding to be observed was not covered in the results

Table 7: Critical Analysis Ciocon et al. (1988)

Karanth et al 2005 (abstract) unpublished	Utilising nasal bridle to secure NG tubes	**Size** Total study sample n=43 Reason for NG insertion Not clearly stated for all patients Method for securing tube Nasal bridle (NB) stated **Patient demographics** Not stated in abstract **Stroke specific details** Stroke patient n=13 (37%) of sample population *Type and severity of stroke* - not stated in abstract *Latency from stroke onset to study day*- not stated in abstract Control Group - none	**Type of study** Audit of clinical practice **Inclusion criteria** More than 2 NG tubes displaced within 48hrs **Exclusion criteria** Not stated Size of NG tube used Not stated **Description of intervention** Brief description of NB given Assessment methods Not stated in abstract **Outcomes measures** Not stated in abstract	**No of times NG tube dislodged/removed/re-passed** - not stated **Length of time NG remain in place with/without intervention** Fixed NG tubes placed for mean 16.5 days (range 2-47) 47/61 NB placed lasted > 24hrs (77%); result not specific to stroke patients **Reason for tube dislodgement** – not clear **Percentage of feed delivered** – not stated **Reason for failure NG feeding with intervention in place** Unsuccessful placement Removal at patient/family request Intolerance of feeding **Complications of intervention** 33% of bridles lasted ≤ 24hrs, reasons for removal: Unsuccessful placement Patient/family request Gastrointestinal intolerance of feeding 10/43 patients required more than one bridle Reasons included: Inadvertent removal Overestimation of oral intake Tube slippage 1/43 patients developed over granulation of anterior nostril **Acceptability of intervention** - not stated Continued NG feeding 8/13 stroke patients survived longer than 2 weeks 6/8 stroke patients successfully maintained on NG feeding with nasal bridle **Commence alternative feeding method** 2/8 stroke patients required a PEG **Reason for ceasing NG feeding** – not stated

Table 8: Critical Analysis Karanth et al (2005)

2.10 Summary

This review has demonstrated the paucity of evidence about current methods used for securing and maintaining NG tube position in stroke patients. This has resulted in the overall aims of the study being: firstly to explore the acceptability and effectiveness of methods used to keep NG tubes in place in stroke patients. Secondly to survey current nursing practice involving the management of NG feeding tubes for stroke patients and thirdly to further develop, explicate and deepen findings on this issue such that they may be tested within a wider healthcare setting.

3 Research Approaches, Methods and Procedures

3.1 Introduction

This chapter gives an outline of the theoretical underpinnings and detailed information about the research process. The overall aims and research questions lead to decisions about using a mixed method approach underpinned by both research paradigms and the rationale for both a survey and two qualitative phases using a Grounded Theory Approach. Information is also provided concerning sampling strategies, data collection methods and analytical approaches for all three Phases. There is a section concerning the reliability, validity and trustworthiness of both qualitative and quantitative research approaches and analysis. In addition a reflexive account is given concerning the influence of my background on the research processes. This chapter concludes with a discussion of the ethical underpinnings as applied to research within a healthcare setting. There is also a description of the ethical permission process followed to enable access to patient, relative and staff participants.

3.2 Overall Aims of the Study

1. To explore the acceptability and effectiveness of methods used to keep NG tubes in place for stroke patients
2. To survey current nursing practice involving the management of NG feeding tubes for stroke patients
3. To develop further, explicate and deepen findings on this issue, such that they may be tested within the wider health care setting

3.3 Research Questions

1. How do stroke patients and their relatives describe their experiences of NG feeding?
2. What are the reported opinions of patients and relatives about how acceptable, safe and effective methods are for maintaining NG feeding?
3. Are methods used to maintain NG feeding for stroke patients considered to be acceptable, safe and effective by staff working with stroke patients?

4. What is the current nursing practice in the UK concerning the management of NG feeding for stroke patients; and is this practice evidence based?
5. What are the opinions and experiences of nurses about current nursing practice regarding the management of NG feeding for stroke patients?

3.4 Research Paradigms

Research is the systematic and rigorous process of enquiry which aims to describe phenomena and to develop and test explanatory concepts and theories, with the eventual aim of contributing to a scientific body of knowledge (Bowling 2002). A paradigm can be defined as an overarching philosophical or ideological stance, a system of beliefs about the nature of the world and when applied in the context of research, the bases from which researchers go about producing knowledge (Saks & Allsop 2007). Strauss and Corbin (1998) describe the paradigm as a perspective taken towards data, an analytical stance that helps to gather systematically and order data in such a way that the structure and processes are integrated. Saks and Allsop (2007) suggest that the researchers' paradigmatic position or the approach they take to data collection and analysis, relates to their understanding of the nature of knowledge, (their epistemological position) and what they perceive to be reality (their ontological position). Traditionally these differences in understanding between what constitutes knowledge and reality have been classified into two opposing paradigms, namely the 'positivist' paradigm and 'post-positivist' or 'naturalist or interpretivist' paradigm (Saks & Allsop 2007; Lincoln & Guba 1985). The positivist paradigm maintains that reality is fixed and that objective knowledge can be produced through rigorous deductive methods. Researchers whose stance is based in the positivist paradigm commonly carry out quantitative research. The post-positivist or interpretivist paradigm maintains that knowledge is socially constructed and reality essentially subjective, methodological approaches and research strategies associated with this paradigm are commonly referred to as qualitative and include such methodologies as grounded theory, symbolic interactionalism, phenomenology and ethnography (Saks & Allsop 2007; Linclon & Guba 1985).

3.5 Quantitative and Qualitative Research

Quantitative research can be defined as a research strategy that uses quantification in the collection and analysis of data. Bryman (2008; pg. 22) summarises quantitative research into the three following points:

- entails a deductive approach to the relationship between theory and research, in which the accent is placed on the testing of theories;
- incorporates the practices and norms of the natural scientific model of positivism in particular; and
- embodies a view of social reality as an external, objective reality.

Quantitative studies use systematic scientific investigation of quantitative properties and their phenomena and their relationships. The objective of quantitative research is to develop and employ mathematical models, theories and or hypotheses pertaining to natural phenomenon, the process of measurement being central as it provides a fundamental connection between empirical observation and mathematical expression. Quantitative research may often be an iterative process where evidence may be evaluated, hypotheses refined and changes and advances to practice made. Quantitative research within the social sciences can employ a variety of methods to evaluate phenomenon, including epidemiological or analytical design strategies (for example randomised controlled trials, before and after studies, cohort or incidence studies and cross sectional studies), survey research, secondary document analysis, structured interviewing and systematic reviews (meta-analysis) (Bryman 2008; Saks & Allsop 2007). The main aim of the quantitative approach is that in attempting to ascertain knowledge about a particular phenomenon, the researcher should remain objective (detached and separate from the participant(s)) by employing scientific techniques to produce reliable findings (through inferential statistics) which may be generalised to the larger population.

In contrast to quantitative research, qualitative research may be understood as a strategy that often emphasises words rather than quantification in the collection and analysis of data (Bryman, 2008). Bryman (2008; pg.22) further summarises qualitative research into the following points:

- predominately emphasises an inductive approach to the relationship between theory and research, in which the emphasis is placed on the generation of theories;
- has rejected the practices and norms of the natural scientific model and of positivism in particular in preference for an emphasis on the ways in which individuals interpret their social world; and
- embodies a view of social reality as a constantly shifting emergent property of individuals' creation.

Qualitative research is generally regarded as an essentially exploratory approach, aiming to produce findings unobtainable by statistical procedures, or other methods of quantification (Strauss & Corbin, 1990). In its simplest terms, qualitative research sets out to describe, understand and explain a particular phenomenon, by asking ***what***, ***why*** and ***how***, but generally not ***how many*** or ***how often*** (Morse 2008a; Barbour 1999). Stimulus for research can arise out of personal experiences (Bryman 2008), and in the case of this study, my experience as a specialist nurse concerning the adequacy of NG feeding for stroke patients, and problems with methods employed to maintain this technique, formed the intuitive basis for inquiry. If no statistical or literary evidence is available to confirm or deny the researcher's intuition (as was shown by the systematic review in chapter 3), a qualitative research approach is a sensible and an expedient beginning point (Bryman 2008; Creswell & Plano Clark 2007; Saks & Allsop 2007, Bowling 2002).

Research based in the 'interpretivist' paradigm tends to use qualitative methods to explore phenomenon. These may include in-depth semi-structured or unstructured interviews, observation, focus groups and secondary discourse analysis. Rubin & Rubin (2005) recommend that these methods are in keeping with the 'interpretivist' paradigm in that they attempt to record types of data (for example peoples' words) which enable reflection on subjective meanings and interpretations, the nature of people's experiences and the relationship between the researcher and researched. In contrast to quantitative research, the qualitative researcher aims to seek knowledge by focusing on subjective meanings in data; data are collected in naturalistic settings; the conduction of the research is not objective and analysis is not concerned with statistical

inference but in-depth complexity. Qualitative findings are not generalisable but are highly valid as they are drawn from the understandings of research subjects (Saks & Allsop 2007).

3.6 Mixed Methods Research

Mixed methods research involves collecting and analysing both qualitative and quantitative data, and may be carried out in a number of different ways. Over the years this 'hybrid' method has been subject to much scrutiny, and it has been regarded as somewhat controversial to combine research approaches historically considered to be incompatible (Bryman 2008; Creswell & Plano Clark 2007; Strauss & Corbin 1998). However since the 1980s mixed methods research has gradually become more acceptable; it is now practised in studies across the social sciences including sociology, nursing, health management and education (Bryman 2008; Creswell & Plano Clark 2007). This type of inductive-deductive approach allows for movement between data collection and analysis, and emergent design and analysis which may be shaped as the study progresses in response to the researcher's early observations (Bergman 2008; Guba & Lincoln, 1989). Criticism has been raised concerning how research strategies born out of two differing epistemological and ontological stances, can be compatible.

3.6.1 Quantitative and Qualitative Interplay

Although quantitative and qualitative research strategies may be seen as opposing and discrete, being derived from allegiance to differing epistemological and ontological stances, it has been argued that research methods are not completely autonomous. Bryman (2008) contends that research methods are much more 'free-floating' in terms of epistemology and ontology than is often assumed. Lantz and Booth's (1998) study on the social construction of breast cancer initially employed qualitative content analysis of magazine articles examining breast cancer in association with the lifestyles of modern women. Although this study was based within the 'constructionist' epistemological position (more often associated with a qualitative approach (Creswell & Plano-Clark 2007)), they also employed quantitative content

analysis of the photographs of women linked to the same magazine articles; this enabled them to make important links between the age of women represented as possessing behaviours linked to an increased risk of breast cancer. Marsh (1982) also proposes that through quantitative social survey research, researchers may often interested in uncovering the meaning behind participants' actions, thus potentially providing a causal link for the action; however, the exploration of social 'meaning' in the 'purist' sense is more commonly associated with the 'naturalistic' or 'interpretivist' paradigm, suggesting perhaps that the boundaries between qualitative and quantitative research strategies may be more blurred than some researchers might accept.

Combining research strategies in a single study has become a more commonly used approach over the years (Onwuegbuzie & Leech 2006) and is now a recognised in many research method texts (Bryman 2008; Gilbert 2008; Saks & Allsop 2007); in addition a number of texts are now available which are devoted to mixed methods research (Bergman 2008; Plano-Clark & Creswell 2008; Creswell & Plano Clark 2007; Axinn & Pearce 2006; Tashakkori & Teddlie 2003).

The approach taken in a research study is dependent on the research question (Bowling 2002). Onwuegbuzie & Leech (2006) suggest that; not only do research questions give rise to the type of data that is collected, but in mixed methods studies the research questions occupy a place that is central, interactive, emergent and evolving. During a mixed methods study research questions may develop, become modified, and additional questions may arise (Onwuegbuzie & Leech 2006). This differs from purely quantitative and qualitative studies. In quantitative studies, questions or hypotheses are developed prior to the study and the purpose statement is narrowed so that questions or hypotheses indicate specific variables to test. In qualitative studies, questions (not hypotheses) are posed around the exploration of a central phenomenon; (questions often contain exploratory verbs such as 'discover', 'explore' or 'understand') (Creswell & Plano Clark, 2007). Reformulation of questions during a mixed methods study, may lead to an evolving design; the different phases of the mixed methods design enables questions to develop and evolve as each research phase informs the next

(Onwuegbuzie & Leech 2006). The way in which mixed methods questions are posed should guide whether data is collected and analysed concurrently or sequentially; however to date the formulation of research questions for mixed methods studies has been somewhat overlooked and requires further attention (Creswell & Plano Clark 2007; Onwuegbuzie & Leech 2006).

Specific designs for mixed methods studies have developed (Bergman 2008; Creswell & Plano-Clark 2007; Johnson & Onwuegbuzie 2004, Tashakkori & Teddlie 2003). Creswell & Plano Clark (2007) classify these designs into four major categories: the triangulation design, the embedded design, the explanatory design and the exploratory design. The following table briefly highlights the specific features of each research design.

Table 9: Major Mixed Methods Design Types; adapted from Creswell & Plano Clark (2007) pg. 85

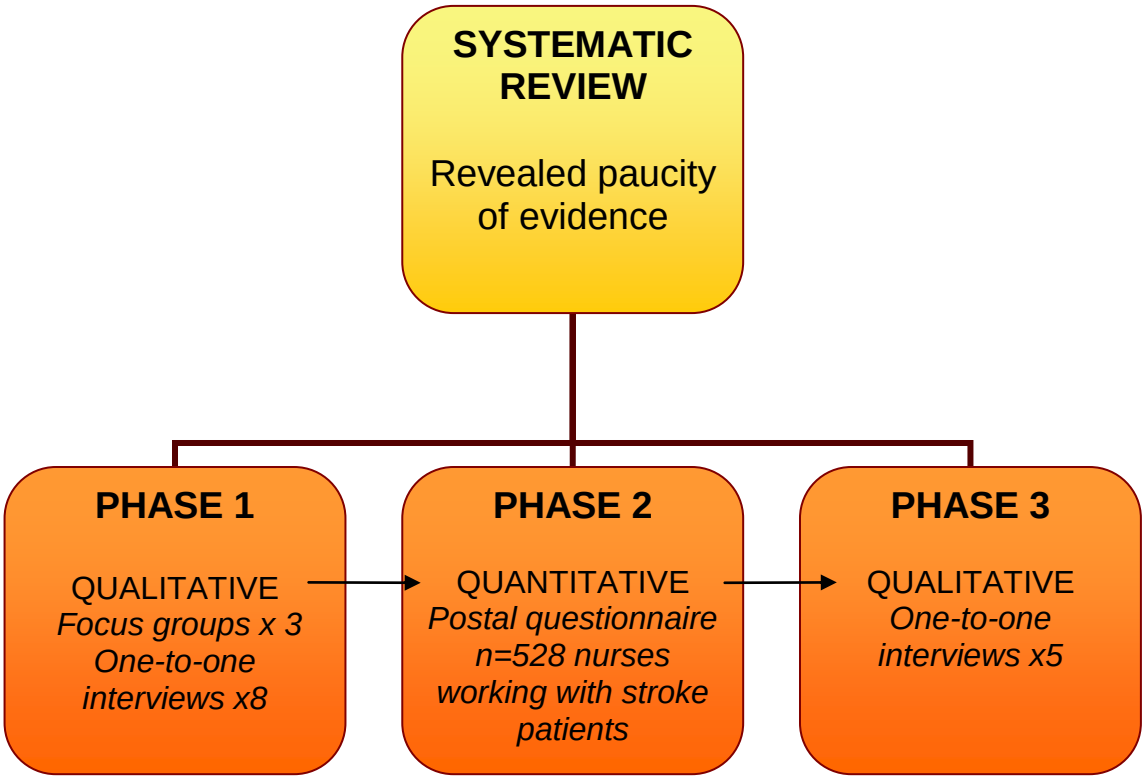
Design type	Timing	Weighting	Mixing	Notation
Triangulation	Concurrent quantitative and qualitative at the same time	Usually equal	Merge the data during the interpretation of the analysis	QUAN + QUAL
Embedded	Concurrent or sequential	Unequal	Embed one type of data within a larger design using the other type of data	QUAN (qual) or QUAL (quan)
Explanatory	Sequential: Quantitative followed by qualitative	Usually quantitative	Connect the data between the two phases	QUAN-qual
Exploratory	Sequential: Qualitative followed by quantitative	Usually qualitative	Connect the data between the two phases	QUAL-quan

* [QUAN/quan – quantitative; QUAL/qual – qualitative]

Johnson & Onwuegbuzie (2004) note that qualitative and quantitative stages tend to run either sequentially or concurrently and although mixed methods studies tend to consist of two phases (qualitative and quantitative) they consider that it is important to understand that the researcher should not be bound by prescribed mixed methods designs as illustrated in Table 9, but should be creative. They go on to recommend that more user specific or complex designs can be easily created. They cite the example of using a qualitative phase, followed by a quantitative phase, followed by another qualitative phase; this is the design that was selected for the current study. The mixed methods design

used in the current study is illustrated in Figure 9. This design followed an exploratory sequential design where questions from one strand emerged from the inferences or questions from the previous one, enabling data collection phases to develop as the study progressed (Bergman 2008; Creswell & Plano Clark 2007).

Figure 9: Mixed methods design of the current study



In the current study a systematic review indicated a paucity of evidence about interventions for maintaining NG feeding for stroke patients; in the face of a lack of evidence an inductive qualitative phase was appropriate; inferences from this phase raised further questions which were best answered using a deductive quantitative phase to enable generalisabilty and further exploration of inferences on a wider basis. Phase 2 findings indicated that a further qualitative phase was appropriate to help explore some of the complexities surrounding findings from phase 2 at the same time as beginning to diversify inferences beyond the speciality of stroke.

Research may be driven by quite practical decisions independent of methodological traditions that may act as stances and aspirations but not

guidelines to be strictly followed in practice (Creswell & Plano Clark 2007; Platt 1996). Although perhaps controversial, using quantitative and qualitative methods in combination may be seen by some researchers as complementary, each adding something to the final findings (Strauss & Corbin 1998). For example, initial categories that arise during a qualitative phase of a study can be further validated, tested, extended and generalised during a sequential quantitative phase; a supplementary qualitative phase may enable further complexity and detail to be teased out so enhancing the essence of those findings. Strauss and Corbin (1998) in their book discussing techniques and procedures for developing grounded theory suggest that combining methods may be done for supplementary, complementary, informational, developmental and other reasons. They point out that combining methods is not new, indeed Lazarsfeld and Wagner (1958) (founders of sociological survey methods) advised that exploratory interviews should precede the formulation and final development of quantitative questionnaire instruments and only with this qualitative foundation, can questionnaires tap into reality. Lazarsfeld and Wagner's view however, tended toward the perception that the initial qualitative investigation was only to inform the more robust quantitative investigation. This was seen as a criticism of qualitative research strategies as not being robust research techniques in their own right (Charmaz 2006). Within the current study, qualitative phases were seen as being equally important to the quantitative phase in informing the final findings. The Medical Research Council (2008) in their guidance about developing and evaluating complex interventions, advocate using a mixture of qualitative and quantitative approaches before embarking on larger scale studies to help refine design and methods.

3.6.2 Rationale for Adopting Mixed Methods

Stroke patients pull out their NG tubes; various methods are used to keep the tubes in place, including mittens, bridle, bandaging on hands, tape on the face and inserting the NG tube on the stroke affected side. A systematic review has shown that these methods have not been properly evaluated; in addition nothing is known about how effective, safe or acceptable patients, their relatives, or staff considers these methods to be. Therefore research into this

issue necessarily starts with a void of evidence either to support or contest the effectiveness of such methods, but with a possibility that interventions such as hand mittens and bandaging of hands, (currently used in clinical practice), may be seen as a form of restraint. For this reason it was deemed pertinent to commence research using an inductive qualitative approach, generating evidence based on the 'lived experiences' of patients and relatives and staff as a means of developing research categories.

Initially, focus groups with staff and one-to-one interviews with patients and relatives were carried out. During the focus groups and interviews several categories emerged and the emphasis of the initial enquiry evolved and broadened. For example, patients and relatives raised the issue of training nurses to insert NG tubes. The views of patients and relatives regarding NG insertion suggested that traumatic tube insertion might have an impact on whether the stroke patient subsequently pulled the tube out. This issue emerged as a consistent theme from patient and relative interviews. It became clear to the me at this point that, in the light of these unanticipated findings, that the focus of the research approach should be broadened to include a quantitative element in order to answer questions regarding the type, level and frequency of training given to nurses about the insertion of NG tubes.

3.6.2.1 Justification for Qualitative and Quantitative Data Analysis Approaches

The qualitative data analysis technique chosen in the current study was constant comparative analysis in keeping with the Grounded Theory Approach (Strauss & Corbin 1998). This allows for one interview and or focus group to build on the previous interview and or focus group until a composite view is derived (Strauss & Corbin 1998). Its other strength was that this technique of analysis enabled a demonstration of the trustworthiness of the data (Creswell & Plano Clark 2007) as the opinions and experiences of participants were evaluated from one interview to the next and one phase to the next. It was decided that given the acute nature of the patients' condition that to have returned interview transcriptions to them would have been an imposition.

The next phase of the study used quantitative analysis using parametric and non-parametric tests. Although qualitative comments were collected within this phase, they were scant. It was decided that it was important to obtain a richer picture through further qualitative interviews of specific areas of practice, which due to their ethical nature were potentially sensitive. Furthermore, since NG feeding is not unique to the stroke speciality, this final phase allowed data to be collected from nurses from other specialities including nurse education (both student and Lecturer). These data were also analysed using constant comparative analysis. The only other method of qualitative analysis which could have been used would have been a thematic approach. However, this would not have allowed for a cumulative picture nor would it have allowed confirmatory evidence to be collected between interviews, focus groups, subsequent phases and specialities which enabled the development of the theoretical model which was grounded from these data.

3.7 Research Process

This study used a three phased mixed method design. Phase 1 involved focus groups with multidisciplinary stroke unit staff and one-to-one interviews with stroke patients and or relatives. Findings from phase 1 were used to inform phase 2, a postal survey sent to a convenience sample of registered nursing staff working with stroke patients across the United Kingdom. Phase 3 involved further interviews with nursing staff to help further develop, explicate and validate findings from phases 1 and 2.

3.7.1 Phase 1

Phase 1 of the current study was qualitative. It is appropriate at this point to emphasise that the analysis model selected for the qualitative phases of this study was a Grounded Theory ***Approach*** (as developed by Strauss and Corbin, (1990) and Strauss and Corbin (1998)), not Grounded Theory proper as devised by Glaser and Strauss (1967). The rationale for selecting a Grounded Theory Approach is discussed in the following section.

3.7.1.1 Rationale for Grounded Theory Approach

The origins of grounded theory as a strategy for qualitative research were influenced from different epistemological traditions (Bryant & Charmaz 2007; Charmaz 2006). Glaser was a student of Paul Lazarsfeld a social scientist and proponent of the positivist research tradition, famed for his influence in statistical survey analysis (Charmaz 2006; Strauss & Corbin 1998; Lazarsfeld 1977). Strauss's research training was firmly based in the 'interpretivist' paradigm, being greatly influenced by the philosophical stance of 'pragmatism' which informed 'Symbolic Interactionism' (Blumer 1969; Mead 1934). Grounded theory provides a methodological strategy which applies a structure to qualitative analysis. Quantitative researchers in the 1960s saw qualitative research as impressionistic, anecdotal, unsystematic and biased, however grounded theory, offers a more systematic approach to qualitative analysis (Charmaz 2006). It has been said that it was Glaser's intention to codify qualitative research methods (Charmaz 2006); indeed, Glaser and Strauss (1967) state that the basic theme within their book 'The Discovery of Grounded Theory: strategies for qualitative research' is *'the discovery of theory from data systematically obtained from social research'* (Glaser and Strauss, 1967; pg.2).

Grounded Theory has developed and diversified over the past 40 years. Anselm Strauss and Juliet Corbin (Strauss & Corbin 1990; Strauss & Corbin 1998) introduced a sense of greater flexibility into the method and encourage the researcher to think creatively. They emphasise that the techniques and procedures contained within their version of grounded theory are not meant to be used rigidly step by step, but provide researchers with a set of tools to enable a confident approach to analysis. Strauss and Corbin (1998) stated that they did not believe in the primacy of either research strategy and encouraged researchers to think in terms of the *'interplay between quantitative and qualitative methods'* (pg. 31), believing that there was no standard set of methods equally useful for each research step. Strauss and Corbin (1998) cite the example of a research study in which Strauss was involved, where qualitative data collected at the earlier phase of the project help influence and enhance the construction of a questionnaire and subsequent statistical analysis. Grounded Theory has become accepted by many quantitative researchers and is adopted as a suitable approach for incorporation into mixed methods studies

(Charmaz 2006; Morgan & Stewart 2002). The qualitative approach taken within the current mixed methods study has been guided by data collection and analysis set out by Strauss and Corbin (1998).

Strauss and Corbin (1998) include the employment of a literature review at the outset of a research study as a means of shaping initial research questions, and subsequently as a way of linking developing theory to established theory. Glaser (1978) eschewed the use of a literature review, suggesting the possibility that preconceptions formed on the basis of existing literature may bias, or otherwise negatively affect the researcher's outlook data collection and analysis. In the current study, a Grounded Theory Approach (Strauss & Corbin 1998) was selected on the basis of the lack of both statistical and literary evidence pertinent to the area under investigation which could not have been established without a preliminary literature review.

3.7.1.2 Elements of the Grounded Theory Approach

The Grounded Theory Approach comprises two key elements: purposive or theoretical sampling, and subjection of data to constant comparative analysis.

3.7.1.2.1 Purposive Sampling

Sampling in phase 1 was arrived at initially by a process of purposive sampling. LoBiondo-Wood & Haber (2006), suggest that purposive sampling may be appropriate for the collection of descriptive data in qualitative studies that seek to describe the lived experience of a particular phenomenon, or in a situation involving the collection of exploratory data in relation to an unusual or specific population. In the current study, purposive sampling was used to identify those participants who were well placed to discuss the phenomenon under investigation.

3.7.1.2.2 Theoretical Sampling

Theoretical sampling is defined by Strauss and Corbin (1998) as purposefully interviewing or observing while looking for instances of similarity or difference. The researcher deduces from the data further differences and comparisons may

be made - for example, who might be the best person to interview next, taking into the consideration what concepts, comparisons or differences have arisen from previous interview data (Strauss & Corbin, 1998). To sample effectively and theoretically the researcher must draw on relevant previous knowledge and experience associated with the area under investigation – knowledge that may be derived, in part, from existing literature. Within the current study, theoretical sampling took place after the initial focus groups and interviews during phase 1. The decision to sample theoretically was based on my knowledge and experience of professional expertise in the field of nursing and NG feeding, supplemented by the initial categories drawn from the analysis of early data from this phase.

3.7.1.2.3 Constant Comparative Analysis

The procedures of identifying properties, dimensions and categories, and formulation of subsequent research initiatives, comprise the second key element of the Grounded Theory Approach namely constant comparative analysis (Strauss & Corbin 1998). The importance of this process derives from the development of properties, dimensions and categories which are literally 'grounded' in the process of qualitative research. As such it is necessary to analyse data both during and after the data collection; as already suggested the tenor of subsequent research phases is vitally dependent upon the researcher's endeavours to identify properties, dimensions, and ultimately categories while research is ongoing. It is this process, which informs the practice of theoretical sampling. As theory develops through data analysis, the individuals, or groups whom one must question, and the appropriate and most potentially fruitful forms of research, become apparent. Classically, constant comparative analysis comprises three stages: open, axial, and selective coding. Open coding, in phase 1 commenced in the aftermath of the first focus groups and initial interviews, and involved the identification of properties and dimensions of the data which were built up using 'invivo' codes (derived from the words of the participants) and or 'substantive' codes (derived from the interpretation of the researcher). For example, evidence provided by patients and their relatives, about the *'trauma'* experienced during NG tube insertion, which may exacerbate extubation, was linked to inadequate training of nurses. This finding prompted

me to consider asking questions about training in the questionnaire. This demonstrates the way in which constant comparative analysis may play a vital role in determining the ongoing pattern of the research and relevant data retrieval.

Open coding is typically followed by axial coding, in which properties and dimensions are resolved into larger categories; however the researcher should remain flexible, avoiding constraining the data which may detract from the essence of the analysis (Strauss & Corbin 1998). The analysis is then completed by selective coding, which involves the integration of concepts around a core category or Basic Social Process (BSP) (Morse 2008a). This stage is often associated with validating the integrated scheme; refining the theory and following through on lose ends (Strauss & Corbin 1998).

In practice, I found it necessary and sensible to adopt a more fluid approach to coding, moving between the different elements of the coding process, as further information, and reflection upon that information took place; the aim being to explain the phenomenon under investigation and not to fragment the data to such an extent that the wholeness or essence becomes lost and the sense of meaning of peoples' experiences become hidden. This fluid approach represents a pragmatic response to the Grounded Theory Approach in a mixed methods study, and is recommended by Strauss and Corbin (1998).

3.7.1.3 Possibility of Bias; the Dilemma of Generalisation

Purposive sampling strategy does have limitations, and has been criticised in terms of introducing possible bias. There is potential for the researcher to over-represent particular sub-groups of a population. Indeed sourcing all possible representatives of a specific group may not always be practical or possible, especially in the case of a patient population with a particular disease process such as stroke. The severity of the disease may exclude certain subjects from participating in the study. It can be argued that the study results in such circumstances would consequently be non-generalisable to the population under investigation. However, the purpose of qualitative research is not generalisability. Specifically, in the case of Grounded Theory, the purpose is to pursue and report new information relevant to an issue for which there is a

paucity of evidence, and for which there may be little or no extant abstract theory – deriving that data from individuals who have experienced the phenomenon under investigation, or, where the nature of their condition precludes direct questioning, from those who are related to them, or connected in other ways to their situation. Where extant theory may be referred to, this approach seeks to clarify, broaden and supplement it; or where, as in the current study, no substantial theory exists, the approach contributes to the formulation of theory. In such circumstances, it should be clear that the Grounded Theory Approach predicates the necessity of purposive or theoretical sampling, since there is little point for the researcher in seeking information from participants who have no experience or knowledge of the phenomenon under investigation, or subsequently seeking information in areas, or from individuals of no relevance to the developing theory.

3.7.1.4 Rationale for Focus Groups

Focus groups are appropriate if a research question indicates that verbal interaction between four or more individuals, plus a facilitator, will produce relevant data. It was decided that focus groups were the most appropriate method for data collection from members of the multi-disciplinary team in stroke units, due to the potential for focus groups to provide a representative forum for multidisciplinary team interaction and hence richer data through this interaction than might emerge from individual interviews.

The methodological underpinning of a study also determines whether or not focus groups are appropriate. Kidd and Marshall (2000) point out that focus group methods developed and existed independently from the prominent methodological traditions within qualitative research so are not intrinsically linked with these. As focus groups take place away from a naturalistic environment they do not provide the first-hand experience of a culture that is the hallmark of ethnography. As data are forged through interaction between participants focus groups cannot achieve the understanding of individual lived experience that is a prerequisite of interpretive phenomenology. Focus groups are considered incompatible with phenomenology for this and other reasons discussed by Webb and Kevern (2001). The current study used a Grounded Theory Approach to qualitative analysis. Focus groups are congruent with

Symbolic Interactionism, a sociological concept - developed by Mead (1934) - which, in the context of Grounded Theory, proposes the generation and analysis of data based upon the subjective meanings attached to naturalistic experience and social interaction by the participants in the study. It should, however, be noted that Glaser and Horton (2004) are emphatic that Grounded Theory and Symbolic Interactionism are not synonymous and emphasises that the former is a general inductive approach.

Whilst the use of focus groups is advocated as a means of obtaining rich qualitative data, Webb and Kevern (2001) point out that the philosophical underpinnings of the research approach, and the human interaction that generates data, are seldom explicated in presentation of research findings. In recent years the use of narrative accounts as appropriate data sources for theory development has increased. Research interviews however, whether focus group or individual, are socially-constructed events and cannot be assumed to provide unproblematic access to 'the truth'. The current study adopted the approach identified by Atkinson (1999), which proposed that;

> *"…personal narratives are themselves social products – subject to cultural conventions of style, genre and structure. Seen from this perspective, narratives are far from being transparent accounts of personal experience" (Atkinson 1999, p.196).*

In focus groups participants may be strangers or, as in the current study, known to one another; either situation affects both what is said (or unsaid) and the style in which it is recounted. The facilitators were also aware that their positions as researchers, would impact on participants. Format and content of discussion differ according to 'audience' and context. Barbour and Kitzinger (1999) reinforce the need to recognise the variability of data according to the situation in which they are obtained. For example, in Barbour's (1999) (as cited in Barbour & Kitzinger 1999) study of the impact of a pilot project involving changed management arrangements for community nurses she found that within a focus group more critical comments were made about other professionals than were made during individual interviews. I was aware that if staff were interviewed individually, different data might have been generated. The purpose, however, was to use the interaction between focus group members to enrich the depth of data obtained.

In addition to the need to account for social context, researchers need to synthesise and analyse data rather than restricting themselves to presentation or description. Morse (1999), writing in her role as editor of *Qualitative Health Research*, comments that some submissions provide minimal synthesis of data, let alone analysis, in the belief that participants' voices should be self-sufficient. Morse (1999, p.163) states that qualitative research must, *"…add something more to the participants' words for it to be considered a research contribution."*

3.7.1.5 Rationale for One-to-one Interviews

Individual qualitative interviews were used in phase 1 with patients and their relatives and in phase 3 with nurses. Rubin & Rubin (2005; pg.4), define qualitative interviews as *'conversations in which a researcher gently guides a conversational partner in an extended discussion'* and they may be used as the overall research strategy or used as one of several methods (Marshall & Rossman1999). Within a qualitative interview the researcher aims to elicit depth and detail about the research topic by following up and exploring answers which the interviewee may give during the interview, thus uncovering the participants' views (Barbour 2008; Rubin & Rubin 2005; Marshal & Rossman 1999). To this end qualitative interviews are often described as being 'in-depth' (Seale et al. 2004). During this process the participants' perspective rather than the researcher's perspective of the phenomenon under investigation should emerge, the researcher's role being largely facilitative (Marshall & Rossman 1999). The interview process used within this study (both individual interviews and focus groups), clearly differs from structured surveys (as used in phase 2) where a structured tool was used to ask participants exactly the same questions. During phase 2 my only interaction with the participants was through postal and email contact for recruitment purposes.

Patients in phase 1 of the study were interviewed individually as the effects of their stroke (e.g. dysphasia, dysarthria) might render group interaction problematic. The individual attention of the researcher in one-to-one interviews permits greater sensitivity to timing, non-verbal language and privacy than is possible in focus groups. Patients' relatives were also interviewed individually because the physical and psychological upheaval created by the patient's

stroke meant that asking relatives to attend focus groups at a venue, date and time suitable for all participants was considered unjustifiable.

The level of structure applied to qualitative interviewing can vary from being completely 'unstructured' where the researcher may begin with a completely 'open-ended' question; to 'semi-structured', where the researcher has ideas about topics that they would like to investigate, but the interview may be run with a flexible agenda allowing the participant to lead. In addition, interviews may be run in a more 'structured' way, using a less flexible agenda and more focus questions (Bryman 2008; Saks & Allsop 2007; Rubin & Rubin 2005). Within phase 1 of the current study, semi-structured interviews with flexible agendas which were participant led were chosen (Bryman 2008; Barbour 2008; Saks & Allsop 2007; Rubin & Rubin 2005).

Questions for initial interviews in phase 1 were derived from the phenomenon under investigation, and to begin with were open-ended and contextually broad. For example, in patient interview one, I opened by asking the participant 'what they could remember about NG feeding' (phase 1; interview 1; pp.3); the breadth and openness of this question did not constrain the participant's response except within the context of NG feeding. The question invites the participant to discuss what was memorable about it, and therefore most significant in their mind. In this particular case, on the basis of the above question, without further prompting or questioning from, the patient chose to relate experiences of NG tube insertion and wearing a hand mitten. Purposive sampling in this instance had enabled me to know that this particular participant had experienced wearing hand mittens and therefore was in a position to potentially discuss this.

As the interviews progressed, purposive sampling developed into theoretical sampling based on the themes emerging from one interview to the next. This in turn influenced what questions were asked. Constant comparative analysis between interviews enabled questions to develop based on information offered in previous interviews (Strauss & Corbin 1998). For example, one patient indicated that the way in which the tape was affixed to his face affected the level of comfort experienced with the NG tube (phase 1; interview 4; pg.3). I was

able to develop this concept in later interviews by asking participants about different taping styles (phase 1; interview 5; pg.18); something which I would not have thought to explore at the beginning of phase 1.

3.7.1.6 Procedure for Focus Groups with Staff

Two focus groups were conducted prior to the commencement of the patient/relative interviews then one focus group afterwards. All three focus groups were held on acute stroke units. Mixing members of staff for the first two focus groups was considered but the logistical complications, for example the geographical distance and staff availability away from their clinical areas, prevented this from being feasible. The analysis of data from the individual interviews and previous focus groups led to conducting the third focus group as a means of further investigating and adding complexity to some of the categories generated. The initial sampling was therefore purposive, but progressed to theoretical sampling which is aimed at further development of emerging categories. The specific aim of the focus groups was to explore the opinion, perceptions and experiences of staff concerning methods used to ensure maintenance of NG tube feeding in stroke patients.

3.7.1.6.1 Focus Group Participants

A sample of between 8-10 permanent hospital staff (including doctors, allied health professionals, nurses and care assistants) who provide care for stroke patients in specialist stroke units in one Health Board in Scotland were approached to take part in one session. All relevant members of the multi-disciplinary team were identified by their managers and contacted by me with an accompanying information sheet (Appendix 1). Non-permanent staff on the stroke units (e.g. relief nurses, locum doctors or students) were not considered to be relevant participants as they were not well placed to provide the information required. The focus groups involved a selection of multidisciplinary staff ranging between registered nurses, doctors, clinical support workers, occupational therapists, physiotherapists and speech and language therapists. The spread of participants can be seen in table 10.

Table 10: Focus Group Participants

Focus Group (FG)	Participants n=17
FG1 n=4	n=3 registered nurses n=1 doctor
FG2 n=6	n=1 registered nurse n=2 speech and language therapists n=1 doctor n=1 physiotherapist n=1 clinical support worker
FG3 n=7	n=5 registered nurses n=1 occupational therapist n=1 physiotherapist n=1 speech and language therapist

3.7.1.6.2 Focus Group Location

Focus groups were held on a selection of specialist stroke units within one Health Board in Scotland. Focus group one was held on a stroke unit that was known to use tape only as a means for securing or maintaining NG tube position for stroke patients. Focus group two was held on a stroke unit known to use such interventions as hand mittens in addition to tape for maintaining NG tube position, both these units were initially purposively sampled as being two areas that used different practices to maintain NG feeding tubes and therefore potentially able to add greater diversity to perception and opinion. Focus group three (held after the completion of the patient/relative interviews) was held on a stroke unit which was again known to use both tape and hand mittens; this third focus group was led by theoretical sampling of the previous data obtained, it was felt that the addition of a further focus group with staff post patient and relative interviews was important to help further explore the experiences of patients. All focus groups were held in private meeting rooms on each stroke unit so staff members were not taken away from the clinical areas for any length of time.

3.7.1.6.3 Agenda for Focus Groups

The purpose of a focus group is to ensure that discussion is participant-led; therefore each group was semi-structured following a flexible format. An example of the format which was used to guide the running of focus groups can be seen in Appendix 3. However in keeping with constant comparative analysis

themes and categories from one focus group would inform the next, so agendas and questions posed in focus groups were flexible and emergent from one group to the next. Focus groups ran for approximately an hour and were tape recorded to enable constant comparative analysis between groups and transcription for subsequent analysis.

3.7.1.6.4 Focus Group Analysis

The audiotape recordings were transcribed verbatim and analysed using a grounded theory approach in order to identify key themes.

3.7.1.7 Procedure for One-to-one Interviews with Stroke Patients and Relatives

Individual interviews with stroke patients and or their relatives were carried out after the first two focus groups.

3.7.1.7.1 Phase 1 Participants

Patients were purposively sampled (Silverman 2005). The aim of purposive sampling is to obtain information from those well-placed to provide it. Patients who had survived stroke and the relatives or representatives of such patients were therefore appropriate sources. Study participants included individuals admitted to a stroke unit with a definite diagnosis of stroke and who had required an NG feeding tube at some point during their admission. I made initial contact with ward managers on a selection of stroke units in one Health Board in Scotland. The ward manager identified potentially appropriate patients for the study. Initial communication with patients was done by the ward manager who gained permission from the patient to meet with me. Only patients who were considered to be clinically stable and with full mental capacity as defined by Adults with Incapacity (Scotland) Act (2000) were approached. Patients were not approached if the clinical team or ward manager considered that they would be unable (by virtue of incapacity), were unwilling to participate, or that participation could be anticipated to cause any psychological or physical distress.

3.7.1.7.2 Relative Representation

Stroke patients who had difficulty speaking (dysphasia) and or articulating (dysarthria), but who showed an interest in participating were asked by the ward manager if their relatives could help undertake the interview with them or represent them independently. In one case however, the relatives of one patient (patient's daughter and her husband) who was unable to participate herself had approached the ward manager of the unit to ask about the research study and whether they could participate as the patient's representative. This was deemed appropriate considering their interest in the study.

Table 11: Interview participants

	Patients (n=4+1patient representative)	Relatives (n=5)	Total (n=9)
Interviews	n=4	n=4	n=8

3.7.1.7.3 Location of one-to-one interviews

Interviews were held in private interviewing rooms on the ward. This was deemed easier for both patients and relatives so that I could come to them rather than require them to leave the ward.

3.7.1.7.4 Agenda for One-to-one Interviews

The purpose of a qualitative interview is to ensure that the discussion is participant-led, therefore interviews were semi-structured and the agenda was flexible (Appendix 3; sample agenda). Interviews were intended to last no longer than an hour and in accordance with constant comparative analysis emergent themes and categories were developed from one interview to the next and interview agendas adjusted accordingly.

3.7.1.7.5 Analysis of One-to-one Interviews

The audiotape recordings were transcribed verbatim and analysed using a Grounded Theory Approach in order to identify key themes. Participants were given a pseudonym in the transcription to ensure confidentiality. Each interview was preliminarily analysed before the next interview took place, thus enhancing constant comparative analysis.

3.7.2 Phase 2

Phase 2 of the study comprised a quantitative survey which consisted of a postal questionnaire sent to a convenience sample of registered nurses working with stroke patients across the United Kingdom (UK). The rationale for choosing a quantitative survey is discussed in the following section.

3.7.2.1 Rationale for Quantitative Survey

A quantitative survey design was chosen to generalise and further develop findings from phase 1. There was a paucity of evidence concerning the maintenance of NG feeding for stroke patients, so an inductive approach was selected in phase 1; this facilitated the emergence of concepts derived from participant experiences and perceptions. To validate and explore these concepts on a wider scale, a deductive approach was selected in the form of a survey exploring nurses' experiences and opinions about the maintenance of NG feeding for stroke patients.

Surveys aim to measure attitudes, knowledge and behaviour and to collect information as accurately as possible. Descriptive surveys are carried out in order to describe populations, to study associations between variables and to establish trends. Longitudinal surveys are conducted at more than one point in time, and aim to analyse cause and affect relationships whereas a cross sectional survey is a descriptive study of a defined, random cross section of the population at one particular point in time (Saks & Allsop, 2007; Bowling, 2002). If the research question is descriptive, then a cross sectional survey of the population maybe appropriate; survey methods may also be employed to ask secondary questions for the same population in addition to testing non-causal types of hypothesis (Bowling 2002).

Cross sectional surveys are often retrospective; they involve asking participants about past and current behaviour, attitudes and events. Longitudinal surveys are analytical surveys that take place over the forward passage of time or prospectively involving more than one period of data collection and tend to follow-up the same population (Bowling 2002). Surveys can be carried out through personal interviews (face-to-face or telephone), self completion questionnaires or diaries (Bryman 2008).

The aims of questionnaires, (self administered survey), are to gather valid, reliable, unbiased and discriminatory data from a representative sample of respondents. I chose to use a postal questionnaire design to gather information from nurses working with stroke patients across the UK. Although commonly quantitative, questionnaires can draw on both qualitative and quantitative forms of questioning; either open ended semi-structured questions or closed questioning requiring a direct response from a selection of possible responses (Saks & Allsop, 2007).

The survey design in the current study consisted of a non-experimental descriptive research design focusing on the retrieval of data concerning the attitudes and experiences of respondents through direct questioning of a specific sample (Moser and Kalton, 1971; Polit and Hungler, 1999). For the purposes of the current study, I chose to carry out a cross sectional survey in the form of a quantitative postal questionnaire using closed questioning, taking into account the time constraints. It was considered that the more succinct and direct the questioning, the more likely participants were to respond (Fink 2003). The cross sectional design was considered appropriate for identifying, measuring and collecting data aimed at investigating nurses' opinions about and experiences of maintaining NG tube feeding for stroke patients in addition to assimilating information about current practice and training within the chosen population. The postal questionnaire would enable further investigation and generalisation of findings from phase 1.

3.7.2.2 Questionnaire Design

When designing and distributing a questionnaire several factors must be taken into account including the appearance, length, content, delivery and participant contact procedures (Bryman 2008; Dillman 2000; Oppenheim 1992). Information yielded from questionnaires can be subject to error and bias from a range of sources, however close attention to issues of questionnaire design and survey administration can help to reduce these errors (McColl et al. 2001). Edwards et al. (2003) published a Cochrane Systematic Review looking at methods to influence response to postal questionnaires just before the questionnaire was designed. Findings from this review were taken into account and used to influence the design of the questionnaire to ensure all possible

techniques were being used to positively influence response rate without introducing possible elements of bias. Edwards et al. (2003) evaluated findings from all unconfounded randomised controlled trials of methods to influence response to postal questionnaires and classified and analysed interventions under broad strategies to increase response. Overall, Edwards et al. (2003) found that the following strategies positively influenced response rate:

Table 12: Strategies for improving postal questionnaire response rate (Edwards et al. 2003)

Incentives
○ the use of monetary incentives ○ give incentives with the questionnaire not after
Length
○ use shorter questionnaires
Appearance
○ use a more personalised approach to participants ○ use of coloured ink
Delivery
○ use of brown envelopes ○ use of stamps on return envelopes (first class postage) ○ use of special delivery
Contact
○ pre-notify participants ○ use follow-up contact for non-responders ○ include another copy of the questionnaire in any repeat postings
Content
○ avoid the use of 'sensitive' questions as part of the questionnaire ○ place more relevant questions at the start ○ use questions relevant to the participants ○ use factual questions only (not attitudinal)
Origin
○ university sponsorship
Communication
○ stress how response would benefit society ○ avoid the use of an 'opt out' for response

Edwards et al. (2003) recommend that researchers can increase response to postal questionnaires using these strategies (as summarised in Table 12). I took all these suggested strategies into account when designing and administering the questionnaire. However it was not possible to address all the strategies adequately, for example using monetary incentives or special delivery post, because project funding did not cover such strategies. Ensuring as far as possible a good response rate to a postal questionnaire increases the validity of the findings (Bryman 2008).

Edwards et al. (2003) in their systematic review also showed that there were no significant effects on response rate when: identifying numbers were used on the questionnaire, a booklet format, clear instructions were given as to how to complete the questionnaire or whether a 'don't know' option was included in questions. These findings were also taken into account when designing and administering the survey.

The questionnaire contained eleven questions, the questions covered three sides of A4 paper, was produced in a booklet format so that none of the pages would get mislaid in the posting or return process; my contact details plus space for free comment were also printed on the back of the questionnaire booklet (Appendix 4). Although Edwards et al. (2003) showed that the odds of response using a single page was twice that using three pages, I felt that it was not possible for the selected questions (based on findings from phase 1) to be compacted into any smaller document without relevance, appearance and clarity suffering. It was considered more important that the questions were relevant to the participants, could be clearly read and easily completed. Dillman (2000; pg.32) recommends that;

> *'the goal of writing a survey question for self-administration is to develop a query that every potential respondent will interpret in the same way, be able to respond to accurately and be willing to answer'.*

3.7.2.2.1 Question Design

Before attempting to write a survey question, the researcher must have decided what requires to be known and before the survey is administered questions must have been tested to see whether planned analysis is answering the questions posed. The survey question is a tool which if carefully worded, makes it possible to determine the distribution of a characteristic (for example; attitude, behaviour, belief or respondent attribute) in the survey population (Dillman 2000). Table 13 gives a summary of the questions that were asked on the postal questionnaire, the full questionnaire can be seen in Appendix 4.

Table 13: Summary of questions from postal questionnaire

1.	What methods does your ward/unit use to check that the NG feeding tube is correctly positioned in the stomach?
	a. pH of aspirate b. Whoosh test c. X-ray d. magnetic tipped tubes
2.	Please indicate how **reliable** you think each method is?
	a. pH of aspirate b. Whoosh test c. X-ray d. magnetic tipped tubes
3.	Have you received any formal training regarding any of these methods?
	a. pH of aspirate b. Whoosh test c. X-ray d. magnetic tipped tubes
4.	Does your ward/unit have written protocols for any of the following?
	a. NG feeding b. Hand mittens c. Nasal bridle/loop
5.	Does your ward/unit use any of the following methods to maintain NG feeding tube position?
	a. Insert tube on affected side b. Tape c. Hand mittens d. Nasal bridle e. Bandages on hands f. Tie hands to bed rail g. Posey vests
6.	Please indicate how **effective** you think the following methods are for securing NG feeding tubes:
	a. Insert tube on affected side b. Tape c. Hand mittens d. Bandages on hands e. Nasal bridle/loop
7.	Please indicate how **safe** you consider the following methods are for securing NG feeding tubes:
	a. Insert tube on affected side b. Tape c. Hand mittens d. Bandages on hands e. Nasal bridle
8.	Please indicate how **acceptable** you consider the following methods are for securing NG feeding tubes:
	a. Insert tube on affected side b. Tape c. Hand mittens d. Bandages on hands e. Nasal bridle
9.	If tape is used on your ward/unit, how is it fixed to the patient's face?
	a. Not used b. Nose only c. Cheek only d. Nose and cheek

10. If methods are used on your ward/unit for holding NG feeding tubes in place, where is this documented?	
	a. Not routinely recorded b. Medical notes c. Nursing notes d. Nutritional charts e. Fluid balance charts
11. NG Insertion	
	a. Have you ever attended a formal training session/study day? b. Have you ever received supervised training in the clinical area? c. Do you feel that you have been adequately prepared to insert a naso-gastric feeding tube? d. Do you consider a formal training session/study day to be necessary for registered nurses?

As discussed earlier, it was decided that the survey would contain closed questions only, in other words all the questions posed within the questionnaire provided answer choices (Fink 2006; Fink 2003; Dillman 2000). Closed-ended questions are generally considered easier to answer and analyse and enable the respondent to complete the task more quickly than using open-ended questions (Fink 2003). All the questions posed in the questionnaire were closed-ended questions with ordered response categories as opposed to non-ordered response categories. Questions using ordered response categories (for example 'yes' or 'no'; or strongly agree to strongly disagree), are considered easier for respondents to answer than questions which present categories in no particular order. If categories are not ordered then response to the question may require more thought and complex decision making (Fink 2003; Dillman 2000). Six of the eleven questions in the questionnaire, provided a choice of 'yes' or 'no' responses (questions 1, 3, 5, 9, 10 & 11); these questions sought to ascertain factual information from respondents about clinical practice or training. Only one of the questions (question 4) (which addressed the existence of protocols), included a 'don't know response', this was because as a clinician, I realised that it might be possible that professionals working in the clinical area would not always be aware whether protocols were available, and if this was the case, then this would be an interesting finding in itself.

The other four questions (2, 6, 7 & 8) offered responses from ordered categories along a Likert scale; these questions sought to ascertain opinion based information, which is an appropriate use for a Likert scale (Bryman 2008; Dillman 2000; Oppenheim 2000). The four Likert scale questions addressed reliability of methods for confirming NG tube position (question 2), the

effectiveness, safety and acceptability of methods used to maintain NG tube position (questions 6, 7& 8). The number of scale items in a Likert scale question can range from 1-3, 1-4, 1-5 or 1-7; may include a middle point and commonly run from positive to negative (Trochim 2006; Fink 2003; Dillman 2000; Oppenheim 2000). However, choosing the number of items for the scale can be more complicated, as there are several options for example; whether to include a middle point 'uncertain', 'neither agree or disagree', or whether to include a 'don't know' or 'no opinion' option (Fink 2003). However, the scale should be meaningful, one that makes sense in terms of the surveys specific objectives, the scale should be balanced (the start point is the opposite opinion to the end point) and five to seven point scales are considered most adequate for questionnaires (Fink 2003). Deciding whether to use a midpoint has raised some debate as it has been seen as providing the respondent with an excuse for not answering questions. Fink (2003) advises that a neutral category should only be included when the researcher is sure that it will provide a valid response.

Questions 2 and 6, addressed nurses' opinions about 'reliability' and 'effectiveness' of interventions, these two questions contained six possible options for respondents to tick. I felt that it would be irrelevant for respondents to be asked for their opinions about 'reliability' and 'effectiveness' if they had not ever used the interventions in the question, therefore a 'never used' option was added and the total denominator for analysis of these two questions was adjusted to include only opinions of those who had used the interventions listed. The remaining two Likert scales (question 7&8) consisted of five options only without a 'never used' option; it was considered reasonable and important for respondents to be able to express an opinion about the safety and acceptability of interventions, even if they had not used them in practice. All the Likert scale questions included a mid-point which was phrased as 'uncertain'. I considered that in the context of the research this was a valid response especially in view of the fact that there were many ethical implications around the acceptability and safety of some methods used for maintaining NG feeding tube position.

The questionnaire content included themes that were relevant and 'interesting' to nurses working with stroke patients. These included; confirming NG tube

position, training nurses how to insert and maintain NG feeding tubes, opinions about the reliability of methods for confirming NG tube position and opinions about the effectiveness, safety and acceptability of methods used to maintain NG feeding tube position. Questions about confirming NG tube position were asked at the start of the questionnaire as due to the recent release of the NPSA (2005a) guidance on confirming NG tube position, this was considered to be particularly 'relevant' to nurses then and therefore may encourage them to answer the questionnaire.

Sudman and Bradburn (1982) suggest putting sensitive questions at the end of a questionnaire as some respondents may find certain questions intrusive or sensitive which may discourage them from completing the questionnaire. None of the questions used were considered to be particularly sensitive. However, the only one that might possibly have caused a level of discomfort for respondents was question 11 (Appendix 4). This addressed whether nurses had been trained how to insert NG feeding tubes, how they were trained and whether they thought training was necessary. Having previously trained nurses how to pass NG feeding tubes, I realised that many nurses felt anxious about passing NG tubes and inadequate if they had not been trained; so this question might be potentially difficult for some nurses to answer and therefore was treated as sensitive.

3.7.2.2.2 Questionnaire Appearance

The questionnaires appearance was thought to be highly important. Fink and Kosecoff (1998) suggest that if a self administered questionnaire is hard to read then it can irritate or confuse respondents resulting in a loss of data. The importance of writing a good questionnaire can be underestimated and questionnaires have been misconstrued as a simple and quick way of collecting data (Bryman 2008). However, if the questions in the questionnaire are the wrong questions, poorly phrased, or in the wrong order, the answers obtained may be worse than meaningless, they may be misleading (Brace, 2004). Therefore time and attention spent designing the content of the questions and layout/order of the questionnaire may be time well spent.

Edwards et al. (2003) found that from ten trials that used coloured paper to print the questionnaire, there was no statistically significant difference in the odds of response when coloured paper was used. However, increases in response rate were noted with the use of coloured ink. Thus it was decided that the questionnaire should be printed in colour quality using grey and black to print the questions with a red title to head the document. It was felt that this would maintain a professional look to the document, keep costs of printing within the available budget, but draw the respondent's attention to the title and encourage them to read it.

The questionnaire was produced in both paper and electronic format so that it could be distributed both by post and via email. However lists provided from each professional group gave postal addresses for the majority of participants, so it was decided that it would be more appropriate to use the postal address only, in an attempt to treat all participants equally and avoid possible selection bias.

3.7.2.2.3 Confidentiality rather than Anonymity

Each participant was assigned a number which was written on the back of their questionnaire; I alone had access to the participant numbers and therefore was the only person who could identify who had or had not responded to the questionnaire. Edwards et al. (2003) showed that using an identifying number on the questionnaire had no impact either way on response rates. Participants had been informed in the covering letter that responses would be treated confidentially but that questionnaire responses were not anonymous. The reason for maintaining confidentiality rather than anonymity was to enable repeat posting to non-responders only, therefore reducing the chance of the same participant responding more than once and possible bias and avoiding the possibility of annoying respondents by sending them a repeat posting inappropriately. In addition, being able to trace respondents back to their name and address allowed geographical location or relevant Health Board or Authority and membership of professional groups to be easily identified at the same times as reducing the cost and time factor involved in a repeat postings.

3.7.2.3 Questionnaire Distribution

3.7.2.3.1 Incentive or no Incentive

Although providing an incentive associated with completing questionnaires has been shown significantly to increase the chances of the recipient replying (particularly monetary incentives) (Bryman 2008; Edwards et al 2003), it was decided that an incentive would not be included, as project funding did not extend to such possibilities. However respondents were offered the opportunity to receive a summary of the results by completing an enclosed identity slip (Appendix 5).

3.7.2.3.2 Pre-notifying the Participants

All potential respondents were pre-notified about the fact that they would receive a questionnaire, and what the questionnaire was about. Notification was carried out through each professional forum. Members of the NSNF and SSNF received a 'flyer' about the research questionnaire along with their monthly forum bulletins. For potential participants from Lothian NHS, 'flyers' were sent to the ward manager of each stroke unit for distribution amongst their staff.

3.7.2.3.3 Piloting the Questionnaire

The questionnaire was piloted on a group of Critical Care Nurses studying at a local Higher Education Institution. It was considered important to pilot the questionnaire to check the layout, appearance, wording and coding for proposed analysis. The pilot sample included n=11 nurses; these nurses did not work within the speciality of stroke, however as critical care nurses they had experience of managing NG feeding. The pilot group were practising nurses who worked in high dependency settings, familiar with the process of NG feeding and so considered to be adequately similar to the actual sample; this avoided using potential participants from the population of stroke care nurses.

I met with the pilot group all together, the group was given time to complete the questionnaires independently, mark any comments they had about questions on the questionnaire and then given time to discuss their questions with me.

Overall, the group found the questionnaire easy to follow and questions clear. One participant commented that they did not like the fact that the Likert scale questions changed direction, some started with a positive opinion choice e.g. 'very reliable' and some started with a negative opinion choice e.g. 'very ineffective' (see questions 2, 6, 7 & 8 of questionnaire: Appendix 4). However, I decided not to alter this aspect of the Likert scale questions as none of the other participants commented on this, in addition Fink (2003) suggests that deciding whether to start with the negative or positive response in a self administered survey is not important unless the question is sensitive, none of the Likert scale questions in the questionnaire were considered to be sensitive. The only other comment made about the questionnaire was that it may have been interesting to add another question about what types of tape were used for securing NG tubes. However although this may have been interesting information, I felt that any extra questions may deter respondents from completing the questionnaire and therefore potentially reduce the response rate (Edwards et al. 2003).

3.7.2.4 Questionnaire Sample

The questionnaire sample was selected from three professional bodies of registered nurses working in stroke care across the UK, this being the most convenient way of accessing a representative group of nurses working in this area of healthcare. The groups approached were as follows: (1) Lothian NHS registered nursing staff (Lothian) working on acute and rehabilitation stroke units throughout Lothian NHS (n=96). Permission to access names of nurses working in acute and rehabilitation stroke units was sought from relevant ward managers via email or telephone contact. I had introduced myself to the majority of ward managers during phase 1 interviews and focus groups, which simplified accessing staff for phase 2; (2) Scottish Stroke Nurses Forum (SSNF) (n=199) representing registered nurses working with stroke patients in Scotland. Names of members for this group were held on a central database, again permission to access these names was sought by personal communication with the group secretary who agreed to post two sets pre-printed labels to cover the first and second posting of the questionnaire; (3) National Stroke Nurses Forum (NSNF) (n=233). This group represented registered nurses working with stroke patients in the United Kingdom (England, Wales, Northern Ireland and the Channel Islands).

Details of the group members were held on a central database and although this was accessible through the members' website, permission to access names was sought through personal communication with the chairperson of the NSNF who agreed to email a copy of the names and addresses with the agreement that details would only be used for the purposes of the questionnaire. There was a possibility that there would be duplicate names on the databases. Nurses in Lothian stroke units may also have been members of either or both the SSNF or the NSNF. It was possible that members of the SSNF were also members of the NSNF. To make sure that names were used only once, each list was examined by hand and where duplications of names occurred, contact details from one source only was used. A summary of the demographic data collected can be seen in Table 14. A total of 528 questionnaires were posted out to the three professional groups. Despite attempts, including obtaining data collected from the National Sentinel Stroke Audit (RCP 2006), it was not possible to establish what percentage of nurses working with stroke patients in the UK this sample represented. Therefore, findings from the questionnaire cannot claim to be representative of this population, although they do present data from a substantial number of nurses, thus increasing their validity.

Table 14: Demographic data collected

Demographic	Demographic sub-divisions
Professional Group	➢ Lothian Nurses n=96 ➢ SSNF n=199 ➢ NSNF n=233
Location	➢ Scottish Health Board ➢ English Health Authority ➢ Wales ➢ Northern Ireland
Work Setting	➢ Acute hospital/trust ➢ Community hospital/primary care ➢ Education ➢ Practice Development ➢ Stroke specialist organisation
Nursing grade	➢ Staff Nurse - D/E Grade or Band 5 ➢ Senior Nurse – F/G/H/I Grade or Band 6,7&8 ➢ Nurse lecturer/researcher/other than clinical

3.7.2.5 First Posting

The first posting of questionnaires took place between June and July and respondents were given one month to respond. Although both a paper and electronic version of the questionnaire had been designed, it was decided that for the first posting all questionnaires would be administered by post only. The reasons for this were; I had been provided with only postal addresses for most of the respondents, so time would be saved by not having to search for email addresses; I felt that the questionnaire may have more impact arriving by post and that all participants should receive the questionnaire via the same administration method in the first instance. The package sent to each participant contained the following:

1. Covering letter
2. Questionnaire
3. Results request form
4. Return envelope – first class stamped addressed
5. Outgoing envelope – first class university franking

The covering letter included all the coloured logos of institutions supporting the research, used a coloured heading title and address, was individualised to participant group (i.e. Lothian, NSNF and SSNF) and was personally signed (Appendix 5). I introduced myself in the covering letter, the rationale and context of the study and stressed the importance of nurses' opinions for this research. In addition the letter covered one side of A4 only and gave a date by which completed questionnaires should be returned to me; the time span selected was two weeks in the first instance.

As discussed earlier the questionnaire was in a booklet format to avoid losing pages and an identifying number was written on the back page of each questionnaire to enable identification of those who had responded so the second posting would only be sent to non-responders. By doing this it was felt that the possibility of duplicating responses would be reduced in addition to sending repeat postings to those who had already responded. Finally a brown envelope with a first class stamp was included for returning the completed questionnaires. Edwards et al. (2003) found that using a stamp addressed envelope (as oppose to a pre-printed business reply envelope) and brown

envelopes had a positive effect on response rate, in addition using first class rather than second class increased the odds of response slightly, so I decided that for the first posting a first class stamp would be used on the return envelope. However Edwards et al. (2003) found no significant difference between using franked or stamped envelopes as the out-going envelopes. I decided to use the University first class franking service for this purpose as it was more time efficient than having to hand-stamp all outgoing as well as return envelopes.

3.7.2.6 Second Posting

The second posting of the questionnaire took place between September and October and was only sent to non-respondents from the first posting. The same package was used as for the first posting except a simplified, shortened covering letter replaced the initial covering letter, as it was assumed that the participant would have already read this (Appendix 5). The second covering letter paid greater emphasis to the nationwide nature of the research, (hoping that this might increase the likelihood of response); in addition, a scanned signature was used instead of a personal one, to enable a quick turn around. The return envelopes for the second posting were again brown but with a second class stamp this time.

3.7.2.7 Third and Fourth Contacts

The third contact took place in November and consisted of using the electronic version of the questionnaire which was emailed to participants who had not responded. For those who did not have an email address, third contact was made by telephone. A fourth contact also took place in November and consisted of a phone call to see if participants were able to complete the questionnaire. Once these calls had been made and any further responses obtained, data collection ceased and analysis commenced.

Table 15: Questionnaire distribution and response rate

	Distribution	Response	
1st posting	NSNF n=233 SSNF n=199 Lothian n=96 **n=528**	NSNF n=110 SSNF n=79 Lothian n=40 **n=229**	
2nd posting & other contacts	NSNF n=123 SSNF n=120 Lothian n=44 **n=287**	NSNF n=39 SSNF n=58 Lothian n=26 **n=123**	**Totals** **n=352 (67%)** **Attrition =38 (8%)** **Analysable n=314 (59%)**

The remaining n=38/352 responses were people who felt unable to complete the questionnaire but had given their reasons by post, telephone or email; 3% (n=7/233) nurses from the NSNF and 16% (n=31/199) nurses from the SSNF responded but did not complete the questionnaire.

3.7.2.8 Questionnaire Analysis

Questionnaires were coded by number and codes entered directly into an SPSS database for statistical analysis. Analysis was split into phases (1) Descriptive analysis, (2) Inferential analysis and (3) Further analysis. A pre-analysis protocol for questionnaire analysis was set out before questionnaires were analysed, this can be seen in Appendix 6. The pre-analysis protocol summarises how phase 1 findings informed the content of the questions posed in the phase 2 questionnaire in addition to what stages of analysis would be followed for the descriptive, inferential and further analysis. It was also decided that questionnaire analysis should be carried out under category headings including training, current practice and opinions about current practice.

3.7.2.8.1 Descriptive Analysis

The spread of response across each demographic parameter (professional group, geographical setting, work setting and nursing seniority) were calculated, in addition to the distribution of response across Health Boards or Health Authorities in the UK. Frequencies were calculated for each question across all the respondents and the results organised under training, current practice and opinions about current practice. The plan for descriptive analysis of the questionnaire can be seen in the pre-analysis protocol (Appendix 6).

3.7.2.8.2 Inferential Analysis

Quantitative data can be analysed in a number of ways. Often the choice of which statistical test to use is dependent on the sample, parameters and data distribution (Watson, Atkinson & Egerton 2006; Altman 1993). Generally, parametric tests assume that: groups are comparable, hypothesis tests involve parameters, there is a very large sample size and or data are normally distributed (Watson, Atkinson & Egerton 2006). Non-parametric testing however, has been described as 'distribution free' (Siegel 1957). These tests do not assume a normal distribution or calculate any parameters. Therefore they may be useful for smaller sample sizes and ordinal data (Watson, Atkinson & Egerton 2006).

The researcher must decide which tests (parametric or non-parametric) are most appropriate for the data in question. The criteria usually applied is which tests are most powerful, that is, the probability that the test will reject the null hypothesis when in fact it is false and should be rejected. A Type I error would occur if we rejected the null hypothesis when in fact it is true; this could occur when applying parametric tests to data without a normal distribution or data that contains extreme outliers which could skew the main body of results (Watson, Atkinson & Egerton 2006). Alternatively we may accept the null hypothesis which is not true and therefore should be rejected, in which case we make a Type II error (Altman 1993; Siegel 1957). It may be unwise to consider that a statistically significant effect is a real one, and conversely that a non-significant result indicates that there is no effect, forcing a choice between significance and non-significance hides the ambiguity that exists when inferences are drawn from a sample (Altman 1993).

Watson, Atkinson & Egerton (2006), suggest that in health related research assumptions for random sampling, normal distribution and sample size may not always be met. The questionnaire sample in phase 2 of the current study was drawn on a convenience basis as it was not possible to recruit the target population randomly. The sample was however large (n=528).

In the current study, differences were tested against geographical location (England vs. Scotland), professional group (Lothian, SSNF and NSNF), work

setting (acute or community/rehab/PCT) and nursing seniority (staff nurse or senior nurse). Inferential analysis was carried out using a non-parametric test - chi-square analysis for categorical data (questions 1, 3, 4, 5, 9, 10 & 11) (Watson, Atkinson & Egerton 2006; Altman 1993). Likert scale questions to gauge nurses' opinions, were analysed as interval rather than ordinal or categorical data (questions 2, 6, 7 & 8) (Fink 2006) and therefore parametric statistical tests were applied. Opinions were scored from one to five on the Likert scale, therefore intervals between each scale point were considered to be at a set measurement of one point which piloting had demonstrated was readily understood by participants (Bryman & Cramer 2009; Jamieson 2004; Blaikie 2003; Knapp 1990).

Bryman and Cramer (2009) discuss the selection of parametric versus non-parametric tests for analysing ordinal and interval data. They point out that the choice between tests has undergone some debate. It is suggested that parametric tests assume certain conditions; data must be of a ratio or interval level, the distribution of the population score should be normal and the variance of variables should be homogenous (Watson, Atkinson & Egerton 2006; Altman 1993). However it has been suggested that these tests can also be used with ordinal variables since tests apply to numbers and not what those numbers mean; therefore data are treated as interval or ratio (Bryman & Cramer 2009). With respect to the second and third criteria (normal distribution and homogeneity of variance), studies have shown that where parametric tests were applied to samples which did not meet these criteria, results differed little to those which did. Based in this evidence, it could be suggested that the value obtained is independent of the test used.

In the current study, data were analysed using t-tests for two independent samples and one-way ANOVA for more than two samples. The t-test is known to be 'robust' in that it is not significantly affected by moderate failure to meet the assumptions (Altman 1993). However despite the above evidence, caution was taken with one-way ANOVA. Where equal variances were not assumed for this test, the non-parametrical equivalent test - namely Kruskal Wallis - was used.

3.7.2.8.3 Further Analysis

Further analysis of questionnaire data sought to determine whether there were any significant relationships between the opinions of nurses about the effectiveness, safety or acceptability of methods used to secure or maintain NG tube position using Pearson's Correlation. Comparisons drawn were decided upon before analysis commenced and can be seen on the pre-analysis protocol (Appendix 6) under the section entitled further analysis.

3.7.3 Phase 3

Phase three consisted of further one-to-one interviews with nursing staff and reflected the qualitative approach used in phase 1; interviews were carried out using a Grounded Theory Approach and constant comparative analysis. Phase 3 discussed and deepened the findings of the questionnaire in addition to beginning to explore the relevance of the findings outside the speciality of stroke. It was my assertion that issues concerning training to insert NG tubes and confirm tube position, opinions about methods used for maintaining tube position, and issues with policies and guidelines may be applicable to the wider field of nursing. In addition the opportunity for comments provided on the questionnaire had included comments from respondents concerning the issue of restraint (Appendix 4). It was considered important to explore this issue further. The final aim of phase 3 was to discuss with the participants how best the findings of this study could be applied back into clinical practice, nurse training and any further areas for future research.

3.7.3.1 Procedure for Phase 3 One-to-one Interviews

One-to-one interviews were considered the most appropriate form of data collection for this phase were carried out directly after phase 2 analysis of questionnaire data was completed. Some of the findings from the questionnaire in phase 2 could have been deemed potentially sensitive in terms of discussing personal training provision and participants' opinions and experiences concerning restraining patients to enable clinical treatment; so it was decided that one-to-one interaction with me might enable the participants to express themselves more honestly. Potential participants were approached via email or telephone and given information about the study and why they might be a

suitable participant. If the potential participant expressed interest in the study, they were sent further information about it and given time to consider whether they were interested. Once participants expressed their interest, a date and venue for the interview was fixed.

3.7.3.1.1 Phase 3 Participants

Participants were initially purposively sampled from the local Health Board and University, they included; a Charge Nurse working within the speciality of Parkinson's disease, a staff nurse who had worked within the speciality of neurology (both the Parkinson's and neurology specialities used a lot of NG feeding so were placed to discuss pertinent issues outside the speciality of stroke), a nurse lecturer who was responsible for the nutritional content of the undergraduate nursing programme in the local University (so well placed to discuss the preparation of student nurses in terms of nutrition), and a student nurse in her third year of study, just about to qualify and who it was felt could give recent information about the content of NG feeding in the undergraduate curriculum as she had experienced it, alongside her experiences in clinical practice. The decision to interview a Nutrition Nurse Specialist as the final participant was driven by the data analysis and constant comparison between the first four interviews. Emerging categories indicated that this participant would be well placed to discuss NG feeding within the wider context of many clinical specialties, and the provision of post registration training for NG insertion in the local Health Board. A total of five interviews were carried out.

3.7.3.1.2 Location of Phase 3 Interviews

Interviews were held in private rooms within the University. Participants had been given the choice of attending the University or for me to meet them in a convenient location; all participants opted to be interviewed at the University.

3.7.3.1.3 Agenda for Phase 3 Interviews

Interviews in phase 3 were far more structured than those in phase 1; this might have been expected considering the fact that phase 3 interviews were informed by findings from phases 1 and 2 and therefore the range of topics to be discussed were far more developed than in phase 1. However the intention

was not to close the interview questions, but enable participants to respond openly to findings. An example of an interview agenda for phase 3 can be seen in Appendix 3.

3.7.3.1.4 Analysis of Phase 3 Interviews

The audiotape recordings were transcribed verbatim and analysed using a grounded theory approach in order to identify key themes. Participants were given a pseudonym in the transcription to ensure confidentiality.

Table 16: Summary of data collection Phases 1, 2 & 3

Phase	Methods
Phase 1	Focus Groups n=2 (n=10 staff) One-to-one interviews patients and relatives n=8 (n=4 patients; n=5 relatives) Focus Group n=1 (n=7 staff)
Phase 2	Postal questionnaire (sent to 528 nurses)
Phase 3	One-to-one interviews nurses (n=5 nurses)

3.8 Validity, Reliability and Rigour

Mixed methods research addresses both exploratory and confirmatory research questions in the same study. Therefore information resulting in overall conclusions is derived from both qualitative and quantitative research strategies, this is sometimes referred to as 'meta-inferences' (Bergman 2008). Bergman (2008; p. 101), explains a 'meta-inference' as being conclusions, explanation or understanding developed through the integration of inferences obtained from the qualitative and quantitative strands of a mixed study. The uniqueness of the mixed methods approach being that those 'overall conclusions' could not have been arrived at through either a purely qualitative or quantitative study.

The validity of mixed methods studies has raised much debate which may be understandable considering the mix of research strategies employed. Even language used to express 'validity' differs between qualitative and quantitative researchers. Some qualitative researchers prefer to use terms such as; 'trustworthiness', 'authenticity' and 'plausibility', the term 'validity' being used predominately by quantitative researchers (Bergman, 2008).

Throughout the study it was ensured that data collection was rigorous whether qualitative or quantitative. In the qualitative phases, although participant validation is considered desirable by some qualitative researchers, within the current study this was considered to be potentially problematic considering the communication and potential visual difficulties of the patients involved. Verbatim transcription of the interviews and focus groups was carried out. In addition by using a grounded theory approach the findings comprise a synthesis of the constant comparison and analysis of data, within and between interviews and throughout the study which helps to further validate and confirm reliability of findings from one participant to the next. No single individual is therefore in a position to 'validate' the final account (Creswell & Plano-Clark 2007).

In the quantitative phase of the study, the reliability and validity of the questionnaire was tested during the pilot phase to ensure that the questions were understandable and adequately addressed the research questions; in addition to ensure that they were applicable to the sample, i.e. nursing staff. Further to validating the questionnaire with a pilot sample of nurses, the proposed analysis of the questions was also tested to ensure that the answers were meaningful. During questionnaire administration, all participants were sent the same information and given the same time period in which to complete the questionnaire. A pre-analysis protocol for questionnaire analysis (Appendix 6) had been prepared prior to final analysis to ensure that data were not over manipulated.

Other forms of reliability and rigour were established and maintained within the current study. The audit trail as described by Koch (1994) was evidenced in the qualitative phases of the study by interview tapes and transcripts and the observational, methodological and theoretical notes (Schatzman & Strauss

1973) that I compiled. Notes compiled included field notes that were made throughout all phases of the study, these were used to help substantiate, contextualise and interpret data.

3.9 Reflexivity

Within the current study I aimed to remain as objective and neutral as possible about the research topic throughout the research process. However, although neutrality has been seen as scientifically desirable in research, Denzin and Lincoln (2005) report that it has now been convincingly argued that interviewing is not merely a neutral exchange between the researcher and the researched; and that this is in fact not possible. They report that an increasing number of social scientists have recognised a need to interact personally with the participants (i.e. interviewee(s)) and in doing so feel that this may persuade the participant to reveal more and encourage greater honesty. The role of researcher within such interactive forums as focus groups and one-to-one interviews is therefore integrative.

Within the current study I chose to be open about my background as a nurse with the staff; patients and relatives through all three phases, and in doing so felt that this encouraged a greater level of openness and response. In addition, my understanding of nursing enabled an awareness of the pressure on practitioners in the clinical area, and empathy toward the potential stress of patients and their relatives as a result of illness and hospitalisation. I was aware that a greater level of patience was needed around recruitment, as potential participants would be unlikely to view this study as a priority in the face of potential conflicting work pressures and health concerns. It is not surprising that the demands of care provision may limit ability for active participation in research studies and it is important for the researcher to be sensitive to this and adapt data collection accordingly.

Morse (2008b) suggests that the execution of qualitative research within the health care setting has necessitated modification of such research strategies as interviewing to ensure that data collection is possible in this potentially challenging setting. I found that at times it was necessary to shorten interviews

if patients appeared tired or agitated. I did not feel however, that this had any adverse effects on the quality of the data collected as such human behaviours and signals were possibly indicative of the nature of the phenomenon under investigation, and therefore important to record.

3.9.1 Influence of Researcher Biography

Though I had extensive experience of caring for stroke patients, learning the art of becoming an objective researcher required some practice, but the insights gained from both stances were invaluable in enhancing the understanding of this vulnerable group. Having had experience of working with stroke patients, I felt I had an ability to be able to interpret what patients were trying to communicate in the face of cognitive and physical disability. This made me particularly aware of the need to give time, listen carefully and probe further where I did not fully comprehend what participants were trying to say.

My experience as a previous staff member within the NHS, gave me an understanding and ability which enabled me to be sympathetic to the working patterns and demands of the lives of staff members. This enabled patience and flexibility while gaining access, recruiting and managing groups and interviews; in turn, this allowed participants to feel that they were understood, safe and able to address potentially sensitive issues.

As discussed earlier in this section, the position of neutrality may be considered desirable in qualitative research (Denzin & Lincoln 2005). However as previously acknowledged, I had knowledge of nutrition and stroke and therefore had a prior view as to the topics which required to be investigated. However, it was important to make sure that my expectations of responses were not assumed but were fully investigated to clarify an agreed understanding. It did however allow me to assimilate substantive codes (Strauss & Corbin 1998) based on knowledge of the subject area in deriving categories from qualitative data.

3.10 Ethical Principles Underpinning Research

There are commonly agreed ethical principles for researchers to follow and these are embodied in general codes for conducting research (Burns & Grove 2005; Sim & Wright 2000; Polit & Hungler 1999). Alongside these principles which are discussed in the context of the current study within the following sections, regulations set out by the Adults with Incapacity (Scotland) Act (2000) and the NMC Code of Conduct: standards for conduct, performance and ethics (2004b) were adhered to carefully.

3.10.1 Respect for Persons

Respect for persons is one of the fundamental principles in research that involves human participants. It is the recognition of a person as an autonomous, unique, and free individual and recognises that each person has the right and capacity to make their own decisions (Smilansky 2005). In the context of the current study, the involvement of a potentially 'vulnerable' group of adults based in Scotland, meant that the inclusion criteria applied to potential patient participants must take into account the 'authority for research' as set out by the Adults with Incapacity (Scotland) Act (2000). This Act states that:

> *"(1) No surgical, medical, nursing, dental or psychological research shall be carried out on any adult who is incapable in relation to a decision about participation in the research unless—*
>
> *(a) research of a similar nature cannot be carried out on an adult who is capable in relation to such a decision";*
> *Adults with Incapacity (Scotland) Act (2000); Section 5; pg. 6*

It was not considered necessary to include any stroke patients who were unable to consent to participation. Patient involvement was of a qualitative nature and used purposive sampling techniques. Therefore it was possible to select possible participants who were able to consent to participation and well placed to answer the research questions.

Respect for person encompasses the ethical principles of respect for autonomy, beneficence, non-maleficence and justice in ensuring that neither the researcher nor the research process compromises the rights of the participants

in any way. Therefore the following discussion highlights how the current study addressed each principle to ensure that all participants' rights were protected.

3.10.2 Respect for Autonomy

This may be defined as *'respecting the decision making capacities of an autonomous person'* (Beauchamp & Childress 2001; pg.12). In the context of research this is respecting the participant's right to self determination; that is the right to take part or to withdraw from the study at any time. As already discussed, it was stressed to all participants that their participation was voluntary and that they may choose not to participate, or to stop participating at any point. All participants were fully informed about the study before they agreed to participate. This involved verbal information giving and distribution of an information sheet and time to consider whether they wished to be involved (Appendix 1). Information sheets for those participating in the qualitative parts of the study were tailored to suit the needs of patients, relatives and staff; in addition to this I was available to answer any questions about the study; every effort to inform participants honestly was made.

For those contacted to complete the questionnaire, pre-notifying flyers were sent via the nurses' professional forums newsletter or to the ward manager of local stroke units to inform nurses that they would be receiving a questionnaire; in addition it was decided that a maximum of four attempts would be made to try and contact those who did not respond. If any potential participants in any part of the study declined to participate, their decision was respected and no attempt to coerce them was made.

During interviews and focus groups, if I felt that the patient, relative or staff member appeared at all uncomfortable about the conversation, then the option to end the interview was offered. This was of particular concern with the patients, as although they all had the ability to consent to the study they had all suffered a stroke, so the need to ensure that they felt able to communicate honestly was paramount. During the study, one patient who appeared restless during his interview was offered the option to stop, which he accepted.

3.10.3 Beneficence

This principle concerns the benefit, actual or potential, that the research could have for the participants and the wider population in general (Beauchamp & Childress 2001). To determine this, the researcher must examine the balance of benefits and risks in the study (Burns & Grove, 2005). The projected benefits of the study were to provide information not yet available about methods used for maintaining NG feeding and presenting evidence about the current practice of NG feeding for stroke patients. It was considered beneficial to enable testimonials from patients, relatives and staff to inform care through lived experience; the eventual aim being to improve the maintenance of NG feeding for stroke patients by establishing what constitutes acceptable, safe and effective care. Further to this, the development of recommendations for nursing education and practice would inform future care. It was acknowledged that there might be no immediate benefit to the participants involved, however it was felt that the ultimate intention to improve patient care as a result of the research was justifiable.

3.10.4 Non-maleficence

This principle upholds any participant's right not to be harmed either physically or psychologically by being involved in the study. This principle was given particular consideration concerning the involvement of stroke patients and their relatives. In keeping with the Adults with Incapacity (Scotland) Act (2000), it was decided that only patients able to consent to participation would be approached; however, if patients expressed an interest in the study but felt unable to communicate with me effectively, then with their permission, their relative(s) were approached to take part.

To protect the stroke patient or their relatives, further, from any discomfort or distress, potential participants were initially approached by a member of the clinical team who knew them and informed them about the nature of the study. I would only make contact with the patient and or their relative(s), once the medical team had determined that participation in the study would not cause any undue physical or psychological distress and the participant had expressed interest in being involved.

It was acknowledged that for all participants (patients, relatives or staff), the nature of the subject under investigation could be considered sensitive and possibly distressing especially for patients and their relatives. Therefore to minimise the risk of any potential discomfort or distress, participants were informed that their participation was voluntary and they could withdraw at any time without any repercussion; in addition participants were given the name of an independent advisor connected to the study, who they could contact if they felt they had any concerns at all about the study which they did not want to discuss with me.

Participants' who took part in the qualitative data collection, were assured that any information that they gave would remain confidential. To this end, data was kept in a locked cabinet which was only accessible to me. Participants were given pseudonyms in transcription and subsequent data analysis.

Although the questionnaire was not anonymous, participants who responded were assured by me that all responses were confidential and that I was the only person able to identify who had completed questionnaires; this was only for purposes of repeat postings. All questionnaire responses and participants names and addresses were kept in a locked cabinet.

3.10.5 Justice

The principle of justice upholds the participant's right to fair treatment and the provision of what he or she is owed (Burns & Grove 2005; Beauchamp & Childress 2001). In a research study this would involve fair selection and treatment of subjects.

Subject selection should avoid any social, cultural, racial or sexual biases; the risks and benefits of the study being fairly distributed amongst the participants (Burns & Grove 2005). Subjects in the current study were selected on the basis of their appropriateness to answer the research questions being asked. In phases 1 and 2 of the study, as previously discussed purposive sampling was initially used to select appropriate participants. However, this was not done on the basis of social, cultural or other agendas, but only on the basis of how well

placed subjects were to answer questions about NG feeding. Focus group participants were selected by virtue of their role working on a stroke unit and to ensure that the multidisciplinary team was offered fair representation, the option to participate was offered to all members of staff on each unit. In phase 2 of the study, subjects were selected on the basis of them being registered nurses (both senior and staff nurses) who worked with stroke patients. The most convenient way to access a large sample of registered nurses working in stroke was to go through professional stroke nursing forums and nurses working on local stroke units. Therefore for this phase of the study, the selection criteria applied to the sample was again on the basis of appropriateness to answering the research questions.

Procedures were put into place to ensure the fair treatment of participants in every phase of the study. In phases 1 and 3 it was agreed that all participants would be interviewed at a time and venue most convenient to them. In most cases this was the stroke unit where the patients were residing or staff were working; however some participants preferred to be interviewed within the University. Each participant was offered the same amount of time for their interview and interviews followed a similar pattern. All interviews and focus groups were taped and transcribed to present each testimonial fairly; except in one case where the patient was unable to speak and wrote their responses instead with the assistance of a relative.

Phase 2 participants were each sent the same pre-notifying information, covering letter and questionnaire; given the same length of time to complete the questionnaire and all offered the opportunity to receive a copy of the results. Lists of participants were checked carefully to ensure that no person was able to answer the questionnaire more than once, therefore potentially unfairly representing their opinions.

3.11 Ethical Approval

Ethical approval for the current study was gained from Faculty Research Ethics and Governance Committee Napier University, the Research and Development Department of the Local Health Board and the appropriate Multi-centre

Research Ethics Committee Scotland (Appendix 8). The Ethics Committees understandably expressed concern at the need for a transparent research processes ensuring the protection of a potentially 'vulnerable group' of patients (stroke patients).

3.12 Access

Once ethical approval for the study had been gained, relevant clinicians were approached to organise access to patients, relatives and staff.

3.12.1 Phase 1

Access to patients in phase 1 was organised through permission from Consultant Stroke Physicians on local stroke units. Consultants were each sent information about the study and the type of patients that were needed to participate (Appendix 8). If the Consultants were agreeable to their patients being approached, they were asked to indicate this consent in writing. Once this level of access had been agreed, a meeting with the Charge Nurses from each unit was arranged; this usually took the form of an information giving session about the research project. At these meetings, Charge Nurses were asked if they would be willing to identify and approach suitable patients in the first instance. If patients were interested, the Charge Nurse would then contact me to set up a meeting with the patient. Patients were only accessed once this process had been completed and I always met patients on the stroke unit itself as this was considered to be less stressful for them. To facilitate this process, I contacted each Charge Nurse by telephone on a regular basis.

Participants for focus groups were accessed through permission from Consultants and Charge Nurses. Once permission to access staff had been established, contact was made directly with the Charge Nurse who then spoke to his or her staff about the study. In addition to this, flyers about the study were sent to each unit for display. The Charge Nurses would then set up a suitable time and date for the focus group which staff chose to have on their own units.

3.12.2 Phase 2

Participants for phase 2 were accessed through three avenues; the National Stroke Nurses Forum (NSNF), Scottish Stroke Nurses Forum (SSNF) and nurses working on stroke units in NHS Lothian. Access to the two professional forums, (NSNF and SSNF), were agreed through negotiation with the chairpersons. I spoke directly to each chairperson to agree how names and addresses could be accessed. Although some names and addresses of members could be accessed publicly via forum websites, both chairpersons agreed that they would prefer to send copies of lists directly to me as they would be more up to date. It was agreed that all lists would be kept confidential and only used for the purposes of the research project.

Access to nurses on stroke units within Lothian NHS was agreed via the Charge Nurses of each unit, who too were asked to complete a questionnaire. I met with each Charge Nurse to inform them about the questionnaire. It was agreed that it would be fairer to send each nurse a questionnaire directly via the internal posting system at each hospital, rather than have the Charge Nurses hand them out; so each Charge Nurse provided a list of all their registered staff members on the understanding that their details would only be used for distribution of the questionnaire.

3.12.3 Phase 3

Access to participants in phase 3 was organised either through the participating HEI or the local Health Board dependent on their status. The student nurse and Nurse Lecturer were accessed through their HEI. To approach a student nurse, permission was sought from their year leader who placed an advert on the students' website for any interested participants, accompanied by information about the research project and contact details. Only one interested student contacted me directly. The Nurse Lecturer, who was responsible for the nutrition content of the undergraduate nursing curriculum, was accessed through personal communication.

The other three participants were all registered nurses from the local Health Board. Nurse Managers from each area were contacted through the Senior Research Nurse of the Health Board involved. Nurse Managers provided

names of Charge Nurses who were responsible for units where NG feeding was common. One Charge Nurse agreed to be interviewed herself and another nominated a member of her nursing team, who later consented to be interviewed. The Nutrition Nurse Specialist was also from the participating Health Board; however I approached her personally as a known specialist in NG feeding.

3.13 Consent

3.13.1 Staff Consent

Staff participants in phases 1 and 3 gave verbal or email consent after my initial approach. Further written consent was obtained from all staff members at the beginning of each focus group or interview in phases 1 and 3, consent forms used for this purpose can be seen in Appendix 2. It was emphasised to staff at initial contact and at the beginning of each focus group or interview that participation in the study was voluntary and that they could withdraw from the study at any time without any further repercussions.

For staff involved in the phase 2 questionnaire, assumed consent was considered if participants completed and returned the questionnaire.

3.13.2 Patient and Relative Consent

Patients and or their relatives involved in phase 1 were initially approached by me only once the Charge Nurse of the participating unit had gained their permission. During the initial meeting patients and or relatives were given information leaflets about the study (Appendix 1), and then offered a week to make a decision about participation. However all patients and relatives who were approached, agreed to participate during this first meeting and preferred to set a date for the interview at that time.

On the day of the interview the both patients and relatives were given a consent form to sign, but again the voluntary nature of participation and option to withdraw from the interview was emphasised, with the reassurance that this would have no adverse impact on the patient's current or future treatment.

Patients who were able to communicate effectively in writing were asked for written witnessed consent. Patients who had difficulty speaking (dysphasia), articulating (dysarthria), or had problems with handwriting due to lack of muscle co-ordination, but who were able to demonstrate willingness to participate, were able to provide verbal consent witnessed by an individual not involved in the study (i.e. a staff nurse), which was then documented. If there was any doubt about a patient's ability to provide consent, due to incapacity - as defined by the Adults with Incapacity (Scotland) Act (2000) - then the patients' relative was asked to participate and consent to the face-to face interviews. Consent forms used for both patients and relatives can be seen in Appendix 2.

3.14 Summary

This chapter has provided a clear view of the theoretical underpinnings of the three phases of this mixed methods study. Phase 1 used a Grounded Theory Approach using focus groups with staff and individual interviews with stroke patients and or relatives. The results of these arising from a constant comparative analysis approach led to the development of a questionnaire (phase 2) used to survey qualified nurses working in stroke units across the UK. The results of phase 2 were discussed in a series of individual interviews in phase 3 again using a Grounded Theory Approach. The sampling methods for each phase were enunciated as were the analysis methods used. A reflexive account was also provided. The mechanisms for gaining ethical approach and their underpinnings were discussed as well as the means for participant access.

4 Patient and Relative One-to-one Interviews and Staff Focus Group Findings

4.1 Introduction

A brief introduction is given for each of the participants involved in phase 1. The findings of the three focus groups (n=17 multidisciplinary staff members) carried out on acute stroke units within the local Health Board, of these, two were conducted prior to the individual interviews and one afterwards. Eight one-to-one interviews were carried out with stroke patients (n=5) and their relatives (n=6). The analyses of these data are presented in the form of eleven categories and seven sub-categories using a constant comparative analysis. To protect the identity of all participants involved in this phase, pseudonyms have been allocated.

4.2 One-to-one Interview Participants

Interview 1 (patient)

Mark suffered a stroke approximately four weeks prior to the interview. While being nursed on an acute stroke unit, Mark was approached by member of clinical staff and asked whether he would be interested in participating in the study. He expressed an interest about being involved, so I arranged to meet him. One week elapsed between first approach by clinical staff and conduction of the interview, in which time Mark had been moved to a stroke rehabilitation unit.

Interview 2 (relative)

Mary's husband suffered a stroke two weeks before contact was made and at the time of first contact was being nursed on an acute stroke unit. He was unable to communicate, and being nasogastrically fed; he also had Alzheimer's disease. Mary was asked by a member of the clinical team whether she would be interested in participating in the project. She agreed to be interviewed, but stressed at the outset of interview that she felt she did not know much about the subject. Mary was reassured by me that anything she knew would be of help.

Interview 3 (patient)

John suffered a stroke eight weeks prior to the interview. Between stroke onset and the time of the interview he was fed with an NG tube. At the time of the interview, John was being nursed on a rehabilitation unit. Staff reported that he was quite depressed. During the interview John spent a lot of time gazing out of the window between discussions; he also displayed a habit of waving his walking stick around while expressing his opinions.

Interview 4 (relative)

Jacqui was the partner of Mark whom I spoke to in interview one. Jacqui's mother had also recently died of a stroke; she too had been fed via an NG tube. Consent to speak to Jacqui had been sought from Mark. Jacqui was given the option of doing the interview with Mark present; however she preferred to be interviewed alone. Like Mary, Jacqui was concerned that she would have nothing to contribute. Throughout the interview, I noticed that when talking about her partner the interviewee spoke very confidently, but when recalling her mother's situation she spoke very quietly. Jacqui found it much more difficult to discuss her mother's stroke, possibly because her mother had recently died.

Interview 5 (relatives)

Phil and Jenny were a married couple. Jenny's mother had recently suffered a stroke; she was being cared for on an acute stroke unit, where she was nasogastrically fed. Phil and Jenny heard about the research project from a member of staff on the unit and expressed their interest in being involved via the Charge Nurse of the unit. Shortly before the interview the medical team informed the couple that Jenny's mother was dying. In light of this news, I gave the participants the option of withdrawing from the interview; however they wanted to continue.

Interview 6 (patient)

Jim was an older male patient who suffered a stroke 4 weeks prior to the interview; he had an NG tube in situ. Jim had recently been informed that he would be receiving a percutaneous endoscopic gastrostomy (PEG) tube to replace his NG tube. At the time of the interview, Jim's enteral feed had been delayed so unfortunately he was anxious and hungry; I offered Jim the option of

postponing the interview, however he requested to continue, as a result the interview was quite brief.

Interview 7 (patient with relative representative)

Liz was a patient in an acute stroke unit being nasogastrically fed; she suffered her stroke 3 weeks prior to the interview. Liz was approached by a member of the clinical team and asked if she would like to participate; she agreed to take part but was unable to speak due to a level of dysphasia. To overcome this, a small questionnaire was designed so Liz could write her opinions and experiences down. Her stroke had also affected her ability to write, so she requested that her son Collin was present during the interview to help verbalise her responses to the questionnaire. The questionnaire that was used for Liz can be found in Appendix 3.

Interview 8 (relative)

Paul was the son of Jim whom the researcher spoke to in interview six. During Jim's interview he suggested I might want to talk to Paul whom he felt might be able to offer some useful information. Paul subsequently agreed to take part in an interview. On the day of the interview Paul's father had his PEG tube inserted. Consequently, at the time of interview Paul was unfortunately distracted, since he was waiting to speak to a Doctor. I offered Paul the option of postponing the interview; however he seemed anxious to get the interview completed.

4.3 Focus Group Participants

Focus Group 1

Focus group 1 was held on an acute stroke unit. Four members of staff were present including three registered nursing staff - Jane, Anne and Diane - and one doctor – Suzanne. At the time of the focus group all four participants were working on the unit. This unit administered a small amount of NG feeding for stroke patients; any NG tubes that were inserted were usually only held in place with tape. No other alternatives were available.

Focus Group 2

Focus group 2 was held on another acute stroke unit within the same Health Board. Six members of staff were present including one registered nurse - Jennifer (the ward sister), two speech and language therapists - Nicola and Paula, one doctor - Tina, one physiotherapist – Gabrielle, and a clinical support worker - Felicity. NG feeding was carried out frequently on the unit. Both tape and hand mittens were used to maintain NG tube feeding for stroke patients.

Focus Group 3

Focus group 3 was held on another acute stroke unit within the participating Health Board. This group comprised seven participants; Martin (deputy ward manager), Simon and Gail (registered staff nurses), Peter and Ellen (registered staff nurses), Jill (an occupational therapist), Miriam (a physiotherapist) and Lucy (a speech and language therapist). Peter and Ellen practised on a specialist elderly unit caring for stroke patients. The remaining participants worked on the stroke unit. This unit regularly carried out NG feeding for stroke patients and used both tape and hand mittens for maintaining tube position.

4.4 Analysis Techniques

The interviews and focus groups were carried out using theoretical sampling and constant comparative analysis in accordance with a Grounded Theory Approach (McCann & Clarke, 2003a; McCann & Clarke, 2003b; McCann & Clarke, 2003c; Strauss & Corbin, 1998). The interviews and focus groups were analysed using open coding to conceptualise and identify categories from the data (McCann & Clarke 2003b; Strauss & Corbin 1998). A combination of 'in vivo codes' (directly related to the language of the data) and 'sociological construct' (derived from substantive data from the field and the researcher's knowledge and expertise) were used to build up and identify categories.

I transcribed all the interviews and focus groups verbatim and then analysed them using constant comparative analysis, in keeping with a Grounded Theory Approach. Each interview and focus group was initially read and analysed prior to the commencement of the next. Themes identified from preliminary analysis were noted and carried into the next interview to enable further clarification and exploration. Categories were identified within the data using relevant coding

procedures as discussed in chapter 3. These categories were further subdivided into properties and dimensions:

- Subtitles in bold denoted by two numbers (e.g. 4.5) represent categories
- Subtitles in bold denoted by three numbers (e.g. 4.5.1) represent sub-categories of larger categories
- Words in italics with single speech marks within the text represent actual words used by participants (*in vivo* codes)
- Questions posed as part of the analysis represent questions put forward by me as a result of analysing the data
- Participant views within the text are either represented using the participant's name or using the term participant
- My interpretation of the findings are presented in the third person

Interviews and focus groups within this phase were generally shorter than those in phase 3 and participants' responses to questions or discussions about the topic of NG feeding a lot less detailed. In particular, patients' response to my questions often only consisted of a couple of words or a short phrase which is reflected within the interview excerpts below.

4.5 NG feeding doesn't feel good

The general perception of patients and relatives regarding NG feeding was that it is not a pleasant experience; both patients and relatives use negative terminology in association with the experience of NG feeding. NG feeding was described as a *'necessary evil'* (Mary; p.2)*, 'terrible'* (Jim; p.2)*, 'doesn't feel good'* (Jim; p.2). When Jim was asked how he felt about having an NG feeding tube, he replied: *'I don't feel very good'* (Jim; p.2). Similarly John and Mark associated NG feeding with *'discomfort'* (John; p.2) and *'stress and trauma'* (Mark; p.3).

Mary was present during her husband's NG tube insertion and gave the following description:

> *"…when he first eh got it in naturally like everybody else knows, coughing and spluttering and what have you, and it was a necessary evil […], and we had to get it down to get nutrition into him…"(Mary; relative, p.2)*

Jacqui reported finding her partner Mark's NG tube insertion *'distressing' (Jacqui; pg.1).* However, like Mary she viewed the insertion as something that was necessary:

> *"…it was unsuccessful I think a couple of times and again that's distressing for everybody, you know….but then, then I just kinda looked on it as a necessary evil…" (Jacqui; relative, p.2)*

Staff's overall opinion of NG feeding was that it was necessary and their main concern about NG feeding for stroke patients was how to keep NG tubes in place. They felt this was important, as from their perspective it must be more physically and emotionally traumatic to have an NG tube repeatedly inserted than experiencing interventions such as hand mittens for keeping NG tubes in place. Felicity, a clinical support worker (CSW), reflects this opinion in focus group two:

> *"Easier option rather than having to constantly pass tubes." (Felicity; CSW FG2; p.4)*

Paul (Jim's son) also echoed this opinion, his main concern being that the patient was able to eat and therefore needed to receive nutrition, which for the majority of relatives was their main concern:

> *"…you got to keep the tubes in place to eat…." (Paul; relative p.8)*

4.5.1 'Intrusive and uncomfortable'

NG insertion was seen as a sub-category of opinions and experiences about NG feeding. NG insertion was only discussed by patients and relatives who recalled it as being a very negative experience. The patients discussed NG insertion from their own experiences, and relatives tended to relate their interpretations of what their family members had been through, and what they witnessed within the clinical areas. Patients, especially, indicated that NG tube insertion was '*uncomfortable'*, '*traumatic' and 'terrible'*:

> *"Well, the most horrible part of it, about it, was it being inserted" (Mark: patient p.3)*

> *"I found it intrusive and uncomfortable" (John: patient p.1)*

"Oh, em getting it in through your nose [……] it's a bit, it din'nae feel very good…." (Jim: patient p.2)

Relative's perception of NG insertion indicated that they also regarded it as an unpleasant and '*distressing'* process; some of them were present during NG insertion:

"I did find it quite distressing the very first day that they were trying to put it in, because the fact that they were trying to do it at visiting time [……]and we, we were just outside and could hear it….." (Jacqui: relative p.1)

"I was there to sort of calm him down a wee bit […..] and when he first eh got it in naturally like everybody else knows, coughing and spluttering and what have you, and it was a necessary evil" (Mary; relative p.2)

These comments suggest that it is not necessarily appropriate for relatives to be present during NG insertion. NG insertion is a traumatic and uncomfortable procedure for the patient. Witnessing it may only add to the relatives' level of distress in an already distressing situation, emphasising and enhancing their negative perceptions. Mary, a relative, indicated that she was there to help keep her husband calm, suggesting that there was a positive role for her to play in the procedure of NG insertion. However Jacqui, Mark's partner, found the experience of being outside the curtain and hearing the procedure very distressing.

Once the tube was inserted however, patients indicated that after a while it felt more comfortable:

"Well once the tube was in, I don't think that it's too bad" (Mark; pg.5)
"After a while you didn't notice it" (John; patient p.2)

This evidence may have implications for tube pulling and dislodgement; it is possible that stroke patients are less likely to attempt to dislodge their tubes once they grown accustomed to them and the memory of the '*trauma'* of insertion has faded. Phil and his wife Jenny, whose mother suffered a stroke, indicated that they felt she grew used to having the tube after a while; she pulled at the tube initially, but eventually settled and seemed to accept it:

Jenny – "Uhuh, but that was initially when she was quite irritated"

Phil – "Yep…since then, she seems to have sort of, accepted it more…." (Phil & Jenny; relatives p.7)

Phil and Jenny also referred to tube pulling as a '*habit',* and proposed that interventions like the mitten could be used in order to break the habit. This perhaps suggests that, if used at all, mittens should be a short term remedy to a temporary problem.

4.5.2 'Some are more skilful than others'

An important dimension and commonly discussed opinion regarding NG feeding was the issue of training for tube insertion (although this issue was raised only by patients and relatives in interviews, not staff in the focus groups). Both patients and relatives reported that several attempts were necessary before the NG tube was successfully inserted – a procedure generally described as extremely distressing for the patient. Some patients and relatives felt this reflected a lack of appropriate training amongst staff; they suggested that some staff were better at inserting NG tubes than others:

Wife – "No, he said "the girls were useless at doing it, that's why I'm going to do it" …..I think it was just experience, he knew what he was doing and didn't have any problems, whereas the, the other staff, they, they couldn't manage it [….] so, I wouldn't like to ask how many times…..they had tried (Jenny; relative p.6)

"…some of them obviously had more skilful at doing it than others" (Paul; relative p.4)

"I think it really comes down to staff training, no one seems to be, even the ones I've seen done here, no one seems to be either confident or competent" (John; patient p.7)

"It was the fact that, the fact that who was doing the first…the first attempt, from their general demeanour of conversation…they reckoned that they weren't going to make it….that they had already given up before they had started…(John; patient p.9)

It is accepted in clinical practice that inserting an NG feeding tube is not a simple process, especially if the patient is unable to understand or 'co-operate' with the procedure. However, John in particular related his suspicion that nursing staff were not adequately trained to pass NG tubes. His description of the events which took place during the process of NG insertion reflected a lack of staff competence. The following excerpt captures this:

John - "It seemed to be a bit of a joke amongst the staff [….], several of them had tried it but hadn't had success, a couple of them who had managed to do it, seemed to be let me have a shot, I tried it a couple of days ago and couldn't manage it [……], seemed to be a very low success rate…."

Researcher – "Do you remember how many times they tried to insert it?"

John – "Happened about 3-4 times"

Researcher – "Right….and how did that feel for you?"

John – "Uncomfortable… [….]. On one occasion I ended up having a nosebleed" (John; patient p.2)

A question we might ask is, although the process of NG insertion may be unpleasant, is a lack of confidence and ability on the part of staff making the process more traumatic and therefore more fearful for patients - and are patients consequently more likely to pull their NG tubes out? This was certainly the opinion of John, who went further to suggest that if the procedure is managed correctly in the first place, fewer patients will attempt to remove the tube:

"The best thing is for the procedure to be done correctly in the first place, with the minimum of discomfort. ….Then you probably wouldn't get so many patients pulling them out or whatever" (John; patient p.9)

It is interesting to note that staff did not refer to a lack of training – suggesting that they did not consider it an issue for staff in general, or more specifically a factor contributing to the incidence of tube dislodgement.

4.5.3 The Importance of NG feeding

Overall patients and relatives accepted the necessity of NG feeding for maintaining nutrition, hydration and medication for stroke patients. None could suggest an alternative means for the initial stages after stroke. However, there is a suggestion in evidence given by Jacqui regarding her mother's experience, that the administering of an NG tube had in fact '*prolonged'* her mother's life against her mother's wishes:

"….had seen my mum come to a point in her life where she was fed up and she had had enough [……]...she was ready to go' ……she had a feed tube put in, she could hardly speak, occasionally she could say

some words…em…and she just kept pulling it out, ….and like "I don't want to be here" (Jacqui; relative p.3).

As a result of her experiences with both her partner Mark and her mother, Jacqui came to the realisation that every stroke case is individual, and each patient may cope in different ways:

"….as they said to me from day one every stroke is different and every patient is different, and just by visiting constantly you just see that so much […..] You know….everybody copes in different ways and gets on individually" (Jacqui; relative p.9)

Jacqui's experience may have implications for the process by which healthcare staff judge the necessity of NG feeding and stresses the importance of responding to each case individually rather than relying on blanket policies.

4.6 Perception versus facts

It is reflected in the evidence from interviews and focus groups that tube pulling and dislodgement are common among stroke patients. The circumstances of tube dislodgement ranged from instances of deliberate removal by patients to cases in which the tube has fallen out as a result of the patient sneezing. However, patient recall of tube pulling and/or dislodgement was variable. In the majority of instances it was relatives and staff who recollected incidents of tube dislodgement, and the number of times tubes were replaced. This is not entirely surprising – diminished recollection may be anticipated in stroke patients, suggesting that patients are unaware, or only partially aware of what they are doing when they dislodge NG tubes. Mark and John related situations in which they felt staff inferred that they had pulled out their NG tubes, although they themselves were unconvinced:

"No. I can't remember anything [indistinct] no nothing like that. Obviously I may well have done it inadvertently or something, or maybe, but no. [pause] In fact I was surprised when they said that […..] [pause] I'm not brave enough to pull out tubes!" (Mark; patient, p.9)

Patient accounts often demonstrated a limited or distorted retention of 'facts' in the immediate aftermath of stroke. Mark for example was certain that his initial tube insertion was carried out by a lay person in the bus station although this

was discounted by Jacqui. Patients appeared unaware of the number of tube insertions they had undergone - the number recalled was lower than that reported by their relatives. Whilst participants were asked for *their* perceptions and it was the patients' recollection of events that was important, the dissonance between perception and fact suggests that some tube removal and dislodgement may subsequently be forgotten by patients.

4.7 'Keeping tubes in place to eat'

All the participants spoken to in phase 1 had strong opinions about interventions used for keeping NG tubes in place on stroke patients. Interventions discussed with participants during this phase are presented separately as sub-categories of this category.

4.7.1 Hand Mittens

Mark was the only patient with experience of mittens – an experience vividly recalled and spontaneously described in his interview: he had found them '*frustrating'*; *'pure torture'* and '*begged to have them taken off'* (Mark; pg.7). While acknowledging the potential usefulness of mittens, it was the general opinion amongst the other patients that they would find them frustrating, and seek a way of removing them.

John suggested that mittens added to a sense of '*loss of dignity'.* He described them as '*insulting'* and saw them as a punitive measure:

> *"Why not just put them in a straight jacket. […….] You know, I mean go the full hog [……..]…give them an electric shock if their hand goes near their nose" (John; patient p.9)*

Relatives had a generally more positive reaction to hand mittens than patients; Jacqui and Mary, who saw the mitten used on a family member, suggested it was successful at preventing tube pulling and dislodgement:

> *"….having the glove on was good in that it kept him from pulling the tube out…" (Jacqui; relative p.6)*

"…it is helping him in as much as he can't pull the tube out..." (Mary; relative p.3)

Those relatives who had not seen hand mittens in use, while accepting their likely effectiveness, expressed concern about their design, appearance and cleanliness, and the effect they might have on patient dignity and comfort. The mitten was referred to as a *'boxing glove',* being *'big'* and *'heavy'* and *'returning the patient to a childlike state'*, and again was likened to a punitive measure. Jenny, who recalled how her mother enjoyed feeling the sheets with her hands for comfort, suggested that a mitten would be perceived as a deprivation - as if saying to her, *'you've been naughty, and so you're not going to play!'*

Mark was convinced that his mitten prevented him from moving up the bed;

" I felt totally powerless because you know I had this memory, I wanted to try and get myself up the bed, it was like trying to box with cotton wool, I couldn't get any purchase on anything with it".(Mark; patient p.8)

Continuing this account, he described how he eventually managed to remove the mitten:

"It was on until I cut it…..I cut it anyway. I couldn't handle that – that was driving me crazy! I was going round the bend!" (Mark; patient p.8)

Jim decided to try a hand mitten on during his interview, he described it as being a *'bit awkward' (Jim; p.6)*, he was however reassured that he could still move his hand with it on, although it was not long before he decided he did not like the experience of wearing it:

'I would pull that off….I can move my hand….but I'm ready to take it off' (Jim; p.6).

These patient experiences suggest that hand mittens could potentially be harmful both physically and mentally for the patient. Stroke patients commonly lose the mobility in one side of their body, therefore can it be ethical to immobilise their one *'good'* side with a mitten. Can possible mental and or physical harm to the patient be balanced against hand mittens serving a purpose in preventing the NG tube from coming out, therefore enabling the patient to receive nutrition, medication and hydration?

Some relatives expressed concern that mittens might hinder the patient's mobility. If mittens do hinder mobility, is it possible that long-term rehabilitation could also be adversely affected?

> *"That would, that would be the same effect as the having the hands paralysed by the stroke" (Jenny; relative p.11)*

> *"I understand why the mittens are used, but I'm not convinced they are a good idea as you can't do anything with your hands" (Collin; relative (spoke on behalf of Liz a patient) p.3)*

Hand mittens (as discussed in chapter 1) are used by physiotherapists as a form of constraint therapy for stroke patients and may help improve mobility in the affected side more quickly. Jacqui intimated that, with the mitten placed on his 'good' hand to prevent tube pulling, Mark was obliged to start using his affected side:

> *"…that was when he started moving his left hand….. Because he had to scratch [….]…..you know and he couldn't do it with that hand" (Jacqui; relative p.7)*

However, the ethics of implementing a form of restraint on a potentially confused patient perhaps should be considered if hand mittens are to be used as a means for preventing NG tube dislodgement.

Mary described how:

'*Her husband pulled his tube out as a result of the staff nurse loosening it off*' (p.3).

This action by the staff nurse may reflect a level of indecision as to whether they considered the hand mitten to be acceptable, comfortable or potentially harmful. Staff from focus groups had mixed opinions about the acceptability of mittens and their effectiveness, they also expressed concern about how ethical and legal it was to use hand mittens (this is discussed further within the category of ethical and legal concerns):

> *"They certainly make em getting people through that confusional crisis very much easier" (Nicola; SLT, FG2; p.8)*

"…it's the easier option for the staff, but is it the best option for the pt?" (Nicola; SLT, FG2 p.5)

"Sometimes it helps but if someone is really determined to remove that tube, then they will" (Simon; RN, FG3; p.9)

4.7.2 Taping to the Face

Generally patients felt that taping the tube to the face was an effective method for securing their NG tube, and that this option would be preferable to wearing a mitten or having a nasal bridle. However Jim stated that he did not like tape being attached to his nose, and preferred the tube to be attached only to his cheek. He suggested that taping to the nose was '*itchy'* and uncomfortable:

"Well when you cough or er, er…it sort of….jerks your nose" (Jim; patient p.4)

If taping to the nose is potentially uncomfortable and irritating either because the patient can feel it pulling on their nose when they swallow, or because it is in their line of vision, could this contribute to tube dislodgement? Is the way in which the NG tube is taped to the face something that warrants closer investigation? Is there a more effective way of taping NG tubes to the face that could reduce the chances of the tube being pulled out? If so, it might be more acceptable to patients to ensure, as far as possible, that the tape is fixed to their face comfortably and securely before initiating such interventions as the mitten or bridle.

Relatives regarded taping as the most acceptable method and proposed that it should be considered first as a means of securing the NG tube. However, some relatives expressed concern that the tape used, and the specific method of application was not always adequate for this purpose. They suggested that there was a lack of uniformity in methods of applying the tape:

"….. Other times it's not been anchored to the side of the face, it's just been tucked behind her ear…. [….] it's not always had tape on it, sometimes it's had it had been just sort of tucked…" (Phil; relative p.4)

Does this reflect a lack of staff training for inserting and securing NG tubes – a deficiency which may contribute to the incidence of dislodgement? Staff from focus groups were negative in their assessment of tape as method of securing NG tubes for stroke patients, and identified deficiencies in the types of tape used, stating that fixation plasters which were provided with the NG tubes were generally inadequate, adding that Micropore was often used as a substitute:

> *"Yes it is generally speaking within the pack, it usually dislodges itself after about two days, or the patient's very warm, that'll slide off. You have to end up with [additional taping] otherwise you'll lose the tube either from their movement or because it falls off" (Jane; RN, FG1; p.2)*

> *"It's usually Micropore that we use….because it's got better adhesion" (Jane; RN, FG1; p.3)*

Could there be methods of taping that are more effective than others? Is there one type of tape that is more effective at securing tubes? If so perhaps more effective techniques and materials would negate the need for interventions such as mittens.

4.7.3 Nasal Bridle

None of the participants had first hand experience of either wearing or implementing the nasal bridle; however, the idea of the nasal bridle was not regarded favourably. It was generally considered an unpleasant and potentially harmful intervention and, in comparison with the hand mitten, a more frightening and intrusive option:

> *"It doesn't look like a terrible easy insertion." (Paula; SLT, FG2; p.14)*

> *"…would rather put a mitt on than this" (Tina; Dr, FG2; p.16)*

> *"Doesn't sound too comfortable" (John; patient p.9)*

Participants had concerns about potential harm that might be caused by inserting tape behind the nasal septum and consequent physical trauma that might be caused by the patient pulling on it:

"..Would that maybe cause more trauma if they kept pulling on it?" (Miriam; Physiotherapist, FG3; p.17)

"My immediate reaction to something like that would be how come they wouldn't pull out half their septum as well?...[…]…I mean it's passed across…and tug…cut right into the septum…..could cause all sorts of agony!" (Phil; relative p.16)

However, a member of staff and a relative both commented that the nasal bridle was possibly more cosmetically pleasing than hand mittens:

"It's probably cosmetically more….pleasing, well it looks better…" (Phil; relative p.16)

This touches on the issue of patient dignity – a matter discussed further in the category 'patient dignity'.

4.7.4 Inserting the NG Tube on the Affected-side

Liz intimated, and her son Collin suggested, that:

'she was less aware of the tube and the tape because she could not feel it, and that it being on the side she could not feel was perhaps a good thing as it did not seem to bother her' (Collin; relative p.2).

This suggests that, at least for this patient, the technique was beneficial. Could this be a generally useful method for reducing the incidence of tube pulling or displacement in stroke patients? If so, is it more ethical to place the NG tube on the affected side, than to place a mitten on their hand or a bridle in their nose? Is this something that should be incorporated into training for the passing of NG tubes on stroke patients? Staff from the focus groups had mixed opinions about inserting the NG tube on the stroke affected or weak side. Some were concerned that reduced awareness of the NG tube increased the risk of the patient dislodging it, potentially harming him/herself in the process:

"But, if it's on the unaffected side then they are more aware of it and therefore they're not going to try and walk to the bathroom whilst connected to the bag" (Jill; OT FG3; p.5)

This technique was only discussed in depth with focus group three, since it arose as a result of evidence from Liz in the interview stage. Martin, a nurse confirmed successful experience in using the technique:

> *"Personally I would opt for putting it in the affected side um, from experience that if it's in the affected side they're less aware of it and less likely to mess with it or pull on the tube" (Martin; RN, FG3; p.4)*

As discussion progressed, however, it transpired that other nurses present did not really consider this as an option.

4.8 'Keep explaining to the patient'

Both patients and relatives discussed the level and adequacy of explanation they received. Some relatives suggested that explanation had been excellent *'they all take time to explain things to me'* (Mary; relative pg.4). However, Paul felt there were aspects of his father's care he might have learned of earlier, and was upset that his father seemed ill informed about his own treatment. While admitting his frustration, Paul attributed this lack of communication to *'unfortunate circumstances'* (Paul; relative pg.14), referring to the '*pressure'* under which the healthcare team were working. Phil and Jenny also commented that communication from staff was poor, and that staff seemed 'rushed off their feet'. The couple were not told that Jenny's mother had required three NG tube re-insertions, and were disturbed one day to find a hand mitten at the end of her bed:

> *"We came in and there was one of those mitts at the bottom of the bed... [….], laid out ready to go sort of thing" (Jenny; relative p.8)*

It was acknowledged by staff and relatives that stroke patients tend to forget information easily, and suggested that if explanation was regular and ongoing, patients may be less likely to pull their NG tubes out:

> *"I suppose an obvious strategy is just keeping explaining to the patient the rationale for why the tube is there. And I don't suppose you can do that often enough actually. So it's a case of reminding them why it's there and then hopefully getting them on board with that plan" (Nicola; SLT, FG2; p.2)*

Patients have a right to know about their care, so every attempt should be made to ensure that patient rights are being addressed.

4.9 'Designed to lower your self confidence'

Ensuring that patient dignity is preserved is of paramount importance during care, yet, as already discussed, NG feeding, and interventions for keeping tubes in place are often felt by patients and relatives to be demeaning. John complained that his dignity was lost the moment he entered the hospital, and that everything seemed to be designed to lower self-esteem:

> *"…you can't be trusted, because everything seems to be designed to lower your self confidence, your self esteem […] you know, from day one […] your dignity you know you lose it, you leave it at reception when you walk in, with any luck if there's any left, it's there when you walk out……"(John, patient; p.6)*

Patient and relative experiences related during phase 1 highlighted loss of dignity not only as a result of stroke, but as a consequence NG feeding and interventions such as hand mittens. Hand mittens were generally regarded as undignified by the participants in this phase. Are methods used for holding tubes in place such as mittens and bridles compounding the loss of dignity patients experience as a result of stroke, and can this be weighed against their potential benefits? Are they being used in the best interests of the patient?

4.10 'I didn't have a choice' – Issues of Autonomy and Justice

Autonomy is the ability and freedom to make decisions; justice comprises the act of respecting autonomy – injustice the act of compromising it. Autonomy is often compromised for stroke patients. Mark, for example, described how wearing a mitten made him feel 'totally *powerless' (Mark pg.8)*, but the factor of potential patient incapacity makes a simple judgement of unjust action problematic. Overall, while such loss of autonomy was regarded with discomfort, it was accepted as an inevitable consequence of the cognitive debilitation many patients experience post-stroke. However, doubt was expressed by some participants as to whether repeated tube removal, rather than being attributable to confusion, indicated the patients' choice to refuse

hydration and nutrition. Many stroke patients are incapacitated and unable to communicate their wishes, making verbal consent to NG insertion impossible; but is the action of voluntary tube removal the patient's way of expressing their right to refuse treatment? Evidence from interviews with patients and their relatives revealed frequent instances of disagreement in the recollection of specific incidents. This suggests that for some patients, the affect of stroke may be an altered understanding of reality, to the point where they are unable to comprehend the purpose of their NG tube. In such cases, tube pulling is perhaps a reaction against something that is '*irritating'* them, rather than a deliberate attempt to remove the tube. Do interventions like the mitten or bridle, by enabling, or enforcing, the delivery of nutrition, hydration and medication, invariably serve the best interests of patients, or by introducing such interventions are we denying their freedom of expression and choice?

John in particular felt that he was not offered any choice as to whether he wanted an NG tube or not and was not convinced that he had lost the ability to swallow:

> *"I didn't have a choice [……] I just got told from day one when I went in, I were told what I could do and what I couldn't do, what was wrong with me, what was right with me" (John; patient p.5)*

Are patients who have the ability to communicate their wishes being given adequate choice? Liz and her son Collin indicated that:

> '*In the circumstances, he did not feel choice was an option'. (Liz & Collin, p.1)*

Thus in this situation the decision taken by the medical team to pass an NG tube was possibly in the patient's best interests.

Perhaps in response to this dilemma, some relatives suggested that the decision to use interventions for preventing tube removal, should be judged on an individual patient basis. Two members of Jacqui's family suffered stroke in quick succession, her mother, then her partner, but Jacqui considered their needs to be completely different. Her partner was given mittens to prevent him from dislodging his tube, and in Jacqui's opinion this was successful. Her

mother who also kept dislodging her tube was not given mittens, and Jacqui felt that in her mother's case mittens would not have been appropriate:

> *"I just felt the whole time that my Mum was so unhappy and so uncomfortable that anything else……" (Jacqui; relative p.8)*

Could this possibly have implications for clinical guidelines on NG feeding for stroke patients? The decision to feed and timing for implementation of interventions such as mittens cannot be standardised, but should be assessed on an individual patient basis.

4.11 Benefits and Harms

NG feeding was seen by both relatives and patients as a necessary intervention to maintain nutrition, hydration and medication after stroke, so although a potentially '*uncomfortable'* and unpleasant procedure, it was still beneficial, *'a necessary evil'*.

Interventions for keeping tubes were viewed in much the same pragmatic way; when asked to rate all three systems (tape, mitten and bridle), both patients and relatives saw tape as being the least harmful and the bridle as being the most harmful. Discussion with relatives especially, revolved around the question of the benefits and harms of interventions:

> *"Well I mean at the end of the day really the point is that he can't swallow [….] and you got to keep the tubes in place to eat, [….] that's really the bottom line isn't it?" (Paul; relative p.8)*

> *"….but I think it aggravated his eczema on his wrist….."*
> *"I think the mitten was probably a good thing […] em…….it just served its purpose" (Jacqui; relative p.6)*

Is it justified that an intervention which may cause emotional and physical distress should be used? Can this level of harm be weighed up against the potential benefits?

It was the feeling of relatives such as Phil that although a patient may dislike the intervention or consider it undignified, it enabled recovery, or prevented greater harm:

"….there are cases where the patient only pull the tube part out, they didn't know about it till later […..] [……], and it ends up in the lungs!" (Phil; relative p.14)

In cases where the likelihood of tube dislodgement is high and there is risk of aspiration due to feed entering the lungs, it is perhaps more ethical and beneficial for staff to use an intervention to reduce this risk even if it affects the patient's dignity and comfort. This seems to alter the emphasis of the question we should ask: is it more harmful to the patient, both emotionally and physically, to experience repeated tube reinsertion as a result of tube dislodgement, rather than use an intervention to prevent this?

4.12 The Nitty Gritty of Mittens

Some of the more practical aspects of mittens were discussed by relatives; Jenny who rejected the option of mittens for her mother voiced concerns about infection control issues. She asked whether hand mittens were used for only one patient, or sterilised and used again. The mittens employed in clinical areas that participated in the study were not disposable and similar concerns were voiced by staff in focus groups. Staff reported that there were no guidelines available as to how hand mittens should be cleaned; one nurse stated that she took mittens home to wash them, as if they were sent to the hospital laundry they often did not come back. Since those data were collected disposable mittens have been produced by the manufacturer; however their cost and effectiveness was not investigated.

Other issues included how warm the mitten was to wear; both Mark and his partner Jacqui were concerned that it may have aggravated Mark's eczema. The size of hand mittens, as an issue of dignity or potential harm was also raised; Phil and Jenny asked whether the design of the hand mitten could be made smaller. Rationale and timing for the introduction of mittens was not clear from the data. For one patient (Mary's husband) the hand mitten was introduced immediately after tube insertion; the patient was confused and disorientated, and deemed at risk of pulling the tube out. Other patients such as Jenny's mother and Mark were only given or offered hand mittens once they had dislodged feeding tubes. At the time this data was collected, there seemed

little communication between staff on this matter. One registered nurse suggested that a couple of failed tube insertions would be a reasonable point to introduce hand mittens:

> *"Yeh you usually see how they get on, don't you? You see how they get on with it and maybe it will involve passing it a couple of times, em, and then [mouthed] we use mitts [half laughed]" (Jennifer; RN p.2)*

No agreed procedures for the introduction of mittens were evident.

There also seemed to be no clear rationale governing the number of mittens used or how they were monitored. Mary reported that her husband was given two mittens; there was no clear explanation for this, although she added that he had been *'lashing'* out at the staff because he was confused and *'aggravated'*. Jacqui admitted that she sometimes removed Mark's mitten:

> *"…sometimes I would take it off when I was in and just hold his hand…" (Jacqui; relative p.6)*

Physiotherapists also suggested that they would remove hand mittens from patients during therapy sessions. However registered nurses did not give clear indication of any guideline or practice followed for monitoring skin condition or hand mobility. Should the mitten be removed regularly for patient comfort and to enable monitoring of the skin? Who should be responsible for this, staff and or relatives? Does the fact that patients require mittens at all reflect poor staffing levels and hence a lack of patient observation? It was suggested by one staff nurse that a lack of staffing resources could be a reason for inadequate patient observation.

4.13 'They didn't have a protocol'

The lack of guidelines and protocols available for such interventions as hand mittens was reported as a matter of concern by staff from all three focus groups:

> *"They didn't have a protocol. There was a lot of difficulties" (Tina; Dr FG1; p.6)*

> *"I just have worries about them [mittens] sort of just being very much part of an automatic care approach" (Nicola; SALT, FG2; p.8)*

In consequence of the concerns expressed by staff, further information was sought from the two units using mittens regarding protocols and/or guidelines. Neither unit had defined guidelines or protocols for hand mittens. I was advised by one of the ward managers that guidelines produced by the manufacturers were used (Posey Company 2007). These were examined. This 'guideline' was not specific to the needs of stroke patients and gave no indication concerning the use of hand mittens on potentially incapacitated patients. The ward manager from the second stroke unit presented a guideline adapted from neurological units in the same hospital (NHS Lothian 2004a; NHS Lothian 2004b); and confirmed the stroke unit was in the process of designing guidelines specific to the needs of stroke patients. From the focus groups it was clear that many of the staff were uncomfortable with the use of hand mittens but conscious of benefits *'I've got worries about them but I'm also seeing the benefits'* (SLT, WGH; pg.7). It was interesting to note that the greatest level of concern regarding mittens was expressed by staff who did not insert NG tubes.

4.14 'Is it the best option for the patient?'

Staff rather than patients related concerns about the ethical and legal implications of interventions such as mittens and the nasal bridle. While nurses were more ready to concede the benefits of mittens, they also reported feelings of 'worry' regarding the legal uncertainty of their position in applying them:

> *"Coz, years ago, we used to put these sorts of restraints on, NG feeds and PEGS and then we went and turned it round and they said it was against the law to, to put restraints on..[…]..And then all of a sudden it was, well, you know, we can put it on. I think the nurses wanted to know where they stood" (Anne; RN, FG1; p.6)*

> *"…it's the easier option for the staff, but is it the best option for the pt?" (Nicola; SALT, FG2; p.5)*

It is interesting that staff who expressed most concerns about the use of mittens more often referred to them as a form of *'restraint'*:

> *"I've only really dealt with two really bad cases where restraints, well what you'd want to call restraints, we used to call them boxing gloves" (Anne; RN, FG1; p.7)*

For those who felt uncomfortable with their use, discomfort was compounded by the lack of guidelines and protocols which posed both an ethical and legal dilemma. However, the issue of restraint was not discussed directly by patients or relatives and overall, although some staff used the term restraint I felt that this issue was not a forthcoming topic of discussion.

4.15 'A Necessary Evil'

Concerns about the ethical implications, harms and benefits of NG feeding, hand mittens and the nasal bridle were raised in interviews and focus groups. Analysis of this evidence gave rise to the emergence of an overarching theme - *'a necessary evil'*, an oxymoron articulated by Mary, Jacqui, Phil and Jenny in relation to NG feeding for stroke patients. This theme represents the ongoing debate regarding the benefits and potential harms of interventions used to maintain NG tubes, and the process of NG feeding itself for stroke patients. The implementation of nutrition is *'necessary'* to aid rehabilitation, but as is evident from the data, the process of inserting and maintaining NG tubes for stroke patients may be perceived as *'harmful'* or *'traumatic'* and therefore associated with the notion of an *'evil'*.

4.16 Summary

The analyses produced eleven categories and seven sub-categories which were used to inform the design of the questionnaire for phase 2. In particular from these categories the following questions arose.

1. Could inadequate training to insert NG tubes be contributing to NG tube dislodgement?
2. Is it more comfortable and/or effective to site the NG tube on the weak/affected side? Is this more ethical/dignified/safer than using interventions like hand mittens or the nasal bridle?
3. Could methods of taping the NG tube to the face be made more effective and comfortable?
4. Could the nasal bridle be a potentially harmful intervention?
5. Can the benefits of mittens be balanced against possible physical and/or mental harm of the patient?

6. Could mittens help to improve the mobility of the stroke patient on the weak/affected side?
7. Are there any protocols in place regarding NG feeding for acute stroke patients or the use of interventions for holding NG tubes in place? Do these protocols need defining further?
8. Are interventions used to keep tubes in place being used in the best interest of the patient?

5 Questionnaire Results - Part 1

5.1 Introduction

This chapter presents quantitative data findings from the questionnaire sent to a convenience sample of registered nurses working with stroke patients across the United Kingdom. This chapter presents overall responses to the questionnaire and demographic data. There were three main topics addressed namely training, current nursing practice regarding NG feeding for stroke patients and nursing opinions about current practice.

5.2 Overall Response to Questionnaires and Demographic Data

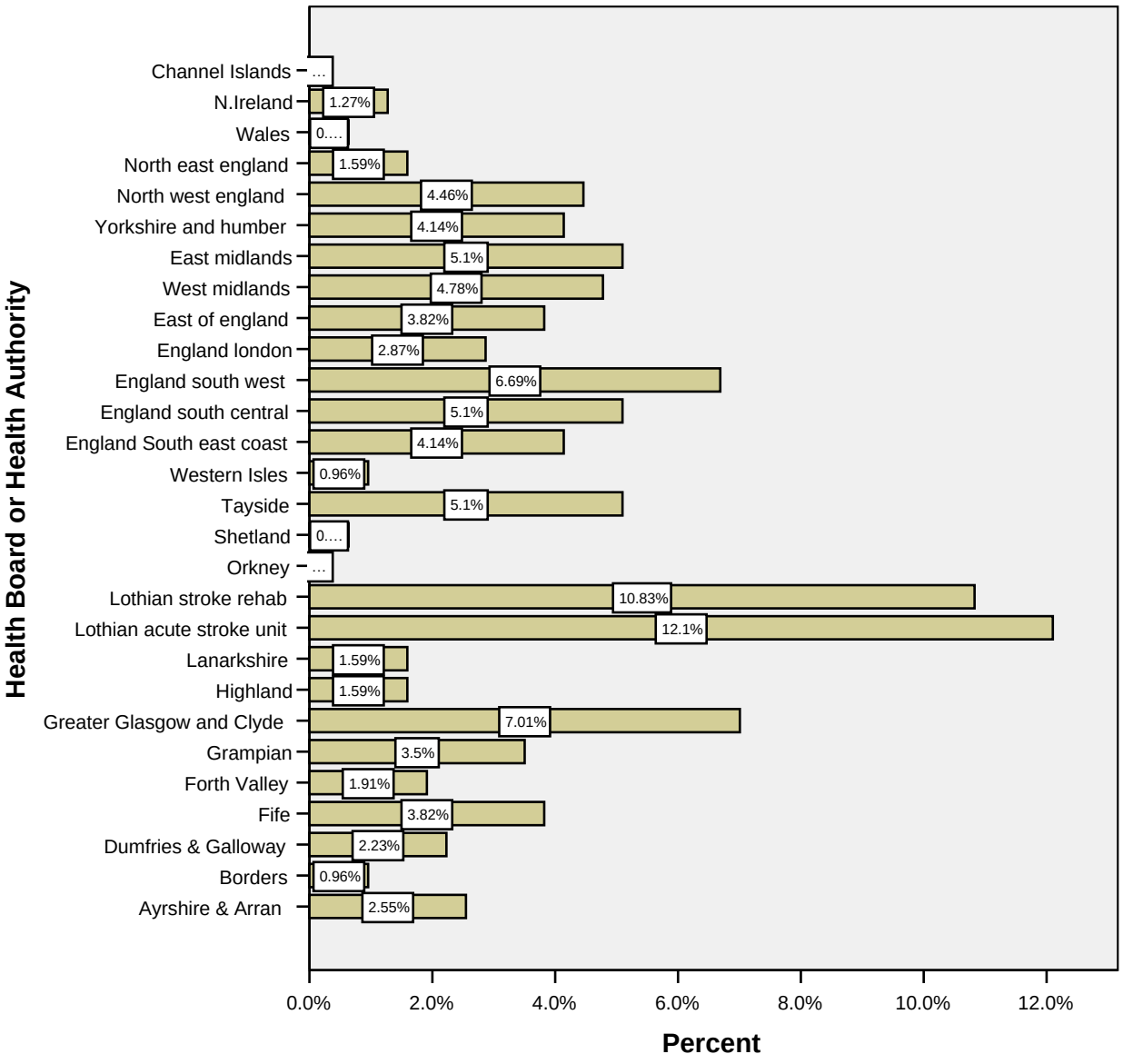
A total of 528 questionnaires were distributed and a total response rate of 67% (n=352/528) was achieved of which; Lothian stroke nurses (Lothian) 68% (n=66/96), Scottish Stroke Nurses Forum (SSNF) 69% (n= 137/199) and National Stroke Nurses Forum (NSNF) 64% (n=149/233). From a total of 352 (67%) responses n=314 (59%) were completed questionnaires that could be analysed. The distribution of completed questionnaires amongst Lothian, the SSNF and NSNF can be seen in Table 17.

Table17: Distribution of completed questionnaires by Professional Group (n=314)

	n	%
Lothian	66	21
NSNF	142	45
SSNF	106	34

Respondents were further categorised by Health Authority or Health Board; this was done by working out which Health Board or Authority the respondent fell into using their geographical location determined by address. Distribution of completed questionnaire response by Health Authority or Health Board can be seen in Figure 10.

Figure 10: Completed Questionnaires by Health Board/Authority (n=314)



Responses from Health Board or Authority varied. However the majority of Health Boards or Authorities in England and Scotland have been represented in the questionnaire response. The professional nursing groups chosen as the sample population however did not contain many members representing Health Boards in Wales, the Channel Islands and Northern Ireland; therefore any further demographic comparison will only be drawn between England and Scotland. Lothian NHS had a greater response rate than any of the other Health Boards in Scotland; this was because nurses working within the speciality of stroke in Lothian were sent questionnaires as a separate professional group to enable conclusions about local current practice to be drawn.

Respondents were further categorized into work settings; this was determined using the respondents' postal addresses. The majority of addresses for respondents were work based which enabled respondents to be placed into one of three categories; (1) acute hospital setting, (2) community/rehabilitation hospital/Primary Care Trust or (3) Education/Practice Development/Stroke specialist organisation/research/other. These categories were selected because it became evident that the majority of responses were from nurses placed in either acute or community based settings with only a small proportion of responses from outside clinical settings, these were represented by the third category. The distribution of respondents by work setting can be seen in Table 18.

Table 18: Completed questionnaires by work setting

	n	**%**
Acute hospital setting	181	57
Community/rehab hospital setting/PCT	78	25
Education/PRD/stroke specialist/research/other	6	2
Unknown	49	16
Total	**314**	**100**

The nursing grade of the respondent had been collected on the questionnaire. Grading on the returned questionnaires was either on the Whitley scale (NHS Employers 2008a), which for registered nurses is from grade D-I (grade D being the most junior and I being the most senior) or on the Agenda for Change banding (NHS Employers 2008b) which for registered nurses ranges from band 4-8 (band 4 being the most junior and 8 being the most senior). At the time this research was carried out nursing pay scales were changing from the Whitley scale (NHS Employers 2008a) to the Agenda for Change banding (NHS Employers 2008b), so to simplify analysis the grade of the nurse was categorised into either; (1) ‘staff nurse’ denoting the lower grade/bands of registered nurse or (2) ‘senior nurse’ denoting the higher grade/banded nurses. Grades D-E/band 4-5 were categorised into ‘staff nurse’; grades F-I/band 6-8 were categorised as senior nurses. Nurses who had left clinical practice and were working in either education, research or areas other than a clinical setting

or who no longer held a nursing grade or band and were categorised into a third category; (3) ‘nurse lecturer/researcher/other than clinical. The distribution of completed questionnaires by nursing seniority can be seen in Table 19.

Table 19: Nursing seniority – completed questionnaires

	n	%
Unknown (missing)	2	
Staff nurse	112	36
Senior nurse	197	62
Nurse lecturer/researcher/other than clinical	3	
Total	**314**	**100**

5.3 Training

Results of questions 3 and 11 relating to training to insert or confirm NG tube position are presented below.

5.3.1 Training to Insert NG Tubes Qu.11

Respondents were asked in question eleven to indicate what type of training they had undertaken on how to insert an NG feeding tube and asked whether they had attended a formal training session or study day, or supervised training in the clinical area. From a total of n=313 nurses who responded to this question, only 56% (n=176/313) of nurses reported having received training to insert an NG feeding tube at a formal study day or session; 78% (n=246/313) however reported receiving supervised training in the clinical area. Participants were asked whether they felt adequately prepared to insert an NG feeding tube. Despite only 56% of respondents having received formal training, 84% (n=264/313) said they did feel adequately prepared. Participants were also asked whether they felt training to insert NG tubes was necessary; 89% (n=279/313) reported that they felt training was necessary, although 11% (n=34/313) indicated that it was not. These results can be seen in Table 20.

Table 20: Training received to insert NG tubes Qu.11

N=313	yes	
	n	%
received formal training/study day on NG tube insertion	176	56
received supervised training in clinical area	246	78
feel adequately prepared to insert an NG tube	264	84
feel training is necessary for registered nurses	279	89

5.3.1.1 Combinations of Training Received to Insert NG Tubes

To investigate further how many respondents had received both formal and supervised training and determine who had received no training to insert NG tubes at all, variables for formal and supervised training were combined. Just under half of the respondents 47% (n=147/313) had received both formal training at a study day and supervised training in the clinical area to insert an NG feeding tube. However 31% (n=99/313) had received supervised training only and 29% formal training only with12% (n=38/313) having received no training to insert NG feeding tubes at all. The combinations of training received can be seen in Table 21.

Table 21: Combinations of training received to insert NG tubes Qu.11

	n	Percent
no training to insert NG tubes	**38**	**12**
formal training only	29	9
supervised training only	99	32
formal & supervised training	**147**	**47**
Total	**313**	**100**

5.3.2 Training to Check NG tube Position

Respondents were asked to indicate from a list of recognised methods used for checking the position of the NG tube once it has been inserted, what training they had received to carry these methods out; these results can be seen in Table 22. Aspirating gastric fluid from NG tubes (withdrawing gastric fluid up the NG tube into a syringe then testing the pH) is a frequently used method for checking NG tube position in clinical practice; 64% (n=202/314) of nurses reported that they had been trained to carry this test out; 23% (n=71/314) had

been trained to perform the 'whoosh test' (injecting air down the NG tube and listening for a 'whooshing' sound over the stomach indicating that the tip of the tube is lying correctly in the stomach), this test is currently not recommended as being reliable for use in clinical practice (NPSA 2005b). A total of 15% (n=46/314) of respondents had been trained how to interpret x-rays (inspecting an x-ray of the abdomen to visualise where the tip of the NG tube is lying) and only 2% (n=7/314) had been trained in the use of magnetic tipped tubes (inserting a magnetic tipped NG feeding tube and using a magnetic field detector to detect where the tip of the NG tube is lying). Respondents were asked to report any other checking methods for which they had received training; none of the respondents had received training in any other checking procedures.

Table 22: Training to check NG tube position Qu.3 (n=314)

Training	yes	
	n	%
trained to aspirate NG tubes	202	64
trained to do 'whoosh' test	71	23
trained to interpret x-rays	46	15
trained in magnetic tipped tubes	7	2

5.3.2.1 Combinations of Training Received to Check NG Tube Position

Aspiration, whoosh test and x-ray were the methods for which nurses had most frequently received training. In clinical practice it may be usual for nurses to use more than one checking procedure post NG tube insertion to confirm tube position (Dougherty & Lister 2008), therefore nurses may be required to know how to carry out more than one checking procedure. To determine what combinations of training had been received by nurses to check tube position, variables for aspiration, the whoosh test and x-ray were combined.

The majority of respondents 35% (n=111/314) had been trained to aspirate NG feeding tubes only. However a substantial number of respondents 33% (n=104/314) had not been trained to carry any checking procedures at all and only 5% (n=17/314) had been trained to do all three. Training to carry out aspiration and x-ray (the most frequently used checking procedures) was

received by only 8% of respondents and 16% (n=50/314) had been trained to carry out the whoosh test and aspiration only. These results are summarised in Table 23.

Table 23: Combinations of training received to check NG tube position Qu.3

Combinations of training received	n	Percent
no training to aspirate, whoosh or interpret x-rays	**104**	**33**
interpret x-ray only	4	1
whoosh only	3	1
x-ray & whoosh	1	
aspiration only	111	35
aspiration & x-ray only	24	8
aspiration & whoosh	50	16
aspiration & whoosh & x-ray	17	5
Total	**314**	**100.0**

5.3.2.2 Combinations of Training Received to Insert and Check NG Tube Position

Knowing how to insert an NG feeding tube and how to check whether it is in the correct position are both integral skills involved in managing successful NG tube feeding for patients. To determine whether nurses had been trained in both NG tube insertion and checking tube position, variables for insertion (formal training and supervised training) were combined with variables for the most common and frequently used checking procedures (aspiration, whoosh test and x-ray). These can be seen in Table 24.

The most frequently received combination for training in NG insertion and checking was formal and supervised training to insert NG tubes in addition to training in aspiration, however this was only received by 20% (n=63/313) of respondents. Notably only 4% (n=12/313) of respondents had received training in insertion (both formal and supervised) and all checking procedures (aspiration, x-ray and whoosh test); 18% had received supervised training in clinical practice to insert NG tubes but no training in how to check NG tube position and 7% (n=22/313) had received no training at all in either NG insertion or checking procedures.

Table 24: Combinations of training received to check NG tube position Qus.3&11

Combinations of training received	n	Percent
no training to insert or check	**22**	**7**
aspiration only	12	4
aspiration & whoosh only	3	1
x-ray & whoosh & aspiration only	1	
formal training to insert only	7	2
formal & x-ray only	1	
formal & aspiration only	12	4
formal & aspiration & x-ray only	4	1
formal &aspiration & whoosh only	3	1
formal &aspiration &whoosh & x-ray only	2	
supervised training to insert only	**55**	**18**
supervised & x-ray only	2	
supervised & whoosh only	1	
supervised & aspiration only	24	8
supervised & aspiration & x-ray only	4	1
supervised & aspiration & whoosh only	11	3.5
supervised & aspiration & x-ray & whoosh	2	
formal & supervised to insert only	19	6
formal & supervised & x-ray	1	
formal & supervised & whoosh	2	
formal & supervised & whoosh & x-ray	1	
formal & supervised & aspiration	**63**	**20**
formal & supervised & aspiration & x-ray	16	5
formal & supervised & aspiration & whoosh	33	10.5
formal & supervised & aspiration & whoosh & x-ray	12	4
Total	**313**	**100**

5.4 Current Nursing Practice

Results of questions 1, 4, 5, and 10 relating to the current practice of NG feeding in stroke care are presented below.

5.4.1 Checking NG Feeding Tube Position

Respondents were asked what methods their ward/unit used in practice to check that the NG tube was correctly positioned in the patient's stomach. A list of commonly used methods were provided as follows; aspiration of fluid and checking its' pH, injection of air down the NG tube ('whoosh test'), x-rays, magnetic tipped NG tubes or any other methods which they were asked to list (Appendix 4). A total of 313 nurses responded to this question (see Table 25). The majority 93% (n=292/313) reported using aspiration to check NG tube position; x-ray was the second most commonly used method with 90%

(n=282/313) of nurses reporting its use; 19% (n=61/313) reported using the 'whoosh test' which is no longer a recommended test and magnetic tipped tubes were only used by 6% (n=19/313) of nurses. Other methods for checking NG tube position were reported by n=3 respondents, these included; (1) ultrasound, (2) injecting 10mls of water, injecting air then aspirating and (3) marking the NG tube with an indelible pen prior to tube insertion to use as a guide.

Table 25: Methods used to check NG tube position Qu.1 (n=313)

Method	yes	
	n	%
aspirate to check tube position	292	93
'whoosh' to check tube position	61	19
x-ray to check tube position	282	90
use magnetic tipped tube	19	6
other method used to check tube position	3	1

5.4.1.1 Combinations of methods used to check NG tube position in practice

Methods used to check NG tube position in clinical practice may not always be successful at confirming the correct position of the tube in isolation, therefore using more than one method may be necessary. To explore further what combinations of checking procedures different clinical areas were using in practice, variables for the most common checking procedures (aspiration, x-ray and the whoosh test) were combined, which can be seen in Table 26.

The most frequently used combination of checking procedures was x-ray and aspiration, 66% (n=206/313) used this combination. X-ray, the whoosh test and aspiration were reported to be used in combination by 18% (n=55/313). Very few places reported using one test in isolation; 8% (n=26/313) used aspiration alone and 6% (n=20/313) used x-ray. X-ray is deemed as the gold standard for confirming NG tube position, however notably 10% (n=31/313) of places used procedures including aspiration and or the whoosh test which did not include x-ray.

Table 26: Combinations of methods used to check NG tube position Qu.2 (n=313)

Combinations of methods	n	Percent
aspiration only	26	8
aspiration & whoosh	5	2
x-ray only	20	6
x-ray & aspiration	**206**	**66**
x-ray & whoosh	1	
x-ray & whoosh & aspiration	**55**	**18**
Total	**313**	**100**

5.4.1.2 Combinations of training received and methods used to check NG tube position

Aspiration and the whoosh test are checking procedures that registered nurses are commonly expected to carry out in clinical practice. Although x-ray was the second most frequently used checking procedure with 90% (n=282/313) reporting its use, interpretation of x-rays is usually the role of the radiologist or doctor and therefore it would not be expected that many nurses were trained to carry out this checking procedure. However, to explore further how many nurses were trained to carry out aspiration and the whoosh test, variables for use (question 1) and training (question 3) were combined for each checking procedure.

5.4.1.2.1 Aspiration

Aspirating NG tubes was the most frequently used checking procedure, 93% (n=292/313) of respondents reported that their clinical areas used it. However only 64% (n=202/313) of respondents indicated that they had been trained in this procedure. To explore further what proportion of nurses had not trained to aspirate NG tubes but were working in areas where aspiration was used, the variables for aspiration training and use were combined.

Although the majority of nurses 60% (n=187/313) trained to aspirate NG tubes worked in areas that use this procedure, 33% (n=105/313) of nurses who had not been trained how to aspirate NG tubes worked in areas that use this procedure for confirming NG tube position and only 2% (n=6/313) who had not been trained in aspiration were not required to use it; these results are summarised in Table 27.

Table 27: Combinations of training and aspiration use Qus.2&3

Training to aspirate	n	Percent
do not use aspiration nor trained to aspirate	6	2
use aspiration but not trained to	**105**	**33**
trained to aspirate but do not use it	15	5
trained to aspirate & use aspiration	**187**	**60**
Total	**313**	**100**

5.4.1.2.2 Whoosh Test

Although the whoosh test is no longer recommended in clinical practice as a reliable method for confirming NG tube position, 19% (n=61/313) of respondents indicated that their clinical areas still used this test (see Table 25) and 23% (n=71/313) of respondents indicated that they had been trained how to do this test (see Table 22). To explore further whether those who had been trained to use the test were those using it, the variables for use and training for the whoosh test were combined; these combinations are summarised in Table 28.

From a total of 23% (n=71/313) trained to do the whoosh test, the majority 14% (n=45/313) did not use the test in practice. However notably 11% (n=35/313) of respondents who were not trained to do the whoosh test at all did work in areas where it was still used in practice. Only 26/71 respondents who were trained to use the whoosh test were nursing in areas where this test was reported to be used in practice.

Table 28: Combinations of training and using the whoosh test Qus.2&3

Training and whoosh test use	n	Percent
do not use whoosh nor trained to use whoosh test	207	66
train to use whoosh test but do not use it	45	14
use whoosh test but not trained to	**35**	**11**
train to use whoosh test & use whoosh test	26	8
Total	**313**	**100**

5.4.2 Securing NG Tubes

Respondents were asked to indicate which methods their ward or unit used in practice to secure or maintain tube position for stroke patients. This question

presented a list of methods which can be used to help retain NG tube position; some of the methods listed are commonly used in clinical practice e.g. taping the tube to the face; other methods such as 'tying hands to bed rails' or 'Posey vests' (vests which prevent excessive movement of the patient and therefore reduce the risk of interventions such as NG tubes being dislodged by the patient) are less commonly used in practice and may be seen as forms of restraint. This question was answered by a total of n=312 respondents (see Table 29), but more than one method is often used in clinical areas.

The most frequently used method or technique for retaining NG tube position was taping the NG tube to the face, 98% (n=307/312) of nurses reported that tape was used in their ward/unit; 62% (n=193/312) reported that 'inserting the NG tube on the affected side' (i.e. inserting the NG tube into the nostril on the side affected by the stroke, the side that the patient should be least aware of) was carried out. All the other methods listed in the question are techniques which if used limit the patients' ability to remove the NG tube. For example hand mittens restrict the motor movements of the patient and hence reduce their ability to pull the NG tube out of place; the nasal bridle secures the NG tube behind the nasal septum. Hand mittens were used by 22% (n=69/312) of respondents' wards or units; 16% (n=51/312) used nasal bridle or loop systems; 8% (n=24/312) used bandages on patients' hands; 1% (n=3/312) used Posey vests to help maintain NG tube position; n=1 respondent reported tying hands to bed rails. Other methods for maintaining tube position were reported by 4% (n=13/312) of respondents.

Table 29: Methods used in current practice for securing NG tubes Qu.5 (n=312)

Intervention	yes	
	n	%
insert on affected side to keep NG tube in place	193	62
tape to face to keep NG tube in place	307	98
use mittens to keep NG tube in place	69	22
use nasal bridle to keep NG tube in place	51	16
bandage hands to keep NG tube in place	24	8
tie hands to bed rail to keep NG tube in place	1	0
use posey vest to keep NG tube in place	3	1
use other methods to keep NG tube in place	13	4

Other methods reported to help maintain NG tube position are listed in Table 30; n=13/312 respondents offered descriptions of other methods that they used on their wards or units. These included Nasofix plasters n=3, Hollister feeding tube attachment devices/feeding tube attachment device n=3, nasal tube sticky plaster n=1, plaster shaped to fit nose with a clip n=1, patient explanation and supervision and specific techniques for taping the tube in place for example taping to the bridge of the nose and taping the tube to the nose.

Table 30: Other interventions used for securing NG tubes (n=13) Qu.5

Intervention	n
Hollister feeding tube attachment device	1
Marking tube	1
Nasofix plasters	1
Nasofix plasters	1
Nasofix plasters	1
Hollister feeding tube attachment device	1
Tape over the bridge of the nose; Opsite to side of face	1
Nasal tube sticky plaster for NG tube	1
Explanation to the patient	1
Hollister nasal fixers; close supervision	1
Taping tube to nose	1
Plaster shaped to fit nose with clip to hold NG tube in place	1
Feeding tube attachment device	1

5.4.2.1 Combinations of Methods used to Secure NG Tube Position

To explore whether more than one method for securing or maintaining tube position was being used, responses to question five were combined for the following: using the affected side, tape, hand mittens, the nasal bridle, bandages on hands, tying hands to the bed rail and Posey vests (see Table 31).

Sixteen different combinations of methods for securing or maintaining NG tube position were used in different clinical areas. Tape and inserting the NG tube on the affected side were the most frequently used techniques in combination with each other, 39% (n=122/312) of areas used this combination and no other methods for maintaining tube position. Tape was the most frequently used

technique in isolation, 27% (n=84/312) of areas used tape only; the only other method used in isolation was the nasal bridle which was only used by one area.

Table 31: Combinations of methods used to secure or maintain NG tube position Qu.5

Combinations of methods	n	Percent
no methods used	4	1
tape only	84	30
affected side & tape	122	39
mitten & tape	8	3
mitten & tape & affected side	27	9
bridle only	1	
bridle & tape	10	3
bridle & tape & affected side	19	6
bridle & mitten & tape	5	2
bridle & mitten & affected side & tape	8	3
bandage & tape & affected side	1	
bandage & mitten & tape	5	2
bandage & mitten & affected side & tape	9	3
bandage & bridle & mitten & tape	6	2
posey vest & bandage & bridle & tape	1	
posey vest & bandage & bridle & mitten & tape & affected side	1	
posey vest & bed rail & bandage & tape	1	
Total	**312**	**100**

5.4.2.2 Techniques for Taping the NG Tube to the Face

Respondents were asked to indicate from a list of taping techniques which technique or combination of techniques they used in their wards or units to tape the NG tube to the patients' face. The options listed were recognised techniques used in clinical practice; they included taping to the nose only, the cheek only or taping to the nose and cheek. Respondents were able to indicate if they did not use tape at all and describe any other taping techniques they might use that were not listed. A total of 312 nurses responded to this question. Only 2% (n=5/312) reported that tape was not used at all on their wards or units. The most commonly reported method of taping the NG tube in place, was taping to the nose and cheek 79% (n=248/312), as reported in Table 32. Taping to the cheek only was the least commonly used technique with 19% (n=60/312) reporting this technique. However 25% (n=77/312) reported taping to the nose only.

Table 32: Techniques of Taping the NG tube to the face Qu.9 (n=312)

Taping technique	n	%
taped to nose only	77	25
taped to cheek only	60	19
taped to nose and cheek	248	79
other methods of taping	21	7

Other methods of taping were reported by 7% (n=21/312) of nurses. The variety of techniques of taping can be seen in Table 33. The most frequently reported alternative technique for taping was taping the NG tube to the nose and forehead n=6; using Nasofix was reported by n=4 respondents and had been reported previously as an alternative method for securing NG tubes. Nasofix is an external nasal splint that is designed to compress the nose after reconstructive nasal surgery (Atos Medical, 2007). Taping the NG tube to the forehead only was reported by n=2 respondents and using Opsite (a transparent film used for wound dressing or fixation (Smith & Nephew, 2007)) had been reported by n=2 respondents, one of whom had specifically described using transparent film (Opsite) to attach the NG tube to the cheek. Other methods reported included taping the NG tube to different parts of the face or body, including the forehead and hair, the forehead and ear, the ear and the neck and the bridge of the nose. Taping the NG tube to equipment such as the giving set (intravenous line attached to a bag of fluid running to an intravenous pump) was also reported. In addition taping behind the ear and using a nasal patch with a clip was described; this had also been mentioned previously as an alternative method for securing NG tubes.

Table 33: Other techniques of taping the NG tube in place Qu.9

Method of taping	Frequency
Behind ear	1
Bridge nose	1
Ear & neck	1
Forehead & ear	1
Forehead	2
Giving set & clip	1
Hair & forehead	1
NG tube tape (nasofix)	4
Nose & forehead	6
Opsite on cheek	1
Opsite	1
Nasal patch with clip	1

5.4.3 Use of Written Protocols

Respondents were asked to indicate whether their wards or units had written protocols guiding the use of (1) NG tubes, (2) hand mittens, (3) nasal bridles or loop systems and were given the choice of yes, no or don't know, these results are shown in Table 34. The number of people who responded to each part of the question varied; even though the option 'don't know' was available. A total of 312 nurses responded to the first part of the question regarding a protocol for NG tubes, 85% (n=265/312) reported having a protocol on their ward or unit for NG tubes, 12% (n=38/312) reported that they did not have a protocol and 3% (n=9/312) said they did not know. A total of 307 nurses responded to the second part of the question about hand mittens. Only 11% (n=35/307) reported having a protocol for using hand mittens even though 22% (n=68/312) had previously reported that they used them on their wards or units; 12% (n=37/307) said they did not know whether they had a protocol for using mittens. A total of 305 nurses responded to whether their unit had a protocol for nasal bridles or loops; only 10% (n=28/305) reported that they did have a protocol, despite 16% (n=51/312) having previously reported that they used them; however 14% (n=43/305) indicated that they did not know whether their ward or unit had a written protocol for nasal bridles or loops.

Table 34: Use of written protocols Qu.4

	yes		no		don't know	
	n	**%**	**n**	**%**	**n**	**%**
written protocol to use NG tubes **n=312**	265	85	38	12	9	3
written protocol to use mittens **n=307**	35	11	235	77	37	12
written protocol to use bridle **n=305**	28	9	234	77	43	14

A total of 22% (n=69/312) respondents reported that their clinical areas used hand mittens and 11% (n=35/307) respondents reported that they had a protocol for hand mittens with a further 12% (n=37/307) respondents not knowing. To determine whether respondents from clinical areas that used hand mittens had a protocol for their use, variables for hand mitten protocols (Qu.4) and hand mitten use (Qu.5) were combined (see Table 35).

Of the n=69/312 respondents that used hand mittens, n=68 responded to question 4 about protocols. From these 68 respondents that used hand mittens, 34% (n=23/68) did not have a protocol for their use and a further 16% (n=11/68) did not know whether they had a protocol. Only 40% (n=34/68) of the areas using hand mittens had a protocol to guide their use.

Table 35: Using hand mittens with a protocol Qus.4&5

Mitten and protocol use	n	Percent
use mittens & do not have a protocol	23	34
use mittens and have a protocol	34	50
use mittens don't know about protocol	11	16
Total	**68**	**100**

A total of 16% (n=51/312) of respondents reported that their clinical areas used the nasal bridle and 9% (n=28/305) of respondents reported that they had a protocol for the nasal bridle with a further 14% (n=43/305) respondents not knowing. To determine whether respondents from clinical areas that used the nasal bridle had a protocol for their use variables for bridle use (Qu.5) and bridle protocol (Qu.4) were combined.

Of the 51/312 respondents that used the nasal bridle, n=47 responded to question 4 about protocols. From these n=47 respondents, 34% (n=16/47) had no protocol for the nasal bridle and a further 15% (7/47) used the bridle but did not know if they had a protocol. Only 51% (n=24/47) of those who used the bridle had a protocol for use (see Table 36). It was not possible to establish whether the remaining four respondents who used the nasal bridle but did not answer question 4 were using a protocol.

Table 36: Using the nasal bridle with a protocol Qus.4&5

Bridle and protocol use	n	Percent
use bridle but have no protocol	16	34
use bridle and have a protocol	24	51
use bridle but don't know if have a protocol	7	15
Total	**47**	**100.0**

5.4.4 Documenting Methods used to maintain NG Tube Position

Respondents were asked to indicate where (if at all) their ward or unit documented or recorded which methods they used for securing or maintaining NG tube position; a list of common forms of medical documentation were provided to choose from; in addition to an option to indicate if no recording was routinely carried out; further to this an opportunity to report any other forms of documentation that might be used was provided. From a total of n=312 nurse responses to this question (see Table 37), 49% (n=153/312) reported that methods used for securing or maintaining NG tube position were not routinely documented. From those respondents who reported that documentation was carried out, 52% (162/312) said that they used the nursing notes for this purpose; 13% (n=40/312) reported using the medical notes; 8% (n=25/312) used nutrition charts and 5% (n=15/312) used the fluid balance charts (charts used for recording patient fluid intake and output on a daily basis). Other documentation used was reported by 3% (n=10/312) of respondents.

Table 37: Documentation of methods used to secure NG tubes Qu.10 (n=312)

Documentation	n	%
method used to secure NG **not** documented	153	49
method for securing documented in medical notes	40	13
method for securing documented in nursing notes	162	52
method for securing documented in nutrition charts	25	8
method for securing documented in fluid balance charts	15	5
method for securing documented in other records	10	3

Other forms of documentation used to record the use of interventions used for securing or maintaining tube position were reported by n=10 (3%) of respondents, these included Integrated Care Pathways (ICP), collaborative, multidisciplinary team notes and shared notes, NG care plans or protocols, the NG tube manufacturers manual and documentation as part of a nasal bridle trial (see Table 38).

Table 38: Other documentation used Qu.10

Documentation	n
Collaborative notes	1
Integrated Care Pathway	1
Integrated Care Pathway/plan	1
Loop trial documentation	1
Manufacturers manual	1
Multidisciplinary team notes	1
NG Care plan	1
NG protocol	1
Shared notes	1
Special care plan	1

5.5 Nurses Opinions about Current Practice

Results from questions 2, 6, 7 and 8 relating to nurses' opinions about current practice of NG feeding are presented below.

5.5.1 Reliability of Methods used for Checking the Position of NG Tubes

Respondents were asked to rate how reliable methods used for checking NG tube position were on a five point Likert scale from 'very reliable' scoring one to 'very unreliable' scoring five. Respondents were given a list of possible methods (pH of aspirate, whoosh test, x-rays, magnetic tipped tubes and other methods); the option of never used was also included. In Table 39, the results have been reported using the following three categories; 'very reliable or reliable', 'uncertain', 'unreliable or very unreliable' and 'never used'.

X-ray was reported as the most reliable method for checking tube position. A total of n=303 respondents rated this method; 96% (n=292/303) considered x-ray to be 'very reliable or reliable'. Aspiration of gastric fluid and checking pH was considered to be the next most reliable test, a total of 304 nurses rated this checking procedure of which 83% (n=254/304) considered aspiration to be 'very reliable or reliable'. However more nurses 11% (n=32/304) were uncertain

about the reliability of aspiration than they were about the reliability of x-ray. The reliability of the 'whoosh test' (injecting air down the NG tube and listening over the stomach with a stethoscope for a 'whooshing' sound to indicate correct tube position), was rated by 228 nurses. The majority 53% (n=121/228) considered the whoosh test to be 'unreliable or very unreliable'. However despite the fact that this test is no longer recommended in practice, 29% (n=66/228) were uncertain about reliability and 18% (n=41/228) considered it to be a reliable or very reliable method for checking NG tube position.

Magnetic tubes were the final option listed for checking NG tube position and the least commonly used technique, (checking with this technique relies on a magnetic tipped NG tube being inserted into the patient, then using a magnetic field detector to locate whether the tip of the NG is lying). A large number of respondents 198/314 reported that they 'never used' this technique. The reliability of this procedure was rated by 75 nurses. Although the majority 54% (n=41/75) were 'uncertain' about its' reliability, 45% (33/75) considered it to be 'reliable or very reliable'; one percent (n=1/75) considered it to be unreliable. The mean scores for these checking procedures indicate that x-ray is considered to be the most reliable procedure.

Table 39: Reliability of methods used for checking tube position Qu.2

Opinion	Rating 1-5	Aspiration n=304	Whoosh test n=228	X-ray n=303	Magnetic tube n=75
Reliability	*1-very reliable or 2-reliable*	n=254 (83%)	n=41 (18%)	n=292 (96%)	n=33 (45%)
	3-uncertain	n=32 (11%)	n=66 (29%)	n=7 (2%)	n=41 (54%)
	4-unreliable or 5-very unreliable	n=18 (6%)	n=121 (53%)	n=4 (1%)	n=1 (1%)
	Mean score	**1.95**	**3.54**	**1.39**	**2.40**

Respondents were asked to rate and describe any other checking methods that they might use which were not included in the question. Two other methods were specified (Table 40). The first was using litmus paper, a blue coloured paper that turns pink or red in the presence of gastric acid and preceded the use of pH indicator paper as part of the aspiration checking technique. Litmus paper is no longer regarded in clinical practice as a reliable checking procedure

and its' use is not recommended and was rated by this respondent as being unreliable. The second method described was measuring the external length of the NG tube, described by the respondent as *'measuring the external length of the NG tube prior to the commencement of feed on every occasion'*. This procedure involves making a note of the length of the NG tube that lies outside the nose and rechecking this measurement regularly. If this measurement increases then this suggests that the tip of the NG tube has moved and may no longer be positioned correctly in the stomach. The respondent rated this technique as reliable.

Table 40: Reliability of other checking methods Qu.2

Method	n	Reliability
Litmus	1	unreliable
Measure the external length of the NG tube prior to commencement of feed	1	reliable

5.5.2 Effectiveness of Interventions used for Securing NG Tubes

Respondents were asked to rate the effectiveness of methods used for maintaining or securing NG tube position in stroke patients. Respondents were given a list of techniques that are used for maintaining or securing NG tube position which included, inserting the NG tube on the affected side (placing the NG tube up the nostril on the side of the patient affected by the stroke), using tape to attach the NG tube to the face, hand mittens, bandages on the hands and the nasal bridle or loop. Respondents were asked to rate the effectiveness of these techniques on a five point Likert scale from 'very ineffective' scoring one to, 'very effective' scoring five; they were also given an option for 'never used'. The results have been reported in the following three categories 'effective or very effective', 'uncertain' and 'ineffective or very ineffective'. For ease of reporting results, the techniques have been divided into two groups (1) effectiveness of the affected side or taping the NG tube to the face in Table 41 (these methods are not considered to be forms of restraint); (2) effectiveness of hand mittens, bandaging and nasal loop or bridle in Table 42 (these methods may be seen as forms of restraint).

Taping the NG tube to the face was seen as the most effective method of securing NG tubes for stroke patients. Effectiveness of tape was rated by 306 nurses. Overall 76% (n=234/306) of respondents considered tape to be 'effective or very effective'; 12% (n=37/306) were uncertain and only 11% (n=35/306) felt it was 'ineffective or very ineffective'. The effectiveness of inserting the NG tube on the affected side was rated by 269 respondents; 43% (n=116/269) considered this technique to be 'effective or very effective', however the majority 44% (n=118/269) were uncertain. Mean scores for these methods indicate that taping is considered to be more effective for securing NG tube position than using the affected side.

Table 41: Effectiveness of using affected side or tape Qu.6

Opinion	Rating 1-5	Affected side n=269	Tape n=306
Effectiveness	*1-Very effective or 2-effective*	n=116 (43%)	n=234 (76%)
	3-Uncertain	n=118 (44%)	n=37 (12%)
	4-Ineffective or 5-very ineffective	n=35 (13%)	n=35 (11%)
	Mean score	**2.70**	**2.33**

Substantially fewer respondents rated the effectiveness of hand mittens, bandaging and bridles compared to inserting the NG tube on the affected side and taping it to the face. The effectiveness of hand mittens was rated by 93 nurses (n=214/314 nurses reported that they 'never used' them). However 66% (n=62/93) of those who rated them considered mittens to be 'effective or very effective', although 25% (n=23/93) were uncertain. The effectiveness of the nasal bridle was rated by 70 nurses, 68% (n=231/314) reported that they 'never used' them. The nasal bridle was seen as being slightly more effective than hand mittens, of those who rated it 67% (n=47/70) felt it was 'effective or very effective' although 29% (n=20/70) were 'uncertain'; only 4% (n=3/70) felt it was 'ineffective or very ineffective'. Bandaging the hands to prevent NG tube removal was rated by 52 nurses, 80% (n=253/314) reported that they 'never used' this technique. Of those who rated bandaging, 42% (n=22/52) considered it to be 'effective or very effective', while 38% (n=20/52) were 'uncertain' and 19% (n=10/52) felt this was an ‘ineffective or very ineffective’ technique.

Mean scores for these three methods indicate that the nasal bridle system is seen as more effective than either hand mittens or bandaging. The mean scores for all five methods for securing or maintaining NG tube position indicate that the nasal bridle was considered overall the most effective method for securing NG tube position. However substantially fewer respondents rated the effectiveness of the bridle (n=70) compared to tape (n=306), which was considered the next most effective method making this finding potentially less reliable.

Table 42: Effectiveness of hand mittens, bandaging hands and nasal bridle Qu.6

Opinion	Rating 1-5	Hand Mitten n=93	Bandage hands n=52	Nasal Bridle n=70
Effectiveness	*1-Very effective or 2-effective*	n=62 (66%)	n=22 (42%)	n=47 (67%)
	3-Uncertain	n=23 (25%)	n=20 (38%)	n=20 (29%)
	4-Ineffective or 5-very ineffective	n=8 (9%)	n=10 (19%)	n=3 (4%)
	Mean score	**2.30**	**2.79**	**2.09**

5.5.3 Safety of Interventions used for Securing or Maintaining NG Tube Position

Respondents were asked to rate the safety of inserting the NG tube on the affected side, taping the NG tube to the face, hand mittens, bandaging hands and the nasal bridle or loop on a five point Likert scale from ‘very safe’ scoring one to ‘very unsafe’ scoring five. Results are reported for taping and using the affected side first in Table 43, then for mittens, bridle and bandaging in Table 44.

Taping the tube to the face was considered to be the safest method for securing or maintaining NG tube position for stroke patients; 308 nurses rated its safety of which 79% (n=242/308) considered it to be ‘safe or very safe’. The safety of using the affected side was rated by 295 nurses of which 54% (n=158/295) considered it to be ‘safe or very safe’, however 39% (n=116/295) were ‘uncertain’ about this method. Mean scores for both these methods indicate that

taping the tube to the face is seen as being a safer method than inserting the NG tube on the affected side.

Table 43: Safety of inserting the NG tube on the affected side and taping to the face Qu.7

Opinion	Rating 1-5	Affected side N=295	Tape N=308
Safety	*1-Very safe or 2- safe*	n=158 (54%)	n=242 (79%)
	3-Uncertain	n=116 (39%)	n=51 (17%)
	4-Unsafe or 5-very unsafe	n=21 (7%)	n=15 (5%)
	Mean score	**2.50**	**2.21**

From the remaining techniques used for securing or maintaining NG tube position, hand mittens were considered the next safest. However from a total of 276 nurses who rated their safety, the majority 42% (115/276) were uncertain about their safety; 29% (n=81/276) felt they were ‘safe or very safe’, and another 29% (n=80/276) felt they were ‘unsafe or very unsafe’. The nasal bridle or loop was considered to be marginally less safe than mittens; 267 nurses rated its safety, 26% (n=70/267) considered the bridle ‘safe or very safe’, however the majority of respondents 63% (n=168/267) were uncertain about how safe although only 11% (n=29/267) thought it was ‘unsafe or very unsafe’. Bandaging the patients’ hands was considered to be the least safe method for maintaining NG tube position, 270 nurses rated its safety of which 47% (n=128/270) considered it to be ‘unsafe or very unsafe’, although 41% (n=111/270) were uncertain. Mean scores for hand mittens, bandaging and nasal bridle indicate that the nasal bridle was considered to be a safer method than either mittens or bandaging for securing or maintaining NG tube position. However, overall taping the tube to the face was considered to be the safest method for securing or maintaining NG tube position.

Table 44: Safety of hand mittens, bandages and nasal bridle Qu.7

Opinion	Rating 1-5	Hand Mitten N=276	Bandage hands N=270	Nasal Bridle N=267
Safety	*1-Very safe or 2-safe*	n=81 (29%)	n=31 (11%)	n=70 (26%)
	3-Uncertain	n=115 (42%)	n=111 (41%)	n=168 (63%)
	4-Unsafe or 5-very unsafe	n=80 (29%)	n=128 (47%)	n=29 (11%)
	Mean score	**3.11**	**3.59**	**2.84**

5.5.4 Acceptability of interventions used for securing NG tubes

Nurses were asked to rate how acceptable they thought inserting the NG tube on the affected side, taping the tube to the face, hand mittens, bandaging the hands and the nasal bridle or loop were on a five point Likert scale from 'very acceptable' scoring one to 'very unacceptable' scoring five. Results are reported for taping and using the affected side first in Table 45, then for mittens, bridle and bandaging in Table 46.

Taping the NG tube to the face was considered to be the most acceptable method for securing tube position and was rated by 310 of whom 93% (n=288/314) felt that it was 'acceptable or very acceptable'. Inserting the NG tube on the affected side was considered the next most acceptable technique for maintaining tube position; 297 nurses rated its acceptability of which 81% (n=242/297) considered it to be 'acceptable or very acceptable'. However more nurses were uncertain about this technique than they were about taping; 16% (n=48/297) were 'uncertain' how acceptable using the affected side was as opposed to only 5% (n=16/310) who were uncertain about taping. The mean scores for both these methods demonstrate that both tape and using the affected side are seen as largely acceptable methods for securing NG tube position.

Table 45: Acceptability of the affected side and taping to the face Qu.8

Opinion	Rating 1-5	Affected side n=297	Tape n=310
Acceptability	*1-Very acceptable or 2-acceptable*	n=242 (81%)	n=288 (93%)
	3-Uncertain	n=48 (16%)	n=16 (5%)
	4-Unacceptable or 5- very unacceptable	n=7 (2%)	n=6 (2%)
	Mean score	**2.01**	**1.88**

From the remaining interventions, the nasal bridle was considered to be the next most acceptable method; 291 nurses rated its acceptability of which 33% (n=98/291) considered it to be 'acceptable or very acceptable', however the majority 52% (n=154/291) were 'uncertain'. Hand mittens were considered less acceptable than the nasal bridle; a total of 303 nurses rated their acceptability of which the majority 52% (n=158/303) considered them 'unacceptable or very unacceptable' with only 24% (n=74/303) finding them 'acceptable or very acceptable'. Bandaging the hands was considered the least acceptable intervention for securing or maintaining NG tube position; 300 nurses rated its acceptability of which 76% (n=231/300) considered bandaging to be 'unacceptable or very unacceptable'; however 8% (n=23/300) considered bandaging the hands to be an 'acceptable or very acceptable' technique for maintaining NG tube position in stroke patients. The mean scores for the acceptability of hand mittens, nasal bridle and bandaging indicate that of these interventions, the nasal bridle was seen as the most acceptable. However, overall taping the tube to the face was seen as the most acceptable method for securing or maintaining NG tube position for stroke patients.

Table 46: Acceptability of hand mittens, bandages and the nasal bridle Qu.8

Opinion	Rating 1-5	Hand Mitten n=303	Bandage hands n=300	Nasal Bridle n=291
Acceptability	*1-Very acceptable or 2-acceptable*	n=74 (24%)	n=23 (8%)	n=98 (33%)
	3-Uncertain	n=71 (23%)	n=46 (15%)	n=154 (52%)
	4-Unacceptable or 5-very unacceptable	n=158 (52%)	n=231 (76%)	n=39 (13%)
	Mean score	**3.50**	**4.16**	**2.83**

5.6 Summary

This chapter has reported the descriptive findings from phase 2 postal questionnaire within the topics of training, current practice of NG feeding for stroke patients and nurses opinions about current practice. The next chapter contains inferential analysis from the questionnaire.

6 Questionnaire Results - Part 2

6.1 Introduction

In this chapter inferential findings from the questionnaire are presented. Results are set out under three main categories; training, current practice and nurses opinions about current practice. Analysis within each category (training, current practice or nursing opinion) were further subdivided to present bivariate analysis with geographical location, work setting and nursing seniority, then multivariate analysis with professional group. Only the statistically significant results are presented here; full bivariate and multivariate analysis can be found in Appendix 7.

6.2 Review of Statistical Tests used for Inferential Analysis

The results from questions about training (Qu.3 & 11) and current practice (Qu.1, 4, 5, 9 & 10) were further analysed using chi-square analysis comparing them with four demographic parameters to determine any significant differences in training or current practice. The four demographic parameters were (1) geographical area (England or Scotland), (2) professional group (Lothian, SSNF, and NSNF), (3) work setting (acute or community/PCT/rehabilitation) and (4) nursing seniority (staff nurse or senior nurse). If the expected count for any proportions in the cells of 2x2 tables were <5, then Fishers exact test was reported (Altman 1993). Differences were considered significant at $p \leq 0.05$; only significant results are reported. Full Chi-square analysis can be seen in Appendix 7. Findings from opinion based Likert scale questions (Qu. 2, 6, 7 & 8) were compared with demographic parameters using t-tests for independent samples (geographical location, work setting and nursing seniority) and one way ANOVA for analysis against Professional Groups (Lothian Nurses, Scottish Stoke Nurses Forum and National Stroke Nurses Forum). Differences were considered significant at $p \leq 0.05$ and only significant findings are reported. Full analysis using t-tests and one way ANOVA can be seen in Appendix 7.

Caution should be used particularly when interpreting marginally significant results due to the possibility of a Type I error, that is, significance occurring due

to chance which is increased when repeated tests are performed (Morgan 2007; Watson, Atkinson & Egerton 2006; Altman 1993). Each test (Chi-square, t-test or ANOVA) was performed on each group (geographical location; professional groups; work setting; nursing seniority) more than once for each variable**.** Therefore, although the following results show significant differences, it must be remembered that in each case there is a chance of a Type I error. In this situation it may be pertinent to perform the Bonferroni adjustment, this method is aimed at controlling the Type I error rate at no more than 5%; however this method has been criticised as being highly 'conservative' in that it errs on the side of safety and not significance (Morgan 2007; Altman 1993). Therefore the Bonferonni adjustment has not been applied to the following analysis.

6.3 Training

Inferential analysis of questions 3 and 11 relating to training, compared to geographical location, work setting, nursing seniority and professional group are presented below.

6.3.1 NG Feeding Tube Insertion Qu.11

Question 11 of the questionnaire asked respondents to indicate what training they had received about how to insert NG feeding tubes (either formal or supervised), whether they felt adequately prepared to insert NG tubes and whether they considered training to be necessary (Appendix 6 for questionnaire). Responses to this question were analysed compared with all four demographic parameters, the following findings were significant at the 0.05 level.

Significant differences in formal training were found with geographical location and nursing seniority, see Tables 47 and 48. Registered nurses from England were significantly more likely to be formally trained how to insert an NG feeding tube than nurses from Scotland ($p = 0.036$).

Table 47: Comparison of formal training received to insert NG feeding tubes and Geographical Location Qu.11

n=313	Formal Training				
	Yes	**no**	df	χ^2	**p**
Scotland n=171	87 (51%)	84 (49%)	1	4.38	**0.036**
England n=142	89 (63%)	53 (37%)			

Senior nurses were significantly more likely to have received formal training about how to insert an NG tube than staff nurses (p = 0.004). No other significant differences were found for supervised training, feeling adequately prepared to insert NG feeding tubes or feeling that training to insert NG tube was necessary.

Table 48: Comparison of formal training received to insert NG feeding tubes and nursing seniority Qu.11

n=308	Formal Training				
	yes	**no**	df	χ^2	**p**
Staff nurse n=112	51 (45%)	61 (54%)	1	8.08	**0.004**
Senior nurse n=196	122 (62%)	74 (38%)			

6.3.2 Training in Methods used to Check NG Tube Position Qu.3

Respondents were asked to indicate what training they had received in methods used to check NG feeding tube position (aspiration, whoosh test, x-ray and magnetic tubes). Responses to this question were compared with geographical location, professional group, work setting and nursing seniority using chi-square analysis, full analysis tables can be seen in Appendix 7. Results were considered significant at p≤0.05, however no significant differences were found for training in methods used to check NG tube position.

6.4 Current Practice

Inferential analyses of questions 1, 4, 5, 9 and 10 relating to current practice compared with geographical location, work setting, nursing seniority and professional group are reported below.

6.4.1 Methods used to Check NG Tube Position Qu.1

Respondents were asked to indicate which methods their wards or units used in practice to check NG tube position (aspiration, whoosh test, x-ray or magnetic tubes). Table 49 shows a comparison of this with demographic data which demonstrated the following significant findings. The SSNF were significantly less likely to use x-ray as a method for confirming NG tube position than Lothian or the NSNF (p = 0.007).

Table 49: Comparison of professional group and the use of x-ray for checking NG tube position Qu.1

n=313	**X-ray**				
	yes	**no**	df	χ^2	**p**
Lothian n=66	65 (98%)	1 (2%)	2	9.94	**0.007**
SSNF n=105	88 (84%)	17 (16%)			
NSNF n=142	129 (91%)	13 (9%)			

6.4.2 Using Protocols for NG Feeding, Hand Mittens and Nasal Bridle Qu.4

Question 4 asked respondents to indicate whether there wards or units used protocols to guide the use of NG feeding, hand mittens or the nasal bridle. Comparisons with demographic data highlighted significant differences in the use of protocols for both hand mittens and nasal bridles.

6.4.2.1 Hand Mittens

Scotland was significantly more likely to use protocols for hand mittens or not know whether they used protocols for hand mittens than England (p<0.001), see Table 50.

Table 50: Comparison of geographical location and the use of protocols for hand mittens Qu.4

n=307	Hand Mittens					
	yes	**no**	**don't know**	df	χ^2	**p**
England n=139	6 (4%)	126 (91%)	7 (5%)	2	28.15	**<0.001**
Scotland n=168	29 (17%)	109 (65%)	30 (18%)			

The use of protocols for hand mittens varied significantly across Professional Groups, Lothian were significantly more likely to have a protocol (p<0.001), see Table 51.

Table 51: Comparison of professional group and the use of protocols for hand mittens Qu.4

n=307	Hand Mittens					
Professional Group	**yes**	**no**	**don't know**	df	χ^2	**p**
Lothian n=66	25 (38%)	24 (36%)	15 (23%)	4	84.05	**<0.001**
SSNF n=105	4 (4%)	85 (81%)	15 (14%)			
NSNF n=142	6 (4%)	126 (89%)	7 (5%)			

The use of protocols for hand mittens also varied significantly across work settings, acute settings were more likely to have a protocol (p = 0.004), see Table 52.

Table 52: Comparison of work setting and the use of protocols for hand mittens Qu.4

n=253	Hand Mittens					
Work Setting	**yes**	**no**	**don't know**	df	χ^2	**p**
acute n=179	25 (14%)	137 (77%)	17 (9%)	2	11.25	**0.004**
community/rehab/PCT n=74	8 (11%)	47 (64%)	19 (26%)			

Staff nurses reported that they were significantly more likely to have a protocol for hand mittens or not know whether they had a protocol for hand mittens than senior nurses (p<0.001), see Table 53.

Table 53: Comparison of nursing seniority and the use of protocols for hand mittens Qu.4

n=302	Hand Mittens					
Nursing Seniority	**yes**	**no**	**don't know**	df	χ^2	**p**
staff nurse n=108	26 (24%)	58 (54%)	24 (22%)	2	49.6	**<0.001**
senior nurse n=194	8 (4%)	173 (89%)	13 (7%)			

6.4.2.2 Nasal Bridle

Nurses from Scotland were significantly more likely not to know whether they had a protocol for the nasal bridle than nurses from England (p<0.001), see Table 54.

Table 54: Comparison of geographical location and the use of protocols for the nasal bridle Qu.4

n=305	Nasal bridle					
Geographical location	**yes**	**no**	**don't know**	df=2	χ^2	**p**
				2	19.8	**<0.001**
England n=138	14 (10%)	118 (86%)	6 (4%)			
Scotland n=167	14 (8%)	116 (69%)	37 (22%)			

Nurses from Lothian were significantly more likely not to know whether they had a protocol for the nasal bridle than nurses from the SSNF and NSNF (p<0.001), see Table 55.

Table 55: Comparison of professional group and the use of protocols for the nasal bridle Qu.4

N=305	Nasal bridle					
Professional Group	**yes**	**no**	**don't know**	df=	χ^2	**p**
Lothian n=63	5 (8%)	35 (56%)	23 (36%)	4	37.1	**<0.001**
SSNF n=104	9 (9%)	81 (78%)	14 (13%)			
NSNF n=138	14 (10)	118 (86%)	6 (4%)			

Nurses who worked in community/rehab/PCT settings were significantly more likely not to know whether they had a protocol for using the nasal bridle than nurses who worked in an acute setting (p = 0.002), see Table 56.

Table 56: Comparison of work setting and the use of protocols for the nasal bridle Qu.4

n=252	Nasal Bridle					
Work Setting	**yes**	**no**	**don't know**	df	χ^2	**p**
acute n=179	17 (9%)	141 (79%)	21 (12%)	2	12.7	**0.002**
community/rehab/PCT n=73	4 (5%)	47 (64%)	22 (30%)			

Staff nurses were significantly more likely not to know whether their ward or unit had a protocol for the nasal bridle than senior nurses (p<0.001), see Table 57.

Table 57: Comparison of nursing seniority and the use of protocols for the nasal bridle Qu.4

n=300	Nasal Bridle					
Nursing Seniority	**yes**	**no**	**don't know**	df	χ^2	**p**
staff nurse n=106	10 (9%)	63 (59%)	33 (31%)	2	38.4	**<0.001**
senior nurse n=194	18 (9%)	166 (86%)	10 (5%)			

6.4.3 Methods used to Secure or Maintain NG Tube Position Qu.5

Question 5 asked respondents to indicate what methods were used on the wards or units to help secure or maintain NG tube position including using the affected side, tape, hand mittens, nasal bridle, bandages on hands, tying the hands to the bed rail or Posey vests. Analysis against demographic parameters showed significant differences for hand mittens, using the affected side, bandages and Posey vests.

6.4.3.1 Hand Mittens

Scotland was significantly more likely to use hand mittens than England (p= <0.001) with Lothian being significantly more likely to use hand mittens than either the SSNF or the NSNF (p <0.001), see Table 58.

Table 58: Comparisons of geographical location; professional group and the use of hand mittens Qu.5

n=312	Hand Mittens				
Geographical location	**yes**	**no**	df	χ^2	**p**
England n=142	16 (11%)	126 (89%)	1	17.8	**<0.001**
Scotland n=170	53 (31%)	117 (69%)			
n=312					
Professional Group	**yes**	**no**	df	χ^2	**p**
Lothian n=66	45 (68%)	21 (32%)	2	103.6	**<0.001**
SSNF n=104	8 (8%)	96 (92%)			
NSNF n=142	16 (11%)	126 (89%)			

Staff nurses were significantly more likely to use hand mittens or be aware that their wards or units used hand mittens than senior nurses ($p<0.001$), see Table 59.

Table 59: Comparison of nursing seniority and the use of hand mittens Qu.5

n=307	Hand Mittens				
Nursing Seniority	**yes**	**no**	df	χ^2	**p**
staff nurse n=111	39 (35%)	72 (65%)	1	17.00	**<0.001**
senior nurse n=196	29 (15%)	167 (85%)			

6.4.3.2 Inserting the NG Tube on the Stroke Affected-side

Nurses who worked in an acute setting were significantly more likely to insert an NG feeding tube on the stroke affected side than nurses who worked in a community or rehabilitation setting ($p<0.05$), see Table 60.

Table 60: Comparison of inserting the NG tube on the affected side and work setting Qu.5

n=257	Inserting the tube on the affected side				
Work setting	**yes**	**no**	df	χ^2	**p**
Acute n=181	117 (65%)	64 (35%)	1	3.984	**0.046**
Community/rehab/PCT n=76	39 (51%)	37 (49%)			

6.4.3.3 Bandages

Stroke wards or units in Lothian NHS were significantly more likely to bandage patients hands to prevent NG tube removal than other stroke wards or units represented from the SSNF or the NSNF (p <0.001), see Table 61.

Table 61: Comparison of professional group and the use of bandages Qu.5

n=312	**Bandages**				
Professional Group	**yes**	**no**	df	χ^2	**p**
Lothian n=66	13 (20%)	53 (80%)	2	17.62	**<0.001** (exact)
SSNF n=104	3 (3%)	101 (97%)			
NSNF n=142	8 (6%)	134 (94%)			

6.4.3.4 Posey Vests

Community or rehabilitation stroke settings were significantly more likely to use Posey vests than acute stroke settings where Posey vests were not used at all (p=0.025), see Table 62.

Table 62: Comparison of work setting and the use of Posey vests Qu.5

n=257	**Posey vest**				
Work Setting	**yes**	**no**	df	χ^2	**p**
Acute n=181	0 (0%)	181 (100%)	1	7.23	**0.025** (exact)
Community/rehab/PCT n=76	3 (4%)	73 (96%)			

Staff nurses were significantly more likely to use Posey vests or be aware that their units used Posey vests than senior nurses, no senior nurses reported the use of Posey vest for maintaining NG tube position (p=0.046), see Table 63.

Table 63: Comparison of nursing seniority and the use of Posey vests Qu.5

n=307	**Posey vest**				
Nursing Seniority	**yes**	**no**	df=	χ^2	**p**
staff nurse n=111	3 (3%)	108 (97%)	1	5.35	**0.046** (exact)
senior nurse n=196	0 (0%)	196 (100%)			

6.4.4 Documentation of Methods used for Maintaining or Securing NG Tube Position Qu.10

Question 10 on the questionnaire asked respondents to indicate where methods used for securing or maintaining NG tube position were documented; the options included medical notes, nursing notes or care plans, nutritional charts or fluid balance charts. Significant differences were found for medical notes and fluid balance charts.

6.4.4.1 Medical Notes

Nurses who worked within stroke wards or units in Lothian NHS were significantly more likely to document any methods used to help secure or maintain NG tube position in the medical notes than nurses from other professional groups (p<0.001), see Table 64.

Table 64: Comparison of professional group and documenting methods used for securing NG tubes in the medical notes Qu.10

n=312	**Medical Notes**				
Professional Group	**yes**	**no**	df	χ^2	**p**
Lothian n=66	16 (24%)	50 (76%)	2	13.72	**<0.001**
SSNF n=104	5 (5%)	99 (95%)			
NSNF n=142	19 (13%)	123 (87%)			

Nurses from acute settings were significantly more likely to document methods used for securing or maintaining NG tube position within medical notes than nurses from community or rehabilitation settings (p=0.035), see Table 65.

Table 65: Comparison of work setting and documenting methods used for securing NG tubes in medical notes Qu.10

n=257	**Medical Notes**				
Work Setting	**yes**	**no**	df	χ^2	**p**
Acute n=181	33 (18%)	148 (82%)	1	4.44	**0.035**
Community/rehab/PCT n=76	6 (8%)	70 (92%)			

6.4.4.2 Fluid Balance Charts

There was a marginally significant difference between the likelihood of documenting methods used for securing or maintaining NG tube position on fluid balance charts. Staff nurses were more likely to carry out this practice than senior nurses (p=0.05), see Table 66.

Table 66: Comparison of nursing seniority and documenting methods used for securing NG tubes on fluid balance charts Qu.10

n=307	**Fluid Balance Charts**				
Nursing Seniority	**yes**	**no**	df	χ^2	**p**
staff nurse n=111	9 (8%)	102 (92%)	1	3.884	**0.05**
senior nurse n=196	6 (3%)	190 (97%)			

6.5 Nurses Opinions about Current Practice

Nurses' opinions about the reliability of checking procedures used to determine NG tube position (question 2), and opinions about the effectiveness, safety and acceptability of methods used for maintaining or securing NG tube position (inserting the NG tube on the affected side, tape, hand mittens, bandages on hands and the nasal bridle; questions 6, 7 & 8) were compared with demographic parameters. t-tests for two independent samples were used to compare mean scores between geographical location, work setting and nursing seniority and one way ANOVA was used to compare the mean scores for professional groups and determine any significant differences. If the assumption of a normal distribution was not met for one way ANOVA, then the equivalent non-parametric test (Kruskal-Wallis k-sample test) was reported, where necessary, this has been indicated in data tables. Differences were considered significant at $p \leq 0.05$.

6.5.1 Reliability of Methods used for Checking NG Tube Position Qu.2

Respondents were asked to indicate on a Likert scale from 1=Very reliable to 5=Very unreliable, how reliable they considered each checking procedure to be

for confirming NG tube position (Appendix 7). The following findings were significant at p≤0.05 level.

6.5.1.1 Geographical Location

Table 67 shows that nurses from England felt that aspiration was significantly more reliable than nurses from Scotland as a test for confirming NG tube position (p=0.039). However nurses from Scotland on average, considered x-ray to be more reliable than nurses from England (p=0.002).

Table 67: Comparison of geographical location and nurses' opinions about the reliability of aspiration and x-ray Qu.2

	Reliability of aspiration				**Reliability of x-ray***			
	n	mean	SD	df=302	n	mean	SD	df=243
England	142	1.85	0.727	t=2.071	137	1.52	0.708	t=-3.155
Scotland	162	2.04	0.870	**p=0.039**	166	1.29	0.517	**p=0.002**

*Equal variances not assumed

6.5.1.2 Work Setting

Nurses from the acute stroke care settings considered aspiration to be significantly more reliable as a test for confirming NG tube position than nurses from community or rehabilitation settings (p = 0.002), see Table 68.

Table 68: Comparison of work setting and nurses' opinions about the reliability of aspiration Qu.2

	Reliability of aspiration			
	n	mean	SD	df=247
Acute	172	1.88	0.711	t=-3.076
Community/Rehab/PCT	77	2.21	0.922	**p=0.002**

6.5.1.3 Nursing Seniority

There was a significant difference between the opinions of staff nurses and senior nurses about the reliability of the whoosh test and x-ray (see Table 69); staff nurses saw the whoosh test as significantly more reliable than senior nurses (p=0.005), staff nurses also considered x-ray to be more reliable (p<0.001).

Table 69: Comparison of nurse seniority and opinions about the reliability of the whoosh test and x-ray Qu.2

	Reliability of whoosh test				**Reliability of x-ray***			
	n	mean	SD	df=222	n	mean	SD	df=289
Staff nurse	72	3.25	1.017	t=-2.815	108	1.21	0.454	t=-4.273
Senior nurse	152	3.66	1.011	**p=0.005**	190	1.49	0.680	**p<0.001**

*Equal variances not assumed

6.5.1.4 Professional Group

Table 70 demonstrates significant differences were between the opinions of nurses in different professional groups and the reliability of aspiration as a method for checking NG tube position (p<0.001).

Table 70: Comparison of professional nursing group and opinions about the reliability of aspiration Qu.2

	Reliability of aspiration				
	n	mean	SD	F	**p**
Lothian	64	1.75	0.777	9.227	**<0.001**
SSNF	98	2.22	0.880		
NSNF	142	1.85	0.727		

However to determine exactly which professional groups were significantly different from the others post-hoc tests were run using Tukey's honestly significantly different (HSD) test, as can be seen in Table 71. Post-hoc tests revealed significant differences between Lothian (p=0.001) and the NSNF (p=0.001).

Table 71: Multiple comparisons of professional nursing groups and their opinions about the reliability of aspiration Qu.2

Tukey HSD

(I) professional group	(J) professional group	Mean Difference (I-J)	Std. Error	p value
Lothian	NSNF	-.095	.119	.703
	SSNF	-.474(*)	.127	.001
NSNF	Lothian	.095	.119	.703
	SSNF	-.379(*)	.104	.001
SSNF	Lothian	.474(*)	.127	.001
	NSNF	.379(*)	.104	.001

* The mean difference is significant at the .05 level.

Significant differences were found between professional groups about the reliability of the whoosh test, p=0.04 shown in Table 72.

Table 72: Comparison of professional nursing group and opinions about the reliability of the whoosh test Qu.2

	Reliability of whoosh test			
	n	mean	SD	F=3.273
Lothian	44	3.18	0.947	**p=0.04**
SSNF	73	3.62	0.952	
NSNF	111	3.62	1.088	

Post-hoc tests revealed a significant difference between the opinions of nurses from Lothian and nurses from the NSNF (p=0.043), reported in Table 73.

Table 73: Significant differences between the opinions of professional groups about the reliability of the whoosh test Qu.2

Tukey HSD

(I) professional group	(J) professional group	Mean Difference (I-J)	Std. Error	p value
Lothian	NSNF	-.440(*)	.182	.043
	SSNF	-.435	.195	.068

* The mean difference is significant at the .05 level.

When comparing the reliability of x-ray to Professional Groups, the Kruskal Wallis test was carried as all the assumptions for a one-way ANOVA were not met for this set of data (equal variances were not assumed). The Kruskal Wallis test showed significant differences between professional groups about the reliability of x-ray (p=0.001), see Table 74.

Table 74: Comparison of professional nursing group and opinions about the reliability of x-ray Qu.2

	Reliability of x-ray *				
	n	mean	SD	F	**p**
Lothian	65	1.18	0.391	6.891	**0.001**
SSNF	101	1.36	0.576		
NSNF	137	1.52	0.708		

*Equal Variances not assumed (One-way ANOVA)

6.5.2 Effectiveness of Methods used for Securing or Maintaining NG Tube Position Qu.6

No significant differences were found between the effectiveness of methods for securing or maintaining NG tubes and geographical location, work setting or nursing seniority.

6.5.2.1 Professional Group

Opinions about the effectiveness of hand mittens varied significantly between professional groups, as shown in Table 75. Post-hoc tests revealed significant differences between the opinions of nurses from Lothian and the SSNF; nurses from Lothian considered hand mittens to be significantly more effective than nurses from the SSNF (p = 0.036).

Table 75: Comparison of professional nursing groups and opinions about the effectiveness of hand mittens Qu.6

	Effectiveness of hand mittens				
	n	mean	SD	F	**p**
Lothian	46	2.11	0.823	3.455	**0.036**
SSNF	17	2.76	1.033		
NSNF	30	2.33	0.884		

6.5.3 Safety of Methods used for Maintaining or Securing NG Tube Position Qu.7

Respondents were asked to indicate on a Likert scale from 1=Very safe to 5=Very unsafe, how safe they considered each method for maintaining or securing NG tube position to be (Appendix 7). The following findings were significant at p≤0.05 level.

6.5.3.1 Geographical Location

Opinions of nurses from England and Scotland varied significantly about the safety of using the affected side and the safety of using tape to secure NG tube position. Table 76 shows that nurses from England considered using the affected side was safer than nurses from Scotland (p = 0.01) and that nurses from Scotland considered using tape was safer than nurses from England (p=0.047).

Table 76: Comparison of geographical location and opinions about the safety of using the affected side and tape Qu.7

	Safety of affected side				**Safety of tape**			
	n	mean	SD	df=293	n	mean	SD	df=306
England	139	2.38	0.696	t=2.582	129	3.19	1.037	t=1.994
Scotland	156	2.60	0.768	**p=0.01**	169	2.28	0.654	**p=0.047**

6.5.3.2 Work Setting

The opinions of nurses working in the acute varied from those in community/rehabilitation settings about the safety of using the affected side to secure NG tube position. Table 77 demonstrates that nurses from the acute

setting considered using the affected side to be significantly safer than nurses from community or rehabilitation settings (p=0.001).

Table 77: Comparison of work setting and opinions about the safety of using the affected side Qu.7

	Safety of affected side			
	n	mean	SD	df=238
Acute	166	2.41	0.714	t=-3.501
Community/Rehab/PCT	74	2.77	0.786	**p=0.001**

6.5.3.3 Nursing Seniority

Significant differences were found between the opinions of staff nurses and senior nurses about the safety of using hand mittens (Table 78); staff nurses considered hand mittens to be significantly safer than senior nurses (p=0.017).

Table 78: Comparison of nursing seniority and opinions about the safety of using hand mittens Qu.7

	Safety of hand Mittens			
	n	mean	SD	df=269
Staff Nurse	95	2.88	1.009	t=-2.397
Senior Nurse	176	3.21	1.099	**p=0.017**

6.5.3.4 Professional Group

Significant differences shown in Table 79, were found between the professional groups and nurses' opinions about the safety of using the affected side, (p=0.023). Post-hoc tests using Tukey HSD revealed that nurses from the NSNF considered using the affected side to be significantly safer than nurses from the SSNF (p = 0.02).

Table 79: Comparison of professional groups and opinions about the safety of using the affected side Qu.7

	Safety of affected side				
	n	mean	SD	F	**p**
Lothian	62	2.53	0.762	3.804	**0.023**
SSNF	94	2.65	0.772		
NSNF	139	2.38	0.696		

Significant differences were found between professional group and nurses opinions about the safety of using hand mittens to keep NG tubes in place, ($p < 0.001$), see Table 80. Post-hoc tests (using Tukey HSD) revealed that nurses from Lothian considered hand mittens to be significantly safer than nurses from the other professional groups ($p<0.001$); nurses from Lothian also considered hand mittens significantly safer than nurses from the NSNF ($p<0.001$).

Table 80: Comparison of professional groups and opinions about the safety of using hand mittens Qu.7

	Safety of hand mittens				
	n	mean	SD	F	**p**
Lothian	60	2.38	0.885	22.27	**<0.001**
SSNF	87	3.49	1.044		
NSNF	129	3.19	1.037		

Significant differences were found between professional groups and nurses' opinions about the safety of bandaging patients' hands to keep NG tubes in place ($p=0.004$), see Table 81. Post-hoc tests using Tukey's HSD revealed that nurses from Lothian considered bandaging hands to be significantly safer than nurses from the SSNF ($p=0.003$); nurses from Lothian also considered bandaging to be significantly safer than nurses from the NSNF ($p=0.02$).

Table 81: Comparison of professional group and opinions about the safety of bandaging hands Qu.7

	Safety of bandages				
	n	mean	SD	F	**p**
Lothian	54	3.19	0.992	5.684	**0.004**
SSNF	88	3.76	1.006		
NSNF	128	3.63	1.026		

6.5.4 Acceptability of Methods used for Maintaining or Securing NG Tube Position Qu.8

Respondents were asked to indicate on a Likert scale from 1=Very acceptable to 5=Very unacceptable, how acceptable they considered each method for maintaining or securing NG tube position (Appendix 7). The following findings were significant at p≤0.05 level.

6.5.4.1 Geographical Location

Significant differences were found between geographical location and nurses' opinions about the acceptability of using hand mittens and bandages to keep NG tubes in place. Nurses from Scotland considered hand mittens to be significantly safer for maintaining NG tube position than nurses from England (p=0.001); in addition nurses from Scotland saw bandages as a safer method for maintaining NG tube position than nurses from England (p=0.002), as shown in Table 82.

Table 82: Comparison of geographical location and opinions about the acceptability of using hand mittens and bandages Qu.8

	Acceptability of hand mittens				Acceptability of bandage*			
	n	mean	SD	df=301	n	mean	SD	df=289.8
England	140	3.74	1.129	t=3.215	140	4.34	0.812	t=3.149
Scotland	163	3.29	1.242	**p=0.001**	160	3.99	1.102	**p=0.002**

*Equal variances not assumed

6.5.4.2 Work Setting

In Table 83 it is clear that, nurses who worked in the acute hospital setting with stroke patients, considered using the affected side to maintain NG tube position to be more acceptable than nurses who worked in community/rehabilitation settings (p=0.001).

Table 83: Comparison of work setting and opinions about the acceptability of using the affected side Qu.8

	Acceptability of affected side*			
	n	mean	SD	df=120.5
Acute	171	1.92	0.646	t=-3.357
Community/Rehab/PCT	72	2.25	0.727	**p=0.001**

*Equal variances not assumed

6.5.4.3 Nursing seniority

Table 84 demonstrates that staff nurses considered hand mittens to be significantly more acceptable as a means for maintaining NG tube position than senior nurses (p=0.002); further more staff nurses considered bandaging patients hands to help maintain NG tube position as significantly more acceptable than senior nurses (p=0.016).

Table 84: Comparison of nursing seniority and opinions about the acceptability of using hand mittens and bandages Qu.8

	Acceptability of hand mittens				**Acceptability of bandage***			
	n	mean	SD	df=297	n	mean	SD	df=174
Staff nurse	106	3.20	1.276	t=-3.183	104	3.95	1.135	t=-2.436
Senior nurse	193	3.66	1.149	**p=0.002**	192	4.27	0.896	**p=0.016**

*Equal variances not assumed

6.5.4.4 Professional Group

Significant differences were found between professional groups and nurses opinions about the acceptability of hand mittens (p<0.001) (Table 85). Post-hoc analysis using Tukey's HSD revealed that nurses from Lothian considered hand mittens to be significantly more acceptable than either nurses from the SSNF (p<0.001) or nurses from the NSNF (p<0.001).

Table 85: Comparison of professional groups and opinions about the acceptability of using hand mittens Qu.8

	Acceptability of hand mittens				
	n	mean	SD	F	**p**
Lothian	64	2.48	1.07	35.13	**<0.001**
SSNF	99	4.28	0.90		
NSNF	140	4.34	0.81		

Significant differences (Table 86) were found between professional groups and the opinions of nurses about the acceptability of using bandages on patients hands to help maintain NG tube position ($p<0.001$). Post-hoc tests using the Tamhane's test (equality of variance cannot be assumed), revealed significant differences in opinions between groups. Nurses from Lothian considered bandaging patients hands to help maintain NG tube position to be significantly more acceptable than nurses from either the SSNF ($p<0.001$) or nurses from the NSNF ($p<0.001$).

Table 86: Differences in nurses' opinions between professional groups about the acceptability of using bandages Qu.8

	Acceptability of bandages *				
	n	mean	SD	F	**p**
Lothian	61	3.52	1.23	17.4	**<0.001**
SSNF	99	4.28	0.90		
NSNF	140	4.34	0.81		

*Homogeneity of variances not assumed

6.6 Further Analysis

Further analysis was carried out looking at the correlation of nurses' opinions between the effectiveness, safety and acceptability of methods used for maintaining or securing NG tube position. The significant results are presented below. In addition further comparisons were made between whether who use the whoosh test were trained to do so, whether those who used hand mittens or nasal bridle felt they were more effective, safe or acceptable than those who did not. Significant findings are presented below.

6.6.1 Correlation

Nurses' opinions about the effectiveness, safety and acceptability of methods used for securing or maintaining NG tube position were compared using Pearson's Correlation. Correlation was considered significant at ≤0.05. The following findings were significant.

6.6.1.1 Effectiveness, Safety and Acceptability of Inserting the Tube on the Affected-side

Tables 87a and 87b show positive correlations between nurses' opinions about the effectiveness, safety and acceptability of inserting the NG tube on the affected side. The safety of using the affected side ($p<0.0001$) positively correlated with the acceptability of using the affected side ($p=0.023$) and in addition the safety of using the affected side positively correlated with the acceptability of using the affected side ($p<0.0001$).

Table 87a: Descriptive Statistics of the effectiveness, acceptability and safety of inserting the NG tube on the stroke affected side

	Mean	SD	n
Effectiveness inserting NG tube on affected side	2.70	.751	269
Safety of using affected side	2.50	.742	295
Acceptability of using the affected side	2.01	.673	297

Table 87b: Correlations between the effectiveness, acceptability and safety of inserting the NG tube on the stroke affected side

		Effectiveness inserting NG tube on affected side	Safety of using affected side	Acceptability of using the affected side
Effectiveness inserting NG tube on affected side	Pearson Correlation	1	.386(**)	.139(*)
	p value		**.0001**	**.023**
Safety of using affected side	Pearson Correlation		1	.518(**)
	p value			**.0001**
Acceptability of using the affected side	Pearson Correlation			1
	p value			

** Correlation is significant at the 0.01 level
* Correlation is significant at the 0.05 level

6.6.1.2 Effectiveness, Safety and Acceptability of Taping the NG tube to the Face

Nurses opinions about the effectiveness of using tape to secure the NG tube are shown in Tables 88a and 88b was positively correlated with their opinions about the safety of tape p<0.0001; in addition their opinion about the effectiveness of tape positively correlated with their opinions about the acceptability of tape p<0.0001. Nurses opinions about the safety of using tape positively correlated with their opinions about the acceptability of using tape p<0.0001.

Table 88a: Descriptive Statistics of the effectiveness, safety and acceptability of taping the NG tube to the face

	Mean	SD	n
Effectiveness of tape to keep NG tube in place	2.33	.741	306
Safety of using tape	2.21	.654	308
Acceptability of using tape	1.88	.587	310

Table 88b: Correlations between the effectiveness, safety and acceptability of taping the NG tube to the face

		Effectiveness of tape to keep NG tube in place	Safety of using tape	Acceptability of using tape
Effectiveness of tape to keep NG tube in place	Pearson Correlation	1	.359(**)	.238(**)
	p value		**.0001**	**.0001**
Safety of using tape	Pearson Correlation		1	.390(**)
	p value			**.0001**
Acceptability of using tape	Pearson Correlation			1
	p value			

** Correlation is significant at the 0.01 level

6.6.1.3 Effectiveness, Safety and Acceptability of using Hand Mittens

Nurses opinions about the effectiveness of using hand mittens to maintain NG tube position positively correlated with their opinions about the safety of mittens ($p<0.0001$) and the acceptability of using mittens ($p<0.0001$). Nurses opinions about the safety of using hand mittens also positively correlated with their opinion about the acceptability of using hand mittens ($p<0.0001$). Tables 89a and 89b show these results.

Table 89a: Descriptive Statistics of the effectiveness, safety and acceptability of using hand mittens

	Mean	SD	n
Effectiveness of mittens to keep NG tube in place	2.30	.906	93
Safety of using mittens	3.11	1.083	276
Acceptability of using mittens	3.50	1.209	303

Table 89b: Correlations between the effectiveness, safety and acceptability of using hand mittens

		Effectiveness of mittens to keep NG tube in place	Safety of using mittens	Acceptability of using mittens
Effectiveness of mittens to keep NG tube in place	Pearson Correlation	1	.367(**)	.357(**)
	p value		**.0001**	**.0001**
Safety of using mittens	Pearson Correlation		1	.621(**)
	p value			**.0001**
Acceptability of using mittens	Pearson Correlation			1
	p value			

** Correlation is significant at the 0.01 level

6.6.1.4 Effectiveness, Safety and Acceptability of Bandaging Hands

Nurses opinions about the effectiveness of using bandages to maintain NG tube position positively correlated with their opinions about the safety of bandaging ($p<0.0001$) and their opinions about the acceptability of bandaging patients hands ($p<0.0001$). Nurses opinions about the safety of bandaging patients hands was also positively correlated to their opinion about the acceptability of bandaging patients hands ($p<0.0001$). These results are shown in Tables 90a and 90b.

Table 90a: Descriptive Statistics of the effectiveness, safety and acceptability of bandaging hands

	Mean	SD	n
Effectiveness of bandage to keep NG tube in place	2.79	1.054	52
Safety of bandaging hands	3.59	1.030	270
Acceptability of bandaging	4.16	.991	300

Table 90b: Correlations between the effectiveness, safety and acceptability of bandaging hands

		Effectiveness of bandage to keep NG tube in place	Safety of bandaging hands	Acceptability of bandaging
Effectiveness of bandage to keep NG tube in place	Pearson Correlation	1	.531(**)	.563(**)
	p value		**.0001**	**.0001**
Safety of bandaging hands	Pearson Correlation		1	.448(**)
	p value			**.0001**
Acceptability of bandaging	Pearson Correlation			1
	p value			

** Correlation is significant at the 0.01 level (2-tailed).

6.6.1.5 Effectiveness, Safety and Acceptability of using the Nasal Bridle

Tables 91a and 91b show positive correlations about the effectiveness, safety and acceptability of the nasal bridle. The effectiveness of using the nasal bridle positively correlated with opinions about the safety of using the nasal bridle (p=0.006) and its acceptability (p=0.003). Nurses opinions about the safety of using the nasal bridle also correlated positively with their opinion about its acceptability (p<0.0001).

Table 91a: Descriptive Statistics of the effectiveness, safety and acceptability of using the nasal bridle

	Mean	SD	n
Effectiveness of nasal bridle to keep NG tube in place	2.09	.959	70
Safety of nasal bridle	2.84	.860	267
Acceptability of using nasal bridle	2.83	.920	291

Table 91b: Correlations between the effectiveness, safety and acceptability of using the nasal bridle

		Effectiveness of nasal bridle to keep NG tube in place	Safety of nasal bridle	Acceptability of using nasal bridle
Effectiveness of nasal bridle to keep NG tube in place	Pearson Correlation	1	.325(**)	.363(**)
	p value		**.006**	**.003**
Safety of nasal bridle	Pearson Correlation		1	.493(**)
	p value			**.0001**
Acceptability of using nasal bridle	Pearson Correlation			1
	p value			

** Correlation is significant at the 0.01 level

6.6.2 Further Analysis of Training to use Whoosh Test

Previous findings had shown that 23% of nurses who responded to the questionnaire, reported that they had been trained how to use the whoosh test. To determine whether there were any differences in opinion between nurses who had been trained to do the whoosh test and how reliable they thought it was t-tests for two independent samples were carried out.

A total of 228 nurses had rated the reliability of the whoosh test 27% (n=61/228) had been trained how to carry out the whoosh test 63% (n=167/228) had not. Those nurses who had been trained how to use the whoosh test considered it to be significantly more reliable than those who had not been trained (p<0.0001), see Table 92.

Table 92: Differences between nurses trained to carry out the whoosh test and how reliable they thought it was:

	Reliability of whoosh test			
	n	mean	SD	df=226
trained to whoosh	61	3.13	1.040	t=-3.677
not trained to whoosh	167	3.68	0.988	**p<0.0001**

6.6.3 Further Analysis of Hand Mitten use and opinions about their Effectiveness

Hand mittens were used by 22% of the nurses who responded to the questionnaire. To determine whether there were any differences in opinion between those nurses who used and did not use hand mittens and how effective, safe or acceptable they thought they were, further t-tests were carried out.

A total of 93 nurses rated the effectiveness of hand mittens, 73% (n=68/93) of those nurses used hand mittens 27% (n=25/93) did not. Nurses who used hand mittens considered them to be significantly more effective than those who did not (p = 0.001), these results can be seen in Table 93.

Table 93: Differences between those who use or do not use mittens and how effective they thought they were:

	Effectiveness of hand mittens			
	n	mean	SD	df=91
Use hand mittens	68	2.12	0.856	t=-3.398
Do not use hand mittens	25	2.80	0.866	**p=0.001**

A total of 276 nurses rated the safety of using hand mittens, from these (n=68/276) nurses reported using hand mittens and (n=208/276) did not use them. Nurses who used hand mittens considered then to be significantly safer than those who did not (p<0.0001), see Table 94.

Table 94: Differences between those who use or do not use mittens and how safe they thought they were:

	Safety of using hand mittens*			
	n	mean	SD	df=197.287
Use hand mittens	68	2.07	0.581	t=-13.952
Do not use hand mittens	208	3.45	0.991	**p<0.0001**

*Equal Variances not assumed

A total of 303 nurses rated the acceptability of using hand mittens, from those nurses (n=68/303) nurses used hand mittens and (n=235/303) did not. Nurses

who used hand mittens saw them as significantly more acceptable than those nurses who did not (p<0.0001), as shown in Table 95.

Table 95: Differences between those who use or do not use mittens and how acceptable they thought they were:

	Acceptability of using hand mittens *			
	n	mean	SD	df=156.275
Use hand mittens	68	2.12	0.702	t=-16.494
Do not use hand mittens	235	3.90	1.016	**p<0.0001**

*Equal Variances not assumed

6.6.4 Further Analysis of Nasal Bridle use and opinion about its Effectiveness

The nasal bridle was used by 16% of those nurses who responded to the questionnaire. To determine whether there was any significant difference in opinion about the effectiveness, safety or acceptability of the nasal bridle between those nurses who use it and those who did not, further t-tests for two independent samples were carried out.

A total of 70 nurses rated the effectiveness of the nasal bridle, 64% (n=45/70) had used the nasal bridle 36% (n=25/70) had not. Table 96 shows that, nurses who had used the nasal bridle considered it to be significantly more effective than those nurses who had not (p<0.001).

Table 96: Differences between those who use or do not use the nasal bridle and how effective they thought it was

	Effectiveness of nasal bridle			
	n	mean	SD	df=68
Use nasal bridle	45	1.80	0.919	t=-3.626
Do not use nasal bridle	25	2.60	0.816	**P<0.001**

A total of 267 nurses rated the safety of the nasal bridle, 18% (n=49/267) used the bridle 82% (n=218/267) did not. Nurses who used the nasal bridle

considered it to be significantly safer than those who did not (p<0.0001) as demonstrated in Table 97.

Table 97: Differences between those who use or do not use the nasal bridle and how safe they thought it was

	Safety of nasal bridle *			
	n	mean	SD	df=66.789
Use nasal bridle	49	2.29	0.890	t=-4.866
Do not use nasal bridle	218	2.96	0.805	**p<0.0001**

* Equal Variances not assumed

A total of 291 nurses rated the acceptability of the nasal bridle, 16% (n=48/291) used the bridle 84% (n=243/291) did not. Table 98 shows that, nurses who had used the nasal bridle considered it to be significantly more acceptable than those who had not (p<0.0001).

Table 98: Differences between those who use or do not use the nasal bridle and how acceptable they thought it was

	Acceptability of nasal bridle			
	n	mean	SD	df=289
Use nasal bridle	48	2.15	0.875	t=-5.948
Do not use nasal bridle	243	2.96	0.869	**p<0.0001**

6.7 Summary

This chapter has presented the statistically significant results from inferential analysis of the questionnaire sent to nurses working within three professional groups in the UK. Results were set out in three categories; training, current practice and nurses opinions about current practice. Within each of these categories, bivariate analysis against geographical location, work setting and nursing seniority were carried out. Then multivariate analysis against the different professional groups was undertaken.

7 Analysis of Phase 3 Interviews with Staff

7.1 Introduction

This chapter presents qualitative findings drawn from interviews carried out in phase 3. This phase consisted of five interviews which further explore and deepen the interpretation of the findings from phases 1 and 2. The content of interview agendas are discussed and a summary of the analysis undertaken given; this is followed by a brief introduction to each of the participants involved. The analyses of these data are presented in the form of eight categories and twenty sub-categories derived from a process of constant comparative analysis. To protect the identity of all participants involved in this phase, pseudonyms have been allocated.

7.2 Interview Agenda

Although it was not practical to discuss all the findings from phases 1 & 2, I sought to raise some of the most salient issues. The agenda for interviews was semi-structured and included the following topics; training and what nurses understood as formal training, opinions about the use of measures such as hand mittens and nasal bridles and the issue of restraint and further opinions about how guidelines and protocols for hand mittens and nasal bridles should be used. Finally each participant was asked how they thought the findings of this research might be used to improve practice and training for NG feeding and what implications the findings might have for future research. An example of the semi structured agenda for interviews can be seen in Appendix 3.

7.3 Analysis

Each interview was initially read and analysed prior to the commencement of the next in keeping with a constant comparative approach. Themes identified from this preliminary analysis were noted and then carried into the next interview to enable further clarification and deepening. All five interviews were transcribed verbatim then analysed using a constant comparative analysis in keeping with a Grounded Theory Approach. Categories were identified within

the data using relevant coding procedures as discussed in chapter 3; sections 3.7.1.2.2 and 3.7.1.2.3. These categories were further subdivided into properties and dimensions in the same manner as described in chapter 4.

7.4 Participants

To preserve confidentiality participants have been assigned pseudonyms and all identifiable data within the transcripts has been removed; for example names of clinical areas or NHS organisations. The five participants were as follows.

Participant 1 (ward manager)

Louise was a Ward Manager within the specialty of Parkinson's disease where they carried out a lot of NG feeding. Louise had been registered for many years.

Participant 2 (staff nurse)

Maria was a staff nurse who worked within the specialty of neurology where NG feeding was commonly used in addition to patient restraint measures. Maria had been qualified for seven years.

Participant 3 (nurse lecturer)

Karen was a nurse lecturer working with Higher Education and took responsibility for the nutrition education within the pre-registration curriculum. Karen had a long period of clinical experience following registration and was an experienced Lecturer.

Participant 4 (student nurse)

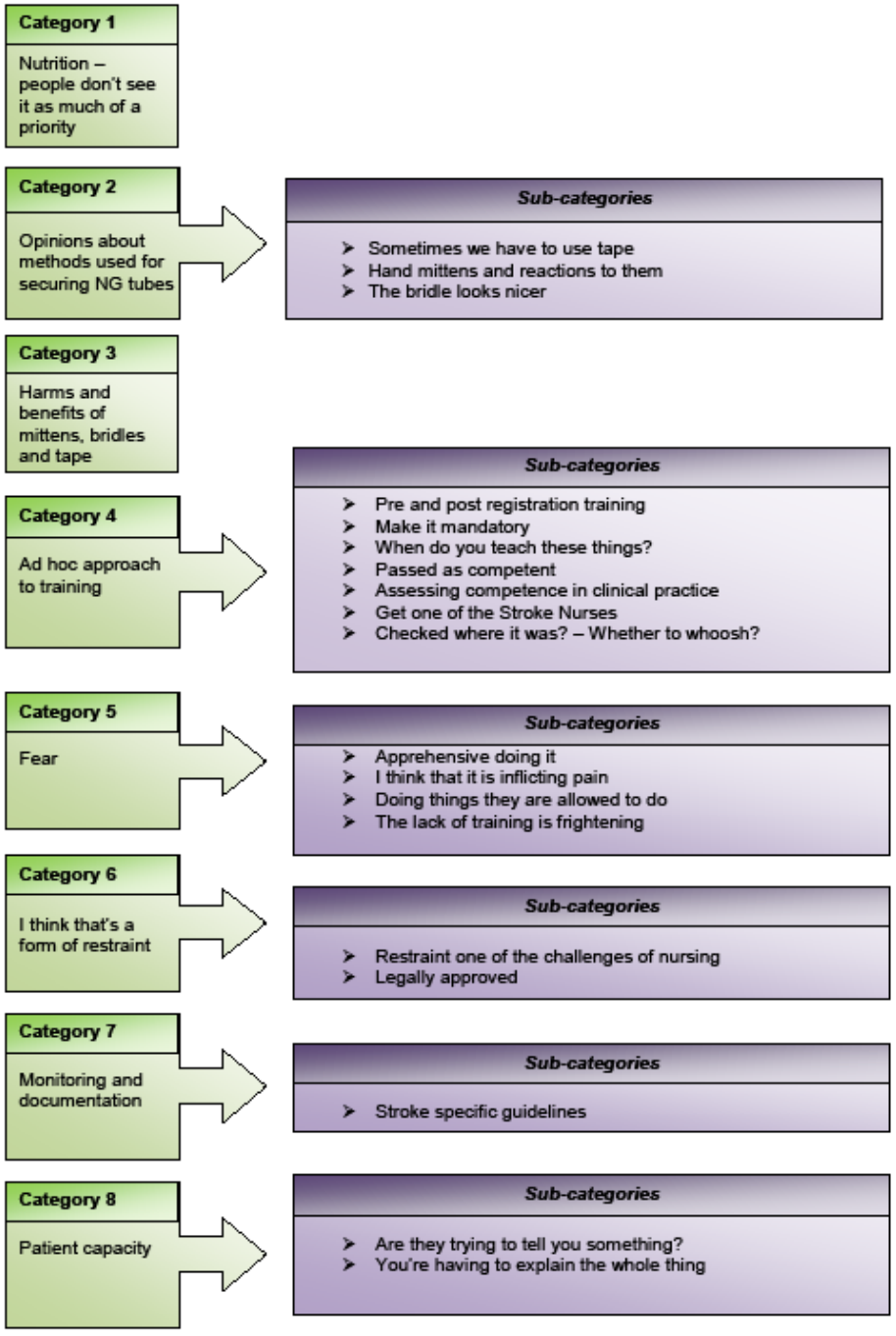
Diane was a third year student nurse just about to register. Diane had expressed an interest in participating as she was completing her final clinical placement on an acute stroke unit where she had gained experience of NG feeding.

Participant 5: (specialist nurse)

Joanne was a Specialist Nurse in Clinical Nutrition and had responsibility for training registered nurses working in clinical practice how to pass, confirm and care for NG feeding tubes. Joanne had many years of clinical experience following registration.

All the participants had recent experience of managing NG feeding for patients; Maria and Diane had gone through nurse training more recently than Louise, Karen and Joanne. A summary of the categories and sub-categories which emerged from phase 3 analysis can be seen in Figure 11.

Figure 11: Phase 3 Categories and Sub-categories



7.5 Nutrition – 'people don't see it as much of a priority'

Throughout the interviews participants expressed their views that nutrition as a whole was not seen as a priority. Joanne saw improving nutritional standards in clinical care as something that has been ongoing for years and not improving:

> *"…we've always known, how long have we known that 40% of these patients are malnourished and you know it's ongoing up to 50%, you know the end of their stay, I mean how old is that McWhirter and Pennington paper…..., we know that but……." (Joanne: p.14)*

She related that although national standards had been issued and there was an impetus with nutrition, the Health Board she worked for had failed to meet these standards, part of which was carrying out nutrition screening for all patients which had been tried and now had to be re-launched across the Health Board:

> *"[Name of Health Board] as a whole have never, never really taken on board err screening, certain areas have been very good at it, in documenting it all, but there's other areas that don't have a pair of scales so…."(Joanne, p.14)*

Karen described nutrition as something that goes down the ladder of care because people do not see it as much of a priority unless it is a specific requirement within a specialty:

> *"…the whole aspect of nutrition and nutritional support and assessment and support, um it's very important and I think it does get lost in many areas out there. Unless you're in a specific area where it's a kinda key skill, a key you know aspect of care, then I think it is one of these things that probably goes down the ladder in the scheme of things, you know….because people don't see it as much of a priority…." (Karen: p.18)*

Diane also felt that more could be done on nutrition during nurse training:

> *"Em, I think it should be in there nutrition, I mean I know obviously they do a lecture on it, but maybe they should do more, sort of healthy eating and the other side of like nutrition as well…." (Diane: p.8)*

However, Karen felt that nutrition was addressed as more of a priority in nurse training than it ever had been before, she also felt that nutritional screening was carried out more in clinical practice. All the participants were more than aware

of how important good nutritional care was for patients, and there was a sense of frustration that still people do not see it as much of a priority, nutrition gets lost amongst all the other priorities in the scheme of clinical care. The sense of nutrition not being prioritised as important was reflected in what Maria described as an attitude gap towards NG feeding that she had experienced in an area where it was used frequently:

> *"Yeh, and I think there's an attitude gap as well […] as to, is this a significant thing or not…,and if you've been in a place where you do it all day in, day out and you don't even think about it, then it is very easy to say, 'well how do you not know this, everybody knows this…, you're a staff nurse, this is basic…go on and do it' [laughing] (Maria: p.5)*

> *"…..and there was a perception that NG feed is just the same as giving somebody soup….and it's just basic nursing care and you just get on with it…, but in fact you can cause an awful lot of trauma with an NG tube…." (Maria: p.5)*

Maria went further to express concern about the fact that non-registered nursing staff now hung feeds which was in her opinion, another reflection of how in some areas NG feeding was seen as a 'basic' nursing skill because the feeding tube only passes into the stomach:

> *"….but they wouldn't be allowed to hang an IV bag, so why can they hang an NG bag?...I think there is this illusion that it's just feeding somebody, it's just putting a longer tube down in front of them so that there's no issues around it, and I think that's the biggest gap" (Maria: p.14)*

This attitude described by Maria is contradictory to the fear that participants described and perceived concerning NG insertion and confirming tube position. Once the tube is in place, there seems to be a perception that it is no different to oral feeding. This perhaps reflects a lack of understanding as to the necessity of monitoring NG feeding regularly. The attitude that Maria describes further demonstrates that the anxiety which nurses feel is around the initial insertion and the dangers of misplacing the NG tube at that time, not about the potential for tube displacements in between feeds. However tube displacement in between feeds and during feeds is possible and is something that should be closely monitored, tube position should be checked regularly and awareness of this should be part of any training given about caring for NG feeding tubes.

7.6 Opinions about Methods used for Securing NG Tubes

Participants were either shown or described the list of methods from the questionnaire for maintaining tube position and the frequency with which they were used.

7.6.1 Sometimes We Have to use Tape

All the participants were familiar with taping, but they felt that it was generally unsuccessful, especially if a patient wanted to pull their tube out or if their skin was at all greasy or sweaty:

> *" Er….it's not successful [both laugh], sometimes we have to use tape that's not there and sometimes they'll land up with lots of bits because obviously you try and tuck it behind their ears and things. I mean we try not to have lots of tape on peoples faces, it's not nice, but I find it, you know it's the one that goes around the tube and then over the nose, is the one that we use, and on some people it's really good but if you're at all greasy or sweaty it's just…..it's off" (Louise: p.12)*

Louise reported that they tended to use whatever tape the manufacturer supplied, relying on the assumption that they were provided with the most appropriate tape. Karen felt that it was possible to do harm with tape if the patient was repeatedly pulling their NG tube out:

> *"…now tape is not going to keep it in place, um if the patient's pulling it up and it's actually likely to cause the patient damage, you know the tape, you know if it's quite well adhered and they're pulling it, you know so um they can actually cause themselves damage and you see that happening."(Karen: p. 19)*

The task of maintaining NG feeding, especially on stroke patients was seen as a *'very challenging area' (Karen: p.19)*; the impression given, was that to prevent tube dislodgement something more robust than tape was required. However, participants had mixed opinions about what was an effective or acceptable alternative.

7.6.2 Hand Mittens and Reactions to them

Louise had very strong opinions about the use of hand mittens, she was anxious to relate that her unit did not use them and that she would not use them:

> *"I would not be putting gloves on, and I wouldn't be bandaging anybodies hands, I mean goodness, you do more damage having somebody's hands in a ….I mean how could you do, do you take it off every hour to exercise their hands?.... things like that, I mean it's just dreadful….." (Louise: p.13)*

Louise saw hand mittens as being almost pre-historic, she felt they were *"….kinda out the Ark now, it should be passed back" (Louise: p 16.)* and only one step away from tying patients hands. Her concerns were not only that they might damage the patient physically; were old fashioned, but also that they were robbing the patient of their independence:

> *"…whereas that [referring to the mitten], not only do you now have a tube but you're …also your hands, so it's almost like you're robbing two things…" (Louise: p.14)*

During the interview a hand mitten was placed on the desk in front of Louise and she kept picking it up and referring to it as *'that'*. Louise's reaction to the hand mitten suggests that she saw it as something she found distasteful.

Other participants were more accepting of hand mittens, and considered them to have a purpose. Diane described the outcome for one patient:

> *" I mean she eventually she got off the NG and she was eating again she improved like, in a couple of weeks she improved like so much, just through the NG I think, so they did work on her" (Diane: p.14)*

Despite seeing hand mittens used successfully, Diane and Maria both had reservations about them. Dianne describes the conflict between knowing that the mittens were effective but acknowledged that the family were not happy about the patient having them on:

> *"They do work, but it's hard to, like there was one lady that had, that was using them, 'cos she was just pulling these naso-gastric tubes out all the*

time, she needed fed, and you could see her just sitting there just trying to like get her, her hands on it all the time, so it was, I suppose they had no other choice because em, you know she needed fed, but her family weren't happy about her using, having these on, then as soon as they took them off, she would whip the NG out. I mean they were still used on her, I think it was during the day, I'm not sure so much at night, but definitely the whole day she'd have them on". (Diane: p.13)

Maria describes a similar conflict. In her experience, patients found hand mittens easy to remove if they were determined enough. However there were times when patients who made no attempt to remove their NG were given mittens:

"I don't know whether you've ever had mittens on, it's very simple to turn your hands round so that you can still pull things, em, and but for a lot of patients if you put mittens on them, they didn't pull their tubes and they didn't attempt to pull things out and you were always left wondering…well maybe they just wouldn't have anyway [laughing]" (Maria: p.9-10)

There seems no doubt that for certain patients hand mittens were effective, however participants struggled about their acceptability. Joanne was the only participant to state that they were acceptable but thought their use required monitoring:

"….And I felt that about the mitts, the mittens because, should there be a specific documentation for that, a care plan when they're checking you know the hands you know and how often you'd supposed to be taking these mittens off and you know are you documenting each time you're taking it off and checking the patient's hands, that sort of thing…." (Joanne: p.10)

Karen's opinion of hand mittens was that it was a challenging area for nurses; however, the requirement to feed the patient outweighed any possible adverse effects:

"Well it's one of these huge challenges for nurses to, something you know, you need to ….going to keep the tube down, how do you do it safely? And something that's not going to cause too much adverse effects on the patient, and maybe we have to accept that there will be some adverse effects on a patient who's receiving treatment" (Karen: p.21)

Even Joanne and Karen who saw mittens as acceptable had reservations concerning adequate documentation, proper care and potential for misuse.

Participants opinions of hand mittens suggest that their use must be considered carefully on an individual patient basis, there must be adequate documentation and policy.

7.6.3 The Bridle Looks Nicer

Participants viewed the nasal bridle as a more acceptable method for securing NG tube position than hand mittens, even though it is more invasive for the patient. The nasal bridle was seen as being a more dignified option than hand mittens, less visible and disabling:

> *"See I think the bridle looks nicer, you know it doesn't look so, like oh that looks big things and when they try and get them off it's just really sad , cos like this woman spent the whole day, she spent the whole day trying to get them off, and getting herself quite agitated and …, so I think that the, the bridle looks sort of nicer, you know that way cos it's just this wee bit there…"(Diane: p.14)*

> *"I think because it's only got, it only deals with one area that already has got something there, so you're not doing anything extra...." (Louise: p.14)*

The issue of patient dignity was deemed as being extremely important by the participants. Louise was particularly concerned about the visual impact of hand mittens for other patients and relatives, whereas the nasal bridle just looked like the patient had a tube in place:

> *"I mean what is that telling to all the other patients and all the other visitors you know, that is, that is a huge imposition, I mean, I'm sure it's very comfortable, you can move your hands a wee bit, but what is that telling everybody, it's a huge visual, whereas I think visually that looks a lot better" (Louise: p.14)*

The opinions of the participants reflected the findings of the questionnaire, but added some level of detail as to why nurses might see the nasal bridle as being more acceptable. The key seemed to be preserving the dignity of the patient:

> *"……that, that is incredibly undignified, that the first thing you come in and see you see someone with a big mitt on their hands, I mean I'd be thinking oh they must be scratching or punching" (Louise:p.14)*

Louise's description suggests that visually hand mittens may appear to be a punitive measure, which to her seemed to be a more important factor than the potential risk of trauma caused by the nasal bridle.

Joanne in her role as specialist nurse in nutrition was concerned about the possible impact on training that adopting the nasal bridle into clinical practice would have. The organisation in which Joanne worked already had issues with adequate training provision for NG insertion, so she saw the potential training needs for the nasal bridle as an added problem:

> *"…I think the nasal bridle, I don't think it should be brought in until there's good training, cos I've never used it" (Joanne: p.11)*

> *"Well that's what I mean, it's, it's….if staff are'nae getting formal training and you know supervision, you know it's not mandatory then how are we gon'nae get that for the nasal bridle?" (Joanne: p. 11)*

The overall implication within the category of training is that training for both pre- and post-registration nurses about NG feeding including insertion and confirming tube position is both variable and inadequate. Participants accept that the best form of training in their opinion is what they would class as formal training which involves a formal study day or session followed by competency based assessment. However the reality of achieving this at either pre- or post-registration stages is currently problematic in terms of training content, delivery and adequate support for achieving competency assessment. This situation seems to be impacted by inconclusive or inadequate guidelines based on insufficient evidence which lead to variable and inconsistent practice, in other words it is not clear what best practice is and therefore what should be taught.

7.7 Harms and Benefits of Mittens, Bridles and Tape

Participants in their discussion about methods used for maintaining NG feeding tube position, weighed up potential harms and benefits for each method which added to findings from phases 1 and 2.

Tape was not deemed to be a successful method of securing NG tubes leading to frequent reinsertion

> *"…now tape is not going to keep it in place […], um if the patient's pulling it up and it's actually likely to cause the patient damage, you know the tape, you know if it's quite well adhered and they're pulling it, you know so um they can actually cause themselves damage and you see that happening…..nose bleeds and things like that, so." (Karen: p.19)*

Participants expressed concern about the potential benefits and harms of hand mittens:

> *"Hand mittens you know, um seen used but generally speaking it's just been actually bandages on hands in the past, um but…I mean I don't know whether there's an easy answer to that one, because unless you've got a nurse there all the time [laughing] just monitoring the patient, how do you cope with a patient who's likely to pull it up?" (Karen: p.19)*

Although participants saw the nasal bridle as a preferable option to hand mittens, there were concerns about potential damage that might be caused to the nasal septum if a patient were to try and tug on the tube. This was speculation on the part of these participants as none of them had seen the bridle being used in practice. Further to this, Joanne was concerned about the bridle being used with confused or disorientated patients such as stroke patients, as she felt this was contraindicated with the advice from the manufacturers because of the risk of trauma. The manufacturers however, recommend that the nasal bridle is suitable for any type of patient (AMT 2008):

> *"Well I thought the bridle, the nasal bridle I thought obviously that seems quite a good idea, but I thought some of what the manufacturers recommendations were, that they shouldn't be used in patients who would attempt to pull it out because of the risk of trauma, and I think that's what people are unclear about….." (Joanne: p.10)*

7.8 Ad hoc Approach to Training and Education

Generally participants were happy to discuss what training they had received. Louise described having been taught how to pass NG tubes by a clinical teacher on a surgical placement just before she finished her training:

"….when I did it, it was somebody passed it and then the next time I passed one with someone there and then I think the third time…I, I did it and had it checked, so I think it was only two that I pass….cos you don't get them that often, but certainly I had someone shown me how to do it you know with little hints and tips, second time she was there with me when I passed it and the third one I did on my own ….(sounds hesitant) and I got them to check before we fed…" (Louise: p.2)

In comparison, Diane had received a less structured training experience than Louise. Both Louise and Dianne had received some level of theory regarding NG insertion prior to practising the skill, Diane reported having had a lecture in the first year which taught her the basic process of passing an NG tube, then in her third year she observed another nurse pass a tube, then tried it herself. Diane's language when describing her training suggests that perhaps she felt she didn't get enough. It gives an impression of incompleteness and her clinical practice perhaps suggests a lack of supervision:

"Right em, basically I think we had a lecture, I think it was in first year, that's basically been it" (Diane: p.2)

Researcher - "So do you remember what was in your lecture in the first year? Do you remember what they told you?"

"It's just more getting them upright and you know going through the whole procedure, and you got a hand out and you were supposed to go away and sort of study up really…" (Diane: p.3)

"Yeh, I obviously observed somebody do it, and that, that was really it, and after that, I saw another person do it and then they gave me a shot at doing it, but it wasn't really successful, and then my third attempt I managed to do it…" (Diane: p.4)

It became apparent that although Diane felt she had been trained how to pass and check the position of an NG tube, she was not sure that she felt competent and hoped that would come with experience.

Researcher - "Is there more that you'd like to know about it?"

Diane - " Yeh, I think I would like to know what I'm looking for, and you know, just feel more competent doing it I think,… but hopefully that will come…… once I've had experience.." (Diane: p.6)

In comparison, Louise had received a more structured training experience and did not express the same level of apprehension at passing an NG tube even though she did not practice the skill regularly. This more structured and comprehensive training experience enabled Louise to understand the procedure more thoroughly and therefore carry it out more confidently. As a student nurse Diane had far more experience with NG feeding than other students might, but even she did not feel confident. However there was no guarantee that she would receive any further training either pre or post registration. Her description of the procedures involved in confirming NG tube position suggested that she did not fully understand the process, and may have witnessed practice that was carried out incorrectly:

> *"Yeh, I think that they do, yeh. I've seen, it's like a regular thing that they'll go down for x-rays if they're unsure if it's in the right position, em I think it's more just to back up what they're doing anyway, just, just in case it's in the wrong position, but I think the, the like x-ray don't, they get a bit huffy supposedly, if the, they so 'oh if you put water down', you know if you try and get aspirate back, they want you to wait, put the water down, and then wait a couple of hours and then if they've not got any aspirate back, then phone them to get an x-ray, cos they don't, they don't like it supposedly, like too many people coming down for x-rays" (Diane: p.6)*

Water should not be put down a feeding tube until it has been confirmed to be in the correct position (Dougherty & Lister 2008; NPSA 2005a). This experience demonstrates that the haphazard nature of training which can result in the perpetuation of poor practice, especially where there is a lack of underpinning knowledge.

Maria described how she had not been trained at all pre-registration on how to pass an NG feeding tube. This skill had been one of her practice objectives as a student; however she never found the opportunity to do it:

> *"Well when I started on the wards em…and I said I don't know how to pass an NG tube, they told me that every qualified nurse knows how to pass an NG tube, so that it's something that the universities should be doing, that that's a basic requirement of ….registration and when I explained that I was in fact qualified but had not had that training, was told well you put it down their nose and you tell them to swallow and that was the attitude, I certainly was aware of nobody going on any formal training at all post registration…" (Maria: p.1)*

Maria then went on to describe how she eventually learnt by *"collaring somebody nice and getting them to show you" (Maria: p.3).* The participants' experiences of their own training varied greatly and added further depth to the issue of an inadequate and inconsistent approach to training. The only participant who related any level of competency checking to perform this skill was Louise. Joanne did not discuss how she was trained and Karen could not remember. Nurses should undergo both theoretical training and supervised clinical practice including competency based assessment before being allowed to pass NG feeding tubes.

7.8.1 Pre- and Post-registration Education

As a lecturer Karen was able to give the greatest level of detail about the education that a student nurse would receive. Her description of this aspect of nurse training came over as something that was constantly changing and therefore somewhat chaotic:

> *"It is quite variable just now, I mean we (sigh), we used to do it um…within um, um nutritional support workshop and it was part of the enteral feeding workshop, which worked quite well, we looked at aspects of nutritional support regards um enteral tubing, enteral tubes and PEG tubes and em……yeh supplements, nutritional supplements and all that, so it fitted quite nicely within that workshop. That went by the by with various changes in that we were moving more to courses being delivered flexibly which meant that these things were more difficult to deliver, so it's ended up by default…..I think it originally ended up in a skills for practice, prep, preparation for practice….em week, em…..that workshop I think ended up there, I can't remember parts of it, and then by default it ended up in an online flexibly delivered, not online, flexibly delivered module which was units of study very like Open University. So, there was some information about enteral feeding, it was a unit on parenteral and enteral feeding and there was some information about naso-gastric intubation within that um be it minimal, it was always a concern that they weren't really getting, the information adequately and it flagged up when we had the recent um change in the em…testing for position you know, sort of looking after insertion, that some of the students out there didn't have the information, it had just come out actually that year and it was students that were out um just after that. But I was aware that we had to get that information out to them, so, it um…became a kinda, a little, a mini lecture if you like because that was the only way we could fit it in at that time, on PowerPoint with just em a visual em you know sort of diagram of what it looks like to pass it and just highlighting the principles and the main aspect and obviously the 'National Patient Safety Guidelines' as well, so making sure that they had that information and giving them the em*

website links so that they can actually keep up to date with that, cos I'm sure a lot of the students didn't even know that that existed, so that was a good focus as well. So er, that was where it was then, and of course then the course changed again as they do, and em I think we've kind of lost it at the moment, we have gastrointestinal input in a 'nursing adults' module which is partly flexibly delivered um in year two, and it's as far as I'm aware, we have the nutritional em….assessment workshop um, I can't remember where the nutritional support, oh the nutritional support has gone back, that's right to the flexible learning unit which we were using before which isn't ideal but in a, on an initial basis when you have to get things done yesterday, it ended up being the best way of delivering it and at least it was being covered, but it's back to that which is not satisfactory…." (Karen: p.3)

Karen describes how training has gone back and forth between being delivered as a formal lecture to being delivered flexibly, she expresses that she has been aware that they were not getting enough information and that currently nutritional support has gone back to being a *'flexible unit'*; although she thought they had lost NG feeding from the curriculum. From Karen's description, it seemed as if any information that the students were currently receiving with regard to NG feeding was being driven by a national guideline from the National Patient Safety Agency (NPSA 2005a) concerning safety advice on reducing the harm caused by misplaced NG feeding tubes.

"The University are making sure that the students are aware of those guidelines so that you know when they go on the ward at least they've heard about them, I mean they may not know much about it, but at least they know that there's a specific way that, and that certain methods are banned, cos I mean that's mentioned, so that information is on [University intranet] for them…" (Karen: p.15)

Diane indicated that the unit where she worked were still using the whoosh test to confirm NG tube position, Diane did not seem to be aware this test had been banned and had been shown how to perform it and as a result performed it herself in practice.

7.8.2 Make it Mandatory

Joanne as a specialist nurse in nutrition and trainer in NG feeding felt that training to insert NG feeding tubes should be mandatory:

> *"I think they should make it mandatory for all areas. I think they're…all this impetus on em nutrition at the moment and the MUST and the QIS Food, Fluid and Nutrition standards, to meet these standards then I think the training should be mandatory…." (Joanne: p.4)*

This contrasts with the opinion of the other participants who thought there was no point in learning something unless you needed to practice it. The Health Board in which Joanne worked had taken a pragmatic decision not to make this training mandatory as there were already too many mandatory skills courses to support. Consequently Joanne expressed that this would result in nurses refusing to perform NG insertion unless they had been on a training day:

> *"So there's no….and because it's not mandatory, we did feel that we'd have a big bunch of staff now saying 'Well I've not been on the training day, so I can't do it'…….. Now, that because that has come with other…..things that they've now got training days or half days that staff who were previously undertaking, people were performing that skill, were starting to say 'Well actually I've not done that, I've never managed to get on that course, so I'm not doing it any longer'……" (Joanne: p.19)*

Joanne was the only trainer for the whole Health Board and she reported that she had lists of nurses awaiting training which was carried out ten times per year. She was concerned that the forthcoming re-launch of the Malnutrition Universal Screening Tool (MUST) (MAG 2003), would cause an increase in the number of patients being NG fed. The MUST tool was launched by the British Association for Parenteral and Enteral Nutrition (BAPEN) in 2004, making it mandatory for all patients to be screened on admission into hospital. Joanne's feeling was that because all patients would be screened on admission, more malnourished patients would be detected causing an increase in dietetic referrals. This might result in the need for more nurses in a variety of clinical settings to be competent at passing NG tubes.

7.8.3 When do you teach these things?

Karen was not sure about was when in the three year pre-registration curriculum it was best to teach clinical skills. In the University in which she worked, students currently received clinical skills teaching in the first and second year but not the third. However the pre-registration curriculum was

about to change again, and Karen thought that perhaps there should be a third year nursing module including clinical skills teaching, which would enable students to consolidate their skills before qualifying; Karen's opinion was that enteral nutritional support would fit well in this potential module:

> *"The other thing, the other issue, is when do you teach these things? […]..Um without anything, and then introduce something in 3rd year that consolidates their knowledge and you know sort of allows them to understand why they're doing it and …em prepares them for registration, but….or do you not let them go near an NG tube, you know before then?" (Karen: p. 5)*

This compares well with Louise's experience of being taught clinical skills by a clinical tutor just before she qualified as a nurse:

> *"So it was, in fact I think if I remember rightly it was a clinical teacher who did it with me, which, which they don't have now…" (Louise: p.3)*

> *Researcher – "So this is when you were a student?"*

> *"Yes, when I was a student yeh, but we were senior students so we would usually just finished our training and waiting for our registration and that's when you got to do all these sorts of things…" (Louise: p.3)*

There was a difference of opinion between the participants about whether NG feeding tube insertion and care should be taught as a pre or post registration. Karen, Louise and Maria all felt that it really fitted better as something that should be taught post registration:

> "*I think it's probably something that a trained nurse should be carrying out and I don't think that the argument that every trained nurse knows how to put down an NG tube (laughing) can wash, and I don't think it's something that the universities should be teaching" (Maria: p.3)*

However Joanne who was responsible for delivering training to post registration nurses felt that students were doing very little on NG feeding and that training should begin during basic training. Diane corroborated this opinion:

> *"Em, I wish they'd been more sort of input in during my training, like more lecture based or even like, clinical skills labs, like things like that, like feeding, like you know the basic things, I think it should have been an*

important aspect really, cos not everyone can eat, so….you know you've got to have all the other options really……" (Diane: p.17)

7.8.4 Passed as Competent

Participants were asked to describe what they thought formal training should consist of; the following quotes represent some of their opinions:

"I would imagine that you would have competencies to do, to have….you know, have done the theory of where it goes, whether it's on diagrams or things like that, and obviously the reasons why you pass them and then there should have been….when I did it, it was somebody passed it […] and then the next time I passed one with someone there…." (Louise: p.2)

"I think that we do definitely need to move towards more theoretical input but also competencies…." (Maria: p.3)

"….it should be like the catheterisation courses, that there, it's a, a an objective that you pick for you area that this is a necessary skill for you to do, you go on a half day training course, I wouldn't say it needs to be a full day, but you know a few hours, you come back and you then carry out the tasks four or five times until you're passed off as competent" (Maria: p.3)

"I think there should be more education and… but obviously that could be link nurses who are you know, got the formal training and they are accountable for supervising, you know I think, yeh I think there should be more, you know it should be more formalised but, for everybody to be signed off before they're passing an NG tube, I don't know….." (Joanne: p.3)

Louise, Maria, Diane and Joanne all describe formal training as some level of competency based training where the learner has to be signed off by an assessor before they were deemed competent. However, the approach to training for example using models, CD-ROMS and videos for delivering education and practising skills was something that the participants had differing opinions about. Maria felt:

"Yeh, well it's….it's the same as, as cannulating a, a rubber arm…it's not the same as a real arm, so why do it…in my mind, it's not teaching you actually… how it feels to do it, so, why are we messing about? The theory, you absolutely need the theory based in a classroom, but practice you need to be doing that on patients in an holistic way, caring for that patient and that's one of the issues.." (Maria: p.15)

However some of the participants felt that there was value in being able to practise the skill of insertion on models before practising on a real patient:

> *"….gives you that confidence to go out when you do see them, it's like oh well, I've sort of seen it in class, so you know, it just sort of gives you that initial confidence to think oh well, I could maybe give that a go……"(Diane: p.17)*

Joanne who taught NG insertion used a model on the formal training days for demonstration and participants to practice on. The best methods for training and assessing nurses how to insert and confirm the position of NG feeding tubes has never been evaluated and currently is very *ad hoc.* Training may often be dependent on practice development approaches within individual health care organisations. A systematic review of evidence has shown that practice development approaches to post registration education and development are very variable (McCormack et al. 2006).

7.8.5 Assessing Competence in Clinical Practice

Joanne and Karen pointed out problems with the assessment of competencies in the clinical area:

> *"When is somebody competent? And you know sort of how many people out there are competent to teach as well? Because if you're gonna let a student do it, you have to have somebody competent to….do it with a student" (Karen: p.11)*

> *"….but I think going and sitting on a training day, even with models is you know; where do they get their supervised practice after that?" (Joanne: p.3)*

From Joanne's current experience as a trainer, they were unable to assess competency in the clinical area once the nurse had been through the training day, as they did not have adequate numbers of competent assessors and only one nutrition nurse. So currently nurses were receiving theory on a study day which also included a practical workshop, however once they returned to the ward there was no guaranteed competency based assessment:

Researcher - "So with the NG, do they get competencies to take back to the clinical area to get signed off?"

Joanne – "No, they do not….no. We did when we were doing it for primary care, they were having to... […]…But for the, when we brought into line with acute, we had to take it out because who's gonna…be signing them off, nobody could agree with that…. (pause). Who's gon'nae deem them competent at doing it?" (Joanne: p.19)

To address this problem, Joanne had initially proposed that a 'link nurse' system could be used for assessing competency to insert NG feeding tubes: However, when Joanne was asked whether a system of 'link nurses' would work in practice, she said that she didn't think it would because the turn over of staff in the clinical areas was too great, therefore maintaining skilled link nurses would be a problem, in addition they had tried it before and it hadn't worked:

"That is a problem and I think you know, the turn over of staff in the wards even senior staff now, to supervise these you know junior nurses, who would be left to it, there's only one nutrition nurse […] in Lothian which is me and I get every single day [indistinct], no matter what day it is 'could you come and pass this tube'.."(Joanne: p.3)

Louise confirmed that once nurses had been on the formal study day that it was then the responsibility of the ward to make sure that competencies were met thus meaning that there would need to be nurses already on the ward deemed competent to asses NG feeding tube insertion:

"Yes, yeh, yeh…As far as I'm aware they get booklets for competencies and that […].., and they get a certificate to say that they had been [to a study day], so that would go in their file, but they would have em…competencies to fill in, they would have to get them signed…" (Louise: p.5)

Within this particular Health Board, there seemed to be no full proof way to ensure that competency could be checked.

7.8.6 Get one of the Stroke Nurses

The concept of the 'stroke nurse' being a specialist in NG feeding emerged as a further property of training. Louise suggested that her ward would quite often

call on the stroke unit if they needed help with tube insertion or they would send nurses along to the stroke unit for training opportunities:

> *"…we still have patients who I've…we've had difficulty passing, we would go and get one of the 'stroke nurses', they, they are doing it much more regularly and they quite often come and they've got little tricks and you know, whatever position, you know quite often they do it…." (Louise: p.3)*

Joanne further confirms the opinion that within the hospital where she works as a specialist in nutrition, she would consider the stroke ward to be good at NG feeding:

> *"….but I would say, stroke wards, you know mainly talking about the [hospital name] here, 'cos that's actually where I'm based, I would say the stroke wards, they're very good at it, but it's all the other wards and we're using, everywhere we're using….NG feeding…" (Joanne: p.3)*

This is an interesting if rather alarming observation in light of the questionnaire results, where results show that only just over half of those working in the stroke specialty were in fact trained how to pass an NG feeding tube.

7.8.7 Checked where it was?

There seemed to be a difference in perception as to whether confirming NG tube position related only to insertion or was part of the ongoing care. Louise saw confirming NG tube position as a natural progression from inserting to ongoing care so it needed to be taught at the same time:

> *"I was trained to do …aspiration when we did the….that was the natural progression from putting the tube in was that you checked where it was" (Louise p.9)*

However since the training for pre-registration nurses consisted mainly of broad concepts about caring for the patients with an enteral feeding tube, the perception was that students wouldn't really get involved in intubation procedures:

> *"I think pre-reg, um just an understanding of em enteral feeding, um the dangers of passing tubes, potential complications, er understanding of how to care for somebody with an enteral tube, I think that's an adequate level, to have in the undergraduate stage". (Karen: p.23)*

In response to this, it was questioned whether in teaching students how to care for an enteral feeding tube, they should also be taught how to confirm tube position.

During the interview Karen referred to the Practice Placement Booklet that the University was using which contained the student nurses' learning objectives for clinical placements. One of these was nutrition. These objectives stated during the student's second year of training they should be able to *'demonstrate ability to care for patients receiving enteral/parenteral nutrition safely'* and goes further to say that as part of the expected input from the clinical placement, that they should *'encourage practice in caring for patients receiving enteral/parenteral nutrition'* (Napier University 2006). For the University's part, the objectives do state that the student will receive theory about enteral and parenteral nutrition, an 'overview of nutritional support and enteral and parenteral nutrition'; however practical training for nutrition at this stage in training does not include any training about confirming enteral tube position (Napier University 2006). Therefore what the student learns would be determined by local clinical policies which as the participants experiences highlight can vary from one specialty to the next. Although this particular approach to training cannot be generalised to other universities or training institutions without further investigation, in this instance it reflects a very broad approach. However, there are basic principles and procedures of NG feeding including tube insertion and confirming tube position that could be taught in a consistent manner within the safety of a simulated environment. This would ensure that students possessed the principles to enable them to care for NG feeding tubes holistically and safely, from and informed and consistent knowledge base, within the clinical environment.

7.8.7.1 Whether to Whoosh?

A further property of training to confirm NG tube position was participant's experience of training to do the whoosh test or air auscultation. I had decided to explore this issue further with the participants as the questionnaire findings had indicated that very few nurses were trained how to perform this test. Recent guidelines from the NPSA (2005a) had advised that the whoosh test should no longer be used due to incidences of misinterpretation about the positioning of NG feeding tubes. However comments from some of the respondents on the questionnaires had indicated that some nurses found the whoosh test to be a useful bed side test, and some areas within the specialty of stroke were still using it as a supplementary test to aspiration (Appendix 7). All of the participants except Louise had used the whoosh test at some time to help confirm NG tube position, however none of the participants had ever been trained how to carry out this test:

> *"It's something that people used to pick up in practice really, I mean it wasn't something I think that was ever formally taught, it was that people decided that it was actually a good way to do it, and I think it kinda worked its way into…..procedure, em by a, through a back door" (Karen: p.14)*

> *"No, I don't think I was ever trained to do it, I don't think anybody ever trained me, I mean I still use it, but only if I'm not getting aspirate and I'd said send them for an x-ray…" (Joanne: p.7)*

It could be argued that misinterpretation of the whoosh test may be as a result of a lack of training. If skills are just assumed as part of practice with no formal instruction, assessment or theoretical underpinning, then how can we be sure that the skill is actually being carried out and interpreted correctly?

Karen suggested that a decision had been taken in the pre-registration curriculum that NG intubation was too specific and unrealistic for students to be involved in, and therefore only broad principles of nutrition assessment and enteral feeding were taught. At times Karen expressed the view that she felt the current situation with teaching of NG intubation was *'not satisfactory'* however she also thought that perhaps it was really part of the *'registered nurse domain'* and not realistic for students to be involved in:

> *"Nutritional assessment (reading student clinical objectives), you know it's, it's very much broader, um we're expecting even in, it's looking at special nutrition requirements, nutritional assessment…em referring to Dietitians, so this is the bit that their mentor's going to sign off, so it's not asking anything specific about naso-gastric intubation, so I think the decision was that em….that was too specific and it was unrealistic for our students to be involved in it…."(Karen: p. 16)*

Education should be given alongside practical demonstration followed by an assessment in practice by a competent other. If training is left to be fragmented and largely self directed (as Diane's and Maria's experiences were) then gaps in knowledge become almost inevitable, errors in clinical practice may never be identified and risks to the safety of the patient are increased.

7.9 Fear

The concept of fear emerged as being an important category. Fear seemed to emerge as running through many aspects of NG feeding for nurses, including apprehension about inserting and maintaining tubes, worry about the lack of training, the fear of things going wrong and being blamed, through to anxiety about hurting the patient.

7.9.1 Apprehensive doing it

When participants were asked about how they felt about passing NG tubes, or how they thought other nurses felt, their perception was that many nurses were worried about passing fine bore NG feeding tubes and confirming their position. Louise related her own experiences of when she was a newly qualified nurse:

> *"I remember being scared of a lot of things, but something like that…'I don't want to do it, I don't want to do it' and the big fear [raised voice] was 'Oh what if I get it into the lungs?'…And that was it, you kept looking to make sure they weren't going cyanotic and it was almost like overkill in a way you know….what's the chance of that happening?" (Louise: p.22)*

Diane as a student said she was *'apprehensive'* about the process of inserting and confirming NG feeding tube position:

"I still feel a bit apprehensive doing it, but me, I think it's obviously the more you do, the more you sort of know what you're feeling for as well, when it gets to the back of throat and they're supposed to swallow…" (Diane: p.4)

Diane attributed this apprehension to not having much experience of passing tubes. As a ward manager, Louise felt that newly qualified nurses coming into practice were frightened of passing tubes, because they were concerned about misplacing the tube:

"I think it's…they all imagine that as soon as they pass it, they pass it into the lungs, the patient's going to go blue, you know.." (Louise: p.6)

As a specialist nurse in nutrition and someone responsible for facilitating registered nurse training, Joanne also sensed that nurses were frightened about misplacing tubes, and perhaps this was due to changes in policy concerning the whoosh test:

"I think the fear the fear as well is displaced tubes, you know, because also there's been various alerts and you know about auscultation you know and about that thing and before you know, the there's still quite a grey area whether all tubes should be x-rayed and even though we've got it written down now in the best practice statements, you know what …..should be x-rayed, but a lot of areas still felt that they should be x-raying it when it's first placed and um not relying on the pH aspirate…" (Joanne: p.6)

Joanne felt that recent guidance issued by the NPSA (2005a) concerning the confirmation of NG tube position, had contributed to the level of fear among the nursing profession regarding NG feeding. This was further reflected by Karen, the nurse lecturer. Web based learning resources on NG feeding were provided purely to alert students about the dangers of NG feeding:

"I mean there's a reference made to why you might want to pass an NG tube, for feeding purposes and things like that, but it's very general and it's really just main principles, so that, and it's more to highlight the dangers of testing…." (Karen: p.13)

What seems to be prioritised in terms of training or education revolves around making sure things do not go wrong, so the University adds a level of fear while attempting to preserve their own good name. This may further impact upon

reasons why nurses are reluctant to pass and manage NG feeding tubes. Is it good practice to drive education with 'negative' critical events in healthcare? The inadvisability of this is perhaps reflected in Joanne's comments:

> *"I get every single day [indistinct], no matter what day it is 'could you come and pass this tube'…because the nursing staff don't want to do it, they don't feel competent to do it, and you know I say have you tried, what's the difficulty here? 'Oh the patient's anxious, oh and quite reluctant to have the tube so if we go ahead and….we don't, we're not successful, then they'll just say no, whereas if because you're more experienced at it, could you come and pass a tube?' And then when you go to the ward, nobody is interested in coming along, you know trying to get staff to come and actually……observe my technique or the procedure" (Joanne: p.3)*

In addition Joanne felt that patients picked up on the nurse's lack of confidence. In her experience even when the patient is as she described *'compos mentis'* , and even if the procedure had been explain as thoroughly as possible before hand, they still often did not fully understand, which might result in them being quite alarmed by the process. However this feeling of alarm is further enhanced if the patient senses that the nurse is not confident about what he or she is doing:

> *"…[…]..then you know, [the patients] they're just, they're quite alarmed by it [NG insertion], and so I think the staff are really, and I think that the patients pick up on the staff not feeling….you know happy about doing it……" (Joanne: p.4)*

The process of NG feeding tube insertion is perceived as being frightening, not pleasant or easy for the patient, nurse or relatives. Therefore, by not preparing nurses to carry out this skill in training, we are further impacting on the nurse's lack of confidence and possibly causing further discomfort and fear for the patient and their relatives.

7.9.2 I think that it is inflicting pain

All of the nurses interviewed described the patient's experience of having an NG tube passed which was one of *'anxiety'* and extreme discomfort. Karen had trained and worked in paediatrics before moving into nurse education, she remembered the *'screams'* of a four year old child in reaction to having an NG tube passed:

"I mean I had a child um when I was on night duty on paediatrics, surgical paediatric unit, and I had to pass a naso-gastric tube on him for feeding purposes um every morning, and he had, he had a medulla blastoma or something like that and he was 4 years old, and I still remember his screams at passing that tube because we couldn't leave it down, because, I mean it was a big problem…" (Karen: p.19)

Maria had worked in neurology and again described the discomfort and fight of some of the patients she had passed tubes on:

"I mean I've, I've put down NG tubes on patients that were incredibly distressed and ……really fighting against …because they've got a decreased GCS they're not able to make decisions for you, for themselves […] you're taking over and you're saying actually this is the best thing for them whether they're distressed by it or not; those are very complicated decisions" (Maria: p.4)

"…and the way some people fight, they know that something hideous is happening to them" (Maria: p.4)

Louise, a Charge Nurse related that because as a nurse you are facing the patient when inserting a tube, then the fear of hurting the patient and causing discomfort was all the more evident, and that at times it was very difficult to be reassuring:

"… […]… the patient is facing you, so you're very well aware of …..um eye contact and although you're looking at what you're doing you're aware of em, whereas if you're doing something like giving em an injection or an enema, they're actually [laughs] facing away from you so you don't have that, and I think sometimes we're not very good with the, you know reassuring people with our facial expressions…" (Louise: p.6)

From the participant's experiences, it seemed the knowledge that they might be causing patients pain was difficult to reconcile. Louise suggested however, that with experience this anxiety reduced and that to a certain extent the nurse learns to accept that some level of discomfort has to be experienced in order for certain treatments to take place:

"I think it is that inflicting pain 'cos we're all there to nurture and they don't like taking blood 'cos they see the patient wince, and they don't like passing NGs 'cos the patient gags…and you know their nose, their eyes run, they don't want it, and I think, I think, ….I think that's part of being a

nurse you know, you feel you're there to nurture and causing people anxiety and discomfort like that is not, not….." (Louise: p.6)

Nurses do have to carry out many clinical interventions that could be deemed as being unpleasant for the patient. However, it became apparent through the interviews that the process of inserting an NG feeding tube was associated by nurses as being contradictory to the nature of their role. Words such as *'nurture'* or being *'tactile'* were associated with the role of the nurse, and therefore at odds with causing fear and discomfort.

7.9.3 Doing things they are allowed to do

As a specialist nurse, Joanne trained nurses in both community and acute settings. She also had experience of supporting specialist enteral feeding nurses employed by NG tube manufacturers. Her experience was that nurses working in both settings were reluctant to be trained, some were worried about maintaining their competencies and felt they would not get enough practice. Even the specialist enteral feeding nurses supporting patients in their own homes, were not allowed by their employer to take responsibility for inserting, caring for or removing NG tubes and so their role was predominantly advisory:

"They won't do naso-gastric, and if, you know they've just written another policy that they've got signed off, that they're only changing replacement balloon gastrostomys, they won't touch you know, they won't pull primary ones or, they won't do NG….intubation either, fine bore…" (Joanne: p.5)

"I think especially at this time of litigation and things….I need to make sure that my staff are doing things that they are allowed to do and competent in doing…." (Louise: p.25)

There is a fear of litigation in healthcare. In the case of NG feeding the fear of potential repercussions from something going wrong appears to be rendering some nurses unwilling to practice or be trained to practice this skill.

7.9.4 The Lack of Training is Frightening

Maria's first experience of passing an NG tube had been without any training when she was newly qualified working on a neurosurgical unit. She reflected how frightening the lack of training was:

> *"I mean looking back on it now [pause] for example nobody told me that you don't put down an NG tube on somebody with facial fractures that might have fractures in their head, and in a neurosurgical unit you would have thought that would have been quite high on the priority list……that might have been something that somebody at some point [laughing] might have mentioned to you….and the more experience you have, I think the more and more scared...I am about the lack of training……and the lack of theory…." (Maria: p.3)*

Diane was visibly shocked and gasped when she was told that approximately half of the nurses who responded to the questionnaire had been formally trained how to pass an NG feeding tube. Even though she had not been formally trained herself as a student, she seemed to assume that all registered nurses were trained in this skill:

> *"I'm just quite surprised that it's not like as trained, I thought that that be something that you need to sign off on before you could start doing it, and I'm quite surprised at that to be honest." (Diane: p.10)*

The concept of fear around NG feeding was developed from one interview to the next using constant comparison. The general opinion from the participants as was, that nurses are apprehensive about NG feeding. Karen (nurse lecturer) was asked whether she got much feedback from students about NG feeding. Her response was negative, because:

> *"I don't think the students are really heavily involved in that side of things and mostly caring for student er eh patients, and I mean they might be seeing tubes getting inserted, but their not actually themselves involved in it, so it tends to be they're quite in a way blasé about you know they've seen it on millions of people with em, well not millions, but a lot of patients with enteral feeding tubes…" (Karen: p.10)*

Karen went further to say:

> *"….um and you know sort of when you're caring for a patient it's, you're not going to have……that amount of fear if you understand, it's like caring for anybody whose got tubes, you know it's understanding why the tubes there and what you've got to do with it, and how you nurse the patient who's attached to a machine [K laughing], you know so um… those are the things that worry students more you know……" (Karen: p.10)*

These students were not thought to be worried because they were not involved in tube insertion. Diane's experience was that she was still *'apprehensive'* about tube. Maria's recollection of the lack of training around NG feeding was that it was *'scary'* and Joanne's experiences of trying to train nurses was that she felt a lot of nurses were frightened and reluctant to take the skill on.

Taking all these experiences and opinions into account; by not ensuring that student nurses and or registered nurses are trained how to insert and care for NG tubes, nor have the educational underpinning, fear will continue to be a reality. As in Maria's case, finding that you need to do something that you have never been taught and that other more experienced nurses may consider as a basic nursing skill, is both humiliating and frightening; she related this to being *'made to feel that you've just announced that you don't know how to wash somebody'* (Maria: p.5). By avoiding training or neglecting to provide training, the feeling of being frightened to carry out a skill and the fear of harming someone can surely only be enhanced.

7.10 I think that's a form of Restraint

The concept of restraint being used to keep NG tubes in place had emerged from the phase 1 focus groups (chapter 4) and on the comments section of the questionnaire in phase 2 (Appendix 7). Restraint was discussed in terms of tying hands to bed rails, hand mittens and bandaging hands. Not many people seemed to know what a Posey vest was and even though this is a recognised form of patient restraint. Louise raised the issue of restraint when asked whether she had ever seen a hand mitten:

> *"Yeh, yeh, [number of ward] have them, they use them on stroke patients, but it's a bit of a, it's a contentious issue isn't it? Because it is like restraint, you know and I worry that they get used for the wrong reasons, but yeh I*

mean I have seen them but you know, we don't, we don't use them on this ward" (Louise: p.12)

"I certainly wouldn't do that [use hand mittens], I think that's a form of restraint rather than anything else, I mean what's the difference between, that's just one step away from tying their hands to the cot, you know the safety rails …of the bed" (Louise: p.14-15)

Maria had worked in neurology where in her experience hand mittens were defined as restraint and they had guidelines and protocols. She had worked in a setting where the combination of mittens and the Posey vests were very commonly used to stop patients either pulling out NG tubes or drains. Maria made a clear distinction between restraint and non-restraint. She grouped hand mittens, bandaging hands, tying hands to bed rails and Posey vests as forms of restraint, while she classed the nasal bridle, taping the tube to the nose and inserting the tube on the affected side as non-restraint:

"Yeh, it, it seems to be a similar sort of mechanism (looking at picture of nasal bridle), so, I don't think that's restraint and I don't think inserting the NG on the affected side isn't restraint, but everything else is…" (Maria: p.10)

Her justification for the necessity of physical restraint was their inability to use any forms of sedation, so they had no other option especially if the patient were in danger of harming him or herself. She reported that they were legally covered to do so and that everything was extremely carefully monitored and documented. However, she felt that physically restraining someone purely for the purposes of NG feeding was not justifiable, as it was easy to replace an NG tube. However she said that restraining someone to stop them pulling out a subdural drain for example was more justifiable as they would need to return to theatre. Despite this participants' concern was that it was potentially harmful for the patient to have to reinsert an NG feeding tube repeatedly:

"….If you work in neuro, you restrain patients and ….you are legally covered because you sign a form saying that you are restraining them for, for their own sake, um…you can't chemically sedate them, because then that alters their neuro obs, so there is no other option and you discuss it as far as you can with the patient, and obviously with the relatives and you document everything and that is a legal loop hole that you have the right to do that if you can show that they're harming themselves, and I think it's a little, it's a fine point as to whether making you, and it feels like that, it's not the truth but it feels like this patient is making you reinsert a tube every five

seconds whether that is actually causing them harm….I mean I think that is part of the issue, and it is very much clouded because pulling at an NG tube is not really a problem, you can re-insert it, pulling out a subdural drain you're gonna have to go back to theatre, that's a huge issue, so if they've got…and withdrawing every method to give them drugs that they need to prevent [indistinct], you know to prevent vasospasm, that is very clearly harming themselves, so restraining them is not, I don't think I've restrained anybody purely because of an NG tube….it's been for other reasons as well (Maria: p.10)

Diane seemed to be aware of the issue of restraint as far as hand mittens were concerned, but was quite hesitant about it:

"Yes, I would say, I would say the mitts were, 'cos they are restraining the person from doing something, so they could be classed as restraint I suppose, I would have thought…" (Diane: p.15)

Joanne did not talk about hand mittens or any other methods for maintaining NG tube position in terms of 'restraint'. She was however concerned about the need for policy, protocol and monitoring about the use of hand mittens. There seemed to be an underlying discomfort about the issue of restraint, it seemed that some of the participants did not really want to think about the possibility of them restraining patients to keep NG tubes in place. This perception of discomfort was reflected in some of the participant's words:

"….and you are physically restraining patients, and …..That's something that most people are very uncomfortable with" (Maria: p.10)

"Well it's one of these huge challenges for nurses to, something you know, you need to… going to keep the tube down, how do you do it safely?" (Karen: p. 21)

Only Louise talked about using medication to calm or sedate patients resulting in stopping them from dislodging their NG feeding tubes. However, within the clinical context in which she worked, she did not see this as a form of restraint, but thought it preferable to using hand mittens:

"I kinda feel if somebody is constantly pulling out their tube, then you have to deal with the reason why they're pulling out their tube. Now whether that is sedation which is not always the best idea...[……]...you need something to get them settled down for a few minutes, get a few doses of their drugs in and you find that ….they're are ok" (Louise: p. 12-13)

"….I wouldn't use that [referring to the mitten] on a patient, at all, no matter what and if it, if they were so bad and not able to make the decision I think there's, there's shorter acting em sedation or something that you would have to give until you could get them calmed down…" (Louise: p.14)

When discussing this issue, it was noticed that each participant struggled to find what they would consider to be a satisfactory solution to the problem of maintaining NG tube position, using what constitutes physical restraint.

7.10.1 Restraint, - 'one of the challenges of nursing'

Throughout the interviews it became apparent that the subject of patient restraint was something that the participants found extremely hard to discuss; it seemed there were no easy answers, almost as though it were something they were frightened to look at. Maria sums up feelings about the issue of patient restraint:

"Certainly, certainly and I think that these are issues, the whole restraint issue, the whole um….consent of patients, er to long-term treatment, dealing with patients who have, have communication problems, all of that is I believe issues that nurses haven't looked at systematically because they probably don't want to know the answers …and that for a very long time we've all just been shutting our eyes and……" (Maria: p. 12)

Participants would often use phrases when trying to discuss the use of methods like hand mittens like '*I don't know' (Diane: p.14), 'it's a very challenging area, […]I mean I don't know whether there's an easy answer to that one' (Karen: p.19) or 'I mean that, it's a dilemma isn't it?' (Louise: p.15).* All these phrases seem to reflect being unable to decide what is the best course of action, while not feeling confident about the acceptability of using restraint techniques. The issue of restraint seems to be something that totally contradicts the role of the nurse, words like *'forcing'* and *'abusing'* were used in association with the issue, whereas *'nurture'* and *'tactile'* were used to describe the role of the nurse:

"I must admit, I don't like these physical restraints because I think they can cause them to be more agitated. If I couldn't…you know, a huge part of, of being a nurse, you know I automatically go to someone and I hold their

hand you know, a lot of nursing is sort of tactile as well and you're not able to do that…" (Louise: p. 14)

Louise saw hand mittens as a barrier to her being able to nurse, and although participants discussed the effectiveness of such methods, none of them were truly comfortable with the use of restraint.

7.10.2 Legally Approved

Maria was the only participant to consider the legalities of using restraint in this phase. All the other participants were anxious about there needing to be tight protocols and guidelines for methods like hand mittens, however Maria was the only participant who referred directly to feeling confident that her experience of restraining patients could be defended in a court of law:

"When I've, I know that I've filled in the paper work, that there is a legally approved form from [name of Health Board], I've filled that out, I've documented it in the notes, I've spoken to the relatives….I feel quite secure that I can, if need be, stand up in a court of law and say…well I've done everything I should have done, I was protecting my patient…..you can't get me. I think when you are in areas where you are restraining, you are physically restraining somebody, and they're not documenting it, or they're, some maybe documenting it, some may not be…….you're into a whole other issues of you know, what are they explaining to the relatives…..how aware is the patient?" (Maria: p. 12)

Maria's attitude towards the legal aspects of using restraint seemed to reflect that she worked in an area where guidelines, protocols and documentation were used, and where the legal ins and outs of restraint had been considered. This seemed to provide adequate rationale to support and defend the care she was giving. In contrast, many of the comments from staff in phases 1 and 2 gave the impression that nurses were not happy with their practice, as they were operating with no clear protocols or guidelines. This results in fear prohibiting the open discussion or even acknowledgement that there are legal aspects regarding the restraint of patients.

7.11 Monitoring and Documentation

The questionnaire (phase 2) had shown that half the respondents did not document methods used for maintaining tube position. Of the respondents who

used hand mittens and nasal bridles, half did not have or did not know if there were protocols or guidelines for their use. Participants in phase 3 however, felt that guidelines and protocols were essential and documentation a matter of course:

> *"Well I was going to say that, I think monitoring and documentation is essential…" (Karen: p.22)*

> *"I would think that anything that you put into a patient that is abnormal to them, whether it be a catheter, whether it be a Venflon, whether that, if it is not a natural thing to them that should be documented…" (Louise: p.17)*

Participants gave many reasons why they felt that guidelines, protocols and documentation were so important especially when using interventions such as hand mittens or nasal bridles. Reasons varied from ensuring that interventions were being used correctly; enabling consistent practice with a clear rationale, to providing a mechanism for regular monitoring. The following quotes represent some of the participant's opinions:

> *"But I think, I think when it comes down to it, I think um protocols and guidelines are the best way you can go, because then you actually decide and you come out with something that's been agreed, that is the most, the best, safest um the recommended way to go, and that people actually adhere to that then, and then you have a more uniform approach to it, instead of a bit wild and whacky and these odd methods around that you know, some of which are a bit dubious, and then I think nurses themselves, it would reassure nurses that you know that people have looked at this and it's actually, something that's been discussed and yes it's acceptable.." (Karen: p. 21)*

> *"Right, that's what I feel, there has to be some sort of formal guideline in with the patient's notes, you know, so that everybody's clear that that's…" (Joanne: p. 11)*

> *"…but I know when we do catheters and things like that, it's all documented in the nursing notes; because the thing that you have to do as well, is that it has to then be monitored and that forces you to monitor it because you know,… it gets written down you know…" (Louise: p.17)*

Even though participants felt that guidelines, protocols and documentation were very important, some were not surprised that many of the places did not have them. There seemed to be an understanding that in nursing practice it was

common enough for interventions to work their way into practice without any formal recognition or monitoring:

> *"Yeh I would imagine that, 'cos I think these stem from…historical use, you know and that's the trouble with many of the aspects of care that we use, particularly in challenging situations like that, they devise methods that seem to work, so they just kinda carry on using those and protocols are a relatively new invention, so that many aspects of practice, sometimes don't have adequate protocols". (Karen: p. 20)*

It became apparent that participants' main concern was that hand mittens could be seen as a form of restraint and therefore a protocol for their use was essential:

> *"Yeh because of the whole ethical restraint dilemma, I think definitely the nurses need to know that there's a procedure there to back up what they're doing, or you know what to do if something happens like….to get consent and things like that…." (Diane: p.15)*

> *"I think they should [have a protocol] because I think that, that…the mitt could be used for anything then can't it. I mean I think that's the problem, they're devised for one thing and then someone, all of a sudden it's, well someone who scratches a nurse well we'll put a mitt on them, you know and I think the problem is, if you don't have tight control of where and when you can't use that….you know everything is open to abuse isn't it?" (Louise: p.16)*

Thus clinical areas using hand mittens and nasal bridles did not have guidelines or protocols reflects, that these interventions may be working their way into practice without adequate supervision, especially within the specialty of stroke. In addition, the concept of restraint was something that staff working within stroke, interviewed in phase 1, seemed more reluctant to define or discuss than the current participants who worked outside that specialty.

Within the context of protocols, guidelines and documentation the necessity for regimented practice when using any form of restraint was made very clear by Maria. She described what would happen if mittens were applied:

> *Maria - "Um that you applied the restraints, that you filled in the form, you …and that form asks you whether you um have spoken to the relatives or not, you, unless it was the middle of the night, you would phone the*

relatives, and you had to explain to them fully, what was happening, why, and they didn't have to give permission, but you had to tell them, you had to notify the next of kin…as far as possible, um those notes were then, that form was then filed at the front of the medical notes"

Researcher – "Right, so this was a specific form?"

Maria – "Specific form, and it went behind, you just, where a DNR form would go right at the front of the notes so that everybody could see it" (Maria: p.12-13)

The protocol was recognised, documentation was completed and a strict policy adhered to. Although this is only the account of one nurse, Maria's experience highlights a significant discrepancy between clinical specialties and their attitude towards interventions such as hand mittens. In contrast Diane was working in stroke and had also seen mittens being used on the ward, when asked whether she knew if they had a protocol, she replied:

"See I never really looked into it, but I think they do have, they have like a big procedures book and I'm sure there was something in there about hand mittens, I'd heard, but I never, I could go back and look up on it to see" (Diane: p.14)

Joanne was also aware that the stroke unit within her Health Board used hand mittens, but again she was not sure whether they had guidelines or specific documentation:

"And I felt that about the mitts, the mittens because, should there be a specific documentation for that, a care plan when they're checking you know the hands you know and how often you'd supposed to be taking these mittens off and you know …are you documenting each time you're taking it off and checking the patient's hands, that sort of thing?…." (Joanne: p.10)

7.11.1 Stroke Specific Guidelines

Participants frequently refer to the introduction of the NPSA (2005a) guidelines about reducing the harm caused by misplaced NG feeding tubes. The phase 2 questionnaire shows that a proportion of nurses within stroke are still using the whoosh test, which is further validated by both Joanne and Diane who

confirmed that they not only still used it, but that they had separate guidelines for it's use resulting from medical guidance:

> *Joanne – "Yes and I think that when we originally looked at, that came out that the stroke unit would have a separate guideline. They would be deemed competent by a Consultant in actually doing, carrying out that test…"*
> *Researcher – "So he was carrying the responsibility?"*
>
> *Joanne – "He was carrying the responsibility for these certain staff, um because the [name of Health Board] didn't want to take that responsibility..." (Joanne: p.7)*

Diane did not realise that the whoosh test had been banned, though she accepted that it was part of the NG feeding protocol on the stroke unit where she was working:

> *Researcher – "What's your experience with confirming the tube position once it's down?"*
>
> *Diane –" Em…..I think what they usually, well what I've seen done is, if they can't get aspirate back, I think that's what they initially try and do, if they get that back then they do the pH paper… see if it's in the right position. I think they x-ray it as well even if they get aspirate back, can't remember, but I think they still x-ray it, em …and they also try like the air as well, just like the three stages I think, I think that's what they've done in the past…" (Diane: p.5)*

This illustrates a variation in practice within stroke, from a lack of guidelines for hand mittens and nasal bridles, to stroke specific guidelines on the use of the whoosh test. This is an inconsistent approach to care.

7.12 Patient Capacity

Joanne expressed concern about the nasal bridle being contraindicated for use with confused or agitated patients, which in her experience, was something that the manufacturers did not recommend. Louise commented about respecting the patient's choice about whether to be fed or not. She felt that if a patient did not want to be fed, then that was their right:

"I think it all depends on what the patient's capacity is, if you have got someone who is, for whatever reason, having to get ….tube fed, but has the capacity to make an informed decision for themselves, and if that is 'I don't like this thing in' and pulls it out you know I would not be putting gloves on…." (Louise: p. 13)

Participants related to patients who were unable to consent verbally. Diane described her experiences of trying to pass NG tubes on demented older patients and how they might claim that they understand what is happening, but do not co-operate with the insertion of an NG tube:

"Yeh…….well, I think that's the case like if they can understand, what it's for, but I mean I think a lot of people, like especially the elderly like, especially…if they've got dementia, that they'll say they'll understand and then it's like, like have a huge fight when you go to do it, so I don't know, it depends on the patient I suppose.." (Diane: p.19)

This description might suggest an assumption of fighting because they do not understand what is happening. However, it cannot be forgotten that having an NG feeding tube passed is an extremely uncomfortable and distressing process. Regardless of patient capacity, it can be difficult to prepare somebody for this. Trying to prepare a patient who is confused or agitated requires a skilful nurse to pass an NG tube quickly.

The issue of being incapacitated and restrained can result in distressing and further confusing the patient according to Maria:

"I mean I think that there can be fairly little worse than being confused, not knowing where you are, and being restrained…….[laugh], and if you wake up to that and you don't understand you're in a hospital and you're restrained [indistinct…]" (Maria: p.12)

Maria's concern is pertinent, as restraint in the situation of stroke patients is more likely with those who are confused or agitated and hence more likely to dislodge their NG tubes. This description illustrates the conflict that exists between ensuring that NG tubes stay in place to provide nutrition, while preventing psychological or physical harm.

7.12.1 'Are they trying to tell you something?'

Louise suggested that even if a patient was confused or agitated, if they continually pull out their NG tube, could it be because they did not want to be fed; and if so this choice should be respected. In Louise's unit if a patient keeps pulling out their tube, then they are not replaced:

> *"If it's feeding, maybe you have to contemplate whether somebody actually wants fed…or not …you know, maybe they don't want fed, and we've had people that we've fed you know three or four times, they've had tubes down and at some point you have to say enough's enough…you know…" (Louise: p.13).*

> *"….we, we tend to not keep putting tubes down, 'cos I kinda think if they pull one out one day, they pull one out the next day then what are they telling you apart from you know, and people have gotta have the right not to, not to have things enforced upon them" (Louise: p.15-16)*

In Louise's opinion, there was a fine line between feeding someone and abusing them by doing something against their will:

> *"….or whether this is someone who really just doesn't want this in and I think there's a fine, there's a fine line between you …you know…..abusing someone by doing something against their will, or making sure that they're, that they're not so….distressed" (Louise: p. 12-13)*

These findings mirror the opinion of Jacqui (Mark's relative) in phase 1, whose mother had suffered a stroke. She thought that for her mother, enteral feeding was inappropriate, it denied her mother's distinct wish not to continue living.

7.12.2 You're having to explain the whole thing

Louise felt that communication with the patient prior to inserting an NG feeding tube was a vital but that it was often inadequately done:

> *"…..I think you know we're there with the trolley, we're ready to put the tube in and the patient's actually not prepared…." (Louise: p. 22)*

The need for giving information to patients was developed through phases 1 and 3. Participants agreed that communication prior to insertion was important

and could make a difference to the experience for the patient. However although Diane agreed that patient explanation was important, she felt that nurses did not really have a real discussion because there was not enough time:

> *"Yeh, yeh I think more, having more time, it's just the time factor though as well, cos obviously if you're, you're having to explain the whole thing, or provide leaflets, or have a real discussion about it, it's you know a lot of time the nurses, they don't, I feel they don't really have the time to, to do that, they'll say …'Is it ok?'… We're gonae pass this tube you know and they'll say yes or no, but they don't really go into the whole. I mean they've got a leaflet on the ward but, but that's about it really. I think it's more a time thing rather than they don't want to do it… (Diane: p.18)*

This reflects that explaining the procedure to the patient is not something that has been prioritised during her training. She goes on to describe that she has never really given a full explanation to the patient before inserting their NG tube. Diane considered that just telling the patient was probably enough:

> *"I mean I've never really gone through the whole thing of like spending the time explaining what you're gonae do... […], and then doing it……" (Diane: p.19)*

However an adequate explanation may have resulted in making NG insertion easier for the patient. Louise suggested that using visual prompts about NG tube insertion would be useful, especially for those who suffer communication problems. She suggested that having a training pack for the patient showing pictures of where the tube was going might be helpful and less frightening than just saying that *'the tube goes up the nose and down the throat'* (Louise: p. 23):

> *"….the big visual impact as well you know, even going over to the patient and showing them where it's going to go, and maybe even having a wee diagram, you know cos a lot of our patients are much better if you show them visual clues as to where it would go down and wherever, and I don't think we've got many packs for that, that would be good a little training pack…you know for the patient saying 'do you understand what's gonae happen to you?'; Even tracing it and saying 'the tube will go here' and letting them know, you don't wanae say, you know, you know …'you might find you gag'. Just you know describing it rather than turning up and saying 'right I'm gonae pass a tube, it's going up yer nose, might feel it at the back of your throat', you think well maybe if we prepared people it wouldn't be…quite so frightening and say to them… 'It's quite common you*

know, lots of people' you know; you're not gonae die from this'…" (Louise: p. 23-24)

This suggestion was discussed with other participants and met with mixed response. Karen felt that any amount of information helping them understand the process was a good thing and suggested using patient information leaflets:

"I think patient information is never a bad thing. You know it's not guaranteed that all patients will read it, but at least you've given the opportunity to read it and then ask questions…" (Karen: p. 22)

However, Maria and Diane were slightly more sceptical in light of patients who have difficulty understanding. They appreciated that communication and explanation was important, but questioned what value it might have for some:

"Certainly, I mean I think…it's very difficult and it depends on the patient group that you're talking about …I mean there are patients with receptive dysphasia that you can explain till you're blue in the face, they can't understand you, and that's not a reason for not explaining it to them, but I think…[struggling to explain]" (Maria: p.16)

More attention requires to be paid to how information is relayed to incapacitated patients.

7.13 Summary

This chapter has presented the qualitative analysis of five one-to-one interviews carried out in phase 3. The agendas for these interviews were informed by findings from the first two phases of the study and analysis was carried out using constant comparison, in keeping with a Grounded Theory Approach. These analyses produced eight categories and twenty sub-categories.

8 Discussion

8.1 Introduction

The purpose of this chapter is to provide a discussion of the findings from all three phases of the current study. Initially how far the initial aims of study were met has been articulated; following this the strengths and limitations of this study are explored. The overall discussion of the results in light of relevant literature is then provided, focusing on the new knowledge that this study has revealed.

This overall discussion of the results is divided into several topics. Firstly, perceptions and experiences about NG feeding including perceptions about keeping NG tubes in place. This is followed by debate about the ethical implications of using restraint in stroke care embedded in the ethical principles of healthcare. Perceptions about autonomy and justice are examined using stroke patients' experiences compared to healthcare workers' opinions. The legal implications of using such interventions as hand mittens and the nasal bridle are explored in the context of relevant legal acts for incapacitated adults and questions are raised as to whether such interventions should be used in clinical practice. Issues concerning training and education about NG feeding are reasoned in the context of current criteria for pre-registration nurse training. Finally the current clinical practices of confirming NG tube position and recording and documenting of methods used to maintain tube position are examined alongside existing healthcare guidelines and protocols.

This chapter ends with a summary of the new knowledge uncovered from the results followed by the specific contribution to knowledge leading to a synthesis of the key findings from the current study. This synthesis culminates in the presentation of a theoretical framework conceptualising the insertion and maintenance of NG tubes for stroke patients.

8.2 Assessment of how far the Initial Aims have been Met

The first overall aim of the acceptability and effectiveness of methods used to keep NG tubes in place for stroke patients has been met from a qualitative

perspective. This has provided new knowledge but further work requires to be done on the measurement of the effectiveness of specific methods used to maintain NG tubes.

The second overall aim was to survey current nursing practice involving the management of NG feeding tubes for stroke patients. This has been successfully met. We now have a more complete picture of the training of nurses in enteral feeding, the current practice of confirming tube position and nurses' views about methods used to maintain tube position.

The third aim was to develop, explain and deepen findings the results of the data on NG feeding so that they could be tested within a wider healthcare setting. The results have described in greater depth the views of nurses from both within and out-with the stroke specialty, the use of restraint with incapacitated patients, and the inadequacy of training and lack of documentation, protocols and guidelines which should be set out within an existing legal framework. Since this work was predominately qualitative in nature, the one aspect of this aim which has not been met is the testing of these issues out-with the specialty of stroke care, but suggestions have been proposed.

8.3 Strengths and Limitations of the Study

This study has explored patients', relatives' and staff's experiences and views about the methods used to keep NG tubes in place and current practice in stroke care. In addition the current education and preparation of nurses about enteral feeding was investigated. In light of these aims, the strengths and limitations will be discussed.

8.3.1 Mixed Methods Design

This study has offered a pragmatic approach to answering the research questions using a three-phased mixed methods design, integrating a Grounded Theory Approach (incorporating one-to-one interviews and focus groups) with a quantitative postal questionnaire. The strength of this design is demonstrated

and reflected upon through the ongoing comparison and development of findings both within and between research phases; this culminates in a detailed and comprehensive synthesis of all three phases followed by conclusions and recommendations for further research. On reflection this design has given me a valuable training in both qualitative and quantitative methods and data analysis.

This research began by listening to the opinions and experiences of patients, their relatives and staff. To ascertain whether their experience was specific to locality a survey investigated current practice in England and Scotland. This showed that though there were some differences in practice, however, there were universal issues such as the use of restraining methods with incapacitated patients alongside inconsistent education and training for nursing staff. The final qualitative phase enabled a more detailed explanation for these differences and similarities to be made.

On reflection, working between two research paradigms was at times limiting for a number of reasons. Firstly, moving between qualitative and quantitative data collection and analysis in the same study proved to be difficult as it required adopting different epistemological and ontological stances. For example, in phase 1, qualitative data analysis gave rise to the understanding and interpretation of participants' experience of physical restraint, while phase 2 assessed the frequency of the use of this practice then in phase 3, I returned to analysing deeper interpretations of the use of restraint from a nursing perspective. This style of analysis required me to move between subjective and objective approaches.

Secondly, it was difficult to determine the timing of qualitative and quantitative phases to ensure balance between the analyses of the three sets of data. This is related to the order in which the researcher uses the data within the study, rather than when the data is collected (Morgan 1998). To clarify this timing issue, the analysis adopted constant comparison so that each interview and focus group in phase 1 fed the agenda for the data collection of the next. Then this whole set of data was used to guide the format and content of the survey. Similarly, the results of the survey were fed back to the participants in phase 3

through the interview agendas as discussed in chapter 3; section 3.7.3.1.3 and 3.7.3.1.4. The interview agenda is set out in Appendix 3. Each of the interviews in this phase informed the next interview as per constant comparative analysis which is discussed in chapter 3, section 3.7.1.2.3.

Thirdly, the need to consider the relative weighting which relates to the importance or priority of the qualitative and quantitative methods used to answer the study's questions (Morgan 1998). There was a paucity of evidence on the chosen topic, which led to an obvious need for a qualitative approach to be the prioritising and guiding drive (Creswell & Plano Clark 2007). However, the need to understand a wider context of stroke care demanded a survey to be carried out. Although participants in the survey were given the opportunity to add explanation for their responses, few did (Appendix 7) and so a return to qualitative methods was deemed appropriate. It is of interest to note that the interviews and focus groups in phase 1 produced less data than those carried out in phase 3. This may have resulted from the increased skill and understanding which I had gained throughout the study. In addition, this effect may well have been stimulated by the constant comparative analysis of one phase to the next.

Fourthly, on reflection of the study design I have noted that the quantitative data has become embedded within the overall design (Creswell & Plano-Clark 2007). However, this was embedded in a sequential manner rather than concurrently which was part of the overall planned design.

8.3.2 Grounded Theory Approach

Evidence regarding maintaining NG feeding in stroke patients was found to be limited. By adopting a Grounded Theory Approach to initial data collection and analysis baseline information was obtained which informed further exploration and validation within the mixed methods design. Both the qualitative phases provided a valuable forum for patients, relatives and staff to communicate their opinions and experiences. The sensitivity and depth of data obtained from these phases would not have been adequately achieved within a purely

quantitative study. Thus it was possible for participants to express fears and ethical challenges associated with NG tube insertion and the lack of nurse training; that would have been difficult to identify using only quantitative techniques.

This study began by using a Grounded Theory approach and it was only on reflection that I realised that indeed it was a Grounded Theory Study which incorporated a quantitative element embedded within this qualitative methodology. Strauss & Corbin 1998 appreciate that within a Grounded Theory Approach, mixed methods may be used to develop theories. A theory about NG feeding for stroke patients has evolved from this study and is discussed in section 8.13. According to Strauss & Corbin (1998) theory denotes a set of systematically developed inter-related categories which form a theoretical framework that explains a relevant phenomenon, such as NG feeding for stroke patients. The relationship between categories explains the occurrence of phenomenon in terms of who, what, when, where, why, how and with what consequences.

Traditionally qualitative research has advocated neutrality; however modern theorists (Denzin & Lincoln 2005; Strauss & Corbin 1998) accept that this may not be tenable. Certainly in the present study, I had a considerable background in nutrition, stroke care and education and so greater care was required in gathering, analysing and interpreting data. This knowledge could be seen as a potential source of bias and hence a limitation of the study. Also data was not confirmed by the participants; this could be seen as a limitation and potential challenge to trustworthiness which is discussed in more detail in chapter 3; section 3.8. According to Bryman (2008), there are four elements of trustworthiness, namely credibility, transferability, dependability, confirmability and authenticity. Credibility was circumvented by adopting a constant comparative approach from one participant's account to another. In phase 3, a conscious effort was made to investigate the phenomenon of NG feeding from the perspective of different specialities. Transferability was addressed through generalising qualitative findings in a quantitative phase and further confirming these to other specialities in a third qualitative phase. Dependability was

adopted through a clear audit trail which ran through all three phases. Confirmability is another aspect. Although I had knowledge of the field under investigation, neutrality was maintained at all times thus answering issues a potential proneness to partiality. Finally, although the study population (in each phase) may not completely represent potential different view points in the chosen social setting, every effort was made to present an authentic view from participants.

8.3.3 Interviewing Stroke Patients

The importance and value of capturing stroke patients' experiences has been illustrated and discussed within the current study. It had been anticipated at the study's inception that interviewing stroke patients would present challenges and at times patient recollection was influenced by communication and cognitive difficulties which may be seen as a limitation to interviewing. Indeed, these potential mental and physical deficits did mean that one participant had to rely on a family member to assist in relaying information. However this does not detract from the importance, meaning and value of the patient accounts as they were able to offer graphic descriptions of their experiences of enteral feeding.

It would have been valuable to have had an opportunity to interview more stroke patients and their relatives. This would have provided a more extensive record of experiences particularly with respect to hand mittens and nasal bridles and may have been possible if the study had adopted a purely qualitative approach.

8.3.4 Focus Groups and Interviews with Staff

Focus groups with multidisciplinary staff proved to be a useful forum for accessing data. However difficulties were experienced in recruiting busy clinical staff and some effort had to be made to co-ordinate participants, this may have resulted in a limitation arising from attendees being self selected and potentially more interested in the topic than their peers. In addition due to time constraints, the focus groups had to be shortened which may have limited the amount of data gathered. These groups were held in the clinical settings in which

participants worked, therefore simplifying access and minimising inconvenience. During group facilitation however, it was at times evident that one voice was dominant above others. In one focus group this was the Charge Nurse and despite efforts to draw other team members into the conversation, reluctance to challenge this dominance was apparent; a potential limitation to ascertaining opinions from individuals in a hierarchical group structure.

Staff members interviewed individually in phase 3 were far more forthcoming with their opinions, this may have been due to participants feeling less inhibited by the presence of others with whom they worked, and therefore more confident about sharing their views with a neutral facilitator. Further to this however, the findings informing phase 3 interviews had been derived from two previous phases and therefore had scope for greater depth of discussion.

Qualitative interviewing in both groups and individually required me to develop a range of skills including the ability to manage, facilitate and be able to refocus participants' ideas to gain understanding of staff experiences and knowledge.

8.3.5 The Survey (postal questionnaire)

There was no ready validated questionnaire available to collect the information required to answer the research questions, so one was designed specifically for this study. It was piloted in an attempt to increase validity.

Data across a wide population of nurses working in stroke care was collected by postal questionnaire, which allowed a degree of generalisation and validation of findings from phase 1. The postal questionnaire used a convenience sample of nurses derived from three professional groups (n=528) as there was no other method of accessing the total population of nurses working within this specialty. Therefore results from this survey cannot be said to be truly representative.

The postal questionnaire achieved a response rate of 59% (314/528). It is accepted that attrition rates from surveys may be a high and that response rates of 40% have been considered acceptable (Dillman 2000; Oppenheim 1992).

However, further analysis could have been undertaken on the non-respondents which would have resulted in an increased knowledge of why people chose not to participate. This may also have provided useful information about the appropriateness of the sampling procedure chosen.

I felt that time spent in communicating with the relevant representatives from the professional groups, plus time spent designing the questionnaire and mail-out package were instrumental in achieving a good response rate.

8.4 Perceptions and Experiences about NG Feeding

From the data obtained in phase 1 it emerged that patients' and relatives' overall perceptions of NG feeding were that it seemed to be a *'necessary evil'*. Patients and relatives accepted that NG feeding tube insertion was not a pleasant process, not only for the patient and their relatives. Graphic descriptions of NG tube insertion were given which included confusion over whom had put the tube in, waking up after insertion with blood all over the pillow, to witnessing a tube being passed on a family member who was retching during the experience. The only patient participant who did not find NG feeding distressing had the tube inserted on her stoke affected side.

Staff in phases 1 and 3 perceived that NG insertion was not a pleasant process, to the extent that some related that it would be less traumatic for the patient to wear a restraint, than have tubes repeatedly inserted. Considering this overriding perception it is not surprising that stroke patients pull their NG tubes out. It would seem a natural human response to remove something that is irritating. However within the specialty of trauma care where many uncomfortable and potentially distressing procedures may be carried out, research has shown that it may be beneficial for practitioners to use comforting strategies (Morse 1992). Specifically, research has looked at the use of comforting strategies during NG tube insertion and considers it to be beneficial (Morse et al 2000; Penrod, Morse & Wilson 1999). Morse et al. (2000) carried out a small study of (n=32) episodes of NG insertion in an acute trauma setting. This small study did not give clear descriptions of the types of strategies used.

Morse et al. (2000) concluded that the caregivers' approach affected both the length of time it took to insert the tube and its retention. However, neither the experience nor training received by the caregivers observed was taken into account. Further research is still needed into the benefits of comforting strategies during NG tube insertion, especially in view of the possible connection between a traumatic tube insertion and the likelihood of tube displacement.

Findings from the current study indicate that stroke patients do not find interventions such as hand mittens and nasal bridles acceptable for keeping NG feeding tubes in place. Two of the patients interviewed were able to recall negative experiences of care early after stroke onset, at a time when nurses and other healthcare staff might have perceived that the patient would have little recall.

Phase 2 has found that nurses within the specialty of stroke are not adequately trained to pass and manage NG feeding tubes; and training opportunities are insufficient. In an attempt to compensate for this lack of skill, restraints such as hand mittens and interventions such as the nasal bridle may be used, while this is not in the patient's best interest.

A perception of fear about NG feeding emerged and became more detailed as the study progressed. Phase 1 highlighted patients' and relatives' anxieties associated with this trauma. Some linked this anxiety to the perception of inadequate training. However, this was not something that staff expressed as an issue in either phases 1 or 2. Within these phases, staff's perception of fear related specifically to hurting the patient, misplacing tubes during insertion or the ethical and legal dilemmas of using restraints to keep tubes in place. However in phase 3 it was made clear that within the category *'the lack of training is frightening'* that staff members' did have concerns about the inadequacy of their training. Fear of NG feeding in association with a lack of training for nurses is a new concept that has not previously been documented within the literature.

Joanne (nurse specialist) in phase 3 felt that patients picked up on nurses' anxieties about passing NG tubes, which consequently increased the patient's unease. This was upheld by John's account in phase 1 of having an NG tube passed while nurses were standing over him discussing which of them should have a *'shot'* because they had been unsuccessful in previous attempts. Maria in phase 3 described her '*fear'* resulting from the '*lack of training'* she had received. As a registered nurse she was required to pass and confirm the position of NG tubes on a regular basis. This situation only added to an already stressful situation for both her and the patient, which could have been reduced if her training had been more comprehensive. Specific literature to contextualise the perceptions and experiences of NG feeding for stroke patients is not available.

8.4.1 Perceptions and Experiences about Keeping NG Tubes in Place

Different methods used for maintaining NG tube position were discussed with participants throughout the study. In phase 1 these were taping, hand mittens, nasal bridle or loop systems and inserting the tube on the stroke affected side. In phase 2 additional methods, namely bandaging hands (which participants equated to hand mittens), tying hands to cot sides and Posey vests were included. In phase 3 perceptions and experiences of these particular interventions were discussed in more depth outside the context of stroke. As the study developed it became clear that participants perceived a hierarchy as to what was considered more or less acceptable, effective or safe for maintaining tube position. In phase 2, tying hands to bedrails was used by less than one percent (n=1/312) of respondents and Posey vests were used by only one percent (n=3/312). Therefore it was appropriate to only address the more frequently used interventions.

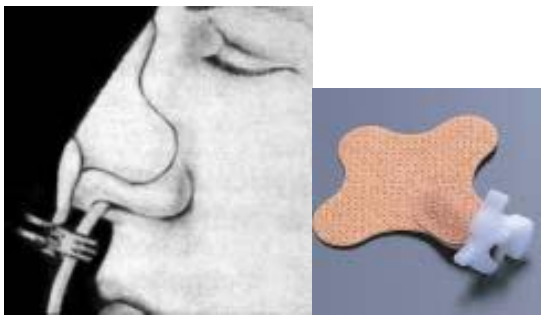
8.4.1.1 Tape

The general opinion throughout the three phases was that taping the tube to the face was the most effective and safe method for securing tubes until the patient tried pulling it out. Comments from relatives in phase 1 and findings from

questions 9 and 10 in the phase 2, reflected variations in approaches about how to position the tape to a patient's face, despite the majority of nurses in phase 2 reporting that tape was placed on both the nose and the cheek (79% (n=248/312)). In one account in phase 1, a patient reported that he did not like tape being placed on his nose (which he found annoying); he preferred it being placed on his cheek. This finding indicates that probably patients are not be given the choice about how their NG tubes should be secured. Dissatisfaction with the placement of the tape which can disrupt the line of vision could be a contributory factor to NG tubes being pulled out.

There is no evidence about the efficacy of taping techniques, patient's preferences about taping, or the type of tape used with stroke patients. Nurses in phases 1 and 3 commented about how the manufacturers' fixtures supplied with NG tubes were frequently inadequate, and so other forms of tape, for example Micropore (surgical tape) (Micropore Surgical Tape 3M 2009) were used, despite not being designed for the purpose. Some of the nurses in phase 2 reported using feeding tube attachment devices, nasal patches with a clip or more specifically, what they referred to as the *'Hollister feeding tube attachment device'*. On further investigation, it was discovered that this is a nasal plaster which has a clasp attached to the end of it to secure the NG feeding tube (Hollister Incorporated 2006) and is illustrated in Figure 11.

Figure 12: Feeding Tube Attachment Device (Hollister 2006)



There is no current available evidence evaluating devices of this nature, so it is not possible to say whether this would be any more effective than other taping techniques at preventing tube dislodgment. However in comparison to hand

mittens and the nasal bridle, a device like this may be considered to be more comfortable and acceptable for patients as it does not require fixation behind the nasal septum or restrict movement. Therefore, fixation devices of this nature warrant further investigation; although this particular example does affix to the nose rather than the cheek, which this study has suggested was not as acceptable to the patient.

8.4.1.2 Inserting the Tube on the Affected-side

Placing NG tubes on the stroke-affected was investigated in phases 1 and 2. Staff in phase 1 had mixed opinions about this technique, it was seen as being effective but some expressed concern about its safety. Conversely, for one patient, having her tube inserted on her stroke-affected side was favourable; she did not notice the NG tube and therefore was less traumatised by it than the others.

Evidence from phase 2 showed that inserting the NG tube on the stroke-affected side is used frequently as a method of reducing tube dislodgement; 62% (n=193/312) of respondents reported its use; furthermore it was significantly more likely to be used in acute rather than rehabilitation or community settings ($p<0.05$). These findings suggest either that this technique is more effective in the initial stages after stroke or that nurses in acute settings are happier to use it than those in the community where fewer NG tubes may be inserted.

The efficacy of inserting an NG feeding tube on the stroke affected side has never been tested and therefore there was no specific literature to contextualise the findings from the current study. Respondents from phase 2 did not score this technique as being as effective as taping, the nasal bridle or hand mittens; although they did feel it was safer and more acceptable than either hand mittens or the nasal bridle. This suggests that nurses are more likely to use what they consider to be safe and more acceptable even if it is potentially less effective; especially if the alternatives may be painful, harmful, or are a form of physical restraint.

8.4.1.3 Nasal Bridle

None of the patients, relatives or staff in phase 1 had any experience of using the nasal bridle. Their general opinion was that it did not look comfortable; in addition they were concerned about it being a potentially harmful intervention especially for confused patients. The particular source of concern was potential harm resulting from a patient pulling at something that was fixed behind the nasal septum. The systematic review in chapter 2 demonstrates that evidence evaluating the use of bridle or loop systems is inadequate and its safety has not been properly tested for stroke patients. The specialist nurse in phase 3 suggested that using the bridle with potentially confused or agitated patients was contraindicated by the manufacturer's advice. However the manufacturer's instructions leaflet (AMT 2008) does not corroborate this opinion, they state that:

> *"Whether it's for temporary problematic patients or necessary for long term use, the AMT Bridle™ is the answer" (AMT 2008)*

Popovich et al. (1996) recommend the use of the nasal bridle in confused or uncooperative patients, or when the risk of unintentional feeding tube removal is high. Evidence from the current study suggests that the use of the nasal bridle within this particular group of patients cannot be supported, as this intervention has not been tested on a large enough sample of patients to evaluate its efficacy or safety. However, such work is being done with stroke patients as part of an ongoing randomised controlled trial taking place in England (Beavan et al 2007).

A small proportion of the respondents from phase 2 (16% (n=68/314)) had used the nasal bridle in clinical practice, their overall opinion was that it was effective, and more so than hand mittens. In terms of safety however, the majority of respondents were uncertain, but the nasal bridle was seen as being less safe than hand mittens. It was not considered to be highly acceptable (mean score= 2.83 - Likert scale 1-very acceptable to 5-very unacceptable), however, nurses considered it to be more acceptable than hand mittens (mean score= 4.16). The bridle had been described by one of the relatives as being *'cosmetically more*

pleasing' than hand mittens. An opinion that was corroborated by nursing staff in phase 3, one of whom felt that *'visually [the bridle] looks a lot better'*. However, patients interviewed in phase 1 saw the nasal bridle as a more frightening alternative than hand mittens even though they did not consider hand mittens to be dignified or acceptable.

8.4.1.4 Hand Mittens

Patients did not like hand mittens and associated them with a loss of dignity and discomfort. In phase 1, Mark who had experienced wearing them recollected that they were *'horrendous'*. Relatives of patients who experienced hand mittens saw them as a good intervention as they were effective at preventing the patient from dislodging their tube. Relatives' main concern related to ensuring that their family members were fed. Conversely, the primary concern for patients revolved around comfort and dignity at a time when this had been severely compromised by illness. A minority of relatives recognised the potential indignity associated with hand mittens, and so felt they may not be suitable for all patients. It seemed that relatives' opinions of mittens were very variable and tended to depend on the physical and or psychological condition of their family member. Two relatives had decided that mittens were not suitable for their family members because they were dying, and they felt that the patient would have preferred to be left alone. These data reflect different perceptions as to what constitute the priorities of care.

Although stroke patients' attitudes towards the use of hand mittens for keeping NG tubes in place have not been previously documented, Page et al. (2002) explored stroke patients' opinions of constraint-induced movement therapy which involves patients wearing a hand mitten to induce movement in their paretic limb. Page et al. (2002) using a postal questionnaire and telephone interviews, found that from a sample of 208 stroke patients, 65% (n= 135/208) responded that they were 'Somewhat unlikely' or 'Not at all likely' to wear the restrictive device (hand mitten). Their main concerns were the reality of wearing the mitten and the length of time this would be required. This corroborates the findings from the current study where stroke patients did not consider hand mittens favourably. However, Wolf 2007; Taub et al. 2006; Wolf

et al. 2006 have demonstrated that mittens are effective in inducing movement in the stroke affected limb.

Nursing staff had mixed opinions about hand mittens; some who had seen them in use felt that they were effective at ensuring patients were fed. However, others thought that if the patient really wanted to remove the mitten, this could be achieved. For some staff, patient dignity, ethical and legal implications of physical restraint were of great importance. These concerns were reported in the category of *'harms and benefits'* which included such conflicting issues as restricting and improving patient mobility. In addition there were concerns about the practicalities of laundering hand mittens, infection control issues and physical irritation to the skin as a result of wearing them.

These concerns corresponded with my own nursing experience of caring for patients with hand mittens. I discovered a hand mitten on a patient's hand back to front where the wrist strap had started to cause breakdown of the skin. In addition, the mitten was soiled with no evidence of it being changed regularly. However the mitten was preventing the patient from pulling her feeding tube out. Although it was obvious that the patient was curious about the presence of the hand mitten and spent long periods of time staring at it. While caring for this patient I decided to remove the hand mitten and look at the condition of the patient's skin and exercise her hand. The patient found moving her hand painful and the skin was dry and required moisturising. These observations (although taken from only one patient) corroborated concerns expressed by some participants in phase 1.

The opinions of nurses working within three professional groups (Lothian NHS, Scottish Stroke Nurses Forum (SSNF) and National Stroke Nurses Forum (NSNF)) about the effectiveness, safety and acceptability of hand mittens was explored further and evaluated in phase 2. These findings corroborated the opinions expressed in phase 1. Although the majority of respondents felt that hand mittens were an effective method for maintaining NG feeding, most nurses were uncertain about their safety and acceptability. Phase 2 also demonstrated

that nurses who used hand mittens saw them as a significantly more effective, safe and acceptable method than those who did not.

Phase 3 explored the relevance of the use of mittens outside the specialty of stroke. Only one of the phase 3 participants stated that she would never use anything like them on any of her patients, she described mittens as '*primitive'*, and '*undignified',* she equated them to tying patients' hands. All the others felt that hand mittens were effective at preventing NG tube removal and some felt that they were acceptable; although, they all had reservations about their use and described restraint as being a '*very challenging area'*. Their reservations were compounded by inadequate guidelines and protocols.

Only one nurse said that although she was not sure about the ethical implications of the use of mittens, she was satisfied that within her particular specialty (neurology), there were guidelines and documentation for the use of restraint (including hand mittens) which nursing staff treated as being extremely important information.

The contrast between how the use of hand mittens was addressed between two closely linked specialties (stroke and neurology) was interesting. From the description of this nurse, neurology seemed to have a more transparent approach to using restraints for preventing dislodgement and removal of intravenous lines and enteral feeding tubes. I was able to obtain a copy of the 'Restraint Risk Assessment Record' from the Department of Neurology (NHS Lothian 2004a) which covered the assessment to be followed if restraint was being considered for treatment purposes. After completing that assessment, if restraint was considered necessary then the nurse would choose the most appropriate form of restraint. Within this documentation, the 'Posey Mitt' is listed as a restraint option (NHS Lothian 2004a).

Conversely, documentation from the stroke speciality did not classify the mitten as restraint. I had asked for any documentation from the two acute stroke units in phase 1 where hand mittens were used, a care plan was obtained from one. In this there was a section for nutrition and hydration in which 'tube tugging' had

been listed as an actual or potential problem which could be counteracted with the consideration of hand mittens (NHS Lothian 2004b). However, it was stated that before implementation consent from the patient must be sought, or if necessary a Certificate of Incapacity under the section 47 of 'Adults with Incapacity (Scotland) Act' (2000) must be completed. At no point in this care plan was the term 'restraint' or 'restraining the patient' referred to (NHS Lothian 2004b). At the time of the focus groups, I had asked the Charge Nurses of both units whether they had any guidelines covering the use of hand mittens. One unit provided a guideline produced by a Clinical Governance group within their Clinical Directorate (NHS Lothian 2004c), which stated:

> *"Use of Posey Mitts potentially constitutes an infringement of the patient's right to autonomy but this is potentially outweighed by benefits to the patient, i.e. Their use may constitute an act of beneficence." (Guideline for the use of Posey Mitts, NHS Lothian (2004c)*

Although this recognises the patients' restricted freedom of choice to such treatment, it does not acknowledge the addition of a physical restraint. The other unit provided a guideline in the form of a memo about the introduction of hand mittens which covers which patients may be or may not be suitable for their use; the guideline then directs nurses to the manufacturer's safety instructions for 'Posey Restrictive Products' (Posey Company 2007). This does not mention hand mittens at all, attached to this however was the application sheet for 'Posey Finger Control Mitts' (Posey Company 2008). Again, this does not refer to hand mittens as a form of physical restraint. Neither of the guidelines provided by the units, or the manufacturer's instruction include any evidence to support or inform their use in clinical practice.

Results from phase 2 show that only half (50% (n=34/68)) of the respondents who used hand mittens across the UK had guidelines or protocols. This may be a reason why staff in phases 1 and 3 reported concern regarding the legalities of their use. The use of hand mittens within stroke has preceded adequate protocols, guidelines, specific care plans and documentation. This may be as a result of inadequate evaluation of this intervention. I suggest that it

is not appropriate to use clinical interventions without adequate evidence to inform protocols or guidelines.

It is interesting to note that the results from phase 2 indicate that hand mittens were significantly more likely to be used in NHS Lothian than any other Health Board in Scotland or England ($p<0.05$). This would suggest that the results of the FOOD Trial (2005) might have influenced the use of hand mittens in this Health Board as the FOOD Trial researchers (Dennis et al. 2006) were based there.

In light of these findings, it must now be questioned whether any further evaluation of hand mittens would be ethical as mittens are seen as being an unacceptable way of maintaining NG tube position. The place of hand mittens in current practice seems to have been based on the perception of efficacy but not safety or acceptability. Furthermore, considerations such as infection control and monitoring of hand mittens as part of patient care has not been considered. The use of such interventions, have implications for staff training in terms of application, monitoring and skin care. From the evidence provided by the current study, it appears that to date none of these issues has been adequately addressed.

8.4.1.5 Bandaging Hands

Comments from phase 2 suggested that bandaging hands may be done when hand mittens were not available (Appendix 7); this practice was also corroborated by one nurse in phase 3. Although bandaging hands was only used by 8% (n=24/312) of respondents in phase 2, it was notable that stroke units in NHS Lothian were significantly more likely ($p<0.001$) to use bandages than the NSNF or SSNF, adding further evidence to the suggestion that bandaging was used as a replacement for hand mittens. Considering the uncertainty which nurses have reported in this study about the acceptability and safety of hand mittens and the nasal bridle; it is concerning that interventions not even vaguely designed for retaining the tube position are being used to restrain patients' hands.

Generally, nurses did not see this method as being particularly effective (mean score= 2.79) or safe (mean score=3.59) and they regarded it as being unacceptable (mean score=4.16). The Adults with Incapacity (Scotland) Act (2000) and Mental Capacity Act (2005) both require that the person responsible for implementing an action to an incapacitated adult, should be satisfied that the intervention be in the best interest, be of benefit and be the least restrictive option in terms of their freedom. If nurses do not see bandaging hands as being acceptable, safe or particularly effective then it cannot be in the best interest of the patient. In addition this study shows that it is not the least restrictive option for the patient, and that other less restrictive options require further evaluation. In summary, based on the principles of the Mental Capacity Act (2005) and Adults with Incapacity Act (Scotland) (2000), bandaging stroke patients' hands to prevent NG tube removal is not legal if the patient is unable to consent.

8.5 Ethical Issues about using Restraint with Stroke Patients

Neither patients nor relatives directly used the term 'restraint'. However imagery evoked by patients when discussing the acceptability of hand mittens likened them to a punitive intervention that physically restricted them and removed an element of freedom. The purpose of the hand mitten, bandaging or tying hands to cot sides is to restrict free movement of the hands. The purpose of the nasal bridle can also be seen to restrict the freedom of choice of the patient. If it is the patient's wish to pull their NG tube out, it makes this more difficult and potentially painful; however it does not prevent the patient from moving their hands freely.

A systematic review carried out by Evans et al. (2002) evaluated evidence about the use of physical restraint in acute and residential care including patient's experiences of being restrained. They found only two studies that related the experiences of people who had been physically restrained (Harden et al. 1993; Strumpf & Evans 1988). From these studies Evans et al. (2002) note that few patients' related positive experiences and many more related negative ones. Evans et al. (2002) have categorised patient descriptions as

'restriction' and 'discomfort' both of which reflect similarities to the words of the patient who had experienced wearing hand mittens in the current study; *'I couldn't even pull myself up, up the bed'* and *'that was torture'*.

Members of staff (particularly from phases 2 and 3) were more inclined than others to classify interventions such as hand mittens as physical restraint. However, the nasal bridle although perceived by participants as being a potentially frightening and damaging intervention, did not refer to it as a form of physical restraint. Studies have shown that nurses are not comfortable with restraining patients (Chuang & Huang 2007; Sequeira & Halstead 2004; Fradkin, Kidron & Hendel 1999). Chuang & Huang (2007) explored nurses' feelings about using physical restraint on older patients. Nurses in their study, mostly associated using restraint with negative thoughts and feelings such as sadness, guilt, conflict, retribution and pity; in addition nurses would rather use interventions which they deemed to be non-restraint. Interestingly enough these nurses described using 'ping pong mitts' (a type of hand mitten) in preference to wrist restraints as they saw these as a form of physical restraint. Chuang & Huang (2007) consign this behaviour to denial that restraints were being used; they point out that 'ping pong mitts' are also a form of restraint. However as a nurse, I would liken this behaviour to nurses preferring to use what they deem to be more acceptable, comfortable and less harmful to the patient, and in comparison to wrist restraints, hand mittens would seem to be the lesser of two evils.

As previously discussed in chapter 1, the action of putting hand mittens or a nasal bridle on a dysphagic stroke patient who is at risk of dislodging their NG tube may be seen as a paternalistic act. Within the context of paternalism it is in the best interests of the stroke patient that they receive nutrients via an NG feeding tube, so the act is done with beneficence; done with the intention to do good (Mason & Laurie 2006; Beachamp & Childress 2001). However, evidence from this study suggests that although interventions such as nasal bridles and hand mittens are intended for the good of the patient, concerns exist. Patients, relatives and staff communicated concerns about the potential harmful physical and psychological effects of hand mittens and the nasal bridle; further patient

accounts would be useful to evaluate this issue more fully. However taking the findings of this study into account, it must be questioned whether the application of hand mittens or the nasal bridle is ethical. It cannot be stated that hand mittens or the nasal bridle are harmless to the patient.

8.6 Perceptions about Autonomy and Justice

This study offered the stroke patient the opportunity to reflect on their experiences of their care. Hafssteinsdóttir and Grypdonck (1997) noted that little attention has been paid to the experience of the stroke patient. This attention is fundamental to help identify the process of recovery and enable nurses to individualise their care to meet both the physical and psychological needs of patients. A systematic review by McKevitt et al. (2004) noted that relatively few studies have sought to document patients' views of acute care, appreciating that there may be practical difficulties in undertaking such work. However two retrospective studies found that patients were satisfied with their acute care (Pound et al. 1995; Thomas & Parry, 1996). The majority of patient accounts from the current study however, do not reflect satisfaction.

Patients in the current study related concerns about a lack of choice when referring to their care. This included the decision to pass the tube, communication with the patient, the way in which the NG tube was secured and interventions to prevent tube dislodgment. Decisions to feed were made by the healthcare or nursing staff, the assumption being that some stroke patients are confused and therefore unable to make these decisions themselves. This approach to care is deemed paternalistic and is a recognised method especially within the case of an incapacitated patient (Mason & Laurie, 2006; Stauch, Wheat & Tingle, 2002). Patient perceptions in the current study focused on not knowing what was happening, but at the same time not being able to communicate their concerns and needs, either because they were physically unable to communicate or because they felt disempowered.

Although evidence from this study shows that stroke patients do to some extent have a distorted recollection of facts, it also shows that their recall of events

post stroke is lasting. All four patients interviewed were between 4-8 weeks post acute stroke. Two patients (one of whom was four weeks post acute stroke and the other eight weeks post stroke) gave graphic descriptions of the trauma associated with feeding, more specifically tube insertion and the experience of wearing hand mittens. One of these patients was very depressed and angry about the care he had received. The trauma described by both; whether it was distorted or not, was disadvantageous psychologically and had left them with disturbing memories. Psychological distress or depression has been found to have a negative impact on stroke patients' participation in rehabilitation (Hafsteinsdóttir & Grypdonck, 1997). Traumatic NG tube insertion which some patients in this study have described as being *'stressful'*, *'traumatic', 'intrusive'* and *'uncomfortable'* adds to the devastating experience of having a stroke. These ordeals are further added to by the reality of wearing hand mittens which only serve to enhance negative thoughts, feelings and experiences. Due to access difficulties, it was not possible in this study to speak to more than one patient who had experienced wearing mittens. To evaluate these aspects of care fully, it would be beneficial to gather the experiences of more stroke patients who have worn mittens.

For stroke patients, the process of trying to communicate their experiences in these early stages can be challenging, frustrating and depressing due to a multitude of factors including speech deficits (Sundin, Jansson & Norberg, 2002; Sundin, Jansson & Norberg 2000). When a patient is unable to communicate distressing events, it then becomes difficult for the nurse to understand the level of trauma that the patient might be experiencing (Kumlien & Axelsson 2000). Studies reporting patients' concepts of recovery after stroke have found disparity between their views and those of the health care professionals (McKevitt et al. 2004). The concept of recovery for the professional may be measured in terms of regaining some level of function, but for the patient successful recovery is more likely to be measured against a return to their pre-stroke abilities (McKevitt et al. 2004). These differences in perception between patients, relatives and staff are demonstrated within the current study and have been previously demonstrated through the personal accounts of stroke patients (Bauby 1997; Benner & Wrubel 1989). The

following quote is taken from the personal published account of Jean Dominique Bauby (1997) a 42 year old man who suffered 'locked in syndrome' (meaning he was unable to move, speak or communicate, but understood and was aware of what was going on around him). Bauby (1997) compares this syndrome to *'a giant invisible diving bell holding his whole body prisoner'* (Bauby 1997; pp.11). He was only able to move his left eyelid with which he worked out a code used to dictate his experiences. Bauby (1997) as McKevitt et al. (2004) suggests, measured his success of recovery against what he was able to do pre-stroke and throughout his book relates inconsolable memories of his pre-stroke life compared with the losses he felt post-stroke. The two following quotes clearly illustrate the chasm of insight between the healthcare professional and those of the patient:

> *" 'You can handle the wheel chair', said the occupational therapist with a smile intended to make the remark sound like good news, whereas to my ears it had the ring of a life sentence." (Bauby 1997; pp.17)*

> *"And every day, since by now it is noon, the same stretcher-bearer wishes me a resolutely cheerful 'Bon appetite!' his way of saying 'See you tomorrow'. And of course to wish me a hearty appetite is about the same as saying 'Merry Christmas' on 15th August or 'Goodnight' in broad daylight. In the last eight months I have swallowed nothing save a few drops of lemon flavoured water and one half-teaspoon of yoghurt which gurgled noisily down my windpipe. The feeding test – as they grandly called this banquet – was not a success. But no cause for alarm: I haven't starved. By means of a tube threaded into my stomach, two or three large bags of a brownish fluid provide my daily calorific needs. For pleasure I have to turn to the vivid memory of tastes and smells, an inexhaustible reservoir of sensations". (Bauby 1997; pp.44)*

Bauby (1997) describes the great loss of independence experienced by stroke patients. Similarly, Mark a patient from phase 1, highlights a lack of understanding on the part of other people about what he was going through:

> *"Well, the tube's very important. I understand that, but maybe people don't understand when you've had, you've had the stroke and that and even wee bits of mobility's very difficult for you where, and that is quite important. I mean I've got a grip of that [demonstrated gripping bed rail with hand] I couldn't even do that […] I couldn't even pull myself up, up the bed. Read a paper? Forget it! […] Turn a page in a book? Forget it! Anything other, to me I just think, thought it was over the top […]. It definitely, it stops you doing anything like!" (Mark; pg. 10)*

This difference in perception about what is important in rehabilitation was demonstrated further in the current study. Staff and some of the relatives interviewed in phases 1 and 2 saw the addition of hand mittens as being positive, whereas patients' views were different. Reported perceptions of patients demonstrated that they were autonomous beings, which was not understood by carers.

None of the patients involved in this study saw the addition of a hand mitten or a nasal bridle as justifiable. However, relatives' rationale for the use of interventions was often influenced by the requirement to have their relatives fed and hydrated. For them autonomy could be super-ceded by physical necessity, except in cases where relatives could clearly see that their family member was close to death, although in one case this was prolonged. This draws attention to the fact that nurses should consider patients on an individual basis.

Findings from the current study indicate that nurses who have used restraints are more likely to consider them acceptable and indeed justifiable without listening to patients' or relatives' views. Understandably relatives want to see their family members receive nutrition and nurses (in addition to wanting the patient to recover) do not want to be continually re-passing NG feeding tubes.

This study has emphasised that what the patient experiences during treatment does not always match the perception of either their families or healthcare staff. From my own experience, the priorities of achieving certain tasks within a clinical shift can detract from taking into account patients' thoughts, feelings and experiences of the care being provided. Therefore to provide 'person centred care', patients' experiences and views must be represented and taken into account to adequately identify and cater for *their* needs both physically and psychologically and so steer away from the more paternalistic tradition (Mitchell & Moore 2003). Consequently patients should be involved in evaluation of treatment options to adequately represent their choices (Scottish Government 2008b; Scottish Government 2007; Department of Health 2004**;** Goodare & Lockwood, 1999).

8.7 Legal Implications

The Adults with Incapacity (Scotland) Act (2000) and Mental Capacity Act (2005) articulate how medical intervention and care should be carried out in the case of an incapacitated adult. This research has shown that some patients felt that they were not adequately communicated with about their treatment decisions, possibly because it was assumed that they were not able to understand. One patient in particular said that if he had received a greater level of explanation, then this might have made the treatment he received more reasonable and acceptable. One nurse in phase 3 suggested that information materials in the form of audio visual aids, pictures or information sheets for patients would be a valuable addition to verbal explanation by the nurse or doctor about tube insertion and might be especially useful to help calm the patient before commencing the procedure. Despite there being teaching aids regarding NG feeding and tube insertion for staff, information for patients is not available. Dougherty & Lister (2008) suggest that the nurse should explain the procedure to the patient and gain verbal consent before proceeding. However in the case of the stroke patient this may not be possible, especially if patients have speech deficits; consequently it can be difficult for the nurse to gauge whether the patient has understood.

The student nurse interviewed in phase 3 felt that nurses did not often have the time to go through the whole procedure, they did have leaflets for the patients where she was working, but mostly nurses only had the time to ask the patient *'if it was ok'* for them to pass a tube, they did not have time for a *'real discussion'*, and she herself had never gone through a full explanation with a patient before inserting an NG tube. In my opinion, this level of communication to gain informed consent is not adequate. The NMC (2008) Code of Conduct states:

> *"the nurse must be aware of the legislation regarding mental capacity, ensuring that people who lack capacity remain at the centre of decision making and are fully safeguarded" (NMC Code of Conduct, 2008, pg.2).*

The information giving process requires assessment and advanced communication skills along with respect for the rights of the individual (Dougherty & Lister, 2008). Therefore, a simple 'yes' or 'no' in response to the question 'Can I insert this tube?' without adequate explanation about the procedure does not suffice. Consent from the patient may be given non-verbally (in the form of a sign e.g. a patient holds his hand up to indicate that NG tube insertion should cease), verbally (agreeing to the procedure once they have been informed), or in writing (Dougherty & Lister, 2008). Although, if a patient is deemed incapacitated and therefore unable to consent to treatment, the health care professional is legally allowed to act in their best interest. Therefore, if the treatment (for example tube insertion) is deemed of benefit to the patient the treatment can proceed without patient consent (Mental Capacity Act 2005; Adults with Incapacity (Scotland) Act 2000). However the need to explain procedures to the stroke patients in an attempt to gain consent should not be ignored. Dougherty and Lister (2008) point out that capacity can vary from day to day and may be dependent on factors such as confusion, pain and medication. Therefore the patient should never be denied the opportunity to consent to treatment. This was an issue for one patient in phase 1 who felt he had not been given the choice about having a feeding tube.

It was recognised by staff in all three phases that patient communication and explanation about procedures is essential and made a positive difference to the patient's handling of their treatment. Therefore the interpretation of incapacity in stroke patients must be judged with a level of caution. Although McKevitt et al. (2004) noted that relatively few qualitative studies had been carried out looking at patients' views of acute care, some work has been carried out with nurses, into communicating with and understanding aphasic stroke patients during rehabilitation (Sundin & Jansson 2003; Sundin, Jansson & Norberg 2002; Sundin, Jansson & Norberg 2000). Aphasia is a defect in the use of language which may occur in comprehension, expression, reading or writing and will often affect all four abilities (Sundin, Jansson & Norberg 2000). Sundin, Jansson & Norberg in various studies suggest that effective communication with stroke patients is dependent on a relaxed atmosphere, creating a safe environment, having empathy and an understanding with the patient. They

noted that interpretation of facial expression and non-verbal signals was crucial and the ability to do this may depend on the depth or length of relationship between patient and nurse. One study identified two main themes namely 'facilitating openness' and 'being in wordless communication' when communicating with stroke patients (Sundin, Jansson & Norberg 2002). However, Sundin & Jansson (2003) note that there is a lack of studies about ways to achieve an understanding with aphasic stroke patients.

Taking this into account, if adequate information about tube insertion is not given, then this may result in an increased likelihood of the patient pulling the tube out. The addition of a physical restraint in this situation would only add increased levels of distress.

8.7.1 Legal Implications of using Hand Mittens and the Nasal Bridle

The majority of hand mittens were being used in Scotland ($p<0.001$), so I looked specifically at how their use fits with the Adults with Incapacity (Scotland) Act (2000). This Act (as discussed in chapter 1), highlights that interventions made on the incapacitated adult should be deemed beneficial by those making them and should be the least restrictive option to the patient's freedom.

Although hand mittens and the nasal bridle are designed to safeguard and promote physical health by enabling feeding, there is insufficient evidence to show that they are physically or mentally safe, and they are not the least restrictive option. The experience of one patient in phase 1 indicated that he found hand mittens highly restrictive, mentally and physically torturing and they aggravated his pre-existing skin condition. None of the patients in phase 1 had experienced the nasal bridle, however their perception of it was unpleasant and potentially harmful, and they saw hand mittens as a less frightening option.

Phase 2 directly addressed the question of how safe nurses felt interventions were. They saw the nasal bridle as a safer intervention (mean score=2.84 (1= very safe; 5= very unsafe)) than hand mittens (mean score=3.11), however neither intervention was rated as being particularly safe. Participants in phase 3

corroborated these opinions; they also saw the nasal bridle as a more acceptable option; however the fear of harming the patient was again echoed.

Therefore until further investigation into the harms and benefits of hand mittens and nasal bridles has been carried out, despite possible effectiveness at preventing tube dislodgement, they should not be used with incapacitated adults such as stroke patients. Their use does not satisfy the requirements of the Adults with Incapacity Act in Scotland (2000) or the Mental Capacity Act (2005).

The use of restraints with stroke patients remains controversial. The current study has highlighted that nurses have mixed attitudes towards the use of physical restraint. Nurses in phase 1 seemed less willing to use the term restraint when referring to hand mittens, almost as if they did not feel comfortable talking about it. Those interviewed in phase 3 however, who worked outside the stroke specialty, were more definite with their assertions about hand mittens being physical restraint. This perhaps suggests that because mittens were being used in clinical practice, nurses were reluctant to accept that they were a form of restraint. There was a general discomfort among participants when discussing the issue of restraint, most seemed unsure about how it should be handled; they were concerned about the ethical and legal aspects of decision making, consent and documentation. The main justification for the use of physical restraint was to prevent repeated tube insertions which nurses considered must be more unpleasant for the patient than having a hand mitten on. However, tube removal may be exacerbated by repeated traumatic tube insertions. On the basis of the findings of the current study, it would be more ethical to ensure that tube insertion is as trauma free and comfortable as possible, before venturing down the route of physical restraint.

8.8 Education and Training

Training was frequently reported as an issue by many of the participants and covered all aspects of maintaining NG feeding for stroke patients; insertion,

securing and confirming NG tube placement initially and prior to subsequent feedings. Many nurses referred to the fact that they had trained years ago; NG insertion and securing tubes had been described as a *'lost skill'* in the comments from the phase 2 questionnaire (Appendix 7).

8.8.1 Training to Insert NG Tubes

Patients' descriptions in phase 1 of NG feeding tube insertion made it clear that this is an extremely unpleasant process and potentially one of the reasons why stroke patients dislodge tubes (Smithard 2002). In addition, having an NG tube in place is very distracting and irritating for a potentially disorientated patient. However, patients and relatives indicated that they felt that some of the nurses were not trained properly how to insert tubes, which added to the process being an unpleasant one for the patient. Phase 2 findings indicated that training to insert an NG feeding tubes was inadequate, with only 56% (n=176/314) having received formal training, 78% (n=246/314) supervised training in clinical practice and 47% (n=147/313) a combination of both. Nurses in phase 3 thought that the combination should be the expected minimum. Furthermore, 12% (n=38/313) of phase 2 nurses had received no training at all yet were working within the specialty of stroke where NG feeding is commonly used (Dennis, Lewis & Warlow 2005b).

Nurses interviewed in phase 3 felt that formal and supervised training should be followed by a competency based assessment in clinical practice. Phase 2 findings show that only 20% (n=63/313) of the respondents had received this level of training and there was a wide variety of combinations of training received revealing a very *ad hoc* approach. NG feeding and its management was not a priority clinical skill in the particular Higher Education establishment that the Student Nurse attended and at which the Nurse Lecturer worked. However NG feeding training was provided post registration by the particular Health Board represented by the Clinical Nurse Specialist. She reported issues with waiting lists to access training and problems of assessing competence in the clinical area once training had been received. Nurses in phase 3 had mixed opinions about when this training should be given.

These findings reflect problems with clinical skills training which has been reported in recent years (NMC 2007; Jukes et al. 2007; NMC 2004a; UKCC 1999). The Student Nurse in phase 3 reported no formal teaching of NG insertion except a very brief lecture in her first year. This situation was corroborated by the Lecturer who described how training on NG feeding for pre-registration nurses has moved within the pre-registration curriculum repeatedly. Therefore, students were not being trained to insert NG feeding tubes resulting in qualification with an absence of an ability to perform this skill unless they had been shown in a clinical area.

It was highlighted in chapter 1 that the NMC Essential Skills Clusters (NMC 2007) set out that pre-registration nurses should be taught how to insert NG feeding tubes if it was 'relevant' to their branch programme. The use of the word *'relevant'* (NMC Essential Skills Clusters 2007; pg.23) introduces a level of ambiguity as to whether this skill should be taught. If NG feeding is not deemed relevant then the assumption would be that it is not compulsory. Leaving NG insertion and maintenance as discretionary, dependent only on the clinical experience of student nurses is an issue that the current research highlights. Although the Essential Skills Clusters (NMC, 2007) do focus on nutrition and more specifically NG insertion as being essential; this guidance is not firm enough to ensure that the training is compulsory even for adult nurses, nor is it specific enough to communicate how that training should be delivered.

8.8.2 Training to Confirm NG Tube Position

Maintaining NG feeding and ensuring safe delivery of feed and medications, also involves checking the tube position on a regular basis. As discussed in chapter 1, current advice from the NPSA (2005b), states that this should be done by aspirating gastric fluid and checking the pH using pH indicator paper. If this test is not conclusive within the parameters set out by the NPSA (2005a), then x-ray should be used. Checking NG tube position is a standard part of inserting and caring for an NG feeding tube and something that every nurse who is responsible for managing NG feeding must be able to monitor effectively.

The phase 2 questionnaire investigated what training nurses had received to check tube position and what methods were being used in their clinical areas.

Aspiration has been deemed as the sole bedside test necessary to confirm the correct position of the tube (NPSA 2005a), however only 64% (n=202/314) of phase 2 respondents had been trained how to carry this out. Despite x-ray being the only other checking procedure, only 15% (n=46/314) of nurses had been trained how to interpret them. The whoosh test is no longer recommended as a safe confirmatory procedure but only 23% (n=71/314) of nurses had been trained how to perform it. Looking at combinations of training, 33% (n=104/314) had not received any training to confirm NG feeding tube position. It became evident within the current study that the training received was variable. This was further corroborated in phase 3 where participants reported various experiences.

This study has clearly highlighted a gap in training and an inconsistent approach about how to insert NG feeding tubes and confirm their position. The perceptions of how training and supervised practice should be delivered varied; some participants advocated simulating skills with anatomical models and audio visual aids such as DVD's. However, one participant felt this was unrealistic and therefore pointless, although all these participants and the majority of those in phase 2 (89% (n=279/313)) felt that training for nurses in this aspect of clinical practice was necessary. The most effective methods for delivering training and education on NG feeding are something that has not been properly evaluated and requires further attention. However currently, the 'Marsden Manual of Clinical Procedures' (Dougherty & Lister, 2008) is the key nursing text which included the management of NG feeding tubes. In addition, various examples of NG feeding tube instructional DVD's and internet links can be found in chapter 1.

The current study has shown that inadequate training leads to a lack of competence and confidence in the practice of inserting and confirming NG tube position which is viewed with a level of trepidation by some nurses. This *'fear'* (highlighted in phase 3) adds to the trauma experienced by patients during

feeding tube insertion and subsequent care. There is no available literature which substantiates how the lack of knowledge and training about NG feeding leads to anxiety and potential incompetence in performing the skill. However, the concept of fear driven by inadequate knowledge is a recognised phenomenon in nursing (Bernardi et al. 2007; Sharif & Masoumi 2005; McGuire, Yarbro & Ferrell 1995).

8.9 Confirming NG Tube Position

Findings from the current study show that in keeping with current guidance (NPSA 2005a); aspiration was the most commonly used technique for confirming NG tube position. It was used by 93% (n=292/313) of respondents, followed closely by x-ray which was used by 90% (n=282/313). In addition, this was the most frequently used combination of methods (66% (n=206/313)). Both these methods were rated as reliable, x-ray being the more so (mean score=1.38 (1=very reliable; 5=very unreliable). Despite this, comments from respondents in phase 2 (Appendix 7) noted difficulty in obtaining aspirate up fine bore feeding tubes and interpreting its pH especially if the patient is on medication which could alter the pH of gastric aspirate. If respondents were unable to obtain aspirate, then x-ray was their next port of call; however many respondents pointed out that x-ray is only accurate at one point and if the NG tube were to dislodge after x-ray, then there was no way of detecting this. These comments highlight difficulties for nurses in confirming tube position for stroke patients and further illustrate that there is no full proof method. This can only add to the anxiety about this whole area.

Despite advice from the NPSA (2005a) regarding the use of the whoosh test, results from phase 2 show that it was still used by 19% (n=61/313) of respondents. The overall opinion about the reliability of the whoosh test ranged between uncertainty and unreliability (mean score=3.54 (1=very reliable; 5=very unreliable)). However, comments from the questionnaire reflected that some still regard the whoosh test as being a useful back-up test if they could not obtain gastric aspirate or a good second confirmation if they could (Appendix 7). Considering that none of the commonly used confirmatory tests (aspiration,

whoosh test or x-ray) are fully accurate, removing one without sufficient evidence, as discussed in chapter 1, only adds to the difficulties of confirming tube position. Although further evaluation of tests confirming NG feeding tube position was commissioned by the NPSA (2005b), it is not clear if the whoosh test was included.

Results from phase 2 of the current study show, that within the specialty of stroke, few nurses have been trained how to carry out the whoosh test (23% (n=71/314)) in comparison to aspiration (64% (n=202/314)). Of the nurses who reported that their departments still used the whoosh test ((19% (n=61/313)), more than half ((57%) (n=35/61)) had not been trained how to carry it out. Although this finding does not prove that these nurses were individually practising this test without training, it does suggest that the test was being used in areas where staff were not competent. Two of the participants in phase 3 also reported using the whoosh test without being trained. Both described situations where the test was commonly used on their units and where they had been expected to acquire this skill. One of the participants was a student nurse working within the speciality of stroke. This scenario corroborated evidence from phase 2 that showed the whoosh test was still used within stroke care; in addition it illustrates that the University's attempts to communicate advice from the NPSA (2005a) had not succeeded.

Perhaps even more concerning is the number of respondents who were not trained how to carry out aspiration, but were using it in clinical areas (33.5% (n=105/313)). From my own experience as a Nutrition Nurse Specialist responsible for training nurses, there were discrepancies between advice being given in text books such as 'The Royal Marsden Manual of Clinical Nursing Procedures' (Dougherty & Lister 2008), national guidelines (NPSA 2005a) and by NG tube manufacturers (Merck 2007).

In the Royal Marsden Manual the equipment list for inserting fine bore NG feeding tubes suggests the use of a 10ml syringe for aspiration (Dougherty & Lister 2008). The NPSA (2005a) guidelines however, do not state what size syringe should be used, but do recommend that if unable to obtain aspirate,

between a 20-50ml syringe should be used for injecting air into the tube before attempting aspiration again. However, no evidence base is presented for these instructions. NG feeding tube manufacturer Merck (2007) within their educational presentation, recommend a 50ml syringe for aspiration. Their rationale for this is that by using a larger syringe, less pressure is exerted inside the feeding tube, thus decreasing the chances of the tube walls collapsing, which would prevent aspirate being drawn up the tube and the tube becoming damaged (Merck 2007). This discrepancy illustrates conflicting evidence adding to an already inconsistent approach to NG feeding.

Potentially this contradictory advice could determine the difference between achieving aspiration with a 50ml syringe and being unsuccessful using a 10ml syringe. Consequently, if aspiration is unsuccessful, under current advice (NPSA 2005a) tube placement should then be confirmed by x-ray. This may in turn cause delay in feeding and expose patients to unnecessary procedures.

8.10 Lack of Protocols and Recording Procedures

All phases demonstrated that there was a lack of policies available to guide interventions for maintaining NG feeding. The systematic review (chapter 2) confirmed that there is insufficient evidence to adequately inform evidence-based guidelines and policies. Phase 2 findings demonstrated that policies and guidelines for hand mittens and nasal bridles were not widely available in areas where they were being used, although most areas had protocols for NG feeding. For those that did have protocols, there are questions about what evidence these are based on. Nurses in phase 3 did not express surprise at the lack of protocols; they felt it was common for interventions to be implemented without guidelines. Hurwitz (1995) in his editorial discussing 'Clinical Guidelines and the Law' recalls how in 1946 the British Medical Association (BMA) in response to the proposal of a National Health Service (NHS), declared that:

> *'The medical profession should remain free to exercise the art and science of medicine according to its traditions, standards and knowledge…without interference' (BMA, 1946; as cited in Hurwitz, 1995).*

So perhaps this lack of surprise is historically based. The inception of Clinical Governance and consequently evidence-based guidelines, policies and protocols, has attempted to reduce the implementation of practices based on 'expert' opinion (Samanta 2004). Clinical Governance is defined as:

> *"a framework through which NHS organisations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish". (Department of Health, 2009)*

Clinical guidelines are the key to clinical effectiveness; they are a method of bridging the gap between academic research and clinical practice (Winning & Mead, 2007; Hurwitz 1999). It was widely acknowledged by staff in phases 1 and 3 that using interventions for maintaining tube position in clinical practice without protocols was not acceptable. This is particularly so considering that hand mittens are a form of restraint and the safety of the nasal bridle has never been tested. Without adequate evidence guidelines and protocols cannot be constructed.

However, there was one participant in phase 3 who made clear that there were protocols as to the use of hand mittens in neurology. One of the aspects that arose from this was a demand that the use of restraint must be documented. Despite this claimed awareness and transparency about hand mittens being physical restraint, I could not corroborate that the documentation I obtained from neurology demonstrated this (NHS Lothian 2004a). Phase 2 showed that 49% (n=153/312) of nurses working within the specialty of stroke did not document what methods they were using to secure tubes; furthermore, the documents used for recording interventions varied from integrated care pathways, nursing notes, medical notes to fluid balance charts. Some 52% (n=162/312) reported documenting interventions in the nursing notes. Those nurses working in the acute hospital settings were more likely to document the interventions ($p<0.05$) than those working in the community or rehabilitation settings. It is apparent from the current study that documentation is *ad hoc* and so needs to be addressed, especially considering the ethical and legal implications of using forms of restraint with incapacitated adults (RCN, 2008b).

8.11 New Knowledge from the Findings

The results of this research have shown that:

- NG feeding is unpleasant and traumatic for some stroke patients
- There is apprehension about NG insertion and maintenance among nurses
- The physical skill of inserting and maintaining tube placement is not specifically addressed in pre-registration education
- There are no fool proof methods for securing or maintaining NG tubes for stroke patients
- Patient preference about maintaining NG tube position may not be considered
- The nasal bridle was seen as being more effective and acceptable than hand mittens by nurses in the survey (phase 2)
- The evidence for the efficacy of current methods for maintaining tube position remains insufficient
- Protocols and guidelines for maintaining tube position are not widely available
- The use of hand mittens and other restraint measure for NG feeding cannot be legally defended in terms of the Mental Capacity Act (2005) and the Adults with Incapacity (Scotland) Act (2000)
- The whoosh test is still being used despite the national guidance (NPSA 2005a)
- The acceptability of care for stroke patients remains largely unknown
- Methods to ensure informed consent for NG insertion in stroke patients are inadequate

8.12 The Specific Contribution to Knowledge

This new knowledge arises from the three phases of this research and as well as making a specific contribution to the body of knowledge concerning stroke patients, it also contributes to the care of patients in other specialties who require NG feeding. Of particular significance is the information given by patients and their relatives about what it feels like to have an NG tube inserted

and retained without properly understanding their purpose. The question of why stroke patients repeatedly attempt to remove feeding tubes still requires further investigation. Although the results from this study suggest that inadequate explanation of the procedure and poor nurse training may impact on this.

Another important aspect of this study's specific contribution lies in the field of ethics. The current use of physical restraint was surprisingly wide spread considering the lack of evidence-based guidelines and protocols. There is however clear legal restriction placed on its use which appears to be ignored within the specialty of stroke in both England and Scotland.

This study has strongly indicated a need to prioritise research and training in NG feeding. This knowledge needs to be reflected upon at both pre and post nurse registration levels both theoretically but also from a practical point of view. This is particularly pertinent in light of the finding that when faced with the need to insert an NG tube, appeal is often made to stroke nurses who are assumed to have more knowledge but in fact are no better trained than any other nurse.

8.13 Final Synthesis of Key Findings

This study has produced new knowledge which has shown that NG feeding is considered by nurses and patients and or their relatives to be a ***necessary evil***. Nurses have problems with the ***insertion and maintenance*** of NG tubes associated with apprehension and ***fear.*** This emotion is shared by patients as a result of the ***trauma*** which they experience during tube insertion which is further compounded by a ***lack of communication*** about what the procedure holds for them and a perception that they are not in safe hands because the nurses are not competent in this skill. This is further accentuated by nurses restraining the mobility of stroke patients' hands. The use of hand mittens, bandaging or tying hands to the bed all increase the patients' anxiety and instils in the nurses feelings of dis-ease about using procedures which are not underpinned by ***protocols, guidelines or education***. This is therefore morally indefensible practice. These ethical aspects of patient care pose challenges for

nurses and as they are not supported at an organisational level thus raising ***legal uncertainty***.

This research addressed two groups of participants, namely ***nurses*** and ***stroke patients*** and or relatives. In light of the previous discussion of the key findings, these two groups can be seen as operating in parallel with little communication between them.

For the nurses, one of their most important and fundamental duties is to ensure that patients are fed as soon as possible after a stroke. This decision is based on the body of nutritional knowledge for stroke patients (Dennis, Warlow & Lewis 2005b). Due to swallowing difficulties and as a way of protecting the patient from aspiration, NG feeding may be implemented. It is known however, that ***tube dislodgement*** in stroke patients is common. Therefore for optimal NG feeding to be achieved, mechanisms required to maintain NG tube position may be necessary.

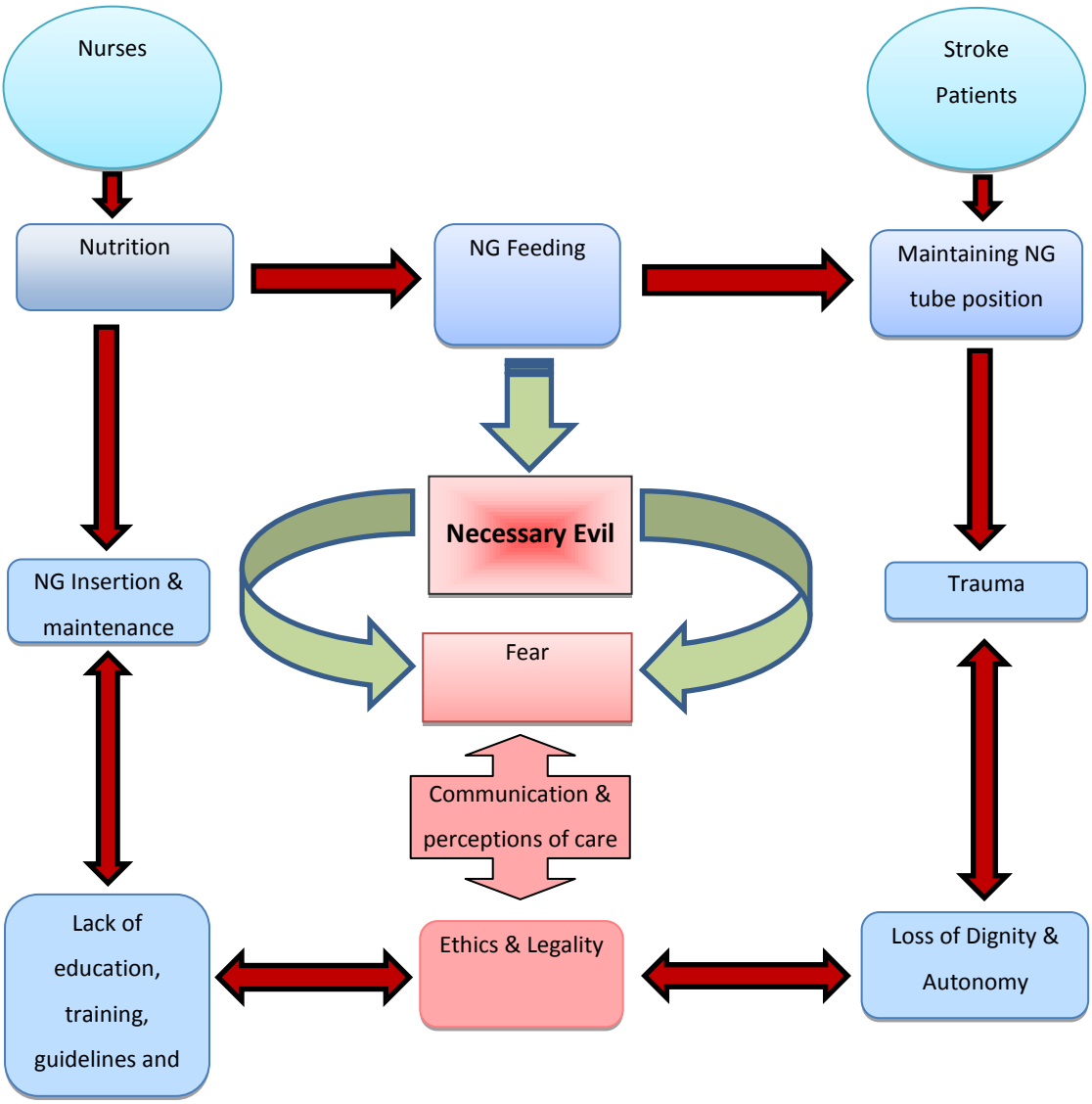
The current study indicates, that from the patient perspective, the ***trauma*** arising from ***insufficient information*** being given about how tubes are inserted, details of tube maintenance and subsequently how they are kept in place, leads to patients not being able to work with nurses to make this procedure as painless and stress free as possible. It also underlines the lack of patients being given the opportunity to give informed consent; this affronts their ***dignity*** and ***autonomy*** in an already distressing and confusing situation. A further element of patient autonomy is reflected by those relatives who were only too aware of the patients' situation and as a result made clear, that in their opinion, when the patients pulled tubes out, they may have in fact been refusing treatment. This aspect of patient choice is not fully understood by nursing staff, possibly because it challenges an innate duty to care and feed.
From the patients' and relatives' perspective, the ***trauma*** associated with NG feeding; added to the lack of skill arising from the ***paucity of training*** and underpinning ***guidelines*** and ***protocols***; produces a ***cycle of fear***. This cycle negates the whole experience of being fed through an NG tube after a stroke, compounding the perception of NG feeding as a ***necessary evil***. This cycle

may not be unique to the stroke speciality and indeed may be compounded by those in other specialities seeking help to pass NG tubes from those whom they consider to be experts because they work in stroke units.

8.14 Generating Theory

This synthesis has resulted in theory related to the insertion and maintenance of NG tubes for stroke patients. Theory offers an explanation and understanding about a studied phenomenon (Charmaz 2006; Morse & Field 2002; Strauss & Corbin 1998). According to Strauss & Corbin (1998), theorizing entails not only conceiving or intuiting concepts, but also formulating them into a logical, systematic and explanatory scheme. Morse and Field (2002) expand on the idea of concept building; they describe the formulation of constructs which they define as being comprised of several concepts, therefore making them more encompassing and abstract than a single concept.

Figure 13: A Necessary Evil: The Insertion and Maintenance of NG Feeding for Stroke Patients



The process of NG feeding for stroke patients as illustrated by the resulting theory (Figure 13); revolves around the core concepts of ***fear***, lack of ***communication***, differing ***perceptions of care*** and ***ethical challenges***, resulting in an understanding by patients, relatives and nurses that NG feeding is a ***'necessary evil'***. These core concepts are fed by peripheral concepts. These include the need to implement and maintain NG feeding for stroke patients which results in patient ***trauma***, which is further compounded by a loss of ***dignity*** and reduced ***autonomy***. For nurses, there is a lack of ***education*** and training as well as a lack of ***protocols*** and ***guidance***. The resulting picture

of NG feeding as a **'*Necessary Evil'*** is a construct of the peripheral and core components of this theoretical framework. This framework illustrates a dysfunctional process that ultimately challenges the procurement of optimal nutrition for stroke patients.

Prior to this study, evidence suggested that NG feeding may be more beneficial than PEG feeding in the early stages after stroke (Dennis, Lewis & Warlow 2005a) and it was recognised that ensuring NG feeding tubes remained in place was important to optimise nutrition for stroke patients (Smithard 2002). However, relatively little formal research had been carried out about how NG feeding could be maintained for stroke patients (Beavan et al. 2007; Johnston et al. 2007; Kee et al. 2007; Karanth et al. 2005; Anderson et al. 2004; Quill 1989; Ciocon et al. 1988) and the opinions, feelings and experiences of stroke patients about NG feeding had not been sought.

A proposed theoretical framework (Figure 13) offers an explanatory scheme about the experience of NG feeding for stroke patients as no recognised theory about this phenomenon previously existed. New understanding is offered about current practice for this group of patients. Attention is drawn to the people involved in the process of NG feeding, nurses, patients and their carers or family. However, there are also further implications for members of the wider multidisciplinary team in terms of the appropriateness of when to feed, patient autonomy and the ethical nature of this activity.

8.14.1 Testing Theory

Theory whether it is obtained inductively or deductively remains conjecture requiring further testing for confirmation (Morse & Field 2002). Only once theory is tested, does it become fact. Strauss and Corbin (1998) suggest that although theory may be validated during the actual research process, it has not been tested and this would be for another study. The propositions and statements derived from the new knowledge contributed by this study can be further tested in subsequent research. Recommendations for future research

informed by the findings and proposed theory of the current study are discussed in chapter 10, section 10.3.

8.15 Summary

This chapter has presented an evaluation of the strengths and limitations of the current study followed by a synopsis of the new knowledge and the specific contribution to knowledge which has been made. The extent to which the initial aims of the study have been met is reviewed followed by an in depth discussion of the findings in conjunction with the relevant literature. This chapter culminates in a synthesis of the key findings and presentation of theory relating to the insertion and maintenance of NG feeding for stroke patients.

9 Conclusions

9.1 Patients', Relatives' and Staff Members Experiences of NG Tube Feeding

NG feeding was found to be an unpleasant and traumatic experience for stroke patients, especially the initial tube insertion. This was with the exception of one patient who had her NG tube inserted on her stroke affected side. Some stroke patients and relatives reported that difficulties experienced during NG tube insertion were exacerbated by incompetence on the part of some of the nurses performing the insertion, which made the process more traumatic for the patient. Further investigation of this in phase 2 showed that within the speciality of stroke, training for nurses about how to insert and confirm NG feeding tube position was inadequate and approaches to training were variable in structure and formality, the majority of nurses having gained the skill in clinical practice.

Nurses interviewed in phase 3 were apprehensive about NG insertion, this was associated with the fact that inserting an NG tube is an unpleasant process for the nurse to perform; *'the lack of training is frightening'* was a category that emerged from the study and had implications which extended beyond the speciality of stroke into the wider field of nursing. It was also reported in this phase that the clinical skill of NG feeding tube insertion was not specifically addressed in the pre-registration curriculum of the participating university; it was not seen as a priority skill. In addition, amongst the five participants interviewed, those trained to nurse more recently related that they had not been trained how to insert an NG feeding tube. Phase 2 substantiated this finding showing that senior nurses were significantly more likely to have been trained than staff nurses. Phase 3 participants further suggested that the lack of knowledge, leading to fear about inserting and managing NG tubes, could be eliminated through adequate education about the insertion and care of NG feeding tubes for nurses.

9.2 Patients', Relatives' and Staff Members Opinions about Methods used for Keeping NG Feeding Tubes in Place

Phases 1 and 2 showed that tape was considered to be the safest and most acceptable method for securing NG feeding tubes, unless patients tried pulling their NG feeding tube out. The most effective type of tape or most comfortable methods of taping to the face have not been sufficiently evaluated; findings from phase 1 of this study indicate that patients may have a preferred position for affixing tape to the face and therefore may benefit from being given a choice. The most frequently used techniques of taping the tube to the face which were reported in phase 2 of the study included using the nose and the cheek. However various and not always appropriate techniques were also described in this phase. Some respondents' reported the use of other 'tube attachment devices' which were not widely used and the efficacy of which is currently unknown.

Overall, relative and staff opinions form phases 1 and 2 suggested that hand mittens were effective at preventing NG feeding tube removal in stroke patients. However, stroke patients did not like them and found them undignified, punitive and unacceptable. Respondents from phase 2 reported mixed opinions about hand mittens ranging from unacceptable to acceptable. Staff and relatives in phase 1 raised concerns about satisfactory patient monitoring while wearing hand mittens and acceptable and successful methods for cleaning mittens. This study has shown there is insufficient evidence to support the use of hand mittens for the purpose of keeping NG tubes in place for stroke patients.

In comparison to hand mittens, the nasal bridle within all phases of the study was seen as a more effective and acceptable method, but a potentially more physically harmful option for patients; it was thought to be a more visually acceptable option than hand mittens. Evidence of the effectiveness, safety and acceptability of the nasal bridle was insufficient. This lack of evidence, supporting and informing the use of both mittens and the bridle means that they are both currently being used without evidence based guidelines and protocols. Based on the findings of this study, there is currently insufficient evidence and

inadequate justification for utilising interventions such as hand mittens and the nasal bridle for stroke patients.

Inserting the NG tube on the stroke affected side was used frequently as a method for keeping NG tubes in place for stroke patients. Evidence from phase 1 of this study suggests that this option may be less distressing and distracting for the stroke patient as they cannot feel or potentially see the NG feeding tube. The efficacy of this technique has never been measured; however staff from phase 2 generally saw this as an acceptable, effective and safe method for maintaining NG tube position.

9.3 Using Physical Restraint to keep NG Feeding Tubes in Place

Nurses in all phases of the study had concerns about the acceptability and safety of hand mittens, bandaging hands and the nasal bridle; hand mittens and bandaging being seen as a form of physical restraint. It is not justifiable legally according to the Mental Capacity Act (2005) and Adults with Incapacity (Scotland) Act (2000) for these interventions to be used with stroke patients, as the person responsible for implementation must be satisfied that the interventions are in the best interests of the patient and are beneficial to them. Furthermore, within the locality studied, there were no protocols or guidelines available governing the use of physical restraint to retain NG feeding tubes position for stroke patients; this may contraindicate their use both legally and ethically.

The use of physical restraint to retain NG feeding tube position for stroke patients was morally, ethically and legally challenging for nurses particularly because protocols and guidelines were not widely available. Despite this discomfort on the part of nurses, hand mittens and bandaging hands were being used in practice. The ethical implications of this nursing practice should not be overridden in favour of technical interventions such as hand mittens which are not currently known to be beneficial for the patient. Patients' opinions and experiences of treatment are important in weighing up the acceptability of

interventions such as hand mittens and the nasal bridle and must be used to inform clinical practice and guidelines if care is to be patient centred.

9.4 Confirming NG Tube Position

Phase 2 showed that overall aspiration and x-ray were the most frequently used methods for determining NG tube position; however training for nurses to perform these confirmatory tests was not adequate. Inconsistencies in the approach to confirming NG tube position were apparent; some nurses from phases 2 and 3 reported that they still used the whoosh test and that they considered it to be a useful bed side test to back-up gastric aspiration. Phase 2 showed that training to carry out the whoosh test amongst nurses was minimal. Problems and inaccuracies were reported with all forms of confirmatory tests.

9.5 Communication

Communication between staff and stroke patients about NG insertion and subsequent feeding was problematic; a lack of communication and understanding of what patients considered to be their priorities in care was perceived. Consequently, some patients from phase 1 felt ill informed and detached from their care, not understanding why they were receiving NG feeding and suffering a significant loss of dignity. Nurses must ensure that stroke patients are adequately and appropriately informed about the reason for NG feeding and the process of tube insertion and maintenance. To achieve effective communication with stroke patients, when appropriate relatives and carers should be consulted and involved. This study has helped to emphasise the potential gap in perception and understanding between nurses and stroke patients who may be unable to communicate or articulate their needs.

9.6 Education and Training

Nurses working within the speciality of stroke in the UK have not been adequately trained how to insert NG feeding tubes or confirm NG tube position using aspiration and x-ray which are currently recommended methods. This

lack of training may be impacting on the likelihood of stroke patients dislodging NG feeding tubes. Nurses believe that training to insert and care for NG feeding tubes should include two fundamental elements, formal instruction and supervised practice. Evidence from the experience of stroke patients indicates that specific aspects of NG tube insertion should be addressed in education and training; these include how to communicate with the stroke patient, ensuring informed consent has been made possible using the most suitable means of communication and information giving for the individual patient.

10 Recommendations

10.1 Implications for Clinical Practice

1. Inserting the tube on the stroke-affected side is more ethical than using physical restraint such as hand mittens and potentially safer than the nasal bridle. Therefore its use may be more ethical, advisable, more comfortable and dignified for stroke patients.
2. Protocols and guidelines to govern the use of interventions for maintaining NG tube position should be available in all clinical areas and should be evidenced based.
3. Continuing the use of hand mittens and nasal bridles with stroke patients in the absence of evidence based guidelines and protocols is not advisable.
4. Hand mittens should be regarded as a form of physical restraint with guidelines and protocols reflecting this.
5. The use of hand mittens should be monitored and recorded. Hand mittens should be laundered frequently, removed from the hand(s) frequently, hands cleansed and exercised.
6. If hand mittens are being used it should only be on an individual patient basis; policies and guidelines covering their use with stroke patients require urgent review.
7. Stroke patients should be provided with every opportunity to give informed consent to NG tube insertion. Information about NG feeding should be readily available in a variety of formats to ensure that every possible effort has been made to ensure patients' understanding.
8. Guidelines and protocols for confirming NG tube position should be standardised within the area of stroke care and training to support practice should be available.

10.2 Recommendations for Nursing Knowledge and Education

1. NG feeding tube education and training should be reviewed within Higher Education Institutions and clinical practice settings.

2. This study has highlighted that interventions such as hand mittens and nasal bridles may be being used in part to compensate for a shortfall in nursing knowledge. The fundamental aspects of NG feeding must be implicit within nurse training to help prevent introducing interventions which by their nature restrict patient freedom, movement and autonomy.
3. Training and education about NG feeding for stroke patients should include both formal education sessions and opportunity for supervised practice of associated clinical skills (NG insertion and NG tube position confirmation) at both pre- and post-registration levels. Details specific to patient communication and techniques for ensuring informed consent should be included.
4. Clear descriptions of comforting strategies effective for enhancing successful NG tube insertion would help to inform more comprehensive educational programmes for nurses and other healthcare professionals and potentially improve the patient experience of NG feeding tube insertion.
5. Confirming NG tube position should be included as an essential element of training to manage NG feeding tubes at both pre-registration and post-registration levels.
6. Training on NG feeding tube insertion and maintenance should be available for both pre- and post registration nurses.
7. Further knowledge of stroke patients' experiences of care, particularly in the acute stages after stroke, would help to enhance nursing education programmes and enable nurses to more realistically comprehend what the priorities of care are for the stroke patient and tailor care accordingly.

10.3 Recommendations for Future Research

1. The content and delivery of NG feeding tube training for nurses requires further appraisal to determine the most effective learning strategies and comprehensive approaches. This should include specific approaches to NG feeding tube maintenance for more complex patients such as stroke patients.

2. Further investigation into the use of comforting strategies during NG tube insertion is warranted as this may help reduce the trauma that patients can experience during tube insertion and may help to increase the number of successful NG tube insertions.
3. Further evaluation of inserting NG feeding tubes on the stroke affected side is warranted to determine whether it is an effective strategy for reducing the incidence of NG tube dislodgement for stroke patients.
4. Additional research is required about communicating effectively with stroke patients and exploring their experiences of care, particularly in the acute stages after stroke. Further to this, evaluation is needed of whether 'effective' communication and 'adequate' information giving and explanation increase the success of NG feeding tube insertion and reduce the frequency of NG tube dislodgement for stroke patients.
5. Further evidence about stroke patients' experiences of methods used for maintaining tube position is required to support the findings of the current study and to help balance the possible harms of each method against potential benefits.
6. The efficacy and safety of air auscultation or the whoosh test should be reinvestigated on a larger scale to fully evaluate its suitability as a bed side method in helping to determine NG feeding tube position.
7. Further evaluation of types of tape used, positioning of the tape on the patient's face and tube attachment devices may result in increased effectiveness of taping even for patients at risk of dislodging their NG feeding tubes.
8. The proposed theory 'A Necessary Evil: The Insertion and Maintenance of NG Feeding for Stroke Patients' should be tested outside of the specialty of stroke care. This would help to confirm the theory and determine whether the issues identified within this theoretical framework are generalisable to NG feeding.

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12 Appendices

Appendix 1:
Information Sheets

Staff Information Booklet:
Focus group interviews

Title: Staff views on the use of mittens (or similar measures) to ensure maintenance of tube feeding in stroke patients.

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask the researchers if there is anything that is not clear or you would like more information. Take time to decide whether or not you wish to take part.

Introduction to the study

At least 50% of stroke patients admitted to stroke units have dysphagia early after onset of stroke and it may persist for days, weeks and occasionally months. Enteral tube feeding, most commonly via a Nasogastric (NG) tube, is often required to give nutrition, fluids and medications. The results of the FOOD trial have indicated that early initiation of NG tube feeding may reduce the incidence of death in dysphagic stroke patients. However, you may have experience of the difficulties in maintaining NG tube feeding in the first few days after stroke, when many patients are restless and confused. Alternatives to NG feeding, such as percutaneous endoscopic gastrostomy (PEG) tube or parenteral feeding, are sometimes used where an NG tube cannot be maintained. However, the FOOD trial has indicated that poorer outcomes may result from early use of PEG. Moreover, continually checking that the NG tube is in the correct place will increase the demands on staff time and frequent repositioning may increase patient discomfort. Therefore, measures may be taken by members of your team to prevent the patient accidentally removing or dislodging the tube [for example the use of hand mittens]. However, there isn't much known about how members of the stroke care team feel about the use of measures to prevent stroke patients dislodging or removing NG tubes. We are carrying out research to ask staff for their views and wonder if you would be interested in taking part.

What is the aim of the research project?

The overall aim of the research is to ensure that the views of members of the care team are taken into account when making decisions about whether or not to take measures [such as the use of hand mittens] to prevent patients removing NG tubes following a stroke. These views will be used to inform the development of guidelines and if warranted will inform future research studies evaluating measures to prevent removal or dislodgement of NG tubes post stroke.

What would I have to do?

This study involves talking to the researcher [who is also a registered nurse] for up to 50 minutes in a group, which includes other members of the stroke care team. The researcher will ask you some questions about your views on the use of measures to prevent patients from removing or dislodging NG tubes. The discussion would take place in a private room in the Hospital (not on the ward). The discussion will be tape-recorded, so that the researcher can concentrate on what you are saying, rather than having to write down the details of what you say. After the discussion, the content of the tape will be typed, word-for-word, but you will not be identified by name, either in the typed version or in the research report [of which, if requested, you will be sent a copy after the research study is completed]. The tape will be stored securely during the course of the research study and destroyed on its completion.

Do I have to take part?

Whilst we would be very grateful if you would agree to take part in the research, we would emphasise that you are obviously not obliged to do so. If you do agree to take part, but decide afterwards that you don't want to do so, you can withdraw at any time.

What will happen to the results of the study?

The study results will be written up as a paper and published in a research journal. The results will be available to the Managed Clinical Network for Stroke (MCNs) for dissemination and development into evidence based standards. A MCN is an organisation made up of people who play a part in the care of patients and patients themselves, which aims to encourage high quality patient care to be developed with patient and carer involvement and are not constrained by hospital division boundaries.

What happens now?

We would like you to think very carefully about whether or not to join the study. It is entirely voluntary. You must be happy about any decision you make and if we can give you any additional information to make the decision easier we will be happy to do so, please contact the researchers [Dorothy Horsburgh or Catherine Mahoney]. Alternatively you can talk to a person who knows about the research but is independent of the study [Name].

Thank you for taking the time to read this leaflet.

Version 4 September 2005 Patient Information 10/08/2009

This study is sponsored by:

Intervention for Tube Tugging after Stroke

Introduction to the study

You are being invited to take part in a research study because you recently had a stroke that affected your ability to swallow. Before you decide to take part you should take your time to read the information about why the research is being done.
It is important to get food and fluids quickly after a stroke; therefore you may receive these via a feeding-tube through your nose. To keep this tube in position you may have it taped to your face and/or be given hand mittens. However, little is known about how patients feel, so we are asking for your help to ensure that the views of stroke patients and their relatives are considered when deciding how to keep feeding tubes in position.

What would I have to do?

This study involves talking to a researcher for about 30 minutes who will ask you about your feelings concerning methods used to keep feeding tubes in place. If you feel tired or wish to stop, then the researcher will stop immediately.
The discussion would take place in a private room within the hospital; it would be tape-recorded so the researcher can concentrate on what you are saying. The tape recording will then be typed, word-for-word, but you will not be identified by name. After the tape has been typed up it will be destroyed.

What are the benefits in taking part in this research study?

Very little research has been carried out on how to keep feeding tubes in place, so although the study will not change the care that you are currently receiving, it will help us improve patient care in the future.

What are the possible risks of taking part?

Recounting your experiences could be distressing for you. If this is the case the interview will be stopped. Please remember you can withdraw at any time.

Will this change the hospital care I receive?

No, taking part in this study will not alter the medical and nursing care you receive.

Who will be told about my illness?
Any information we collect about you will be confidential, used only for the purpose of this study, and only available to research staff and clinical staff caring for you.

What will happen to the results of the study?
The study results will be published in a research journal. The results will also be available to the hospital to help the development of future care guidelines.

Who is organising and funding this research?
This study is funded by the charity Chest, Heart and Stroke, Scotland, who work to improve the quality of life for people in Scotland affected by stroke (the funding does not provide payment or reimbursement of expenses for participation).

Who has reviewed this study?
This study has been reviewed and approved by the Research Ethics Committee [ref: 05/MRE00/71] on the 25/08/2005.

What happens now?
Please take as much time as you need to think about whether or not to join the study. It is entirely voluntary so if you decide not to join your care will not be affected.

Thank you for reading this leaflet, please keep a copy. We will contact you again in 7 days to see if you wish to participate.

For further information please contact:
Researchers: Dorothy Horsburgh, Lecturer, or Catherine Mahoney, PhD student, Napier University, School of Acute and Continuing Care Nursing. Tel: 0131 455 5636
d.horsburgh@napier.ac.uk c.Mahoney@napier.ac.uk

Independent contact not involved with the research: [Name] [Address] [Number] [email]

Complaints procedure: If you have any complaints about your treatment as a participant in this study or believe that you have been harmed in some way by your participation, please write or telephone:

The Principal & Vice Chancellor
Napier University, Craighouse Campus
Edinburgh,EH10 5LG
Tel: 0500 35 35 70
http://www.napier.ac.uk/

If you have any complaints that are related to your care as hospital in-patient, please write or telephone:

Complaints Officer
NHS Lothian University Hospitals Division
Royal Infirmary of Edinburgh,
Room F8807, 51 Little France Crescent, Old Dalkeith Road, Edinburgh,EH16 5SA

Tel: (Royal infirmary, Liberton and Royal Victoria Hospitals): 0131 242 3383
Western General Hospital: 0131 537 2390
St John's Hospital, Livingston: 01506 422779

Please keep a copy of this information for your records

This study is sponsored by:

Intervention for Tube Tugging after Stroke

Introduction to the study

You are being invited to take part in a research study because your relative recently had a stroke that affected their ability to swallow. Before you decide to take part you should take your time to read the information about why the research is being done. It is important to get food and fluids quickly after a stroke; therefore your relative may have received these via a feeding-tube through their nose. To keep this tube in position it may have been taped to their face and/or hand mittens may have been used to stop them pulling the tube out. However, little is known about how patients feel, so we are asking for your help to ensure that the views of stroke patients and their relatives are considered when deciding how to keep feeding tubes in position.

What would I have to do?

This study involves talking to a researcher for about 30 minutes who will ask you about your feelings concerning methods used to keep your relatives feeding tubes in place. If you feel tired or wish to stop, then the researcher will stop immediately. The discussion would take place in a private room within the hospital; it would be tape-recorded so the researcher can concentrate on what you are saying. The tape recording will then be typed, word-for-word, but you will not be identified by name. After the tape has been typed up it will be destroyed.

What are the benefits in taking part in this research study?

Very little research has been carried out on how to keep feeding tubes in place, so although the study will not change the care that your relative is currently receiving, it will help us improve patient care in the future.

What are the possible risks of taking part?

Recounting experiences about your relative's illness could be distressing for you. If this is the case the interview will be stopped. Please remember you can withdraw at any time.

Will this change the hospital care my relative receives?

No, taking part in this study will not alter the medical and nursing care your relative receives.

Who will be told about the information collected?
Information collected will be confidential, used only for the purpose of this study.

What will happen to the results of the study?
The study results will be published in a research journal. The results will also be available to the hospital to help the development of future care guidelines.

Who is organising and funding this research?
This study is funded by the charity Chest, Heart and Stroke, Scotland, who work to improve the quality of life for people in Scotland affected by stroke (the funding does not provide payment or reimbursement of expenses for participation).

Who has reviewed this study?
This study has been reviewed and approved by the Research Ethics Committee [ref: 05/MRE00/71] on the 25/08/2005.

What happens now?
Please take as much time as you need to think about whether or not to join the study. It is entirely voluntary so if you decide not to join your relative's care will not be affected.

Thank you for reading this leaflet, please keep a copy. We will contact you again in 7 days to see if you wish to participate.

For further information please contact:
Researchers: Dorothy Horsburgh, Lecturer, or Catherine Mahoney, PhD student, Napier University, School of Acute and Continuing Care Nursing. Tel: 0131 455 5636
d.horsburgh@napier.ac.uk c.Mahoney@napier.ac.uk

Independent contact not involved with the research: [Name] [Address] [Number] [Email]

Complaints procedure: If you have any complaints about your treatment as a participant in this study or believe that you have been harmed in some way by your participation, please write or telephone:

The Principal & Vice Chancellor
Napier University, Craighouse Campus
Edinburgh,EH10 5LG
Tel: 0500 35 35 70
http://www.napier.ac.uk/

If you have any complaints that are related to your care as hospital in-patient, please write or telephone:

Complaints Officer
NHS Lothian University Hospitals Division
Royal Infirmary of Edinburgh,
Room F8807, 51 Little France Crescent, Old Dalkeith Road, Edinburgh,EH16 5SA

Tel: (Royal infirmary, Liberton and Royal Victoria Hospitals): 0131 242 3383

Western General Hospital: 0131 537 2390
St John's Hospital, Livingston: 01506 422779

Please keep a copy of this information for your records

Staff Information:
Interview

Title: Nurses views on research findings about nasogastric feeding.

I am a registered nurse and am currently doing my PhD at Napier University. I previously worked as a specialist nurse in clinical nutrition support and my research is looking at nasogastric feeding.

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish before making a decision.

Introduction to the study
This study looked at the maintenance of nasogastric feeding for dysphagic stroke patients. Enteral tube feeding, most commonly via a Nasogastric (NG) tube, is often required to give nutrition, fluids and medications. However, you may have experience of the difficulties in maintaining NG tube feeding for many patients, especially if like many stroke patients, they are restless and confused. So this study set out to look at the experiences and opinions of stroke patients, their relatives and the multidisciplinary team about measures used for keeping NG tubes in place; the research was carried out in two phases (1) interviews with stroke patients and relatives and focus groups with healthcare staff; (2) a postal survey of nurses working with stroke patients around the UK.

What is the aim of this interview?
The overall aim of this interview is to give you an opportunity to discuss the results of this research study in more detail with the researcher, and consider how applicable the findings are to your own experience of nasogastric feeding and the wider field of nursing. In addition, consider what implications you think these findings might have for future nursing practice, guidelines, training and research.

What would I have to do?
This study involves talking to the researcher for up to 30 minutes at a place and time that is suitable for you; it would be good to get your views. The researcher will ask some questions about your views. The discussion will be tape-recorded, so that I can concentrate on what you are saying. Afterwards, the content of the tape will be typed, word-for-word, but you will not be identified by name, either in the typed version or in the research report where a pseudonym will be used. The tape will be

stored securely during the course of the research study and destroyed on its completion. Copies of the final report will be available.

Do I have to take part?
Whilst I would be very grateful if you would agree to take part in the research, I would emphasise that you are not obliged to do so. If you do agree to take part, but then change your mind, you can withdraw at any time, without giving an explanation.

What happens now?
I would like you to think very carefully about whether or not to join the study. It is entirely voluntary. You must be happy about any decision you make and if I can give you any additional information to make the decision easier I will be happy to do so: please contact me using the details below if you need to. If you would like to speak to an independent advisor about the study please contact Dr Norrie Brown using the details below.

Thank you for taking the time to read this leaflet.

Contact details

Researcher:

Catherine Mahoney
PhD student
School of Nursing, Midwifery and Social Care
Napier University
0131 455 5632
c.mahoney@napier.ac.uk

Independent Advisor

[Name]
[Position]
SNMSC
Napier University
[Number]
n.brown@napier.ac.uk

Appendix 2:
Consent Forms

Consent Form: focus groups

(Name of researcher:) _____

Title: Staff views on the use of mittens (or similar measures) to ensure maintenance of tube feeding in stroke patients.

Name: _____

Address: _____

_____

1. I confirm that I have read and understand the Information Sheet for the above study and have had the opportunity to ask questions

O

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, or without my legal rights being affected

O

3. I understand that this session will be audio-taped to aid analyses of data by transcribing for key themes. All tapes will be stored within a securely locked cabinet; your personal details/identifiers will be removed or changed.

O

4. I agree to take part in this focus group

O

Signature: _____ Date: _____/_____/_____
Day month year

Researcher signature: _____

Please give a copy of this form once completed to the participant if requested.

(Name of researcher:)

Title: Patient's views on the use of interventions to ensure maintenance of nasogastric tube positioning in stroke patients.

Short Title: Intervention for Tube Tugging after Stroke

Name: _____

Address: _____

_____

1. I confirm that I have read and understand the Information Sheet for the above study and have had the opportunity to ask questions

O

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected

O

3. I understand that this session will be audio-taped. All tapes will be stored within a securely locked cabinet; my personal details/identifiers will be removed or changed. I am aware that the audio-tapes will be typed word-for-word after which they will be destroyed.

O

4. I give you permission for the researchers to approach my relative/carer (name:) to participate in the study.

Delete as applicable [**yes/no**]

5. I agree to take part in this interview

O

Signature: _____ Date: _____/_____/_____
day month year

Independent witness:_____

If the patient gives verbal consent to take part in the study but is unable to sign, the responsible doctor /nurse must sign here: _____
And the signature must be witnessed (see above)

Please keep a copy of this form for your records

(Name of researcher:)

Title: The views of patients' relatives/representatives on the use of interventions to ensure maintenance of nasogastric tube positioning in stroke patients.

Short Title: Intervention for Tube Tugging after Stroke

Name: _____

Address: _____

_____

1. I confirm that I have read and understand the Information Sheet for the above study and have had the opportunity to ask questions

O

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, or without my legal rights being affected

O

3. I understand that this session will be audio-taped. All tapes will be stored within a securely locked cabinet and my personal details/identifiers will be removed or changed. I am aware that the audio-tapes will be typed word-for-word after which they will be destroyed.

4. I agree to take part in this interview

O

Signature: _____ Date: _____/_____/_____
day month year

Independent witness:_____

Researcher signature:_____

Please keep a copy of this information for your records

Name of researcher: _____

Title: Nurses views on research findings about nasogastric feeding.

Name: _____

Address: _____

_____

5. I confirm that I have read and understand the Information Sheet for the above study and have had the opportunity to ask questions

O

6. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, or without my legal rights being affected

O

7. I understand that this session will be audio-taped to aid analysis of data by transcribing for key themes. All tapes will be stored within a securely locked cabinet; your personal details/identifiers will be removed or changed.

O

8. I agree to take part in this interview

O

Signature: _____ Date: _____/_____/_____
Day month year

Researcher signature: _____

Appendix 3:
Interview and Focus Groups Agendas

Sample Agenda for Phase 1 Focus Groups

- Introductions

- Explanation of the purpose, format and duration of the focus groups (including re-iteration of participants' freedom to withdraw at any point)

- The perceptions and reactions of staff were sought in relation to the following:

    1. interventions that they have used or witnessed being used to help keep naso-gastric tubes in place for stroke patients
    2. visual stimuli to prompt discussion
        - ◊ a hand mitten
        - ◊ a short article describing a nasal bridle
    3. the extent to which they consider these measures to be effective/ineffective
    4. the extent to which they consider these measures to be acceptable/unacceptable

- Any issues that are raised by staff in relation to the topic will be explored within the group

- Conclusion and switch off tape recorder

Phase 1 – Sample Agenda for interviews with patients

- Introductions
- Explanation of the purpose, format and duration of the interview, using the patient information booklet (Appendix-1) to structure the explanation (including re-iteration of participants' freedom to withdraw at any point)

Ask the patient about the following:

- their experience of the NG tube, in relation to both insertion and retention of the tube

- the means used to secure their NG tube

- any interventions that were used to prevent them displacing or removing the NG tube

- their feelings about the use of interventions to prevent displacement or removal of NG tubes

In order to stimulate further discussion:

- Show the patient the sticking tape used to place the tube on patients' face (if not seen or experienced previously) and ask for comments about its use.

- Show the patient a hand mitten used in clinical practice (if they have not seen these previously) and ask for their comments about their use

- Show the patient a diagram of the "nasal bridle" NG tube retention system and ask for their comments about its use

- Ask the patient if they have any other issues that they wish to discuss in relation to the topic

- Conclusion

Phase 1 – Sample Agenda for interviews with patients' relatives/representatives

- Introductions
- Explanation of the purpose, format and duration of the interview, using the information booklet for patients' relatives/representatives (Appendix 2) to structure the explanation (including re-iteration of participants' freedom to withdraw at any point)

Ask the relative/representative about the following:

- the means used to secure the patient's NG tube

- any interventions (e.g. mittens) that were used to prevent the patient displacing/removing their NG tube

- their feelings about the use of interventions to prevent displacement/removal of the NG tube

In order to stimulate further discussion:

- Show the patient's relative/representative the sticking tape used to place the tube on patients' face and ask for comments about its use.

- Show the patient's relative/representative a hand mitten used in clinical practice (if they have not seen these previously) and ask for their comments about their use

- Show the patient's relative/representative a diagram of the "nasal bridle" NG tube retention system and ask for their comments about its use

- Ask the patient's relative/representative if they have any other issues that they wish to discuss in relation to the topic

- Conclusion

Research Study - Interventions for Tube Tugging After Stroke

Questions for patient 180106 – patient was unable to speak to me directly as she was dysphasic, she had agreed to try and answer some questions for me by writing, however her writing was also poor as it had affected her right side, so she requested to have her son present during while answering/discussing the questionnaire to help answer the questions. This was the questionnaire the patient and her son were given and discussed.

- How long ago did you have your stroke?
- Were you aware after your stroke that you were not able to swallow properly?
- How long have you had your naso-gastric tube?
- Was it explained to you why your naso-gastric tube was necessary?
- Were you given a choice about having a naso-gastric tube?
- How do you feel about your naso-gastric tube?
- Has your naso-gastric tube had to be replaced at anytime since your stroke, if so how many times?
- If you have had your naso-gastric tube replaced, what was the reason(s) for it coming out, can you explain what happened?
- Do you remember wanting to tug at your tube, or feeling that you wanted it to be removed at any time? If so can you explain why?
- How is your naso-gastric tube been held in place? How does this feel?
- In your opinion, has this method been successful?
- If tape was used, how was it positioned to keep tube in place? How did this feel?
- Did you wear a mitten or glove on your hand at any point to help keep your naso-gastric tube in place? If so, how did this feel?
- Both patient and son were shown a picture of the nasal bridle system and asked what their opinion would be to that
- Do you have any views or opinions that you would like to communicate about how your naso-gastric tube has been held in place?
- Please feel free to make any other comments:

Sample Interview Agenda – Phase 3

Introduction and background to research

Establish what speciality the nurse works in, and what type of patients are NG fed in his/her unit

Part 1 - Training to insert and check tube position

Possible problems with NG feeding tube insertion became evident when I was speaking to stroke patients, so I decided to investigate this further. Less than half the nurses who filled in the questionnaire had been trained to insert an NG feeding tube; senior nurses were more likely to have received formal training than staff nurses and English nurses more likely to have been formally trained than Scottish nurses.

- *Are you surprised by these findings?*
- *What is your experience of training how to insert an NG tube?*

Despite the low level of formal training received, most nurses said they felt adequately prepared, many had received supervision to insert an NG tube in clinical practice and a small number felt that training was not necessary at all.

- *Do you think training to insert NG tubes for registered nurses is necessary?*
- *Do you have any ideas about how and when you think it should be carried out?*

I also asked nurses what methods were used to check tube position and what training nurses had received to check NG tube position.

The majority of areas (93%) used aspiration to check NG tube position; 90% used x-ray.

- *What methods do you used to check NG tube position?*

Although over 90% of areas used aspiration to check tube position only (64%) 2/3rds of nurses had been trained how to aspirate an NG feeding tube.

- *Have you been trained how to check NG tube position?*
- *What methods have you been trained to use?*

Some nurses commented that neither aspiration nor x-ray is always reliable and that the 'whoosh test' was useful as a third measure (which is no longer recommended in practice).

- *What do you think are the most effective and reliable methods?*
- *Do you find confirming NG tube position a problem?*
- *Why do you think the whoosh test was banned?*

Part 2 – Measures Used for keeping NG tubes in place

Many patients (especially if confused or disorientated) will pull their NG tube out.

- *Would this be common with the patients that you care for?*
- *If so in your perception why do you think they pull their NG tubes out?*

I asked nurses about what measures were used for keeping NG feeding tubes in place for stroke patients. The majority used tape to the face or inserting the tube on the affected side; some nurses especially in NHS Lothian used hand mittens and some places more so in England used the nasal bridle (have examples of both with me)

- *Are you aware, or do you use any measures for keeping NG tubes in place for patients who are likely to dislodge them?*

Patient opinion - Some of the patients I spoke to were concerned about the affect of measures like hand mittens and the nasal bridle on their dignity and their right to choose;

Quote:

"Why not just put them in a straight jacket. […….] You know, I mean go the full hog [……..]…give them an electric shock if their hand goes near their nose")

One patient who had experienced hand mittens related that:

Quote:
I wanted to try and get myself up the bed, it was like trying to box with cotton wool. I couldn't get any purchase on anything with it.

Staff opinion - However some staff and relatives (especially those who have used or seen used mittens or the nasal bridle in practice) considered them to be effective at preventing patients from dislodging their tubes; although the majority of nurses who filled in the questionnaire did not consider them to be safe or acceptable; some staff have expressed concerns about legal and ethical issues around their use.

- *Do you have any opinions about the use of such measures?*

Those nurses who filled in the questionnaire seemed more reluctant to answer questions about the safety and acceptability of using hand mittens, nasal bridles or bandages…..

- *Have you any idea why this might be? Please feel free to look at the questionnaire*.

Part 3 – Protocols

Some of the places that used hand mittens and nasal bridles did not have protocols to guide their use; some nurses related that they did not know if they had protocols.

- *Do you think protocols are important in this instance?*

Only half of the nurses reported that their units documented any of the methods they used for keeping NG tubes in place, and documentation was done in a number of different places from medical notes, nursing notes even fluid balance charts. Nurses

from Lothian NHS were more likely to use medical notes than either nurses from England of the rest of Scotland and nurses working in more acute setting were also more likely to use medical notes for this reason. Staff nurses were more likely to use the fluid balance charts than senior nurses.

- *Do you think that documentation is important in this instance?*
- *Would you have any opinion why documentation around this area of care should be inconsistent?*

Part 4 - Future recommendations for training and Practice

- *Considering the issues I have related to you from this piece of research, would you have any opinions or recommendations about how these should be taken forward in relation to training, guidance, practice and research?*

Summarise what has been spoken about

- *Please feel free to make any other comments about anything we have discussed*
- *Do you have any further questions?*

Appendix 4:
Postal Questionnaire

NASOGASTRIC FEEDING FOR ACUTE STROKE PATIENTS

Nursing Grade/Band

Please State:

1. What methods does your ward/unit use to check that the NG feeding tube is correctly positioned in the stomach? *(Please tick yes/no for each option)*	Yes	No
Aspiration of fluid and checking of its pH	☐	☐
Injection of air down the tube and listen for bubbling noise over stomach ("Whoosh test")	☐	☐
X-rays	☐	☐
Use of magnetic tipped nasogastric tubes with magnetic field detector	☐	☐
Other *(please describe any other methods used)*	☐	☐

2. Please indicate how ***reliable*** you think each method is? *(Please tick one box only on each line)*

Method	**Very reliable**	**Reliable**	**Uncertain**	**Unreliable**	**Very unreliable**	**Never used**
pH of aspirate	☐	☐	☐	☐	☐	☐
Whoosh test	☐	☐	☐	☐	☐	☐
X-rays	☐	☐	☐	☐	☐	☐
Magnetic tipped tubes	☐	☐	☐	☐	☐	☐
Other *(please specify and rate on scale provided)*	☐	☐	☐	☐	☐	☐

3. Have you received any formal training regarding any of these methods? *(Please tick yes/no for each option)*	Yes	No
pH of aspirate	☐	☐
Whoosh test	☐	☐
Interpretation of X-rays	☐	☐
Magnetic tipped NG tubes	☐	☐
Other *(please specify)*	☐	☐

4. Does your ward/unit have written protocols for any of the following? *(Please tick one response only for each option)*	Yes	No	Don't know
Use of nasogastric feeding tubes	☐	☐	☐
Use of hand mittens	☐	☐	☐
Use of a nasal bridle/loop *(see figure 1 overleaf for illustration/explanation of bridle)*	☐	☐	☐

5. Does your ward/unit use any of the following methods to maintain nasogastric feeding tube position? *(Please tick yes/no for each option)*	Yes	No
Inserting nasogastric tube on the affected side	☐	☐
Taping the tube to the face	☐	☐
Hand mittens	☐	☐
Nasal bridle/loop *(see figure 1 for illustration/explanation of bridle)*	☐	☐
Bandages on hands	☐	☐
Tie hands to bed rails	☐	☐
Posey vests	☐	☐
Other *(please specify)*	☐	☐

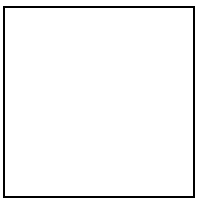

Figure 1
Nasal Bridle/Loop – a piece of tape is passed behind the nasal septum and forms a loop from one nostril to another; a clip secures the tape to the nasogastric tube

6. Please indicate how ***effective*** you think the following methods are for securing nasogastric feeding tubes: *(Please tick one response only for each method)*

Method	**Very ineffective**	**Ineffective**	**Uncertain**	**Effective**	**Very effective**	**Never used**
Inserting tube on affected side	☐	☐	☐	☐	☐	☐
Taping tube to face	☐	☐	☐	☐	☐	☐
Hand mittens	☐	☐	☐	☐	☐	☐
Bandages on hands	☐	☐	☐	☐	☐	☐
Nasal bridle/loop	☐	☐	☐	☐	☐	☐

7. Please indicate how ***safe*** you consider the following methods are for securing nasogastric feeding tubes: *(Please tick one response only for each method)*

Method	**Very unsafe**	**Unsafe**	**Uncertain**	**Safe**	**Very safe**
Inserting tube on affected side	☐	☐	☐	☐	☐
Taping tube to face	☐	☐	☐	☐	☐
Hand mittens	☐	☐	☐	☐	☐
Bandages on hands	☐	☐	☐	☐	☐
Nasal bridle/loop	☐	☐	☐	☐	☐

8. Please indicate how ***acceptable*** you consider the following methods are for securing nasogastric feeding tubes: *(Please tick one response only for each method)*

Method	**Very acceptable**	**Acceptable**	**Uncertain**	**Unacceptable**	**Very unacceptable**
Inserting tube on affected side	☐	☐	☐	☐	☐
Taping tube to face	☐	☐	☐	☐	☐
Hand mittens	☐	☐	☐	☐	☐
Bandages on hands	☐	☐	☐	☐	☐
Nasal bridle/loop	☐	☐	☐	☐	☐

9. If tape is used on your ward/unit, how is it fixed to the patient's face? *(Please tick yes/no for each option)*	Yes	No
Not used	☐	
Nose only	☐	☐
Cheek only	☐	☐
Nose and cheek	☐	☐
Other *(please specify)*	☐	☐

10. If methods are used on your ward/unit for holding nasogastric feeding tubes in place, where is this documented? *(Please tick yes/no for each option)*	Yes	No
Not routinely recorded	☐	
Medical notes	☐	☐
Nursing notes/care plans	☐	☐
Nutritional charts	☐	☐
Fluid balance charts	☐	☐
Other *(please specify)*	☐	☐

11. NG Insertion	**Yes**	**No**
Have you ever attended a formal training session/study day on how to insert a nasogastric feeding tube?	☐	☐
Have you ever received supervised training in the clinical area on how to insert a nasogastric feeding tube?	☐	☐
Do you feel that you have been adequately prepared to insert a nasogastric feeding tube?	☐	☐
Do you consider a formal training session/study day to be necessary for registered nurses?	☐	☐

Please add any comments:

THANK YOU FOR TAKING PART IN THIS QUESTIONNAIRE

Please return questionnaire in the stamped addressed envelope provided to:

Catherine Mahoney RGN
PhD Research Nurse
SACCN
Napier University
74 Canaan Lane
Edinburgh
EH9 2TB

Further enquiries to: Catherine Mahoney Tel: 0131 4555632 / 5372876
c.Mahoney@napier.ac.uk

Appendix 5:
Covering Letters and Results Request Forms

Results Request Form

Nasogastric Feeding For Acute Stroke Patients

Would you like a summary of the results from this study sent to you?	Yes ☐	No ☐
Please provide your email or postal address in the box provided *(this information is optional)* *Please note: this information will not be stored on a database, and will only used to send you a summary of the research results*	Name: Title: Address	

NAPIER UNIVERSITY
EDINBURGH

June XXXX

Dear Fellow Nurse

Re: Nasogastric Tube Feeding for Acute Stroke Patients

My name is Catherine Mahoney. I am a nurse currently doing my PhD at the School of Acute and Continuing Care Nursing (SACCN) Napier University Edinburgh. My research is about nasogastric feeding for dysphagic stroke patients. I would like to find out more about how best to secure nasogastric feeding tubes to maintain feeding, hydration and medication for stroke patients. I feel it is important to explore nurses' opinions, experiences and beliefs about the acceptability and effectiveness of interventions used to secure nasogastric tubes.

I should be very grateful if you would take a few minutes to complete the enclosed questionnaire and return it to me in the envelope provided before ***3rd July***.

If you are interested in the results of this research they will be available on the National Stroke Nurses Forum (NSNF) website at (www.nationalstrokenursingforum.com) on completion of analysis. Alternatively if you complete the enclosed request slip, I will send a summary of the results to you. Please note: any information that you provide will remain confidential and your contact details will not be stored in an electronic database, they have only been used to post you this questionnaire and a summary of the results if requested.

Your contribution to this research will be extremely valuable. Results from this research will help to inform future protocols, guidelines and ongoing research to further improve the nutritional care of stroke patients. If you would like any further information please contact Catherine Mahoney on 0131 4555632 / 5372876 or c.mahoney@napier.ac.uk

Many thanks for your help,

This study is funded by

100 YEARS OF CARING
CHEST, HEART & STROKE SCOTLAND

Catherine Mahoney RGN
PhD Researcher

enc

NAPIER UNIVERSITY
EDINBURGH

June XXXX

Dear Fellow Nurse

Nasogastric Feeding for Acute Stroke Patients
Questionnaire for Nurses

Your contribution to this nationwide research is extremely valuable so please take this second chance to complete this questionnaire.

Stroke patients frequently dislodge their nasogastric (NG) feeding tubes; there are a variety of methods used to help prevent this including tape, hand mittens and nasal bridle/loop systems. I would like to find out more about how best to secure nasogastric feeding tubes for stroke patients. To do this, I feel it is important to explore nurses' opinions, experiences and beliefs about the acceptability and effectiveness of these methods.

Please take a few minutes to complete the enclosed questionnaire and return it to me in the envelope provided before ***30th September***.

If you are interested in the results of this research they will be available on the National Stroke Nurses Forum (NSNF) website at (www.nationalstrokenursingforum.com) on completion of analysis. Alternatively if you complete the enclosed request slip, I will send a summary of the results to you. Please note: any information that you provide will remain confidential and your contact details will not be stored in an electronic database, they have only been used to post you this questionnaire and a summary of the results if requested.

Results from this research will help to inform future protocols, guidelines and ongoing research to further improve the nutritional care of stroke patients. If you would like any further information please contact Catherine Mahoney on 0131 4555632 / 5372876 or c.mahoney@napier.ac.uk

Many thanks for your help,

This study is funded by

Catherine Mahoney RGN

Appendix 6:
Pre-analysis Protocol for Questionnaire

PRE – ANALYSIS PROTOCOL FOR QUESTIONNAIRE DATA

(A) Summary of questions arising from Phase 1 patient/carer interviews and staff focus groups which helped to inform questionnaire content

1. Could inadequate training to insert NG tubes be contributing to NG tube dislodgement?
2. Is it more comfortable and/or effective to site the NG tube on the weak/affected side? Is this more ethical/dignified/safer than using interventions like hand mittens or the nasal bridle?
3. Could methods of taping the NG tube to the face be made more effective and comfortable?
4. Could the nasal bridle be a potentially harmful intervention?
5. Can the benefits of mittens be balanced against possible physical and/or mental harm of the patient?
6. Could mittens help to improve the mobility of the stroke patient on the weak/affected side?
7. Are there any protocols in place regarding NG feeding for acute stroke patients or the use of interventions for holding NG tubes in place? Do these protocols need defining further?
8. Are interventions used to keep tubes in place being used in the best interest of the patient?

(B) Summary of Questionnaire used in Phase 2:

1. What methods are used for checking NG tube position?
2. How reliable you think each method is?
3. Have you received training to carry out any of the checking procedures?
4. Does clinical area have any protocols for use of NG tubes/mittens/bridles?
5. Does ward/unit use any of (list of methods for maintaining tube position) to help keep NG tubes in position?
6. How effective you think (list of methods are) for securing NG tubes?
7. How safe methods are for securing tubes?
8. How acceptable methods are for securing NG tubes?
9. How is tape fixed to the patient?
10. Where methods for holding NG tubes in place are documented?

11. Training to insert NG tubes?

(C) PRE-ESTABLISHED ANALYSIS PROTOCOL

Demographic data

Convenience sample of registered nurses who care for stroke patients across the UK n=528

- Lothian stroke nurses (Lothian) n= 96
- Scottish Stroke Nurses Forum (SSNF) n= 199
- National Stroke Nurses Forum (NSNF) n=233

Total response rate n=353/528 (67%) of which;

Lothian n=66/96 (68%), SSNF n= 133/199 (66%), NSNF n=154/233 (66%)

Other demographic data collected

- *Location* – Scotland and England/Wales/N.Ireland
- *Professional Group* – Lothian nurses, Scottish Stroke Nurses Forum, National Stroke Nurses Forum
- *Work Setting* – acute hospital/trust, community hospital/primary care, education, practice development, stroke specialist organisation
- *Nursing grade* – staff nurse (D&E grades) senior nurse (F, G, H, I grades); nurse lecturer, researcher, other than clinical
- *Health Boards* – Scottish Health Board, English Strategic Health Authorities, Ireland and Wales

Analysis of the data will be considered under the following themes; training, current practice and nurses opinions about current practice.

TRAINING

(1) How are Registered Nurses trained to insert NG tubes? Do they feel adequately prepared? Do they think formal training for registered nurses is necessary? Qu.11

(a) Show the percentage of nurses across the UK that have/have not been trained to insert an NG tube at;

- Formal study session/day
- In the clinical area

(b) Show what percentage of nurses UK-wide that;

- Feel adequately prepared to insert an NG tube
- Consider training necessary

(c) Are there any differences in the provision of training between location, professional group, work setting and nursing grade? Is training to insert NG tubes adequate?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade

(2) Training of Registered Nurses to carry out procedures (aspiration of NG tubes, 'whoosh' test, interpretation of x-rays, using magnetic tubes and any other procedures) for checking the position of NG feeding tubes Qu.3

(a) Describe on a nationwide basis how many nurses have been trained to aspirate/perform 'whoosh test'/interpret x-rays/manage magnetic tipped tubes and carry out any other checking procedures.

(b) Are there any differences in the provision of training between location, professional group, work setting and nursing grade? Is training to check NG tube position adequate?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade

CURRENT PRACTICE

(3) Methods for checking tube position Qu.1

(a) Which tests are used (aspiration, 'whoosh test', x-ray, magnetic tipped tubes or other methods); what other methods are used? Calculate frequencies; which test is used most frequently across the UK?

(b) Are there any differences between which tests are used by location, professional group, work setting and nursing grade?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade

(c) Are there any differences between health boards in Scotland and England and which tests are used?

(d) Are there any differences between Lothian NHS and wider Scotland and which tests are used?

(e) Look specifically at the use of the 'whoosh test'; this test has been banned nationally.

(4) Are protocols used for NG feeding/use of hand mittens/use of nasal bridle/loop? Do nurses know? Qu.4

(a)Describe number of nurses UK-wide that say that their wards/units do/do not have protocols for NG feeding/mittens/bridles and percentage of nurses that don't know.

(b) Are there any differences between which the use of protocols by location, professional group, work setting and nursing grade?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade (staff nurse or senior nurse)

(c) Are there any differences between health boards in Scotland and England and where protocols are or are not used?

(d) Are there any differences between Lothian NHS and wider Scotland and where protocols are or are not used?

(5) Methods used to secure/maintain NG tube position Qu.5

(a) Express as a percentage how frequently the methods listed (inserting tube on affected side, tape, hand mittens, nasal bridle/loop, bandages on hands, tying hands to bed rail, posey vests) are used to secure/maintain tube position across the UK.

(b) Are there any differences between which securing methods are used by location, professional group, work setting and nursing grade?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade (staff nurse or senior nurse)

(c) Are there any differences between health boards in Scotland and England and which securing methods are or are not used?

(d) Are there any differences between Lothian NHS and wider Scotland and which securing are or are not used?

(6) How tape is fixed to the patient's face Qu.9

(a) Show from the UK-wide practices about how frequently tape is not used, fixed to the nose only, cheek only, nose and cheek, other methods of fixing and what these other methods are.

(b) Are there any differences between the use of tape by location, professional group, work setting and nursing grade?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade

(c) Are there any differences between health boards in Scotland and England and how tape is or is not used?

(d) Are there any differences between Lothian NHS and wider Scotland and how tape is or is not used?

(7) If methods are used for securing NG tubes, is this documented and if so where? Qu.10

(a) Express as a percentage the number of nurses UK-wide who say that their units/wards do not routinely record this; percentage that record this in medical notes/nursing notes & care plans/nutritional charts/fluid balance charts/other (what other documents are used).

Show any combinations of documents that might be used.

(b) Are there any differences between documentation by location, professional group, work setting and nursing grade?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade

(c) Are there any differences between health boards in Scotland and England and how methods are or are not documented?

(d) Are there any differences between Lothian NHS and wider Scotland and where methods are or are not documented?

OPINIONS ABOUT CURRENT PRACTICE

(8)Registered Nurses opinions about the reliability of methods used for checking NG tube position Qu.2

(a) Express the reliability of each checking procedure as a percentage from very reliable to very unreliable; show which methods nurses consider to be most/least reliable across the UK

(b) Are there any differences between which procedures nurses consider to be reliable or unreliable by location, professional group, work setting and nursing grade?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade

(c) Are there any differences in opinion about reliability between health boards in Scotland and England?

(d) Are there any differences between Lothian NHS and wider Scotland and opinions about reliability?

(9)Registered Nurses opinions about how effective they think methods used to secure/maintain NG tube position are Qu.6:

(a) Express the opinion of nurses across the UK about the effectiveness of each securing method as a percentage from very effective to very ineffective and never used; show which methods nurses consider to be most and least effective across the UK

(b) Are there any differences between which securing methods nurses consider to be effective or ineffective by location, professional group, work setting and nursing grade?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade

(c) Are there any differences in opinion about effectiveness between health boards in Scotland and England?

(d) Are there any differences between Lothian NHS and wider Scotland and opinions about effectiveness?

(10)Registered Nurses opinions about how safe they think methods used to secure/maintain NG tube position are Qu.7:

(a) Express the opinions of nurses about the safety of each checking procedure as a percentage from very safe to very unsafe; show which methods nurses consider to be most safe and least safe

(b) Are there any differences between which procedures nurses consider to be safe or unsafe by location, professional group, work setting and nursing grade?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade

(c) Are there any differences in opinion about safety between health boards in Scotland and England?

(d) Are there any differences between Lothian NHS and wider Scotland and opinions about safety?

(11)Registered Nurses opinions about how acceptable they think methods used to secure/maintain NG tube position areQu.8:

(a) Express the opinions of nurses across the UK about acceptability of each securing method as a percentage from very acceptable to very unacceptable; show which method is considered to be most acceptable/least acceptable

(b) Are there any differences between which procedures nurses consider to be acceptable or unacceptable by location, professional group, work setting and nursing grade?

To establish this analysis will be carried out further by;

- Location (Scotland vs. England)
- Professional group (Lothian, SSNF, NSNF)
- Work Setting (acute or community)
- Nursing Grade

(c) Are there any differences in opinion about acceptability between health boards in Scotland and England?

(d) Are there any differences between Lothian NHS and wider Scotland and opinions about acceptability?

TRAINING – further analysis

Qu.3 & Qu.11

If nurses are trained to insert NG tubes are they also trained to check tube position?

Qu.1 & Qu.2

If aspiration/whoosh test/x-rays/magnetic tubes/other checking methods are used, how reliable did they feel they were?

Is there an association between what checking procedure is used and how reliable it is? For example, if aspiration is the most commonly used test, is it also considered to be the most reliable? Explore for each checking procedure.

Qu.1 & Qu.3

If aspiration/whoosh test/x-rays/magnetic tubes/other checking methods are used, has training been given/received on how to use them?

Is there an association between what checking procedures are used and what training has been received on checking procedures? Explore for each checking procedure.

CURRENT PRACTICE AND OPINION – further analysis

Qu.5 & Qu.6

If methods are being used to secure/maintain NG tube position, how effective do nurses think that these methods are?
Is there an association between what securing methods are used and how effective nurses consider them to be?

Qu.5 & qu.7

If methods are being used to secure/maintain NG tube position, how safe do nurses think they are?
Is there an association between what securing methods are used and how safe nurses consider these methods to be?

Qu.5 & Qu.8

If methods are being used to secure/maintain NG tube position, how acceptable do nurses think they are?

Qu.5 & Qu.10

If methods are used to maintain tube position is this routinely documented?

Qu.6 & Qu.7

If nurses consider methods for keeping NG tubes in place to be effective, do they also consider them to be safe?

Qu.6 & Qu.8

If nurses consider methods for keeping tubes in place to be effective, do they also consider them to be acceptable?

Qu.5 & Qu.4

If mittens and bridles are being used on wards/units are protocols in place?

Qu.6, 7 & 8

If nurses consider a securing method to be effective, do they also consider it to be safe and acceptable?

Appendix 7:
Questionnaire Analysis Tables
Comments from Questionnaire

	Formal Training			**Supervised training**			**Adequately prepared**			**Training necessary**		
Geographical Location	**n=313**			**n=313**			**n=313**			**n=313**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
England n= 142	89	53	χ^2=4.38	115	27	χ^2=0.88	120	22	χ^2=0.005	125	17	χ^2=0.330
Scotland n=171	87	84	**p=0.036**	131	40	p=0.347	144	27	p=0.943	154	17	p=0.565
Professional Group	**n=313**			**n=313**			**n=313**			**n=313**		
	yes	no	df=2	yes	no	df=2	yes	no	df=2	yes	no	df=2
Lothian n=66	36	30	χ^2=4.97	53	13	χ^2=1.76	59	7	χ^2=2.19	59	7	χ^2=0.38
SSNF n=105	51	54	p=0.083	78	27	p=0.42	85	20	p=0.33	95	10	p=0.83
NSNF n=142	89	53		115	27		120	22		125	17	
Work Setting	**n=258**			**n=258**			**n=258**			**n=258**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Acute n=181	97	84	χ^2=1.21	145	36	χ^2=0.4	155	26	χ^2=0.61	163	18	χ^2=0.045
Community /rehab/PCT n=77	47	30	p=0.27	59	18	p=0.53	63	14	p=0.44	70	7	p=0.83
Nursing Seniority	**n=308**			**n=308**			**n=308**			**n=308**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Staff nurse n=112	51	61	χ^2=8.08	87	25	χ^2=0.16	92	20	χ^2=0.69	98	14	χ^2=0.84
Senior nurse n=196	122	74	**p=0.004**	156	40	p=0.69	168	28	p=0.406	178	18	p=0.359

TRAINING: **Training to insert NG tubes Qu.11**

	Aspiration			**Whoosh test**			**X-ray**			**Magnetic tube**		
Geographical Location	**n=314**			**n=314**			**n=314**			**n=314**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
England n=142	94	48	χ^2=0.39	38	104	χ^2=2.5	26	116	χ^2=2.78	3	139	χ^2=0.02
Scotland n=172	108	64	p=0.53	33	139	p=0.11	20	152	p=0.096	4	168	p=1.00 exact
Professional Group	**n=314**			**n=314**			**n=314**			**n=314**		
	yes	no	df=2	yes	no	df=2	yes	no	df=2	yes	no	df=2
Lothian n=66	47	19	χ^2=3.7	16	50	χ^2=4.11	7	59	χ^2=2.87	2	64	χ^2=0.26
SSNF n=106	61	45	p=0.16	78	27	p=0.13	13	93	p=0.24	2	104	p=1.00 exact
NSNF n=142	94	48		38	104		26	116		3	139	
Work Setting	**n=259**			**n=259**			**n=259**			**n=259**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Acute n=181	118	63	χ^2=0.001	33	148	χ^2=0.44	27	154	χ^2=0.19	2	179	χ^2=3.9
Community /rehab/PCT n=78	51	27	p=0.98	17	61	p=0.5	10	68	p=0.66	4	74	p=0.069 exact
Nursing Seniority	**n=309**			**n=309**			**n=309**			**n=309**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Staff nurse n=112	66	46	χ^2=2.3	23	89	χ^2=0.45	12	100	χ^2=2.4	2	110	χ^2=0.18
Senior nurse n=197	133	64	p=0.13	47	150	p=0.5	34	163	p=0.12	5	192	p=0.72 exact

Training to check tube position Qu.3

	Aspiration			Whoosh test			X-ray			Magnetic tubes		
Geographical Location	**n=313**			**n=313**			**n=313**			**n=313**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
England n=142	135	7	χ^2=1.31	25	117	χ^2=0.59	129	13	χ^2=0.16	7	135	χ^2=0.59
Scotland n=171	157	14	p=0.25	36	135	p=0.44	153	18	p=0.69	12	159	p=0.44
Professional Group	**n=313**			**n=313**			**n=313**			**n=313**		
	yes	no	df=2	yes	no	df=2	yes	no	df=2	yes	no	df=2
Lothian n=66	63	3	χ^2=3.59	19	47	χ^2=4.69	65	1	X^2=9.94	5	61	χ^2=0.65
SSNF n=105	94	11	p=0.194 exact	17	88	p=0.096	88	17	***p=0.007***	7	98	p=0.72 exact
NSNF n=142	135	7		25	117		129	13		7	135	
Work Setting	**n=258**			**n=258**			**n=258**			**n=258**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Acute n=181	168	13	χ^2=0.03	39	142	χ^2=2.57	164	17	χ^2=0.74	9	172	χ^2=0.78
Community /rehab/PCT n=77	71	6	p=0.86	10	67	p=0.11	67	10	p=0.38	6	71	p=0.39
Nursing Seniority	**n=308**			**n=308**			**n=308**			**n=308**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Staff nurse n=111	106	5	χ^2=0.83	27	84	χ^2=2.23	99	12	χ^2=0.11	3	108	χ^2=3.60
Senior nurse n=197	183	14	p=0.36	34	163	p=0.13	178	19	p=0.74	16	181	p=0.06

Current Practice: Methods used to check NG tube position Qu.1

	NG feeding					**Hand Mittens**					**Nasal Bridle/loop**				
Geographical Location	**n=312**					**n=307**					**n=305**				
		yes	no	don't know	df=2		yes	no	don't know	df=2		yes	no	don't know	df=2
England	n=140	124	14	2	χ^2=3.25	n=139	6	126	7	χ^2=28.15	n=138	14	118	6	χ^2=19.8
Scotland	n=172	141	24	7	p=0.21	n=168	29	109	30	**P<0.0001**	n=167	14	116	37	**P<0.0001**
Professional Group	**n=312**					**n=307**					**n=305**				
		yes	no	don't know	df=4		yes	no	don't know	df=4		yes	no	don't know	df=4
Lothian	n=66	55	7	4	χ^2=5.73	n=64	25	24	15	χ^2=84.04	n=63	5	35	23	χ^2=37.1
SSNF	n=106	86	17	3	p=0.22	n=104	4	85	15	**P<0.0001**	n=104	9	81	14	**P<0.0001**
NSNF	n=140	124	14	2		n=139	6	126	7		n=138	14	118	6	
Work Setting	**n=258**					**n=253**					**n=252**				
		yes	no	don't know	df=2		yes	no	don't know	df=2		yes	no	don't know	df=2
Acute	n=180	149	26	5	χ^2=3.43	n=179	25	137	17	χ^2=11.25	n=179	17	141	21	χ^2=12.7
Community /rehab/PCT	n=78	70	5	3	p=0.20	n=74	8	47	19	p=0.004	n=73	4	47	22	p=0.002
Nursing Seniority	**n=307**					**n=302**					**n=300**				
		yes	no	don't know	df=2		yes	no	don't know	df=2		yes	no	don't know	df=2
Staff nurse	n=112	95	11	6	χ^2=4.27	n=108	26	58	24	χ^2=49.6	n=106	10	63	33	χ^2=38.4
Senior nurse	n=195	166	26	3	p=0.114	n=194	8	173	13	**P<0.0001**	n=194	18	166	10	**P<0.0001**

Current Practice: The use of protocols for NG feeding, hand mittens and the nasal bridle/loop Qu.4

	Affected side			**Taping**			**Hand mittens**			**Nasal bridle**			**Bandages**			**Tie hands**			**Posey vests**		
Geographical location	**n=312**			**n=312**			**n=312**			**n=312**			**n=312**			**n=312**			**n=312**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
England n=142	93	49	χ^2=1.46	140	2	χ^2=0.06	16	126	χ^2=17.8	18	124	χ^2=2.57	8	134	χ^2=1.55	0	142	χ^2=0.84	0	142	χ^2=2.53
Scotland n=170	100	70	p=0.23	167	3	p=1.00 exact	53	117	**P<0.0001**	33	137	p=0.11	16	154	p=0.21	1	169	p=1.00 exact	3	167	p=0.25
Professional Group	**n=312**			**n=312**			**n=312**			**n=312**			**n=312**			**n=312**			**n=312**		
	yes	no	df=2	yes	no	df=2	yes	no	df=2	yes	no	df=2	yes	no	df=2	yes	no	df=2	yes	no	df=2
Lothian n=66	39	27	χ^2=1.46	66	0	χ^2=2.19	45	21	χ^2=103.6	16	50	χ^2=4.41	13	53	χ^2=17.62	0	66	χ^2=2.00	2	64	χ^2=4.34
SSNF n=104	61	43	p=0.48	101	3	p=0.38 exact	8	96	**P<0.0001**	17	87	p=0.11	3	101	**P<0.0001**	1	103	p=0.54 exact	1	103	p=0.09 exact
NSNF n=142	93	49		140	2		16	126		18	124		8	134		0	142		0	142	
Work Setting	**n=257**			**n=257**			**n=257**			**n=257**			**n=257**			**n=257**			**n=257**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Acute n=181	117	64	χ^2=3.984	177	4	χ^2=0.22	45	136	χ^2=0.215	28	153	χ^2=1.176	16	165	χ^2=0.18	0	181	χ^2=2.39	0	181	χ^2=7.23
Community /rehab/PCT n=76	39	37	**p=0.046**	75	1	p=1.00 exact	21	55	p=0.643	16	60	p=0.278	8	68	p=0.672	1	75	p=0.3 exact	3	73	**p=0.025 exact**
Nursing seniority	**n=307**			**n=307**			**n=307**			**n=307**			**n=307**			**n=307**			**n=307**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
staff nurse n=111	64	47	χ^2=0.94	110	1	χ^2=0.57	39	72	χ^2=17.00	19	92	χ^2=0.088	12	99	χ^2=2.16	1	110	χ^2=1.77	3	108	χ^2=5.35
senior nurse n=196	124	72	p=0.33	192	4	p=0.66 exact	29	167	**P<0.0001**	31	165	p=0.767	12	184	p=0.14	0	196	p=0.36 exact	0	196	**p=0.046 exact**

Current Practice: Methods used to secure or maintain NG tube position Qu.5

	Tape not used at all			Nose only			Cheek only			Nose and Cheek		
Geographical Location	**n=312**			**n=312**			**n=312**			**n=312**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
England n=142	3	139	χ^2=0.430	37	133	χ^2=1.707	23	119	χ^2=1.544	110	32	χ^2=0.654
Scotland n=170	2	168	p=0.662 exact	40	102	p=0.191	37	133	p=0.214	138	32	p=0.419
Professional Group	**n=313**			**n=313**			**n=313**			**n=313**		
	yes	no	df=2	yes	no	df=2	yes	no	df=2	yes	no	df=2
Lothian n=66	0	66	χ^2=1.377	14	52	χ^2=1.725	12	54	χ^2=2.436	56	10	χ^2=1.546
SSNF n=104	2	102	p=0.624 exact	23	81	p=0.422	25	79	p=0.296	82	22	p=0.462
NSNF n=142	3	139		40	102		23	119		110	32	
Work Setting	**n=257**			**n=257**			**n=257**			**n=257**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Acute n=181	178	3	χ^2=0.041	44	137	χ^2=0.115	33	148	χ^2=0.584	138	43	χ^2=3.673
Community /rehab/PCT n=76	75	1	p=1.00 exact	20	56	p=0.734	17	59	p=0.445	66	10	p=0.55
Nursing Seniority	**n=308**			**n=308**			**n=308**			**n=308**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Staff nurse n= 111	0	111	χ^2=2.879	25	86	χ^2=0.343	24	87	χ^2=0.477	92	19	χ^2=0.827
Senior nurse n=196	5	191	p=0.163 exact	50	146	p=0.558	36	160	p=0.490	154	42	p=0.363

Current Practice: Use of tape for securing NG tubes Qu.9

	Not recorded			Medical Notes			Nursing notes/care plans			Nutritional charts			Fluid balance charts		
Geographical Location	**n=312**			**n=312**			**n=312**			**n=312**			**n=312**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
England n=142	70	72	χ^2=0.007	19	123	χ^2=0.073	89	81	χ^2=0.028	9	133	χ^2=0.992	5	137	χ^2=0.934
Scotland n=170	83	87	p=0.93	21	149	p=0.787	73	69	p=0.868	16	154	p=0.319	10	160	p=0.332
Professional Group	**n=312**			**n=312**			**n=312**			**n=312**			**n=312**		
	yes	no	df=2	yes	no	df=2	yes	no	df=2	yes	no	df=2	yes	no	df=2
Lothian n=66	30	36	χ^2=0.497	16	50	χ^2=13.72	37	29	χ^2=0.622	4	62	χ^2=2.636	61	5	χ^2=1.619
SSNF n=104	53	51	p=0.780	5	99	**P<0.001**	52	52	p=0.733	12	92	p=0.268	5	99	p=0.445
NSNF n=142	70	72		19	123		73	69		9	133		5	137	
Work Setting	**n=257**			**n=257**			**n=257**			**n=257**			**n=257**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Acute n=181	82	99	χ^2=1.153	33	148	χ^2=4.44	98	83	χ^2=0.172	13	168	χ^2=2.346	9	172	χ^2=0.832
Community /rehab/PCT n=76	40	36	p=0.283	6	70	**p=0.035**	39	37	p=0.678	10	66	p=0.126	6	70	p=0.388 exact
Nursing Seniority	**n=307**			**n=307**			**n=307**			**n=307**			**n=307**		
	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1	yes	no	df=1
Staff nurse n=111	63	48	χ^2=2.456	18	93	χ^2=1.558	64	47	χ^2=2.139	11	100	χ^2=0.725	9	102	χ^2=3.884
Senior nurse n=196	93	103	p=0.117	22	174	p=0.212	96	100	p=0.144	14	182	p=0.394	6	190	**p=0.049**

Current Practice: Documentation of methods used for securing or maintaining tube position Qu.10

Nurses' opinions about the reliability of methods used to check NG tube position Qu.2

T-tests for two independent samples

	Aspiration				**Whoosh test**				**X-ray ***				**Magnetic tubes**			
	n	mean	SD	df = 302	n	mean	SD	df = 226	n	mean	SD	df = 243	n	mean	SD	df = 73
England	142	1.85	0.727	t = 2.071	111	3.62	1.088	t = -1.237	137	1.52	0.708	t = -3.155	29	2.45	0.736	t = -0.419
Scotland	162	2.04	0.870	**p = 0.039**	117	3.45	0.969	p = 0.217	166	1.29	0.517	**p = 0.002**	46	2.37	0.826	p = 0.677

*Equal variances not assumed Levene's test p<0.05

	Aspiration				**Whoosh test**				**X-ray**				**Magnetic tubes**			
	n	mean	SD	df = 247	n	mean	SD	df = 182	n	mean	SD	df = 248	n	mean	SD	df = 61
Acute	172	1088	0.711	t = -3.076	138	3.56	1.004	t = -0.432	175	1.41	0.598	t = 1.165	39	2.28	0.857	t = -0.841
Community/Rehab/PCT	77	2.21	0.922	**p = 0.002**	46	3.63	0.928	p = 0.666	75	1.31	0.657	p = 0.245	24	2.46	0.721	p = 0.404

	Aspiration				**Whoosh test**				**X-ray ***				**Magnetic tubes ***			
	n	mean	SD	df = 297	n	mean	SD	df = 222	n	mean	SD	df = 288.345	n	mean	SD	df = 49.708
Staff Nurse	110	1.92	0.858	t = -0.247	72	3.25	1.017	t = -2.815	108	1.21	0.454	t = -4.273	20	2.70	0.571	t = 2.471
Senior Nurse	189	1.94	0.759	p = 0.805	152	3.66	1.011	**p = 0.005**	190	1.49	0.680	**p <0.001**	54	2.28	0.834	p = 0.17

*Equal variances not assumed Levene's test p<0.05

One Way ANOVA

	Aspiration				**Whoosh test**				**X-ray ***				**Magnetic tubes**			
	n	mean	SD	F=9.227	n	mean	SD	F=3.273	n	mean	SD	F=6.891	n	mean	SD	F=0.217
Lothian	64	1.75	0.777	**p<0.0001**	44	3.18	0.947	**p=0.04**	65	1.18	0.391	**p=0.001**	18	2.44	0.784	p=0.805
SSNF	98	2.22	0.880		73	3.62	0.952		101	1.36	0.576		28	2.32	0.863	
NSNF	142	1.85	0.727		111	3.62	1.088		137	1.52	0.708		29	2.45	0.736	

* Homogeneity of variances not assumed, appropriate non-parametric tests applied to verify conclusions

Nurses' opinions about the effectiveness of methods used to maintain or secure NG tube position Qu.6

T-tests for two independent samples

	Affected side				Tape				Hand mittens				Bandage				Nasal bridle			
	n	mean	SD	df = 267	n	mean	SD	df = 304	n	mean	SD	df= 91	n	mean	SD	df=50	n	mean	SD	df=68
England	128	2.63	0.638	t = 1.300	138	2.32	0.715	t = 0.240	30	2.33	0.884	t= -0.236	20	2.80	1.056	t=-0.062	26	2.08	0.977	t=0.059
Scotland	141	2.75	0.838	p = 0.195	168	2.34	0.765	p = 0.811	63	2.29	0.923	p= 0.814	32	2.78	1.070	p=0.951	44	2.09	0.960	p=0.954

	Affected side				Tape				Hand mittens				Bandage				Nasal bridle			
	n	mean	SD	df=217	n	mean	SD	df=250	n	mean	SD	df=84	n	mean	SD	df=43	n	mean	SD	df=58
Acute	151	2.66	0.791	t=-1.429	177	2.34	0.761	t=-0.522	60	2.32	0.983	t=0.042	28	2.71	1.150	t=0.027	35	2.03	0.954	t=-0.509
Community	68	2.82	0.732	p=0.155	75	2.40	0.788	p=0.602	26	2.31	0.736	p=0.967	17	2.71	0.772	p=0.979	25	2.16	1.028	p=0.612

	Affected side				Tape				Hand mittens				Bandage				Nasal bridle			
	n	mean	SD	df=262	n	mean	SD	df=299	n	mean	SD	df=90	n	mean	SD	df=49	n	mean	SD	df=67
Staff Nurse	96	2.70	0.822	t=0.077	109	2.27	0.715	t=-1.001	43	2.21	0.833	t=-0.937	22	2.77	1.066	t=0.047	28	2.21	0.995	t=1.015
Senior Nurse	168	2.69	0.709	p=0.318	192	2.35	0.745	p=0.318	49	2.39	0.975	p=0.351	29	2.76	1.057	p=0.963	41	1.98	0.935	p=0.314

*Equal variances not assumed Levene's test p<0.05

One Way ANOVA

	Affected side *				Tape				Hand mittens				Bandage				Nasal bridle			
	n	mean	SD	F=0.863	n	mean	SD	F=0.087	n	mean	SD	F=3.455	n	mean	SD	F=2.672	n	mean	SD	F=0.002
Lothian	56	2.77	0.953	p=0.423	66	2.36	0.835	p=0.917	46	2.11	0.823	**p=0.036**	22	2.50	1.012	p=0.079	21	2.10	1.136	p=0.998
SSNF	85	2.74	0.758		102	2.32	0.720		17	2.76	1.033		10	3.40	0.966		23	2.09	0.793	
NSNF	128	2.63	0.638		138	2.32	0.715		30	2.33	0.884		20	2.80	1.056		26	2.08	0.977	

* Homogeneity of variances not assumed, appropriate non-parametric tests applied to verify conclusions

Nurses' opinions about the safety of methods used for securing or maintaining NG tube position Qu.7

T-tests for two independent samples

	Affected side				**Tape**				**Hand mittens**				**Bandage**				**Nasal bridle**			
	n	mean	SD	df=293	n	mean	SD	df=306	n	mean	SD	df=274	n	mean	SD	df=268	n	mean	SD	df=265
England	139	2.38	0.696	t=2.582	129	3.19	1.037	t=1.994	129	3.19	1.037	t=-1.112	128	3.63	1.026	t=-0.721	129	2.74	0.859	t=1.678
Scotland	156	2.60	0.768	**p=0.01**	169	2.28	0.654	**p=0.047**	147	3.04	1.122	p=0.267	142	3.54	1.036	p=0.472	138	2.92	0.855	p=0.095

	Affected side				**Tape**				**Hand mittens**				**Bandage**				**Nasal bridle**			
	n	mean	SD	df=238	n	mean	SD	df=252	n	mean	SD	df=223	n	mean	SD	df=217	n	mean	SD	df=213
Acute	166	2.41	0.714	t=-3.501	179	2.20	0.622	t=-0.744	158	3.00	1.088	t=-0.933	154	3.55	1.023	t=-0.252	149	2.81	0.849	t=-0.515
Community	74	2.77	0.786	**p=0.001**	75	2.27	0.684	p=0.458	67	3.15	1.118	p=0.352	65	3.58	1.117	p=0.801	66	2.88	0.937	p=0.607

	Affected side				**Tape**				**Hand mittens**				**Bandage**				**Nasal bridle**			
	n	mean	SD	df=288	n	mean	SD	df=288	n	mean	SD	df=269	n	mean	SD	df=263	n	mean	SD	df=201
Staff Nurse	106	2.57	0.717	t=1.026	111	2.19	0.611	t=1.026	95	2.88	1.009	t=-2.397	91	3.43	0.968	t=-1.661	89	2.96	0.782	t=1.677
Senior Nurse	184	2.47	0.761	p=0.306	192	2.22	0.674	p=0.306	176	3.21	1.099	**p=0.017**	174	3.65	1.058	p=0.098	173	2.77	0.903	p=0.095

*Equal variances not assumed Levene's test p<0.05

One Way ANOVA

	Affected side				**Tape**				**Hand mittens**				**Bandages**				**Nasal bridle**			
	n	mean	SD	F=3.804	n	mean	SD	F=2.036	n	mean	SD	F=22.27	n	mean	SD	F=5.684	n	mean	SD	F=2.131
Lothian	62	2.53	0.762	**p=0.023**	66	2.26	0.708	p=0.132	60	2.38	0.885	**p<0.001**	54	3.19	0.992	**p=0.004**	52	2.81	0.742	p=0.121
SSNF	94	2.65	0.77		10	2.29	0.62		87	3.49	1.04		88	3.76	1.00		86	2.99	0.91	

			2		3		0				4				6				4	
NSNF	139	2.38	0.696		139	2.13	0.646		129	3.19	1.037		128	3.63	1.026		129	2.74	0.859	

Nurses' opinions about the acceptability of methods used to secure or maintain NG tube position Qu.8

T-tests for two independent samples

	Affected side				**Tape ***				**Hand mittens**				**Bandage ***				**Nasal bridle**			
	n	mean	SD	df=295	n	mean	SD	df=295.5	n	mean	SD	df=301	n	mean	SD	df=289.8	n	mean	SD	df=289
England	140	1.95	0.661	t=1.539	141	1.82	0.593	t=1.783	140	3.74	1.129	t=-3.215	140	4.34	0.812	t=-3.149	136	2.74	0.888	t=1.618
Scotland	157	2.07	0.680	p=0.125	169	1.93	0.597	p=0.076	163	3.29	1.242	**p=0.001**	160	3.99	1.102	**p=0.002**	155	2.91	0.942	p=0.107

	Affected side *				**Tape**				**Hand mittens**				**Bandage**				**Nasal bridle**			
	n	mean	SD	df=120.5	n	mean	SD	df=254	n	mean	SD	df=248	n	mean	SD	df=245	n	mean	SD	df=238
Acute	171	1.92	0.646	t=-3.357	181	1.88	0.621	t=-1.128	177	3.32	1.217	t=-1.332	175	4.11	1.003	t=0.366	169	2.86	0.921	t=0.768
Community	72	2.25	0.727	**p=0.001**	75	1.97	0.592	p=0.260	73	3.55	1.225	p=0.184	72	4.06	1.112	p=0.715	71	2.76	0.836	p=0.443

	Affected side				**Tape**				**Hand mittens**				**Bandage***				**Nasal bridle**			
	n	mean	SD	df=291	n	mean	SD	df=304	n	mean	SD	df=297	n	mean	SD	df=174	n	mean	SD	df=285
Staff Nurse	106	2.03	0.696	t=0.214	111	1.86	0.639	t=-0.317	106	3.20	1.276	t=-3.183	104	3.95	1.135	t=-2.436	101	2.93	0.908	t=1.280
Senior Nurse	187	2.01	0.664	p=0.830	195	1.89	0.563	p=0.751	193	3.66	1.149	**p=0.002**	192	4.27	0.896	**p=0.016**	186	2.78	0.928	p=0.202

*Equal variances not assumed Levene's test p<0.05

One Way ANOVA

	Affected side				**Tape ***				**Hand mittens**				**Bandages ***				**Nasal bridle**			
	n	mean	SD	F=1.74	n	mean	SD	F=1.86	n	mean	SD	F=35.13	n	mean	SD	F=17.4	n	mean	SD	F=1.53
Lothian	62	2.00	0.747	p=0.177	66	1.89	0.704	p=0.16	64	2.48	1.07	**p<0.001**	61	3.52	1.23	**p<0.001**	59	2.85	0.91	p=0.22
SSNF	95	2.12	0.634		103	1.96	0.483		99	3.82	1.05		99	4.28	0.90		96	2.95	0.97	

NSNF	140	1.95	0.661		141	1.82	0.593		140	3.74	1.13		140	4.34	0.81		136	2.74	0.89	

*Homogeneity of variances not assumed, appropriate non-parametric tests applied to verify conclusions

TRANSCRIPT FROM QUESTIONNAIRES

Qu.1 Methods for checking tube position

ID23/292 – 'whoosh test' - occasionally

56/109 – x-ray used if aspiration and whoosh test are unsuccessful

78/416 – *Aspiration* –preferred option and x-ray

82/317 – Other=Trust wide policy – inject air then aspirate, if no aspirate then x-ray

124/61 – *'whoosh test'?* – before sending for x-ray

134/437 – *x-ray* – if no aspirate

Qu.2 Reliability of checking methods

ID19/285 – Other-measuring external length of tube prior to commencement of feed on every occasion

ID31/488 – x-ray very reliable at the time it is taken

ID36/135 – x-ray reliable but short term

ID44/390 – x-ray reliable only at the time of being taken and place

57/147 – magnetic tipped tubes very reliable for x-ray

83/301 – Other=x-ray now not used

99/372 – Reliable at time of x-ray – dislodgement may occur before feed is connected

136/411 – Other – X-ray is reliable at time of x-ray, when patient is transported or moved the tube could have moved

138/198 – *x-rays* – reliable at point of x-ray only

110/99 – *Other* – litmus paper

128/257 – *x-ray?* – Only reliable at time of x-ray

134/437 – *pH of aspirate?* –but medication can cause wrong pH

135/522 – *'whoosh test'* – never used, against hospital policy

'x-ray' – reliable at the time

Qu.3 Training to check tube position

ID5/204 – Merck Silk Flocare fine bore radio-opaque

74/21 – aspiration, whoosh test, interpretation of x-rays – trained as a student

75/115 – self reading, criterion on policies etc, discussion on wards, reps

81/511 – *Interpretation of x-rays?* – should be done by medical staff with guidelines to follow

88/232 – pH of aspirate? – in training

94/290 – formally midwife for special care babies

107/314 – *'whoosh test'* – Previous training but method now **not** used in practice to check tubes

Qu.4 Protocols

Qu.5 Tube securing methods

ID2/381 - Other – No**,** rarely work with NG feeds, send patients with PEG feeding

ID4/146 - Nasal bridle – however with no success. Other – Feeding tube attachment device

ID6/15 - Nasal bridle – only seen it in use once

ID12/526 – Other-taping tube to nose

ID23/292 – nasal bridle – currently undergoing training

56/109 – Other=nasofix

57/147 – hand mittens=soft limb restraints

69/291 – Hollister feeding tube attachment device (stock no. 9786)

75/115 – Other=Hollister nasal fixers, close supervision, replace with a PEG if applicable, SLT initiates feeding ASAP

88/232 – *inserting tube on affected side?* –unsure if used

Nasal bridle/loop – occasionally used

94/290 – taping the tube to the nose

103/7 – *bandages on hands?* – only if mitts not available

106/122 – *inserting tube on affected side* – sometimes

114/298 – *Other?* – just use tape to form a loop and tape it to nose

125/364 – *Other?* - Hollister feeding tube attachment device

Qu.6 Effectiveness of securing methods

99/372 - *inserting tube on affected side* – patient dependent

Hand mittens – patient dependent

140/6 – *nasal bridle* – only seen one

Qu.7 Safety of securing methods

ID24/244 Hand mittens – not allowed, Bandages on hands – not allowed

ID 30/523 – Hand mittens, bandages on hands – no patient comfort

ID36/135 – Not sure what you mean by 'safe' 1) the method itself is not causing a risk or 2) the method is unreliable and could risk aspiration

75/115 – We are having a rep in re nasal bridle next month

81/511 – hand mittens/bandages on hands= ethically very unsafe

88/232 – nasal bridle – if appropriate, not if patient confused

135/522 – *bandages on hands* – unsafe ?ehtical

Nasal bridle/loop – unsafe…pulling

Qu.8 Acceptability of securing methods

135/522 – hand mittens? – uncertain, certain patients

Qu.9 Taping techniques

ID3/446 Sometimes nose and forehead

ID24/244 We use the tape which comes with the NG tube to go on the nose

63/133 – Other=across forehead, nose, cheek and tuck behind ear

67/229 – Other=neck (looped around the ear and taped to neck).

80/519 – Other='opsite' dressing to cheek

81/511 – nose only – tape used – bridge of nose to tube not attached to nostril, as this causes friction.

83/301 – Other=specially shaped tape is used to secure NG tubes – ordered for this purpose

84/189 – Other=nose and forehead sometimes

106/122 – *nose only?* – sometimes

Cheek only? – sometimes

113/174 – *Other?* – nose and forehead

Qu.10 Documentation of securing methods

ID25/293 As we only use tape at present and it is not a method of restraint and historically acceptable, it is not separately documented

ID27/136 – Nursing notes/care plans used if bandages on hands used

ID28/116 – Other – collaborative notes

ID45/119 – Medical notes sometimes

ID52/101 – Joint notes for MDT, but only document mitten use, not fixings (see enclosed document).

81/511 – nursing notes/care plans – within NG protocol

84/189 – Other=Nasogastric specific care plan – document date, length of tube, pH and risk assessment

94/290 – company (Southern Cross) care manual

106/122 – *nursing notes/care plans?* – sometimes

107/314 – *other* - specific care plan for checking tube

Qu.11 Training to insert NG tubes

67/229 – formal training session – many years ago in training

Supervised training in the clinical area – no, but had to take a lead role in this field and teach others

71/40 – *Adequately prepared to insert an NG tube?* – A skill I haven't used for a long time so would benefit from a refresher

75/115 – *adequately prepared?* – ongoing assessment required

81/511 – *Attended formal training?* - trainer for hospital

94/290 – *Do you feel adequately prepared to insert an NG feeding tube?* – A long time ago…….

96/382 – *Have you attended formal training/supervised training in the clinical area?* – as a student nurse

100/311 – *Adequately prepared?* – teaching from other staff on the ward

103/7 – *nursing notes/care plans?* –occasionally if posing any problems

GENERAL COMMENTS

ID4/146 – We only use the feeding tube attachment device as a means of securing a NG tube. We have been introduced to the nasal loop however have had 2 attempts, both unsuccessful.

ID10/455 – The fixing a position of tubes is very difficult. I have found that different methods suit different patients. Could you send me more info on nasal bridles.

ID19/285 – Having used NG feeding tubes for the last 10 yrs, worked in rehabilitation setting with no x-raying facility there fore tubes formally identified as being in place using 'whoosh test'. Now work on stroke unit (acute). NGT's routine nursing practice, at least 3 NGT's in use – up to 6 at one time.
Only used bandaging for one patient and that was unsuccessful.
Documentation includes – pH test with Acilit – very sensitive pH paper.
Measuring of length of tubing external.
Several patients have required the passing of more than one tube, as they may have removed them.

ID23/292 – We are currently undergoing training so that we can begin an audit of nasal bridles. If you already use or have any info you could pass on that would be really helpful. Good luck with your research.

ID25/293 – I am at present investigating the use of bridles for securing NG tubes. If we do go ahead, there will be a strict protocol for its use, including a full discussion (documented) with the next of kin.
There are a lot of ethical issues involved, but on the other hand, due to cerebral irritation, patients often do pull NG tubes out – one after another! I would never under any circumstances, physically restrain a patient's hands.

ID26/310 – In other trusts I have used the whoosh test and found it reliable and reduced delay in feeding patients, however in my present trust it is not allowed.

ID27/136 – The whoosh test is not permitted in our trust but many feel confident that it is a reliable test when no aspirate can be obtained

ID28/116 – I think this is a very interesting and much needed piece of research and look forward to your results

ID33/55 – It is not clear from the questionnaire if by 'maintain nasogastric tube position' you actually mean 'prevent the patient from pulling it out'. Mitts, bandages etc don't hold tubes in position, they just reduce patient interference. We do not rely on the whoosh test for confirming placement, but use it as an indication as to it being worthwhile proceeding to x-ray if aspiration has failed.

ID42/197 – We did trial nasal bridle loop but 3 times unsuccessful (not on same patient), so did not try further

ID43/543 – Trust employed by los (NG?) policy on insertion of NG tubes due to previous problem with some (Interpretation – Trust has a policy regarding insertion of NG tubes due to previous problems with them?).
Can still have problems with pH level due to patient being prescribed medication (PPD) to reduce gastric pH levels – therefore still a risk factor to consider prior to feeding/administration of medication via NG tube.

ID44/390 – I am no longer currently working with stroke patients but may still use NG feeding in a rehab setting. Our practice for securing the NG tube is to use a Duoderm film (opposite type dressing) directly to the cheek, place the NG tube over it and secure with Tegaderm dressing.

ID45/119 – Method used for securing NG tube would vary depending on the patient – however if consistently pulled out by patient i.e. 2 times then would be discontinued and reviewed by SLT – then PEG if required. We would not persist in trying to feed via NG if persistently difficult.

ID52/101 – I am currently trying to find out who can make the decision to insert NG tubes, get conflicting info, some say it must be a medical decision, others that nurses can decide. This is an important issue and obviously training is crucial if re-feeding syndrome etc one to be considered. Not usually a problem Mon-Fri 9-5 but for patients admitted Friday after 5pm, they often wait all weekend with no nutrition or medication. Have you any information regarding this? If you need clarification of any of my answers you can contact me

on…..good luck with your research. I have enclosed a document re mitten use which we are using on our stroke unit.

57/147 – We have soft limb restraint policy 3 days post stroke

63/133 – I run training for insertion of NGT's and testing with pH papers for nurses and doctors. People seemed to be so worried they will get it wrong these days, it was deemed necessary in out trust.
Have used nasal loops in previous trusts – patients have still managed to remove the tube. It does stop accidental pulling out by staff and patients.

66/243 – *Qu.5* NG inserted on affected side if the side is an appropriate choice: not normally as a security measure on unit.
Taping to face – Micropore/zinc oxide tape to nostril, Tegaderm to cheek – accepted unit practice.
Surprised at the 'tie hands' option. Qu.9 – see Qu.5 comment.

68/294 – We have no x-ray facilities at our hospital and therefore if unsure if NG tube in position then patient has to be transferred to acute area for x-ray. We always check insertion with two registered nurses.

78/416 – I don't pass NG as not confident to do so without training from competent practitioner. Relatively new stroke area.

81/511 – As stroke specialist nurse practitioner I have been responsible for passing of, and training of, insertion of and subsequent care of NG tubes. In conjunction with one of my peers I am author of our local NG protocol. In my experience stroke patients do not tolerate NG tubes well and PEG is a more preferred option. I would welcome your research results and if I can be of any further help to you please contact me.

84/189 – Problem at the moment with this trust is due to the changes with checking correct positioning, a formal training session is in the process of being developed with the new guidelines and documentation. So some of the staff

have not had the training for insertion of NG tubes and have been waiting 18 months + for training. I have enclosed documentation that I have developed using the NPSA guidelines which is being used throughout the trust.

85/321 – Current policy in my work place is that Drs pass NG tubes – I have undertaken this in previous jobs

93/213 – As a stroke co-ordinator I am involved in stroke wards and non-stroke wards – including surgical/orthopaedic etc. Therefore practice varies from area to area, some areas still regard x-ray as the only way of confirming positioning! So some of my answers may appear conflicting for this reason.

104/53 – Have been on holiday only got back today (4th July) hence late return

108/309 – I am interested in learning more about the use of mittens. Do you have any information to pass on? Good luck and kind regards……..

110/99 – My training for insertion of NG tubes was in my training between 1984-7. But 15 years in stroke care has given me adequate practice to insert them……I was taught to use the 'whoosh test' and think it is a shame that it is now band. With training in the technique I feel the risk of error occurring is minimal and could be less risky than x-ray checking in some respects…….Good luck with you PhD.

126/529 – I feel very strongly that the issue of patients removing or attempting to remove NG tubes MUST be discussed as an MDT/with relatives and patients (where applicable) to ensure the reason for this is clear i.e. is it confusion? Or a definite refusal/objection to being fed in the absence of an advanced directive or living will.

136/411 – I feel nurses on my unit require the specialised knowledge of NG feeding pertaining to stroke patients communication, sensation etc. It is more of a problem than it is to general nursing

137/352 – I sometimes feel that a patient who may have limited communication ability may be rejecting treatment by pulling tubes out and feel this may be their right to do so. I do not feel that any method of restraint is acceptable.

139/212 – Well done Catherine – a very needy area! Our department were just thinking about doing a study around this – if you need another centre to do any more around this subject, please just ask!
P.S. If you would like me to recruit other nurses of different levels in my service, also willing to help! (gave name and contact details)

Appendix 8:
Ethical Approval and Access

Multi-Centre Research Ethics Committee for Scotland

Secretariat
Deaconess House
148 Pleasance
Edinburgh
EH8 9RS
Telephone 0131 536 9026
Fax 0131 536 9346
www.corec.org.uk

NHS SCOTLAND

[redacted]
Lecturer
Napier University
Canaan Lane Campus
74 Canaan Lane
Edinburgh
EH9 2TB

Date: 29 March 2005
Your Ref.:
Our Ref.: 05/MRE00/26

Enquiries to: [redacted]
Extension: 89026
Direct Line: 0131 536 9026
Email: [redacted]@lhb.scot.nhs.uk

Dear [redacted]

Full title of study: **An exploratory study to establish the effectiveness and acceptability of mittens (or similar methods) to maintain nasogastric (NG) feeding in acute stroke patients.**

REC reference number: **05/MRE00/26**

Protocol number: **1**

The Multi-Centre Research Ethics Committee for Scotland, Committee A reviewed the above application at the meeting held on 24 March 2005.

Ethical opinion

The Committee agreed that parts 1 and 3 of the application (the focus groups in staff and the survey of staff) did not require ethical approval and could proceed. However the members of the Committee present decided that it was unable to give a favourable ethical opinion on parts 2 and 4 of the research, for the following reasons:

1. The use of a 'restrictive measure' on a vulnerable group who may not be in a position to object and could risk limiting recovery of hand function and comfort in other ways, in absence of further information on acceptability and absence of direct benefit from a small pilot study.
2. Not all dysphagic stroke patients were unable to consent to participation in research; a pilot study could be undertaken in adults with capacity to consent.
3. Concern that the focus groups in treated patients may be biased as there was a risk the enrolment approach would select participants who have gone through the process successfully i.e. there would be patients needing fed because they were either sick

NHS
SCOTLAND

and frequently may die and this would especially apply to those who may not want to be fed or not given mittens.

4. Several of the answers of the questions to be answered in the pilot study could be achieved on the basis of an audit of existing experience in hospitals which use mittens and from the scientific questions under study.
5. Estimates of sample size for the main study would not usefully come from the pilot phase i.e. they were more likely to be generated from existing audit data, from estimates of clinically important effect sizes and from previous randomised trials of other interventions.

The Committee also made the following observations:

6. There was insufficient clarity about the participant group in part 2 interviews i.e. which carers/relatives/patients and how would they be selected.
7. Preferably involving relatives as participants should be with the permission of the patient participant.
8. For research of this nature a minimum of 24 hours should be allowed before consent was obtained from potential participants.
9. The participant information leaflet should:
    1. be on headed notepaper
    2. the time stated for the duration of the patient interview differs from that given in the answer to QA13 of the application form
    3. contact details for researchers and independent contact need to be added
    4. mention the questionnaires and indicate how long it would take to complete them
    5. mention that the study has been approved by the Multi-Centre Research Ethics Committee for Scotland, Committee A
    6. inform participants how complaints would be handled and what redress might be available
    7. mention that participants would be given a copy of the information sheet and consent form to keep.
10. The consent form should:
    1. be on headed notepaper
    2. mention the date and version number of the participant information sheet.

I regret to inform you that the application is therefore not approved.

Options for further ethical review

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SCOTLAND

You may submit a new application for ethical review, taking into account the Committee's concerns. This would be processed in exactly the same way as any new application. You should enter details of this application at Question A55 on the application form. The Committee considered that part 4 should be submitted as a standalone application.

Documents reviewed

The documents reviewed at the meeting were:

Application form, parts A and B dated 16 February 2005
Study protocol: version 1 dated February 2005
Study summary and flowchart: version 1 dated 16/02/2005
Staff information booklet (group interviews): version 1 dated 16/02/2005
Staff consent form (focus groups): version 1 dated 16/02/2005
Agenda for staff focus groups
Participant information booklet (interviews): version 1 dated 16/02/2005
Participant consent form (interviews): version 1 dated 16/02/2005
Participant's representative/relative information booklet (interviews): version 1 dated 16/02/2005
Participant's representative/relative consent form (interviews): version 1 dated 16/02/2005
Participant information booklet: version 1 dated 16/02/2005
Participant consent form: version 1 dated 16/02/2005
Agenda for one-to-one interviews with participants (or representatives)
Instruction sheet for secure mitt
Safety information for use of posey torso and limb restrictive products
Letter from sponsor dated 15 February 2005
Letter from funder dated 1 February 2005
CV

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

Notification of other bodies

This letter is confidential but we shall notify the research sponsor of the outcome of the review.

It is your responsibility to notify local Principal Investigators of the outcome of the review.

Multi-Centre Research Ethics Committee for Scotland

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NHS SCOTLAND

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Date: 29 August 2005
Your Ref.:
Our Ref.: 05/MRE00/71

Enquiries to: [redacted]
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Email: [redacted]lhb.scot.nhs.uk

Dear [redacted]

Study title: **A qualitative study to explore the perspectives of patients (or their representatives) about the effectiveness and acceptability of interventions to maintain nasogastric feeding in acute stroke patients**

REC reference: **05/MRE00/71**

Protocol number: **3**

The Multi-Centre Research Ethics Committee for Scotland, Committee A reviewed the above application at the meeting held on 25 August 2005. Thank you for attending to discuss the study.

Documents reviewed

The documents reviewed at the meeting were:

Document	Version	Date
Application form, parts A and B		27 June 2005
Investigator CV		27 June 2005
Protocol	3	June 2005
Covering letter		27 June 2005
Letter from sponsor		20 June 2005
Participant information sheet	3	22 June 2005
Participant information sheet (relative/representative)	3	22 June 2005
Participant consent form	3	22 June 2005
Participant consent form (relative/representative)	3	22 June 2005
Letter from funder		01 February 2005

Chairman [redacted]
Vice-Chairman [redacted]

NHS
SCOTLAND

Copy of management approval letter	08 March 2005
Copy of management approval letter	12 April 2005

Provisional opinion

The Committee had no ethical concerns with this study and considered that the justification for doing it had been well described. There was the potential for bias because it was being proposed to look only at participants who were being fed. In the discussion with the research team they agreed to widen the sample to include participants who were not fed but who could be considered eligible for nasogastric feeding and if necessary by expanding the sample size accordingly. The Committee agreed that justification had been provided to include incapacitated adults.

The Committee would be content to give a favourable ethical opinion of the research, subject to receiving a complete response to the request for further information set out below.

Authority to consider your response and to confirm the Committee's final opinion has been delegated to the Chair together with Professor M Donaghy.

Further information or clarification required

Chest Heart & Stroke - Topic colleagues & DCN.

1. Confirm that the initial approach will come from participant's treating clinician /clinical team.
2. Provide copy of peer review referred to at A45. – application form. Anne will forward.
3. Provide a one page summary information sheet.
4. The participant information sheet should:
   1. mention that the audio-tapes would be destroyed after transcribing.
5. The consent form should:
   1. mention that audio-tapes would be destroyed after transcribing (at statement 3.)
   2. mention the version number and date of the information sheet.

When submitting a response to the Committee, please send revised documentation where appropriate underlining or otherwise highlighting the changes you have made and giving revised version numbers and dates.

The Committee will confirm the final ethical opinion within a maximum of 60 days from the date of initial receipt of the application, excluding the time taken by you to respond fully to the above points. A response should be submitted by no later than 23 December 2005.

NHS
SCOTLAND

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

Communication with sponsor and care organisation(s)

This communication is confidential but you may wish to forward copies to your sponsor and/or relevant NHS care organisation(s) for their information.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

REC reference number: 05/MRE00/71-Please quote this number on all correspondence

Yours sincerely

[redacted]

Committee Co-ordinator

Mahoney, Catherine

From: [redacted]@lhb.scot.nhs.uk]
Sent: 13 February 2007 15:40
To: Mahoney, Catherine
Subject: Re: Project 05/MRE00/26

Hi Catherine

The Committee's Vice Chairman has considered your e-mail. He commented as follows:

"I assume these follow up focus groups are not explained in the PIS but on the other hand it's a harmless procedure with participants who have already contributed and would more than likely be pleased to do a bit more if requested.

So, on balance, I'd agree to this proceeding without submission as a substantial amendment."

Hope this helpful.

[redacted]
Committee Co-ordinator
MREC for Scotland A
Tel: 0131 536 9026

Consultant Name:_____

Ward/ Hospital:_____

(please tick all that apply)

1. I agree for eligible patients under my care can be approached to take part in face-to-face interviews. Researchers will only approach those patients that identified by members of the clinical team.

O

2. I understand that the interview session will be audio-taped to aid analyses of data by transcribing for key themes. All tapes will be stored within a securely locked cabinet, patients' personal details/identifiers will be removed or changed.

O

3. I agree for eligible patients under my care can be approached to take part in the Mitten Intervention for Tube Tugging in Stroke (MITTS)– pilot phase. I am aware that only those patients that the clinician is uncertain about the value of mittens to maintain effective NG-tube feeding in acute dysphagic stroke working on the ward will be eligible for the study.

O

Signature: _____ Date: _____/_____/_____
day month year

Ward Manager
Name:_____

Ward/
Hospital:_____

(please tick)

4. I agree for my unit to be included in the Mitten Intervention for Tube Tugging in Stroke (MITTS) observational study.

O

Signature: _____ Date: _____/_____/_____
day month year

Appendix 9

Data Proforma Recording Sheet

REVIEWER'S INTITIALS

FIRST AUTHOR

ID #

PUBLICATION DATE

SUBJECTS

TOTAL # of SUBJECTS

Reason for NG tube insertion

Method of securing tube

Stroke specific details

AGE RANGE of SUBJECTS

CONTROL GROUP

Group	# in group	Age range	Mean Age	SD	Male/Fem

METHODS

	Study Design	Description of intervention used to secure tube
	Inclusion criteria	Data analysis/statistical tests
	Exclusion criteria	Outcome measures stated
	Type/size NG tube used	

OUTCOME MEASURES REPORTED

NG, ND, NJ, PEG

- No. of NG tubes inserted/dislodged/re-passed
- Reason for tube dislodgement
- Continued NG feeding
- Length time NG tube + intervention
- Percentage prescribed feed/hydration delivered
- Reason for failure of NG feeding
- Complications of intervention
- Acceptability of intervention
- Alternative feeding methods used

Comments on Quantification **Method**:

SIGNIFICANT RESULTS REPORTED

- - -

Does the Paper Meet the Criteria?

ADDITIONAL NOTES

Appendix 10

NHS safety agency issues guidance on nasogastric tubes

Catherine M. Mahoney, Research student
Napier University, School of Acute and Continuing Care Nursing, Edinburgh EH9 2TB,
Dr Anne M. Rowat and Professor Martin S. Dennis

Send response to journal:
Re: NHS safety agency issues guidance on nasogastric tubes

Editor–The National Patient Safety Agency (NPSA) advice on reducing the harm caused by nasogastric tubes1 is limited by poor quality studies which comprise case studies, small prospective studies, retrospective studies and no randomised clinical trials. Their suggested method to measure tube position is checking the pH of gastric aspirate1, but pH readings are influenced by medication and enteral feed also it may be difficult to aspirate from fine bore tubes2,3. This may lead to an increase in the use of x-rays which are only accurate at one point in time, increase radiation exposure, are not cost effective4 and not always practical/possible in patients' homes or small hospitals.

They recommend that injection of air down the tube and auscultation over the stomach, "the whoosh test" be abandoned on the basis of small studies and case reports3. Using "the whoosh test" alone has led to deaths from undetected tube displacement, although in terms of the total number of tubes inserted the absolute risk of death from tube displacement is probably small. However if two imperfect tests such as "the whoosh test" and pH measurement are used in combination it seems obvious that the overall accuracy will increase.

Basing clinical practice on imperfect advice is not ideal, however we believe that "the whoosh test" could be made more reliable with the introduction of a proper protocol and staff training. Training is essential although difficult without adequate research. Perhaps the NPSA are not going far enough in funding a systematic review. We believe that prospective studies which test the sensitivity and specificity of the methods for confirming tube position against a gold standard such as tube insertion under x-ray guidance are urgently required.

Authors

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Competing interests: None declared

[Back to Article] [See other letters]

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A necessary evil? Interventions to prevent nasogastric tube-tugging after stroke

Dorothy Horsburgh and Anne Rowat are lecturers and Catherine Mahoney is PhD student, School of Nursing, Midwifery and Social Care, Napier University, Edinburgh, Canaan Lane Campus, Edinburgh, EH9 2TB; Martin Dennis is Professor of Stroke Medicine, Department of Clinical Neurosciences, University of Edinburgh. Correspondence: a.rowat@napier.ac.uk

Dysphagia (difficulty in swallowing) is commonly associated with poor outcomes after stroke (Martino et al, 2005). As many as 50% of patients will have dysphagia soon after stroke, and in some it may persist for days, weeks and sometimes months (Mann et al, 2000). To prevent nutritional deterioration, feeding through a nasogastric (NG) feeding tube is preferred early after stroke (Dennis et al, 2005b). Interventions, such as taping the NG tube to the face, application of one or two hand mittens (*Figure 1*) and insertion of nasal loop (bridle) systems (*Figure 2*), may be used to prevent tube removal or dislodgement (Burns et al, 1995; Popovich et al, 1996; Kee et al, 2007). At present there is no definitive advice regarding the best intervention methods for keeping NG tubes in place after stroke and there is little known about how patients and their relatives feel about the use of such interventions.

Literature review

The FOOD Trials, a family of three multi-centre international randomized controlled trials, are the largest studies to address feeding issues for acute stroke (Dennis et al, 2005a 2005b). The second and third trials enrolled dysphagic stroke patients if the clinician was uncertain about when to start tube feeding (trial 2; n=859) or if they were certain about when to start tube feeding but were uncertain whether to use an NG or percutaneous endoscopic gastrostomy (PEG) tube (trial 3; n=321) (Dennis et al, 2005b). Although these trials included fewer patients than needed to give statistically significant results, they do provide practical information that can guide practitioners' feeding decisions following stroke. The trials indicate that early tube feeding post-stroke may reduce case fatality, and that NG feeding was associated with better outcomes than PEG tube feeding (Dennis et al, 2005b).

NG tubes are not always well tolerated by stroke patients. In the FOOD Trial, stroke patients frequently pulled out their tubes (maximum number of tubes per patient=18) thus interrupting their nutrition, hydration or medication (Dennis et al, unpublished data). Alternatively patients may dislodge the tube, which can result in feed or fluid entering the lungs resulting in poor outcome. Continually checking that the NG tube is in the correct place would increase demands on staff time and frequent repositioning may increase patient discomfort (Dennis, 2000). To combat these problems some clinical areas may use interventions to prevent NG tube removal/dislodgement. However, some interventions used to keep NG tubes in place could be seen as controversial, for example

ABSTRACT

This study explores the perspectives of patients, relatives and carers on the use of interventions to prevent nasogastric tube-tugging following a stroke. The study was qualitative and involved focus groups with practitioners (n=3) and interviews with stroke patients (n=4) and relatives (n=4). Data were analysed using a grounded theory approach to identify key categories. The authors found that practitioners, patients and relatives viewed the use of interventions (e.g. hand mittens) to maintain nasogastric tube feeding in terms of benefits, harms and justice. The core category, linking all data, was 'a necessary evil', i.e. while interventions were undesirable their use as a final resort might be justified to maintain patients' nutritional status post-stroke.

Key words
■ Stroke ■ Enteral and parenteral nutrition ■ Hand mittens ■ Restraint

Accepted for publication following double-blind peer review 16 April 2008

Figure 1. A hand mitten

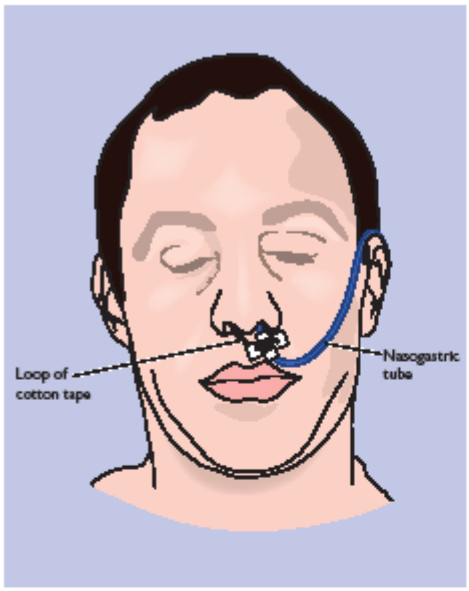

Figure 2. Nasal loop (bridle): tape is passed in one nostril behind the nasal septum and exits via other nostril. It is attached to the nasogastric tube with a fastening clip.

hand mittens restrict patients' mobility, as well as their freedom to remove the NG tube (Horsburgh, 2004). However, one small study found that dysphagic stroke patients who wore hand mittens (n=8), compared to those that did not (n=10), required fewer NG tube insertions, had fewer episodes of pneumonia, were better nourished and had a better overall outcome (Kee et al, 2007).

Anderson et al (2004) reported on 14 stroke patients who had been given a nasal loop to maintain NG tube position. In the study 57% (n=8) of patients were successfully maintained on NG tube feeding with a nasal loop in situ; 43% (n=6) of patients were able to communicate; and 4 of these 6 patients reported that the nasal loop was more acceptable than repeated tube insertions. Currently there is an ongoing randomized controlled trial which is aiming to evaluate the use of nasal loop with conventional NG feeding in dysphagic stroke patients (Beavan et al, 2007).

Nurses are regularly responsible for keeping NG tubes in place, but local clinical guidelines may not be specific enough to meet the complex needs of dysphagic stroke patients. Furthermore, little is known about the feelings of patients or their relatives about the use of such methods. The aim of this qualitative study was to explore the perspectives of the multidisciplinary stroke care team, patients and relatives of patients who had experienced stroke recently and who had been fed nasogastrically.

Methods

Study design

This is a qualitative study using a grounded theory approach. A theoretical underpinning for grounded theory is provided by 'symbolic interactionism' (Mead, 1964; Blumer, 1969) which proposes that individual's responses to objects, people and situations are learned over time.

Population and sample

Purposive sampling (Silverman, 2000: 4) uses a characteristic that enables research question(s) to be addressed. The characteristic important for staff was direct involvement in care of patients who require NG feeding following stroke (rather than demographic details, e.g. sex, age). The relevant characteristic for patients' inclusion was recent experience of stroke and NG feeding. For relatives the characteristic was being related to someone who had experienced stroke recently and who had required NG feeding.

Focus groups

Between May 2005 and February 2006 three focus group interviews were carried out with members of multidisciplinary teams in three stroke units in Lothian. A total of 17 staff were included (group 1, n=4; group 2, n=6; group 3, n=7) (*Table 1*). The rationale for focus groups was that participants' interaction would provide a forum for debate that is impossible in individual interviews. In addition, focus groups provided a familiar environment for multidisciplinary staff who already worked together in

Table 1. Composition of focus groups

	Registered nurses	Care assistants	Doctors	Physiotherapists	Occupational therapists	Speech and language therapists
Focus group 1	3	0	1	0	0	0
Focus group 2	1	1	1	1	1	1
Focus group 3	4	0	0	1	1	1

the same clinical area.

We conducted two focus groups prior to commencement of the patient/relative interviews and one focus group afterwards. Analysis of data from the patient/relative individual interviews led to the need to conduct the third focus group as a forum for exploring the categories (themes) generated. The first focus group was in a stroke unit that used only tape on the face to maintain NG tube position; the second unit used hand mittens. None of the stroke units included in this study used nasal loop (bridle) systems.

Individual interviews

Group interaction would have been stressful for patients or relatives in view of their recent experience of stroke, therefore one-to-one semi-structured interviews were used to obtain their perspectives. Between October 2005 and January 2006 interviews were carried out with patients post-stroke and who had experienced NG feeding (n=4), as well as with the relatives of patients who had received NG feeding, but who were unable to communicate with the researchers directly (n=4). Consent forms were signed by participants prior to individual interviews, which took place in a private area within the stroke unit.

Ethical approval

NHS Ethics Committee approval was obtained and written permission to access staff was granted by mangers. All potential participants were given verbal and written information about the study to obtain informed consent. The patients whom we interviewed were those deemed to have 'capacity' in terms of the Adults with Incapacity (Scotland) Act 2000, and were able to provide informed consent. If patients were deemed 'incapacitated', their relatives were interviewed to gain their perspective on methods used to maintain NG feeding in the relative who had suffered a stroke.

Data collection and analyses

Agendas for focus groups and interviews were semi-structured to allow flexibility and to ensure that data reflected participants' perspectives. Staff were asked about their general experiences of caring for patients who had NG tubes. The authors then used a 'funnel' approach to focus more closely on interventions to prevent tube dislodgement. Interview questions aimed to clarify and expand on participants' perspectives about methods of securing NG tubes.

The audiotape recordings were transcribed verbatim and analysed using a grounded theory approach to identify and code emergent themes. Initial analytical coding of data from each interview (focus group and individual) was carried out before starting the next. The analysis involved comparison of data within a single interview and with data between interviews. Codes were examined, compared with data from other participants and similarities and differences identified. Codes were frequently the participant's own words. Following initial coding, categories (themes) emerged from data analysis and, by the study's completion, a core category emerged that underpinned and explained most of the data.

Findings

Categories identified

There were five identifiable categories and one identifiable core-category:

Harm

Codes such as 'intrusive' and, more emphatically from one patient, 'torture', were compared with codes of a similar nature and signified the category (theme) of 'harm'. Harm was, in some instances, physical, e.g. potential trauma caused by repeated tube insertions, or psychological, e.g. perceived loss of dignity. Harm could also result from interventions such as hand mittens that prevented hand movement necessary to remove or dislodge NG tubes. One participant reported that a pre-existing skin condition was exacerbated by a hand mitten.

Problems in maintaining hygiene and preventing infection were discussed. Staff identified that a formalized and efficient method of mitten cleaning was required, as opposed to ad hoc measures, e.g. staff laundering mittens at home. Participants highlighted the potential for cross-infection.

Although the stroke units in the study did not use nasal loops, participants were shown product information (*Figure 2*) and asked for comments. The main view from staff, patients and relatives was potential harm. Concerns were expressed about the potential for pain and damage to the nasal septum if patients tried to remove the tube.

Benefit

Codes such as '(mitts) ensure food and fluid intake' indicated a category of 'benefit' and were articulated to a greater extent by staff and relatives than by patients. Patients' recall of events was usually confined to one attempt at tube removal, whereas relatives/representatives identified two or more tube removals having taken place prior to the use of interventions. Data from staff supported the need for multiple tube re-insertions before mitten use was considered.

Mittens might spare patients multiple tube insertions and disruption to hydration and nutrition. Staff identified time saving as a benefit of mittens, although this was not perceived as an acceptable rationale for their use. Staffing levels were discussed (e.g. a constant presence, a visitor or staff to repeat explanations and guide patients' hands away from tubes) as ways to reduce tube removal and consequent re-insertion. However, in practice, staffing levels meant supervision of individual patients was unachievable though desirable.

There were diverse opinions about which nostril should be used for tube insertion. Some advocated use of the side affected by the stroke, as patients would be less aware of the NG tube. This view was supported by one patient whose NG tube was situated on the affected side and who

had no discomfort or tube removal. However some staff were concerned that tube insertion on the affected side might mean that patients, if unaware of the tube, might dislodge or remove it inadvertently. Focus group participants highlighted the lack of evidence for the most effective strategy.

Participants in focus groups and in several individual interviews identified deficiencies in NG fixative tape. Various supplementary methods were used: taping to nose or face, or tube winding behind patients' ears. There was no consensus about which was most effective.

Autonomy and justice

All participants identified that mitten use diminished or removed patients' autonomy, i.e. ability to make their own decisions, exemplified by one patient's feeling of being 'totally powerless'. Overall, however, the adverse effect on autonomy was viewed as undesirable but acceptable, due to some patients' inability to make informed decisions immediately post-stroke.

The category of patient autonomy referred also to the category of justice. Some participants expressed doubt as to whether repeated tube insertions were for patients' benefit, or whether tube removal indicated patients' choice to refuse hydration and nutrition, rather than attributable to confusion. Participants considered that use of interventions for preventing tube removal should be judged on an individual patient basis. One relative with experience of two close family members who had stroke said that for one individual mittens were appropriate, but inappropriate for the other individual for whom repeated tube removal was a sign that, 'they wanted to die'.

Tube insertion

The study's focus was originally on the patient's experience of insertion of an NG tube after stroke. However, issues around tube insertion were raised in all focus groups and most individual interviews and were clearly significant to participants. Physical and psychological discomfort of tube insertion was suggested as contributory, if not causative, of subsequent tube removal by patients. Preparation for practice in tube insertion was 'on the job'; one patient quoted a nurse as saying that, 'I've never done one before, give me a shot'. While not in the original remit for discussion, the need for skilled tube insertion emerged as important to participants.

Perception versus 'facts'

Our study highlighted patients' limited or distorted retention of 'facts' immediately post-stroke. One patient, for example, was certain that initial NG tube insertion was carried out by a lay person in the bus station although this was discounted by his wife. Patients appeared unaware of their number of tube insertions; they recalled lower numbers than those reported by their relatives and by the charge nurse. While this study asked participants for their perceptions, the dissonance between perception and fact suggests that tube dislodgement and removal may be forgotten by patients.

Interdependence of categories

It should be noted that these categories did not emerge from data as specific entities, but were to some degree interdependent. Categories of harm, benefit, autonomy and justice were interwoven but, overall, emerged as central to discussion about effectiveness and acceptability of interventions. NG tube insertion technique emerged as an important category for both patients and relatives and related to categories of harm and benefit.

Core category (theme)

As a study progresses one category (theme) becomes identifiable as core, owing to its centrality and clear relationship to other categories. Within this study, 'a necessary evil' (a phrase articulated by one of the participants), emerged as the core category underpinning and explaining most of the data. Participants weighed up harms and benefits, including acknowledgement of patient autonomy and legal and moral rights of patients and staff. From this analysis emerged the concept of interventions as never desirable but sometimes required.

Discussion

The findings from staff focus groups and individual interviews with stroke patients and relatives, indicated that judgements were made by weighing up benefits and harms that interventions (and their absence) might create for patients. Overall, interventions were viewed as 'a necessary evil' to ensure adequate nutrition and hydration in the immediate post-stroke period.

Implications for practice

Nurses are regularly responsible NG tube insertion, but findings from this study suggest that current training may be insufficient to meet the complex needs of dysphagic stroke patients. It should be noted that insertion of NG tubes in stroke patients can also be associated with a modest drop in arterial oxygen saturation (SaO_2) (Rowat et al, 2004). This could adversely affect outcomes for stroke patients, particularly for those who require several attempts to insert the NG tube, and in the hyperacute phase of stroke when there is a concern about protecting vulnerable areas of brain. Therefore NG insertion training and clinical guidelines need to be specific enough to meet the complex needs of dysphagic stroke patients.

The present study also highlighted that local and national protocols to inform use of interventions are informal or non-existent and require development and implementation to ensure that interventions are used appropriately and in patients' best interests. The use of mittens (a form of restraint) to maintain NG feeding needs to be justified. Therefore the introduction of guidelines for staff to follow should ensure that judgments adhere to the accepted professional standards, such as the Nursing and Midwifery Council (NMC) code of professional conduct (2008). Laundering facilities for mittens should also be formalized and efficient, rather

KEY POINTS

- Nasogastric tube displacement/removal is common after stroke and reinsertion may be required
- Interventions such as tape on face, hand mittens and nasal loop (bridle) may be used to prevent nasogastric tube displacement/removal
- Current use of interventions used to keep nasogastric tubes in place is varied and controversial
- Interventions may be viewed as 'a necessary evil', i.e. justifiable as a final resort, to ensure patients' nutrition and hydration after stroke

than ad hoc.

Implications for research

This study highlights that future research should evaluate whether positioning the tube in the nostril of the affected or unaffected side results in different outcomes. Similarly, means of securing tape should be evaluated to identify the most effective and comfortable technique(s). Current use of interventions used to keep NG tubes in place, such as mittens, is varied and controversial. Indeed, restriction of movement could limit or delay rehabilitation, although studies have suggested that restricting the unaffected limb might encourage movement of the limb affected by the stroke and thus have potential to promote recovery (constraint induced movement therapy) (Taub et al, 2006). Early studies of the nasal loop suggest that it allows a more secure placement of a NG tube (Anderson et al, 2004), but there are concerns that tube dislodgement with a nasal loop in situ may result in trauma to the nasal septum. Staff require training on how to site the nasal loop safely.

Limitations

Given that this study was small it is possible that additional participants could provide alternative insights. Therefore, claims of theoretical development at this stage would be over-ambitious. Transferability of findings to individuals placed in similar situations in other hospitals is also problematic due to study size.

Conclusions

The core category, 'a necessary evil', highlights the insight that interventions to maintain NG feeding are never desirable but sometimes required. However, at present there is little research to evaluate the effectiveness of interventions used to keep NG tubes in place; therefore their use remains varied and controversial.

By consulting individuals who have the experience of stroke practitioners can ensure that future stroke research is of particular relevance to stroke patients and their relatives (Goodare and Lockwood, 1999). These findings have been used to inform a questionnaire that will be sent to staff in stroke units throughout the UK. This larger study should indicate whether these study findings are transferable to other stroke units and indicate whether further studies of interventions to keep NG tubes in place are necessary.

Acknowledgments: This study was funded by Chest, Heart and Stroke, Scotland. The authors would like to thank the healthcare practitioners, patients and their relatives in NHS Lothian stroke units at the Western General Hospital, Royal Victoria Hospital, Royal infirmary of Edinburgh and St John's Hospital for taking part in this study. The authors also thank Professor Beth Alder for looking at earlier drafts of this manuscript.
Conflict of interest: none declared.

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