Awareness campaigns of Atrial Fibrillation as an opportunity for early detection by pharmacists - an international cross-sectional study

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Abstract

Background: Atrial fibrillation (AF) accounts for up to one third of strokes, one of the lead mortality causes worldwide. The European Society of Cardiology guidelines recommend opportunistic screening as a means to increase the odds of early detection and institution of appropriate treatment according to risk factors identified. However, in most countries there are various barriers to effective uptake of screening, including low awareness. The Atrial Fibrillation Association is a patient association engaged with raising awareness of AF. Establishing a partnership with the International Pharmacists for Anticoagulation Care Taskforce, we set as goals to test a model for raising awareness of AF involving pharmacists globally; and to identify barriers and enablers to its implementation.

Methods: A cross-sectional study was conducted during the Arrhythmia Alliance World Heart Rhythm Week. Pharmacists from 10 countries invited individuals (≥40 years; without anticoagulation therapy of AF) to participate in the awareness campaign. Participants agreeing were engaged in the early detection of AF (EDAF) using pulse palpation. Individuals with rhythm discrepancies were referred and prospectively assessed to have information on the proportion of confirmed diagnosis, leading to estimate the detection rate. Interviews with country coordinators explored barriers and enablers to implementation.

Results: The study involved 4,193 participants in the awareness campaign and 2,762 in the EDAF event (mean age 65.3±13.0), of whom 46.2% individuals were asymptomatic, recruited across 120 sites. Most common CHA_2DS_2-VASc risk factor was hypertension.

Among 161 patients referred to physician, feedback was obtained for 32 cases, of whom 12 new arrhythmia diagnoses were confirmed (5 for AF, 2 for atrial flutter), all among elders (≥65 years). Qualitative evaluation suggested a local champion to enable pharmacists' success; technology enhanced engagement amongst patients and increased pharmacists' confidence in referring to physicians; interprofessional relationship was crucial in success.

Conclusion: This study suggests involving pharmacists is beneficial for greater outreach of awareness campaigns. Effective communication pathways for inter-professional collaboration are needed to gain full benefits of EDAF.

Keywords: Atrial fibrillation; awareness; pharmacists; pulse check; early detection of disease

Background

Mass screening at the population level is one means for early detection of a disease, within the scope of public health initiatives. The StrokeStop study involved thousands of individuals screened for atrial fibrillation (AF).[1] However, demonstrating that opportunistic screening is more cost-effective led to consider new venues.[2] Community pharmacies are conveniently located, easily accessible and serve many individuals, including asymptomatic, making pharmacists positioned to undertake initiatives for the early detection and management of chronic diseases.[3,4] Various early detection events have been shown feasible and effective when delivered through pharmacies[5], including the early detection of AF (EDAF), tested in Australia, New Zealand, Canada and the UK.[6-10] Considering the high prevalence of AF in the elders, the risk of thromboembolic events (mainly stroke), the existence of effective medicines, and the success of previous EDAF in pharmacies, the development of pharmacist-patient partnerships in awareness on a global scale seemed natural.[6]

Methods

Aims and objectives

The primary aim of this study was to test a model for raising awareness of AF involving pharmacists globally and to use this event for opportunistic EDAF. A secondary objective included identifying the enablers and barriers to program implementation.

Design and procedures

The International Pharmacist for Anticoagulation Care Taskforce (iPACT) created a partnership with the Atrial Fibrillation Association (AF Assoc) & Arrhythmia Alliance (A-A) to promote the active involvement of pharmacists in awareness campaigns. A

cross-sectional study was conducted during the global A-A World Heart Rhythm week, in June 2017, involving pharmacists from ten countries. A pilot study, to determine feasibility, was undertaken in 2016 using 56 recruitment sites across five countries (Canada, New Zealand, Portugal, Spain and the UK). Five additional countries were included in the main study (Czech Republic, France, Hong Kong, Hungary and Switzerland). All individuals aged ≥40 years during the awareness event entering sites involved (community pharmacies, hospital outpatient clinics, community day care centres and nursing homes) were invited to participate in the EDAF.[12-14] Patients with known AF not on anticoagulant therapy were also addressed because this event was considered an opportunity to motivate pharmacists to engage further in medicines optimisation. Patients diagnosed with AF and prescribed any anticoagulant (except if for a limited time for the indication of venous thromboembolism including oral and parenteral drugs) were excluded.

Public Involvement

This study arose from an initiative led by the AF Assoc and the A-A. Both are registered charities with a longstanding successful history in publicising pulse awareness campaigns, for which all materials have been developed jointly between healthcare professionals and citizens, considering patients' preferences. This study aimed to go beyond awareness by contributing to EDAF. To reach such aim, the research questions, the study design and procedures were developed, refined and agreed by a steering group of four individuals, including one cardiologist, one patient representative, one clinical pharmacist and one researcher. The overall results of the study have been disseminated to study participants using social media and Health Pioneers report, issued annually by

154 the AF Assoc and the A-A. A podcast mentioning the global event has also been widely
155 spread.
156
157 *Previous training and materials used*
158 iPACT developed an online module to support education of pharmacists about AF and its
159 early detection. Pharmacists advertised the event two weeks ahead providing oral
160 information and displaying posters. Once the campaign started, pharmacists used pulse
161 taking as recommended by the latest European Society of Cardiology (ESC) guidelines
162 to identify and refer suspects of AF[11], informed individuals to manually take their pulse
163 to promote self-care, and increase awareness of AF. Participants used educational
164 materials developed by AF Assoc and A-A; non-English translations for the project were
165 developed jointly between A-A, AF Assoc and iPACT. Pharmacists engaged patients in
166 EDAF when agreement on data storage was reached, which was made possible using a
167 secure web-based application. The pulse was manually checked, using a standardised
168 procedure developed by A-A and endorsed by the UK Department of Health[15] and made
169 available on iPACT's website and in the online module. Subsequently, an assessment of
170 symptoms and risk factors was made and in some countries, the pulse check was
171 confirmed using a single-lead portable ECG device (Kardia AliveCor)®. Whenever an
172 abnormal heart rate or rhythm were detected, when having symptoms suggestive of AF
173 or in the presence of a high CHA_2DS_2-VASc score, pharmacist referred the patient to a
174 physician. All referred individuals were requested to return and provide feedback on the
175 medical consultation. The decision to undertake additional diagnostic tests, particularly a
176 12-lead ECG, or to initiate therapy was left to the physicians' discretion, even in countries
177 where pharmacists independently prescribe. Pharmacists were not compensated for
178 delivering this service nor were patients charged for this service.

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Outcomes

The primary outcomes reflecting the functionality of EDAF model were the detection rate of AF and the proportion of confirmed diagnosis. Further analysis focused on the barriers and enablers to program implementation by way of interviews with all country coordinators in March 2018. The referral pathway and the influence of the setting, country and communication format on the effectiveness of EDAF were explored. The theoretical hypothesis leading the analysis was based in Freedman *et al*, where questions posed to identify targets for EDAF where benefits are substantial include: Whom to screen? Where to screen? How to screen? [16]

Data analysis

Quantitative data analysis conducted in SPSS v.24 included non-parametric tests (Chi-square and Mann-Whitney) to compare proportions or rankings of population subgroups by setting, considering a p-value of 0.05. Qualitative data analysis focused on constant comparative analysis to understand the enablers for effective referral pathways. Each coordinator was sent an interview guide to discuss all aspects of the process with pharmacists from their respective countries. Interviews were conducted by SA with the coordinators, advising the purpose, using an adapted interview guide from the AF-study[6] (supplement 1). These interviews were audio-recorded, transcribed verbatim and analysed manually line-by-line and coded by LN for emergent themes using Charmaz's iteration of constant comparative analysis.[17]. Analyses were interpreted by LN and FC until cohesive and conceptually clear themes were identified, and discussed amongst all authors to reach consensus on interpretation of content and principal themes.

Results

The pilot study undertaken in 2016 involved 1,717 individuals, and suggested the project to be realistic, while shedding light on improvements needed to reach further individuals.[18]

The upscaling study involved 4,193 participants. Individuals with no demographic data (n=1,259), and those not meeting predefined inclusion criteria (n=172) were excluded. The largest contribution was from the UK (n=1,259; valid data from 592 individuals), although the country contributing the most valid data was Portugal (n=958), followed by Spain (n=432), Hong Kong (n=351), Canada (n=128), Hungary (n=118) and New Zealand (n=78). Some countries used this opportunity to test the referral pathway using a small sample of recruiting sites and involving few individuals (Switzerland n=48; Czech Republic n=45; France n=12). The final analysis included 2,762 individuals, mainly recruited in community pharmacies, with smaller numbers in other settings (Figure 1).

Globally 120 recruitment sites were used, including 104 community pharmacies, three community care centres, two hospitals, and one nursing home. Some characteristics were similarly distributed across sites, while others were clearly influenced by the site, particularly CHA_2DS_2-VASc score. Most individuals were female (68%), with a greater gender inequality where the elder prevailed ($p<0.05$). Mean age was 65.3 ±13.0, while nursing homes displayed a significantly higher mean age ($p<0.05$). Nearly half the individuals were asymptomatic for heart difficulties, with a slightly higher proportion of asymptomatic found at the day care centre. The most common symptom found in all settings was tiredness and the most common stroke CHA_2DS_2-VASc risk factor was hypertension. The least common was previous myocardial infarction, followed by stroke. In contrast, patients from nursing homes more frequently reported previous history of

229 stroke, compared to others settings ($p<0.05$). The mean CHA_2DS_2-VASc score was 2.6
230 in the overall sample, varying significantly between settings ($p<0.05$) [Table 1].
231 Overall, 161 patients were referred to the physician (5.8%), with a lower proportion
232 among those submitted only to manual pulse taking (5.2%; 74/1,416) compared to those
233 where manual pulse was confirmed by the one-lead device (6.5%; 87/1,346). The
234 proportion of referrals ranged from 3.0% in the UK to 8.9% in Spain, the most common
235 being around 6.0-7.1% (Switzerland, Hong Kong, Czech Republic and New Zealand).
236 Portugal was an exception, where few of the pharmacies had access to the device but the
237 overall trend was to use solely manual pulse taking. In this country, referral was higher
238 for those pharmacists using portable devices (11.1% versus 4.2%). However, when only
239 manual pulse was used, more frequently a confirmed diagnosis was obtained from the
240 physician (n=10/1,416 vs n=2/1,346).
241 Considering the subsample, in which the one-lead portable ECG device was used
242 (n=1,346; 48.7%), 60 individuals were identified as having "possible AF" (4.5%). There
243 were additionally 14 individuals with known AF, three of whom were medicated with
244 antiplatelet agents, actionable AF (0.2%).[19] These individuals were advised to consult a
245 physician.
246 The detection rate was different across health care settings, and in line with the changes
247 in CHA_2DS_2-VASc score (Table 2).
248 The analysis was restricted to individuals aged ≥ 65, justified by previous research[20], and
249 where the portable ECG device was used, justified by the higher validity.[21] Among
250 referred patients (n=161), feedback was obtained for 32 cases (19.9%). In total 12 new
251 arrhythmia diagnoses were confirmed, five for AF (0.32% among the elderly). All five
252 cases were identified among elders in the community pharmacy, two following manual
253 pulse check and three subsequently confirmed by the portable ECG device. There were

two additional cases of atrial flutter, also among the elderly in community pharmacy and confirmed by the physician. Two cases of bradycardia were detected, one resulting from iatrogenic reaction to beta-blockers.

Qualitative results

The interviews suggest that identification of a local champion was instrumental in enabling community pharmacists to successfully undertake EDAF. The key enabling factors facilitated by the local champion was finding innovative ways to combine with existing services and enabling flexibility in service provision leading to new opportunities to identify AF (Figure 2).

Local champion

One local champion was even able to offer EDAF to people on public transport:

"*One of my rural colleagues checked pulses in a group of older Maori women in the back of the bus going to town".* (New Zealand)

Combine with existing services

Managing existing services was viewed as a useful way to engage with EDAF and enhance recruitment; patients liked the addition of EDAF to medication review, or to other cardiovascular risk factor clinics. Multiple participants commented that combining these services provided benefit and increased patient acceptance:

"*In the context of a medication review or other professional service, patients were more likely to accept AF screening. Patients often said they felt that the medication review was more comprehensive with the AF screen than without*". (Canada)

Enhanced role

This ability to combine services provided a useful enhanced role for pharmacists and they were notably more willing to engage with these services if they had prior experience of offering enhanced services. They reported having the required skills and expertise to engage in these services:

"*My team's previous involvement in the national Pharmaceutical care program of hypertension enabled us to actively participate in the pulse awareness campaign quite easily*"… "*In fact, probably creating links with other existing programs would maximise the efficiency in practice*". (Hungary)

Conducting these events gave pharmacists a greater understanding about the potential for a wider scope of practice and felt participation could be motivational:

"The events have been a good way to motivate the staff, to show pharmacists that there are other valuable roles they can take on. It was also useful for intern pharmacists to participate in, to get them used to touching patients and in providing more general medical, rather than pharmaceutical knowledge." (New Zealand).

<u>Flexibility of setting</u>

Others struck a note of caution about the rapid increase in role diversity in pharmacists and the changing environment in which pharmacists are working:

"The scope of practice of pharmacists is quickly expanding. We just had a decree published enabling us to offer more services, namely in health promotion and disease prevention (e.g. HIV screening). This could be a very interesting additional service in the future, provided the referral pathway is improved." (Portugal)

<u>Bright inviting patient materials</u>

A key area for increased engagement was the provision of bright inviting patient materials, which a local champion could play a key role in tailoring for the local setting.

"We used two billboards at the pharmacy door and had them on sight during the entire week…we also used Facebook and twitter to advertise the Heart Rhythm week". (Spain)

Text dense page booklets

The patient materials could also act as barriers, because of their text-dense, complex language; for the older, with lower health-literacy, or finding the information inaccessible:

"The large detailed information sheet on AF is very wordy and off-putting to many patients." (New Zealand)

Language barrier

"Most of our elders (1/3) could not read and that hindered the use of leaflets". (Hong Kong)

Finding AF

Successfully identifying AF acted as a major enabler to sustained service provision as it increased the sense that there was a value in providing the service, and enabled a sense of camaraderie between the GPs and the pharmacists conducting the screening:

"*The first patient we screened in our initial AF week initiative turned out to have undiagnosed asymptomatic AF. I had previously informed the GPs of the initiative and they were supportive. We had agreed on a point of referral should a pharmacist find an irregular pulse. An hour after we sent the patient for review the clinical director came down to tell us that an ECG had confirmed AF. After that the GPs also upped their screening rate for the week*". (New Zealand)

Simplicity of screening and online resources

Pharmacists commented on the ease of technology and the enhanced engagement provided amongst patients:

"*The screening for AF with the Kardia® Mobile ECG-Monitor was very easy. In addition, patients were very curious and most patients asked, also agreed to be checked*". (Switzerland)

While most pharmacists commented on the positive engagement, there were some patients who felt that their GPs were already providing these services, or did not really see the point of engaging in EDAF in pharmacy. It was younger more technologically aware patients who were interested in the tests, while those more likely to benefit showed a greater reluctance to participate:

"Patients who were more reluctant to use technology were less keen to be involved in the AF screening. Often younger, more tech savvy patients were the patients who were more eager to be assessed. Other patients felt that their physician already provided such services during their annual physical." (Canada)

<u>Better communication</u>

The patient relationship with the physician was crucial for the success (or otherwise) of pharmacy based EDAF, as physicians were influential, with some pharmacists reporting a good relationship with their local GPs enabling better service provision.

"*We are fortunate where we work as we already have an established relationship working closely with our clinicians and this was another opportunity to extend our clinical activity to improve the care or in the case detection of a condition for people with AF*". (UK)

<u>Cardiologists unwilling to relinquish tasks</u>

Some physicians resisted pharmacists taken on EDAF and to pharmacist-led initiatives in general, which acted as local barriers to uptake:

"Some physicians are quite strongly against these pharmacist-led initiatives, which make implementation much more difficult." (Hungary)

Pharmacists found the EDAF process less rewarding when feedback was not obtained:

"In Hungary, there was absolutely no feedback whatsoever from physicians, so confirmation of any referral was impossible to obtain…a long way needs to be worked here" (Hungary)

When a good relationship existed, pharmacists commented that conducting EDAF enhanced their relationship with local care providers, and particularly liked the enhanced communication:

"*Overall, (it was a) very rewarding experience. Patients, particularly those with underlying cardiovascular disease, were very appreciative that we were offering such a service… The team also saw the value of the screen and often helped in the recruitment of patients…it led to collaboration between pharmacy technicians, assistants and pharmacists.*" (Canada)

Financial constraints

A major challenge remained in considering sustaining a service like this, in particular relating to finances for undertaking EDAF, which acted as a key barrier globally:

"*Whilst this is easily deliverable in community pharmacies, this needs to be commissioned for this to be undertaken routinely"*. (UK)

Discussion

A large number of individuals were involved, suggesting community pharmacies offer a convenient and accessible venue for awareness campaigns. The demographics include a high proportion of patients with chronic medical conditions and contribute to the high detection rates previously shown.[19,22] This international roll-out experience showed the enormous potential of such initiatives raising the awareness on AF to over 4,000 individuals across ten countries. The involvement of 2,762 individuals in EDAF was also an achievement, although the detection rate of new cases was only 0.18% restricting to

those physician confirmed, but could be as high as 4.5% assuming device detected AF. This rate varied across settings, likely related to the number of co-morbidities indicated by the CHA_2DS_2-VASc score and age contributing to the progressive increase in the incidence of AF.[23] The weighted average for detection rate of new cases in screened groups across all studies reported by European Heart Rhythm Association is 0.9%.[24]

Because opportunistic screening is recommended for patients aged ≥ 65,[11] we have recalculated the detection rate, finding a detection rate of 1.8% in the ambulatory setting, in line with the 1.4% previously reported.[20] This value could be underestimated, because we used single-time point screening; and particularly in some countries, the healthcare system's organization leads to delayed response. Conversely, the validity of methods used is likely to generate some false positives.

The experience gained from this initiative suggests that involving pharmacists from various settings has benefits, namely reaching younger individuals where raising awareness about AF is effective in health promotion. The higher proportion of suspected AF detected in day care centres and nursing homes is not surprising as the older are more likely to have AF and other arrhythmias. Previous studies have demonstrated high cost-effectiveness of using community pharmacies to screen for AF using portable devices.[5] We are aware that more episodic pulse checks would increase the rate of detection.[25] Using pulse palpation has benefits in access, and limitations associated with the technique's validity.[5] Regular implementation in practice is needed to achieve full potential of the pharmacist delivered EDAF. The confidence of pharmacists to advise patients on anticoagulation varies by region.[26] This implies that while for some countries an online training could suffice, for others intensive face-to-face training with practical components would be necessary. The possibility of involving practice nurses and clinic receptionists in EDAF was also explored elsewhere showing differences in confidence

addressing patients.[27] This supports the need for tailored education, especially in multi country initiatives where levels of practice vary widely. Pharmacists need additional training in communication skills, particularly on disclosing information, an aspect to be addressed in the future in cooperation with the medical and civil society organizations. Our qualitative data suggests a need for investing in efficient referral pathways to ensure patients identified with AF receive anticoagulation where appropriate. The differences in referral rates could result from various factors, including access to portable ECG devices, patient's unwillingness, more advanced practice levels[26] or stronger inter-collaboration networks in place. The main difficulties in gaining the benefits could be access to 12-lead ECG assessment and physician acceptance of the EDAF. Initiatives aimed at a direct referral to a one-stop AF clinic are already being explored.[28] Approaches combining EDAF with existing services were suggested, *e.g.* immunization, medication review or cardio checks.

Participants thought that perceiving an unmet need would increase the recognition of the value of this initiative. As such, in the future we intend to explore individuals' previous experience with the health care services.

The easy use and previous validity data drove the choice of device. However, unavailability in some countries limited standardization of the procedure. A high proportion of unclassified (8.4%) and unreadable (0.4%) traces were found, repeated, but when unsolved, led to referral for investigation. It is worth highlighting that some of these devices are currently marketed directly to consumers, which may have implications for patients and for the health care system. In fact, we believe having healthcare professionals as entry points to the system is beneficial and pharmacists working collaboratively are key to ensure signs, symptoms and false positives are identified, avoiding unnecessary use of medical services and patients' concerns.

Although this study is valuable due to the innovative approach to pharmacists' traditional role and the number of countries involved, limitations exist. We opted to provide a unified process for recruitment without sample size estimation, where all countries were motivated to participate, regardless of their resources. This option led to greater outreach but for a lower ability to engage in subgroup analysis of data. We used manual pulse as a means for raising awareness but also for EDAF. However, we noticed pharmacists with access to portable devices felt more confident to refer subjects with possible AF to physicians. Only around a quarter of suspected cases were referred. The reasons abovementioned for low referral are not applicable to actionable AF, where individuals were referred using an unstructured procedure attributable to the setting (hospital waiting area), leaving the decision to consult the physician on the patient with no possible feedback. This suggests this venue is effective for awareness but not suitable for EDAF. The more frequent confirmation of diagnosis when only manual pulse was taken might result from a greater perceived need to come to a diagnosis.

In some countries, there is no access to medical history; hence, patient reports were used, potentially leading to misclassification bias. Missing data may result from difficulty understanding the English data collection form, an aspect to be addressed in the future creating a multilingual app. The main drawback seems to be the low proportion of confirmed diagnosis, which led us to highlight the detection rate identified by the mobile single-lead ECG device and a need for investing in efficient referral pathways in future work to ensure patients identified with AF receive anticoagulation where appropriate. The true detection rate is much lower, but we believe it results mainly from a culture of interprofessional collaboration that needs boosting in many countries. It is worth stressing that results are not generalizable elsewhere, as health system's functioning and

professional culture seems to play a heavy influence on communication needed for such events.

Conclusions

Our data shows the enormous potential of involving multiple stakeholders in awareness events, as we have reached over 4,000 individuals across ten countries in only one week. The ability to engage in EDAF seems however to be lower. Although nearly 3,000 individuals were involved, the main barrier identified was the healthcare pathway that would ensure a physician subsequently assesses positive cases. Our data suggests that it might not be the setting per se to influence the detection rate, but the infrastructure in place, namely the possibility to use portable devices but above all the existing communication channels between pharmacists and physicians. Other barriers seem easier to tackle, namely the availability of devices or more intense training. However, the improvement of healthcare systems' functionality calls for multiple efforts, which must involve the public, various healthcare professionals and policy-makers.

List of Abbreviations

A-A: Arrhythmia Alliance

AF: Atrial fibrillation

AF Assoc: Atrial Fibrillation Association

CHA_2DS_2-VASc: Atrial Fibrillation Stroke Risk (Congestive heart failure history; hypertension; advanced age; diabetes; stroke or thromboembolism history; vascular disease history; sex)

CHF: Congestive Heart Failure

DM: Diabetes Mellitus

ECG: Electrocardiogram

EDAF: Early Detection of Atrial Fibrillation

ESC: European Society of Cardiology

GPs: General Practitioners

iPACT: International Pharmacists for Anticoagulation Care Taskforce

MI: Myocardial Infraction

UK: United Kingdom

HIV: Human Immunodeficiency Virus

PAD: Peripheral Artery Disease

SD: Standard Deviation

SOB: Shortness of Breath

Declarations

Ethics approval and consent to participate

The project was approved by Egas Moniz Ethical Review Board, Portugal (No. 319), Univerzita Karlova Eticka Komise, Czech Republic (No. 911), Barts Health NHS Trust Ethics Committee (No. 10357), the National Institute of Pharmacy and Nutrition in Hungary (No. 29517) and The Chinese University of Hong Kong Ethics Committee (CRE-2014.012). The remaining countries after consulting with their local or national committees, because the law mentions that as long as the activity is within the

normal scope of pharmacy practice data may be used for observational studies, it was considered that the precedent decisions were valid. As an example, regulatory law for observation studies in France states that ethical approval by an ethics committee is not mandatory when looking at healthcare professional practices (article R1121-1-II of the Public Health Code, Decree no.2017-844, 9th May 2017; available at https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000034634217&categorieLien=id. In fact, the trend to use anonymous patient data as part of the provided care and support and acknowledge its use is being adopted in many countries by various research organisations following recommendations from patients themselves, quoting "This work uses data provided by patients and collected by the NHS as part of their care and support" available at www.usemydata.org.uk.Data collection was also notified to the competent bodies (*e.g.* Comissão Nacional de Proteção de Dados, Portugal).

Patients agreeing to the EDAF gave their written consent. Only in Spain, France and Hungary were oral consent considered sufficient by the national legislation, as long as the pharmacist clearly provided all information orally, which was ensured. The informed consent included a section authorising publication of data in a compiled and anonymized format. The investigation conforms with the principles outlined in the Declaration of Helsinki.[29]

Consent for publication

Not applicable

Availability of data and material

The data that support the findings presented in this study are available from www.ipact.org Data are available from the authors upon reasonable request.

Competing interests

T. Lobban is the Founder & CEO of AF Assoc & Arrhythmia Alliance, a non-profit registered charity aiming to raise awareness of atrial fibrillation (AF), which receives funding from various sources, including donations, fundraising, grants, and trusts. Most of the authors are members of International Pharmacist for Anticoagulation Care Taskforce (FAC, VL, SA, MCC, DG, RV, JP, KML), an organization representing pharmacists with interests in anticoagulation, under the statutes of DRM-Foundation. DRM-Foundation has received funding in the past from Bayer Global and from Pfizer, Canada. S. Antoniou received personal fees and/or non-financial support from Bayer, Boehringer Ingelheim, Daiichi Sankyo and BMS/Pfizer related to AF anticoagulant management. B. Freedman reports grants to the institution, for investigator-initiated studies from Pfizer/BMS, and Bayer and Boehringer Ingelheim personal fees and/or non-financial support from Bayer, Boehringer Ingelheim, and BMS/Pfizer, related to screening for AF. None of these companies had any influence on the study design, conduct or review of results presented; neither did they provide any funding for the development of the study described.

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Authors Contributions

The manuscript was originally drafted by FAC, reviewed and enriched by KML, SA and LN, subsequently critically reviewed by all authors and proof read for English by native

co-authors, namely SA, LN, TL and BF. All named authors contributed substantially to the study conception and design (FAC, SA, TL, BF), data acquisition (RV, MCC, EP, DG, KH, VL, ST, KML), analysis and manuscript writing (FAC, KML, LN, SA). All gave final approval and agree to be accountable for all aspects of work ensuring integrity and accuracy.

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638

639 **Figure Legends**

640 Figure 1: Flowchart of study's implementation

641 Figure 2: Barriers and enablers for the success of early detection events

642 Table 1: Characteristics of individuals involved in the early detection event (overall and
643 by setting)
644 Table 2: Detection rate by setting (restricting the analysis to individuals 65 years or
645 over, using the portable device)