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## Risk factors, comorbidity and social impairment of ICD-11 PTSD and complex PTSD in Danish treatment-seeking military veterans

Running title: CPTSD Military Risk Factors, Comorbidity

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## Abstract

### Purpose: While a number of studies have investigated risk factors and comorbidities of ICD-11 post-traumatic stress disorder (PTSD) and complex PTSD (CPTSD) in various trauma exposed samples, few studies have been conducted in military samples. Existing studies with military samples have included rather small samples. The aim of the present study was to identify risk factors and comorbidities of ICD-11 PTSD and CPTSD in a large sample of previously deployed, treatment-seeking soldiers and veterans. Methods: Previously deployed, treatment-seeking Danish soldiers and veterans (*N*=599), recruited from the Military Psychology Department of the Danish Defense, completed the International Trauma Questionnaire (ITQ), as well as questionnaires of common mental health difficulties, trauma exposure, functioning and demographics. Multivariate multinomial logistic regression analysis explored differences in self-reported exposure to adversity and health outcomes between those meeting ICD-11 criteria for probable PTSD, CPTSD and no trauma disorder. Results: A total of 13.0% met probable ICD-11 criteria for PTSD and 31.4% for CPTSD. Risk factors for CPTSD (compared to those with no trauma disorder) included exposure to warfare or combat, longer duration since the traumatic event and being single. Those with CPTSD were more likely than those with PTSD or no trauma disorder to endorse symptoms of depression, anxiety, stress, use of psychotropic medication, and suicide attempts. Conclusion: CPTSD is a more common and debilitating condition compared to PTSD in treatment-seeking soldiers and veterans. Further research should focus on testing existing and novel interventions for CPTSD in the military.

*Keywords:* PTSD, Complex PTSD, ICD-11, Veterans, Military, Trauma

Introduction

The eleventh revision of ICD (ICD-11) (World Health Organization, 2018), released in 2018, describes two trauma-related disorders: post-traumatic stress disorder (PTSD) and complex PTSD (CPTSD). Diagnosis of PTSD requires (1) re-experiencing of the traumatic event in the here and now, (2) avoidance of traumatic reminders and (3) sense of current threat. The ICD-11 conceptualizes PTSD primarily as a fear response and the re-experiencing and avoidance symptoms are directly linked to the traumatic event. CPTSD follows repeated or prolonged traumatic stressors causing changes in self organization (”Disturbances in Self-organization”, shortened DSO). The DSO construct is drawn from studies of trauma exposed populations describing symptom presentations that reflect severe and pervasive problems in emotion regulation (i.e. affect hyperactivation or deactivation), in the experience of a diminished and defeated sense of self (i.e. feeling a failure or feeling worthless), and in disturbed relationships (i.e. feeling distant or cut-off from others or finding it difficult to stay emotionally close to others) (Maercker et al., 2013). A diagnosis of CPTSD requires fulfilling the PTSD criteria in addition to the fulfillment of the three (impaired) self-organization clusters.

 In ICD-11, the type of traumatic stressor is considered a risk factor rather than a prerequisite for a differential diagnosis (Cloitre, 2020; Hyland et al., 2017a). At this point, there is substantial evidence supporting the distinction between ICD-11 PTSD and CPTSD. A recent synthesis of research investigating the latent structure of The International Trauma Questionnaire(ITQ; Cloitre et al., 2018), a self-report measure for the assessment of ICD-11 PTSD and CPTSD diagnoses, found support for the conceptual coherence of PTSD and CPTSD as empirically distinguishable disorders (Redican et al., 2021). Moreover, latent class analyses have identified symptom profiles following either a CPTSD or a PTSD profile in various trauma exposed populations (Brewin et al., 2017), including some studies of military samples (Folke et al., 2019, 2021; Palic et al., 2016).

A body of work is focusing on risk factors and comorbidities of ICD-11 PTSD and CPTSD in various trauma exposed samples. Emerging evidence suggests that chronic traumatic experiences such as interpersonal trauma in childhood (Cloitre et al., 2013; Folke et al., 2019; Hyland et al., 2017a; Karatzias et al., 2017; Karatzias, Hyland, et al., 2019; Murphy et al., 2020), but also prolonged trauma in adulthood (e.g. refuges, Palic et al., 2016) is associated with an increased risk of CPTSD. With regard to comorbidities, a number studies have found high comorbidity rates of CPTSD with depression and anxiety (Hyland et al., 2017a; Karatzias, Hyland, et al., 2019; Letica-Crepulja et al., 2020; Murphy et al., 2021), ADHD (Facer-Irwin et al., 2021), alcohol and substance misuse (Facer-Irwin et al., 2021; Hitch et al., 2020), and suicidality (Hyland et al., 2018; Karatzias, Hyland, et al., 2019). CPTSD has a higher number of symptoms and therefore it is a more severe and debilitating condition than PTSD. Consequently, CPTSD would be associated with higher levels of comorbidity.

Surprisingly few studies on ICD-11 PTSD and CPTSD have been conducted in military populations. Identifying risk factors and comorbidities associated with CPTSD and PTSD in military samples has important implications for diagnosis, early intervention programs and subsequent treatment. To our knowledge, only two studies have examined risk factors and comorbidities of PTSD and CPTSD in military populations. The first (Letica-Crepulja et al., 2020) found that 80.6% of Croatian treatment-seeking veterans with PTSD (N=160) met criteria for probable CPTSD. No differences were found in types of trauma exposure between PTSD and CPTSD. Veterans with PTSD were more likely to be divorced, while veterans with CPTSD had more comorbid general anxiety disorder. The second study (Murphy et al., 2021) found 13.8% to meet criteria for PTSD and 54.3% for CPTSD in a sample of 177 treatment-seeking UK veterans. Veterans with CPTSD were younger, took longer to seek help, reported higher rates of childhood adversity, and reported more comorbidity including depression and anxiety, higher levels of dissociation and anger, and greater degree of impairment including social isolation, sleep difficulties and impaired functioning. Since both of these studies were based on relatively small samples, it was emphasized that findings regarding differences between PTSD and CPTSD must be considered exploratory due to the small number of participants (especially with “only” PTSD; *N*=31 in Letica-Culpa et al., 2020and *N=*24 in Murphy et al., 2021). We fill this gap in the literature by conducting similar research but in a large cohort of previously deployed, treatment-seeking soldiers and veterans.

## Aims

In a large sample of previously deployed, treatment-seeking soldiers and veterans, we set out to investigate if demographic characteristics (gender, age, civilian status, children, employment), previous traumatic life events in childhood and adulthood, possible childhood ADHD, time since traumatic exposure, and delayed treatment-seeking were associated with PTSD/CPTSD status. Second, we aimed to determine if probable CPTSD was associated with higher levels of functional impairment and comorbidities (psychotropic medication, drug and alcohol use, symptoms of depression, anxiety, and stress, self-rated general health, quality of life, and suicide behavior) compared to PTSD and no trauma disorder. Based on existing literature of risk factors for ICD-11 PTSD and CPTSD in military populations, as well as the wider trauma literature, we hypothesized that CPTSD will be associated with a higher number of traumatic life events (in both childhood and adulthood). Moreover, we expected that veterans with CPTSD will report the highest levels of functional impairment and comorbidities.

## Methods

### Participants and procedures

### We included previously deployed Danish soldiers and veterans (both labeled ‘veterans’) who referred themselves for treatment at the Military Psychology Department (MPD) in the Danish Defense, and who completed an on-line administered questionnaire at treatment intake between 26th October 2019 and 16th October 2021 (*N=*608). If they were multiply referred, participants were included in their first referral only. We included respondents who screened positive for at least one lifetime traumatic event (assessed using the Traumatic Life Events Questionnaire (TLEQ); 97.5%, final sample N=599). We have almost no missing data due to on-line data collection. However, two persons who filled out a paper and pencil questionnaire failed to answer some items (i.e. one person had missing on WHO5-score (0.17%) and one person had missing on information on self-rated health (0.17%), depression (0.17%), anxiety (0.17%), and stress scores (0.17%)).

## Measures

**ICD-11 PTSD and CPTSD**

### The International Trauma Questionnaire (Cloitre et al., 2018) is the only available self-report measure of ICD-11 PTSD and CPTSD symptoms. The ITQ assesses the respondent’s most distressing traumatic event and the time passed since the trauma occurred (response options: <6 months ago, 6-12 months ago, 1-5 years ago, 10-20 years ago, and <20 years ago). The ITQ contains 12 items measuring the six PTSD and six DSO symptoms. Three items assess functional impairment in the domains of social, work‐life, and other important areas of life, relating to both sets of symptoms. All items use a five‐point Likert scale ranging from 0 (“Not at all”) to 4 (“Extremely”). A symptom is endorsed based on a score of ≥2 (“Moderately”). The ICD‐11 diagnostic rules only permit a diagnosis of PTSD or CPTSD, but not both. As this measure is self-report, caseness for PTSD/CPTSD is considered probable. We used a version translated to and validated in Danish (Hansen et al., 2021). In the current sample, the internal reliability (Cronbach’s alpha) of the PTSD (α = .89), DSO (α = .89), and total (α = .92) scale scores were excellent. Based on ‘time passed since traumatic event” and the year the veteran entered the MPD clinical database, we were also able to establish whether the veteran contacted the MPD within five years after the trauma occurred (MPD>5 years).

### Socio-demographic information

### Veterans completed questions about age, gender, marital status (single; including single, divorced or widowed vs. in a relationship; including those in a relationship, cohabiting or married), occupational status (employed/studying vs. unemployed vs. sickness benefits) and children (yes/no).

### Clinical and psychological variables

### *Traumatic life events* were assessed using the Traumatic Life Events Questionnaire (Kubany et al., 2000). TLEQ lists 19 traumatic events that might have happened during a person’s lifetime, including warfare or combat, and each item score is the number of times a particular trauma has occurred with an upper limit of six, indicating that the trauma happened six or more times. Three of the 19 TLEQ-items concern childhood trauma (witnessing violence in the family, physical assault, and sexual abuse). For this study, three sum scores were calculated; one for warfare or combat (range 0-6), one for adult trauma (range 0–90) and one for childhood trauma (range 0–18).

### *Attention problems in childhood* were measured by six items describing attention problems at the age between 5 and 12 years. The items stem from the Adult Self Report Symptoms of Childhood Scale (ASRS v1. 1, ADHD Symptom Checklist for Children; Barkley & Murphy, 2006). For this study we included the information as a total score (range 0-6). A higher score is indicative of more severe symptoms. The internal reliability (Cronbach’s alpha) of the Adult Self Report Symptoms of childhood (α = .82) scale score was good.

### *Symptoms of depression, anxiety, and stress* were measured using the 42-item Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995). Each symptom category is assessed by fourteen items on a four-point Likert scale from 0 (“I did not experience it at all”) to 3 (“I experienced it many times or all the time”). Based on the answers, a total score for each symptom category is calculated that divides symptoms into five difficulty levels (Normal, Mild, Moderate, Severe, Extremely Severe). Higher scores indicate higher probability of severe illness. The internal reliability (Cronbach’s alpha) of the depression (α = .95), Anxiety (α = .92), and stress (α = .93) scale scores were excellent.

### *Alcohol use* was assessed with two modified questions from The Alcohol Use Disorders Identification Test (AUDIT-C; Saunders et al., 1993) asking how often alcohol is consumed and how many units are typically consumed. The mean number of standard drinks per week was then calculated.

### *Drug use* was assessed withsevenquestions about cannabis and other illicit drugs. For the analyses we used information about current use of cannabis and/or other drugs. The questions have been used in previous surveys including different Danish populations and veterans (Andersen et al., 2013; Ottosen & Østergaard, 2018).

### *Use of psychotropic medication* was identified by categorizing self-reported medication using the anatomical therapeutic chemical (ATC) classification system and included psycholeptica (N05) and psychoanaleptica (NO6).

### *Suicidality* was assessed using two questions from the “Euro Multicentre Study of Suicidal Behavior" (*Suicidal behaviour in Europe*, 2004) and national surveys (Ekholm et al., 2009). The questions examine suicide attempts within the last year and ever (yes/no) (“*Have you ever made an attempt to take your own life?)* and (“*During the past 12 months have you made an attempt to take your own life?*”). We dichotomized information on suicide attempts into never vs. one time or more.

### *Quality of life* was assessed using The World Health Organization 5 Well-Being Index (WHO-5; Topp et al., 2015), which is a short and generic global self-report questionnaire considered the gold-standard measure for assessing the positive well-being dimension of quality of life within the last 14 days, using five questions (6-point Likert-like scale with “at no time” (=0) to “all of the time” (=5)). Raw sum-scores (0-25) are transformed into a well-being score from 0 (worst thinkable well-being) to 100 (best thinkable well-being). Total well-being scores <50 scale points indicate well-being problems. The scale has been developed and validated in Denmark. The internal reliability (Cronbach’s alpha) of the WHO-5 (α = .87) scale score was good.

### *Self-rated health* was assessed using one question asking the respondent to rate their health on a 5-point Likert scale going from “Excellent” (=1) to “Poor” (5). The question is from the short form-36 (SF-36; Ware & Sherbourn, 1992), which is widely used to examine health in public health studies. For the present analysis we dichotomized the answers into good (including excellent, very good and good) and poor (including fair and poor) mental health.

## Statistical analysis

In a univariate analysis we estimated 1) the association between diagnostic status (PTSD, CPTSD or no trauma disorder) and the socio-demographic factors and trauma risk factors and 2) the association between diagnostic status and the clinical and psychological variables which is described in the methods section. Participants were assigned to the three groups based on the diagnostic aligoritme of the ITQ. As the ICD-11 diagnostic rules only permits a diagnosis of PTSD or CPTSD, but not both, no participant with PTSD was included in the CPTSD group and vice versa. We adjusted for multiple comparisons using the Holm-Bonferroni method (in total 20 comparisons). We used Chi-square tests for categorical variables, one-way ANOVAs for normally distributed variables, and Kruskal-Wallis tests for non-normally distributed variables. For tests including clinical and psychological variables, a post hoc test was applied if the test was significant. The post hoc tests used were Holm’s sequential Bonferroni procedure for categorical variables, Scheffé post hoc tests for normally distributed variables and the Steel-Dwass-Critchlow-Fligner test for non-normally distributed variables. In a subsequent multivariate analysis two multinomial regression models with diagnostic status as the response variable were constructed, a crude model (model 1) including only normalized childhood, warfare/combat and adulthood trauma scores as explanatory variables (Z-score transformed for meaningful and comparable odds ratios (OR)) and a model where the relation between the response and normalized trauma score was adjusted by variables found to be significant in the univariate analysis (model 2). Results are presented as OR with 95% confidence intervals (CI). For both models, error assumptions were met and no multicollinearity was found. The analyses were performed using SAS version 9.4, SPSS version 22, and R version 4.2.1.

## Results

Table 1 shows that the sample was predominantly male (93.8%) with a mean age of 39.9 (SD=9.7). Most participants were married/cohabiting (75.3%). Based on the ITQ, 31.4% (*N*=188) and 13.0 % (*N*=78) met the ICD-11 criteria for probable CPTSD and PTSD, respectively. On average, participants had experienced 5.9 (SD 3.1; median 5.0) unique lifetime traumatic events (range 1-16). The most commonly reported was ‘warfare or combat’ (*N*=479, 80.0%), which was also the most commonly reported ‘most distressing traumatic event’ (*N*=340, 56.9%). Table 2 shows sample characteristics by diagnostic status of CPTSD/PTSD. Gender, number of children, adult life and childhood trauma were not associated with diagnostic status, but the overall difference between the diagnostic groups were found for all other socio-demographic factors as well as having been involved in warfare or combat.

Table 3 describes comparisons in psychological status, addictive behaviour and functional status across the three diagnostic groups. Statistically significant differences between those with CPTSD, PTSD and no trauma disorder were found for all variables except alcohol intake and use of cannabis/other drugs. Post hoc tests showed that psycholocial and funtional status was significantly worse among participants with CPTSD compared to participants with PTSD or no trauma disorder. The PTSD and no trauma disorder groups only differed with regard to anxiety, stress scores and quality of life; those with PTSD were worse off.

Only statistically significant variables from the univariate analysis were included in the multinomial regression analysis (with the exception of information on adult life and childhood trauma). Both models shown in Table 4 were statistically significant (Model 2: Likelihood ratio χ2(20) = 110.479, p <0.0001. Nagelkerke= 0.198 indicating 19.8% of variance in group membership was explained). The likelihood of PTSD was not related to number of traumatic life events neither in model 1 nor in model 2. Older age (OR: 1.07, p<0.001) and receiving sickness benefits (OR 3.28, p<0.01) was associated with increased likelihood of PTSD. Having experienced warfare or combat traumas increased the likelihood of CPTSD (model 2, OR: 1.27, p<0.05). Also older age (OR: 1.03, p<0.01), being single (OR: 1.80, p<0.01), receiving sickness benefits (OR 1.78, p<0.05), and having experienced trauma 10 or more years ago (OR 2.95, p<0.01) significantly increased the likelihood of CPTSD compared to no trauma disorder.

## Discussion

**Main findings**

In a large sample of previously deployed treatment-seeking Danish soldiers and veterans, our results showed that 31.4% met criteria for probable CPTSD and 13.0% for PTSD. CPTSD was independently associated with having experienced warfare or combat, longer duration since traumatic exposure, and being single. Shared risk factors associated with PTSD and CPTSD were older age and receiving sickness benefits; however, both were more strongly associated with PTSD than CPTSD. When comparing participants with no trauma disorder, PTSD and CPTSD, those with CPTSD reported more functional impairment (poorer self-rated health, more use of psychotropic medication, and receiving sickness benefit more often), and more symptoms of depression and anxiety, and more suicide attempts compared to veterans with PTSD or no trauma disorder.

**Comparison with other studies**

Our finding that CPTSD was a more common diagnosis than PTSD is in line with findings from other treatment-seeking populations of civilians (Brewin et al., 2017) and veterans (Letica-Crepulja et al., 2020; Murphy et al., 2021). While PTSD is often a more common diagnosis than CPTSD in nationally representative samples, CPTSD is often more commonly reported in clinical samples (Brewin et al., 2017).

The present study found exposure to warfare or combat to be an independent risk factor for CPTSD. Military deployment to armed conflicts involves constant threat-to life, and elevated prevalence rates of CPTSD have been reported in veteran cohorts after service (Zerach et al., 2019). While previous research has found childhood interpersonal trauma to be a risk factor for CPTSD (Cloitre et al., 2013; Hyland et al., 2017a; Karatzias et al., 2017; Karatzias, Hyland, et al., 2019), also in military samples (Folke et al., 2019; Murphy et al., 2020), this was not found in the present study. The TLEQ provides information on witnessing violence in the family, physical punishment, and sexual abuse, but not emotional abuse and emotional neglect during childhood, which have previously been shown to have high predictive power for CPTSD (Karatzias et al., 2017; Knefel et al., 2015). This could partially explain the lack of association between childhood adversities and CPTSD in our study.

In line with other studies, the present study found that longer duration since traumatic exposure (Karatzias, Hyland, et al., 2019; Murphy et al., 2021) and being single (Karatzias et al., 2016) increased the risk of CPTSD. The DSO symptoms of CPTSD describe difficulties engaging in relationships, and previous studies also reported that individuals with CPTSD were more likely to be unmarried and live alone (Cloitre et al., 2013; Folke et al., 2019, 2021; Hyland et al., 2017b; Palic et al., 2016). Older age and receiving sickness benefit were shared risk factors for both PTSD and CPTSD, but being more strongly associated with PTSD than CPTSD. In line with previous studies in treatment-seeking veterans (Letica-Crepulja et al., 2020; Murphy et al., 2021), there appeared to be clear evidence of increased functional impairment associated with CPTSD, as participants with CPTSD were more likely to report poorer self-rated health, more use of psychotropic medication, and receiving sickness benefit more often than veterans with PTSD or no PTSD disorder.

A picture also emerged suggesting that those with CPTSD were more likely to report comorbidities (see post hoc analyses in Table 3). When comparing between participants with no trauma disorder, PTSD and those with CPTSD, veterans with CPTSD reported higher scores for common mental health difficulties (depression/anxiety/stress severity). There was also evidence for more suicide attempts (ever or within the last year) for veterans with CPTSD compared to the other groups. Among those with CPTSD, 30.2% reported suicide attempts, compared to 9.0% of those with PTSD, and 10.8% of those with no trauma disorder. Our results are consistent with previous findings (Folke et al., 2019, 2021; Hyland et al., 2017a; Spikol et al., 2022), suggesting high rates of comorbidity with anxiety, depression, and self-injuries/suicidal ideation in CPTSD (Hyland et al., 2017a).

**Strengths and limitations**

A notable strength of the current study is the identification of risk factors and comorbidities associated with ICD-11 PTSD and CPTSD in a large sample of treatment-seeking veterans with a history of war-related trauma. Previous studies in military samples (Letica-Crepulja et al., 2020; Murphy et al., 2021) have been conducted in relatively small samples, limiting their generalizability to the wider population of military veterans. Nonetheless, there were several limitations. First, all data were collected via self-reports which provide evidence of probable diagnosis rather than actual diagnosis. Moreover, over- and underreporting of symptoms is possible in self-rated data. The findings thus require replication with clinician-administered interviews. Second, the study was based on cross-sectional data and it is not known whether the sociodemographic, psychological and functional characteristics are causes or consequences (or both) of C/PTSD. Third, the sample consisted primarily of males, limiting generalizability to female veterans. Finally, adverse childhood experiences were reported using a relatively narrow measure of childhood trauma, which might explain the lack of association between childhood adversities and CPTSD in this study.

**Conclusion and clinical implications**

This study explored risk factors and comorbidities of ICD-11 PTSD and CPTSD in a large clinical sample of military veterans. Findings support the proposition that prolonged trauma of an interpersonal nature, such as being exposed to combat or war, is related to CPTSD symptoms years after returning from international deployment. Moreover, veterans with CPTSD reported more functional impairment, and more comorbidities compared to veterans with PTSD or no trauma disorder.

Although CPTSD is a more debilitating condition than PTSD, there is only limited evidence for its treatment. While some studies suggest that most individuals classified as having CPTSD benefit from intensive trauma-focused treatment (Voorendonk et al., 2020), there is also evidence suggesting that existing trauma-focused treatments are less efficient for CPTSD symptoms following childhood trauma (Karatzias, Murphy, et al., 2019). There is now an urgent need to explore the effectiveness of existing and new interventions for CPTSD in general and in military populations.

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**Author Contributions**

SF and ABSN conceptualized the manuscript. ABSN conducted the statistical analysis with support from LRN and SF wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

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**Data availability statement**

Due to privacy and data protection regulations of the Danish Defense, data from the current study cannot be shared.

## Declarations

**Conflict of interest**

The authors declare that they have no conflict of interest.

**Ethical approval**

In Denmark, studies that do not include interventions or human biological material should not be subjected to the National Committee on Health Research Ethics. All participants provided informed consent.

**References**

Andersen, S. B., Madsen, T., Karstoft, K.-I., Elklit, A., Nordentoft, M., & Bertelsen, M. (2013). *Efter Afghanistan – rapport over soldaters psykiske velbefindende to et halvt år efter hjemkomst [After Afghanistan – Danish veterans’ mental wellbeing 2.5 years after homecoming]*. Danish Veteran Centre.

Barkley, R. A., & Murphy, K. R. (2006). *Attention-deficit hyperactivity disorder: A clinical workbook, 3rd ed*. Guilford Press.

Brewin, C. R., Cloitre, M., Hyland, P., Shevlin, M., Maercker, A., Bryant, R. A., Humayun, A., Jones, L. M., Kagee, A., Rousseau, C., Somasundaram, D., Suzuki, Y., Wessely, S., van Ommeren, M., & Reed, G. M. (2017). A review of current evidence regarding the ICD-11 proposals for diagnosing PTSD and complex PTSD. *Clinical Psychology Review*, *58*, 1–15. https://doi.org/10.1016/j.cpr.2017.09.001

Cloitre, M. (2020). ICD-11 complex post-traumatic stress disorder: Simplifying diagnosis in trauma populations. *The British Journal of Psychiatry*, *216*(3), 129–131. https://doi.org/10.1192/bjp.2020.43

Cloitre, M., Garvert, D. W., Brewin, C. R., Bryant, R. A., & Maercker, A. (2013). Evidence for proposed ICD-11 PTSD and complex PTSD: A latent profile analysis. *European Journal of Psychotraumatology*, *4*(1), 20706. https://doi.org/10.3402/ejpt.v4i0.20706

Cloitre, M., Shevlin, M., Brewin, C. R., Bisson, J. I., Roberts, N. P., Maercker, A., Karatzias, T., & Hyland, P. (2018). The International Trauma Questionnaire: Development of a self-report measure of ICD-11 PTSD and complex PTSD. *Acta Psychiatrica Scandinavica*, *138*(6), 536–546. https://doi.org/10.1111/acps.12956

Ekholm, O., Hesse, U., Davidsen, M., & Kjøller, M. (2009). The study design and characteristics of the Danish national health interview surveys. *Scandinavian Journal of Public Health*, *37*(7), 758–765. https://doi.org/10.1177/1403494809341095

Facer-Irwin, E., Karatzias, T., Bird, A., Blackwood, N., & MacManus, D. (2021). PTSD and complex PTSD in sentenced male prisoners in the UK: Prevalence, trauma antecedents, and psychiatric comorbidities. *Psychological Medicine*, 1–11. https://doi.org/10.1017/S0033291720004936

Folke, S., Nielsen, A. B. S., Andersen, S. B., Karatzias, T., & Karstoft, K. I. (2019). ICD-11 PTSD and complex PTSD in treatment-seeking Danish veterans: A latent profile analysis. *European Journal of Psychotraumatology*, *10*(1), 1686806. https://doi.org/10.1080/20008198.2019.1686806

Folke, S., Nielsen, A. B. S., & Karstoft, K.-I. (2021). PTSD and complex PTSD in treatment-seeking Danish soldiers: A replication of Folke et al. (2019) using the International Trauma Questionnaire. *European Journal of Psychotraumatology*, *12*(1), 1930703. https://doi.org/10.1080/20008198.2021.1930703

Hansen, M., Vægter, H. B., Cloitre, M., & Andersen, T. E. (2021). Validation of the Danish International Trauma Questionnaire for posttraumatic stress disorder in chronic pain patients using clinician-rated diagnostic interviews. *European Journal of Psychotraumatology*, *12*(1). https://doi.org/10.1080/20008198.2021.1880747

Hitch, C., Toner, P., & Armour, C. (2020, oktober 1). *Latent class analysis of Northern Ireland veterans regarding mental health and alcohol issues: Society for the Study of Addiction*.

Hyland, P., Murphy, J., Shevlin, M., Vallières, F., McElroy, E., Elklit, A., Christoffersen, M., & Cloitre, M. (2017a). Variation in post-traumatic response: The role of trauma type in predicting ICD-11 PTSD and CPTSD symptoms. *Social Psychiatry and Psychiatric Epidemiology*. https://doi.org/10.1007/s00127-017-1350-8

Hyland, P., Murphy, J., Shevlin, M., Vallières, F., McElroy, E., Elklit, A., Christoffersen, M., & Cloitre, M. (2017b). Variation in post-traumatic response: The role of trauma type in predicting ICD-11 PTSD and CPTSD symptoms. *Social Psychiatry and Psychiatric Epidemiology*. https://doi.org/10.1007/s00127-017-1350-8

Hyland, P., Shevlin, M., Fyvie, C., & Karatzias, T. (2018). Posttraumatic Stress Disorder and Complex Posttraumatic Stress Disorder in DSM‐5 and ICD‐11: Clinical and Behavioral Correlates. *Journal of Traumatic Stress*, *31*(2), Article 2. http://dx.doi.org/10.1002/jts.22272

Karatzias, T., Hyland, P., Bradley, A., Cloitre, M., Roberts, N., Bisson, J., & Shevlin, M. (2019). Risk factors and comorbidity of ICD‐11 PTSD and complex PTSD: Findings from a trauma‐exposed population based sample of adults in the United Kingdom. *Depression and Anxiety*, *36*. https://doi.org/10.1002/da.22934

Karatzias, T., Murphy, P., Cloitre, M., Bisson, J., Roberts, N., Shevlin, M., Hyland, P., Maercker, A., Ben-Ezra, M., Coventry, P., Mason-Roberts, S., Bradley, A., & Hutton, P. (2019). Psychological interventions for ICD-11 complex PTSD symptoms: Systematic review and meta-analysis. *Psychological Medicine*, *49*(11), 1761–1775. https://doi.org/10.1017/S0033291719000436

Karatzias, T., Shevlin, M., Fyvie, C., Hyland, P., Efthymiadou, E., Wilson, D., Roberts, N., Bisson, J. I., Brewin, C. R., & Cloitre, M. (2016). An initial psychometric assessment of an ICD-11 based measure of PTSD and complex PTSD (ICD-TQ): Evidence of construct validity. *Journal of Anxiety Disorders*, *44*, 73–79. https://doi.org/10.1016/j.janxdis.2016.10.009

Karatzias, T., Shevlin, M., Fyvie, C., Hyland, P., Efthymiadou, E., Wilson, D., Roberts, N., Bisson, J. I., Brewin, C. R., & Cloitre, M. (2017). Evidence of distinct profiles of Posttraumatic Stress Disorder (PTSD) and Complex Posttraumatic Stress Disorder (CPTSD) based on the new ICD-11 Trauma Questionnaire (ICD-TQ). *Journal of Affective Disorders*, *207*, 181–187. https://doi.org/10.1016/j.jad.2016.09.032

Knefel, M., Garvert, D. W., Cloitre, M., & Lueger-Schuster, B. (2015). Update to an evaluation of ICD-11 PTSD and complex PTSD criteria in a sample of adult survivors of childhood institutional abuse by Knefel & Lueger-Schuster (2013): A latent profile analysis. *European Journal of Psychotraumatology*, *6*(1), 25290. https://doi.org/10.3402/ejpt.v6.25290

Kubany, E. S., Leisen, M. B., Kaplan, A. S., Watson, S. B., Haynes, S. N., Owens, J. a., & Burns, K. (2000). Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: The Traumatic Life Events Questionnaire. *Psychological Assessment*, *12*(2), 210–224. https://doi.org/10.1037//1040-3590.12.2.210

Letica-Crepulja, M., Stevanović, A., Protuđer, M., Grahovac Juretić, T., Rebić, J., & Frančišković, T. (2020). Complex PTSD among treatment-seeking veterans with PTSD. *European Journal of Psychotraumatology*, *11*(1), 1716593. https://doi.org/10.1080/20008198.2020.1716593

Lovibond, S. M., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales*. Psychology Foundation.

Maercker, A., Brewin, C. R., Bryant, R. A., Cloitre, M., Van Ommeren, M., Jones, L. M., Humayan, A., Kagee, A., Llosa, A. E., Rousseau, C., Somasundaram, D. J., Souza, R., Suzuki, Y., Weissbecker, I., Wessely, S. C., First, M. B., & Reed, G. M. (2013). Diagnosis and classification of disorders specifically associated with stress: Proposals for ICD-11. *World Psychiatry*. https://doi.org/10.1002/wps.20057

Murphy, D., Karatzias, T., Busuttil, W., Greenberg, N., & Shevlin, M. (2021). ICD-11 posttraumatic stress disorder (PTSD) and complex PTSD (CPTSD) in treatment seeking veterans: Risk factors and comorbidity. *Social Psychiatry and Psychiatric Epidemiology*, *56*(7), 1289–1298. https://doi.org/10.1007/s00127-021-02028-6

Murphy, D., Shevlin, M., Pearson, E., Greenberg, N., Wessely, S., Busuttil, W., & Karatzias, T. (2020). A validation study of the International Trauma Questionnaire to assess post-traumatic stress disorder in treatment-seeking veterans. *The British Journal of Psychiatry*, *216*(3), 132–137. https://doi.org/10.1192/bjp.2020.9

Ottosen, M. H., & Østergaard, S. V. (2018). *Psykisk partnervold: En kvantitativ kortlægning* (1. udg.). VIVE-Det Nationale Forsknings-og Analysecenter for Velfærd.

Palic, S., Zerach, G., Shevlin, M., Zeligman, Z., Elklit, A., & Solomon, Z. (2016). Evidence of complex posttraumatic stress disorder (CPTSD) across populations with prolonged trauma of varying interpersonal intensity and ages of exposure. *Psychiatry Research*, *246*, 692–699. https://doi.org/10.1016/j.psychres.2016.10.062

Redican, E., Nolan, E., Hyland, P., Cloitre, M., McBride, O., Karatzias, T., Murphy, J., & Shevlin, M. (2021). A systematic literature review of factor analytic and mixture models of ICD-11 PTSD and CPTSD using the International Trauma Questionnaire. *Journal of Anxiety Disorders*, *79*, 102381. https://doi.org/10.1016/j.janxdis.2021.102381

Saunders, J. B., Aasland, O. G., Babor, T. F., De La Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption-II. *Addiction*, *88*(6), 791–804. https://doi.org/10.1111/j.1360-0443.1993.tb02093.x

Schmidtke, A., Bille-Brahe, U., DeLeo, D., & Kerkhof, A. (2004). *Suicidal behaviour in Europe: Results from the WHO/EURO Multicentre Study on Suicidal Behaviour* (s. xii, 288). Hogrefe & Huber Publishers.

Spikol, E., Robinson, M., McGlinchey, E., Ross, J., & Armour, C. (2022). Exploring complex-PTSD comorbidity in trauma-exposed Northern Ireland veterans. *European Journal of Psychotraumatology*, *13*(1), 2046953. https://doi.org/10.1080/20008198.2022.2046953

Topp, C. W., Østergaard, S. D., Søndergaard, S., & Bech, P. (2015). The WHO-5 well-being index: A systematic review of the literature. *Psychotherapy and Psychosomatics*, *84*(3), 167–176. https://doi.org/10.1159/000376585

Voorendonk, E. M., De Jongh, A., Rozendaal, L., & Van Minnen, A. (2020). Trauma-focused treatment outcome for complex PTSD patients: Results of an intensive treatment programme. *European Journal of Psychotraumatology*, *11*(1), 1783955. https://doi.org/10.1080/20008198.2020.1783955

Ware, J. E., & Sherbourn, C. D. (1992). The MOS 36-Item Short-Form Health Survey (SF-36): I. Conceptual Framework and Item Selection. *Medical Care*, *30*(6), 473–483.

World Health Organization. (2018). *International classification of diseases for mortality and morbidity statistics* (11. udg.). https://icd.who.int/browse11/l-m/en

Zerach, G., Shevlin, M., Cloitre, M., & Solomon, Z. (2019). Complex posttraumatic stress disorder (CPTSD) following captivity: A 24-year longitudinal study. *European Journal of Psychotraumatology*, *10*(1), 1616488. https://doi.org/10.1080/20008198.2019.1616488

**Tables**

**Table 1. Sample demographic characteristics (*N=*599)**

|  |  |
| --- | --- |
| **Variable** | **Mean (SD)/Number (%)** |
| Gender (male) | 562 (93.8%) |
| Age (Mean (SD)) | 39.9 (9.7) |
| Marital status (single) | 148 (24.7%) |
| Children (yes) | 413 (68.9%) |
| Employment |  |
| *Unemployed* | 27 (4.5%) |
| *Receiving sickness benefits* | 88 (14.7%) |
| Currently using psychotropic medicine | 145 (24.2%) |
| Trauma |  |
| *Childhood trauma* | 154 (25.7%) |
| *At least one other adult life trauma* | 599 (100%) |
| *Combat* | 479 (80,0%) |
| PTSD according to ICD-11 criteria | 78 (13.0%) |
| CPTSD according to ICD-11 criteria | 188 (31.4%) |

Notes: Values are N (%) unless stated otherwise, SD = Standard deviation.

**Table 2. Socio-demographic and trauma risk factors and association with diagnostic status**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **No trauma condition****(*N=*333)** | **PTSD****(*N=*78)** | **CPTSD****(*N=*188)** | **Total****(*N=*599)** | **χ2** | **df** | **Overall difference****btwn. No, PTSD,****CPTSD****P-value** | **After Holm Bonferroni correction: Evaluation of significance** |
| *Gender (male)* | 314 (94.3%) | 72 (92.3%) | 176 (93.6%) | 562 (93.8%) | 0.450 | 2 | 0.7983 | Not sig. |
| *Age (Mean (SD))* | 37.6 (9.4) | 44.9 (10.8) | 41.7 (8.7) | 39.9 (9.7) | 24.93a | 2 | <0.0001b | Sig. |
| *Marital status (single)* | 74 (22.2%) | 12 (15.4%) | 62 (33.0%) | 148 (24.7%) | 11.664 | 2 | 0.0029 | Sig. |
| *Children (yes)* | 214 (64.3%) | 61 (78.2%) | 138 (73.4%) | 413 (68.9%) | 8.278 | 2 | 0.0159 | Not sig. |
| *Employment Status* |  |  |  |  | 22.883 | 4 | 0.0001 | Sig. |
| Unemployed | 11 (3.3%) | 5 (6.4%) | 11 (5.9%) | 27 (4.5%) |  |  |  |  |
| Receiving sickness benefits | 31 (9.3%) | 20 (25.6%) | 37 (19.7%) | 88 (14.7%) |  |  |  |  |
| Possible childhood ADHD score (Median (IQR)) | 1 (0-3) | 0 (0-2) | 1 (0-2) | 1 (0-2) | 3.318 | 2 | 0.1903c | Not sig. |
| *Trauma* |  |  |  |  |  |  |  |  |
| Childhood traumas (Median(IQR)) | 0 (0-0) | 0 (0-1) | 0 (0-1) | 0 (0-1) | 2.073 | 2 | 0.3547c | Not sig. |
| Warfare or combat (Median(IQR)) | 3 (1-6) | 4 (1-6) | 6 (1-6) | 5 (1-6) | 11.178 | 2 | 0.0037c | Sig. |
| Adult life traumas (Median(IQR)) | 7 (4-13) | 8 (4-14) | 9.5 (4-17) | 8 (4-15) | 8.481 | 2 | 0.0144c | Not sig. |
| *Time before contacting MPD >5 years* | 137 (41.1%) | 52 (66.7%) | 107 (56.9%) | 296 (49.4%) | 22.637 | 2 | <0.0001 | Sig. |
| *Time since traumatic event* |  |  |  |  | 43.432 | 4 | <0.0001 | Sig. |
| Up to 12 months ago | 77 (23.1%) | 7 (9.0%) | 18 (9.6%) | 102 (17.0%) |  |  |  |  |
| 1 to 10 years ago | 130 (39.0%) | 21 (26.9%) | 50 (26.6%) | 201 (33.6%) |  |  |  |  |
| 10 or more years ago | 126 (37.8%) | 50 (64.1%) | 120 (63.8%) | 296(49.4%) |  |  |  |  |

Notes: Values are N (%) unless stated otherwise, SD = Standard deviation, IQR = Interquartile range, a= F-value, b = Anova, c = Kruskal-Wallis Test.

**Table 3. Differences between diagnostic groups on psychological and clinical variables**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **No trauma condition**a**(*N=*333)** | **PTSD**b**(*N=*78)** | **CPTSD**c**(*N=*188)** | **Total****(*N=*599)** | **Test result** | **After Holm-Bonfer-roni correc-tion: Evalua-tion of signify-cance** | **Post hoc** |
| Depression score (Mean (SD)) | 15.9 (10.4)\* | 15.2 (7.6) | 28.7 (8.3) | 19.8 (11.2)\* | Fa (2, 598) = 118.94, p<0.0001 | Sig. | c>a,b |
| Anxiety score (Mean (SD)) | 8.6 (7.1)\* | 14.4 (7.4) | 20.6 (8.3) | 13.1 (9.3) | Fa (2, 598) = 154.57, p<0.0001 | Sig. | c>a,b and b>a |
| Stress score (Mean (SD)) | 16.6 (8.6)\* | 21.4 (8.4) | 28.1 (8.0) | 20.9 (9.8) | Fa (2, 598) = 112.70, p<0.0001 | Sig. | c>a,b and b>a |
| Currently using psychotropic medicine | 52 (15.6%) | 18 (23.1%) | 75 (39.9%) | 145 (24.2%) | χ2 (2, 599) = 38.665, p<0.0001 | Sig. | c>a,b |
| Number of standard drinks per week (Median (IQR)) | 2.3 (0.5-8.0) | 2.3 (0.5-8.0) | 2.4 (0.3-9.0) | 2.3 (0.5-8.0) | χ2a (2, 599) = 0.394, p=0.8212 | Not sig. | - |
| Actual use of cannabis /other drugs | 37 (11.1%) | 9 (11.5%) | 20 (10.6%) | 66 (11.0%) | χ2 (2, 599) = 0.0521, p=0.9743 | Not sig. | - |
| Self-rated general health (fair/poor) | 113 (34.0%)\* | 32 (41.0%) | 127 (67.6%) | 272 (45.5%)\* | χ2 (2, 598) = 55.099, p<0.0001 | Sig. | c>a,b |
| WHO-5 score (Mean (SD)) | 36.4 (20.6) | 30.6 (13.9)\* | 19.2 (14.5) | 30.2 (19.7)\* | Fa (2, 598) = 54.50, p<0.0001 | Sig. | c<a,b and b<a |
| Suicide attempt ever or within last year | 36 (10.8%) | 7 (9.0%) | 57 (30.2) | 100 (16.7) | χ2 (2, 599) = 36.725, p p<0.0001 | Sig. | c>a,b |

Notes: \* indicate 1 person has missing value. Values are N(%) unless stated otherwise, SD = Standard deviation, IQR = Interquartile range, a = Anova.

**Table 4. Multinomial logistic regression results predicting CPTSD (CPTSD *N*=188; reference = no PTSD disorder *N*=333) and PTSD (PTSD *N*=78; reference = no PTSD *N=*333)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Predictors** | **PTSD (OR(CI))****Model 1** | **PTSD (OR(CI))****Model 2** | **CPTSD (OR(CI))****Model 1** | **CPTSD (OR(CI))****Model 2** |
| Trauma |  |  |  |  |
| *Childhood traumas* | 0.90 (0.68-1.21) | 0.88 (0.64-1.19) | 0.98 (0.82-1.19) | 0.99 (0.81-1.20) |
| *Warfare or combat* | 1.07 (0.83-1.38) | 1.08 (0.82-1.42) | 1.30 (1.08-1.57)\*\* | 1.27 (1.04-1.56)\* |
| *Adult life traumas* | 1.11 (0.84-1.46) | 0.95 (0.71-1.28) | 1.28 (1.06-1.56)\* | 1.18 (0.97-1.45) |
| Age  |  | 1.07 (1.04-1.10)\*\*\* |  | 1.03 (1.01-1.06)\*\* |
| Marital status (ref: In a relationship) |  |  |  |  |
| *Being single* |  | 0.65 (0.32-1.32) |  | 1.79 (1.16-2.76)\*\* |
| Employment status (ref=Working/education) |  |  |  |  |
| *Unemployed* |  | 2.14 (0.67-6.80) |  | 1.93 (0.78-4.76) |
| *Receiving sickness benefits* |  | 3.28 (1.67-6.47)\*\* |  | 1.78 (1.03-3.08)\* |
| Time before contacting MPD >5 years (ref=yes)  |  | 0.64 (0.34-1.23) |  | 1.08 (0.69-1.69) |
| Time of trauma event (ref = Up to 12 months ago) |  |  |  |  |
| *1 to 10 years ago* |  | 1.22 (0.45-3.29) |  | 1.50 (0.77-2.92) |
| *10 or more years ago* |  | 1.55 (0.56-4.33) |  | 2.95 (1.49-5.85)\*\* |

Notes: OR (CI) = Odds ratio with 95% Confidence Intervals (CIs). P-values: \*=p<0.05, \*\*=p<0.01, \*\*\*=p<0.001