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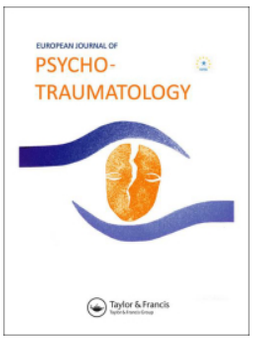

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The complex trauma of psychological violence: cross-sectional findings from a Cohort of four Danish Women Shelters

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ABSTRACT

Background: Psychological trauma has only recently been considered a traumatic event. Therefore, research on Posttraumatic Stress Disorder (PTSD) and Complex-PTSD following exposure to psychological violence, is less studied compared with physical and sexual violence.

Objectives: This study aimed to establish the prevalence of PTSD and C-PTSD of among female victims of partner violence (IPV) and examine the unique association between different subtypes of IPV (i.e. physical, psychological and sexual IPV) and the traumatic response.

Methods: The study includes a shelter-based sample of female victims of IPV (N = 147). Validated measures were used to estimate IPV exposure and mental health outcomes. Partial Correlation and Hierarchical Regression was used to examine the association between IPV and PTSD and C-PTSD, respectively.

Results: The study found a high prevalence of both PTSD (56.5%) and C-PTSD (21.1%) in the sample. Overall, when controlling for the other types of violence, psychological violence correlated with PTSD, C-PTSD, *negative affect* and *somatization*. When controlling for psychological violence, neither physical nor sexual violence correlated with any of the mental health outcomes. Hierarchical regression models helped explain 23.5% and 29.7% of the variance in symptoms of PTSD and C-PTSD, respectively.

Conclusion: A relatively large subgroup of the women had symptoms of C-PTSD, which demonstrate a potentially unmet need for trauma-informed treatment services in Danish Women Shelters. Psychological violence was found to be the strongest risk factor for all mental health outcomes and thus, it is important to acknowledge the severity of this IPV subtype.

El Trauma Complejo de la Violencia Psicológica: Hallazgos transversales de una cohorte de cuatro refugios de mujeres danesas.

Antecedentes: El trauma psicológico sólo recientemente ha sido considerado un evento traumático. Por lo tanto, la investigación sobre el Trastorno de Estrés Postraumático (TEPT) y el TEPT Complejo tras la exposición a la violencia psicológica, está menos estudiada en comparación con la violencia física y sexual.

Objetivos: El objetivo de este estudio fue establecer la prevalencia del TEPT y el TEP-C entre las mujeres víctimas de la violencia de pareja (IVP, en siglas en inglés) y examinar la asociación distintiva entre los diferentes subtipos de IVP (es decir, IVP físico, psicológico y sexual) y la respuesta traumática.

Métodos: El estudio incluye una muestra basada en refugios para mujeres víctimas de IVP (N = 147). Se utilizaron medidas validadas para estimar la exposición a la IVP y los resultados de salud mental. Se utilizó la correlación parcial y la regresión jerárquica para examinar la asociación entre la IVP y el TEPT y el TEPT-C, respectivamente.

Resultados: El estudio encontró una alta prevalencia tanto de TEPT (56,5%) como de TEPC (21,1%) en la muestra. En general, al controlar los otros tipos de violencia, la violencia psicológica se correlacionó con el TEPT, el TEPT-C, *el afecto negativo y la somatización*. Al controlar la violencia psicológica, ni la violencia física ni la sexual se correlacionaron con ninguno de los resultados de salud mental. Los modelos de regresión jerárquica ayudaron a explicar el 23,5% y el 29,7% de la variación en los síntomas del TEPT y el TEPT-C, respectivamente.

Conclusión: Un subgrupo relativamente grande de mujeres tenía síntomas de TEPTC, lo que demuestra una necesidad potencialmente no cubierta de servicios de tratamiento con información en traumas en los refugios de mujeres danesas. Se comprobó que la violencia psicológica era el factor de riesgo más fuerte para todos los resultados de salud mental y, por lo tanto, es importante reconocer la gravedad de este subtipo de IVP.

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KEYWORDS
IPV; psychological violence; women shelter; PTSD; C-PTSD

PALABRAS CLAVE
IPV; violencia psicológica; Refugio de Mujeres; TEPT; TEPT-C.

关键词
IPV; 心理暴力; 女性庇护所; PTSD; C-PTSD。

HIGHLIGHTS

- New research suggests that psychological IPV is the strongest risk factor for Complex Posttraumatic Stress Disorder, compared to physical and sexual IPV. This emphasizes the need to acknowledge the severity of psychological violence in both research and clinical practice.

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心理暴力的复杂性创伤：来自四个丹麦女性庇护所的横断面队列研究结果

背景: 心理创伤直到最近才被认为是一种创伤事件。因此, 相较于身体暴力和性暴力, 对遭受心理暴力后的创伤后应激障碍 (PTSD) 和复杂性PTSD的研究较少。
目的:本研究旨在确定伴侣暴力 (IPV) 的女性受害者中PTSD和C-PTSD的流行率, 并考查IPV不同亚型 (即身体, 心理和性IPV) 与创伤反应之间的独特关联。
方法:研究包含一个基于庇护所的IPV女性受害者样本 (*N* = 147) 。经过验证的测量用于估计IPV暴露和心理健康结果。偏相关和分层回归分别用于考查IPV与PTSD和C-PTSD之间的关联。
结果: 研究发现此样本中PTSD流行率 (56.5%) 和C-PTSD流行率 (21.1%) 均很高。总体而言, 在控制了其他类型的暴力时, 心理暴力与PTSD, C-PTSD, 负性情绪和躯体化相关。在控制了心理暴力时, 身体暴力和性暴力均与任何心理健康结果无关。分层回归模型分别解释了23.5%的PTSD症状变异和29.7%的C-PTSD症状变异。
结论:一个相对较大数量的女性亚组患有C-PTSD症状, 这表明丹麦女性庇护所中对于创伤知情治疗服务潜在未满足的需求。心理暴力被发现是所有心理健康结果的最强风险因素, 因此, 认识到此IPV亚型的严重程度很重要。

1. Introduction

The present study aims to address a current gap in the literature concerning the association between specific subtypes of intimate partner violence (IPV), especially psychological IPV, and the newly introduced diagnosis of Complex Posttraumatic Stress Disorder (C-PTSD).

Judith Herman was the first to conceptualize C-PTSD in 1992 (Herman, 1992). Herman argued that regular posttraumatic stress disorder (PTSD) failed to capture the complexity of exposure to prolonged and repeated trauma, which can occur in a state of captivity. Captivity is not only physical detention but can also represent a psychological barrier that captivates the victim and creates a unique kind of relationship with the perpetrator. The psychological state of captivity resembles the state of coercive control often described in IPV literature, which describes a relationship of dependency in which the perpetrator has power and control over the victim. The nature of this relationship puts certain victims at increased risk of a complex traumatic response, particularly those exposed to childhood abuse, sexual victimization and severe domestic violence (Cloitre et al., 2009; Herman, 1992).

Following many years of debate among researchers (Friedman, 2014), the ICD-11 (International Classification of Diseases), which will come into effect in 2022, presents a more generic PTSD diagnosis, compared to the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 2013), and C-PTSD will be implemented as a sibling disorder (World Health Organization, 2018). In addition to PTSD symptoms, C-PTSD requires three clusters that reflect disturbances in self organization (DSO; i.e. difficulties with emotion regulation, negative self-concept, and disturbed relationships; World Health Organization, 2018).

IPV has long been a known risk factor for mental health problems and PTSD has been identified in 31% to 84.4% of women exposed to IPV (Golding, 1999). Nevertheless, it is important to note that earlier studies define IPV as primarily physical and sexual acts of violence, especially back when Herman addressed the complex traumatic response. Today, psychological violence is widely recognized as an important aspect of IPV and has generated research attention in the last two decades (Jordan, Campbell, & Follingstad, 2010). Despite this, relatively few studies have examined the association between psychological violence and PTSD. This is likely due to the fact that psychological violence cannot be classified as a trauma in the DSM, seeing that is does not live up to the A1 criteria (i.e. threat to life or physical integrity) of the PTSD diagnosis (American Psychiatric Association, 2013; Follingstad, 2009). Moreover, most of the studies that do include psychological violence, pool the IPV scores and examine the total effect of IPV on mental health (Golding, 1999; Johnson, Zlotnick, & Perez, 2008). Consequently, important information on the unique contribution of each IPV subtype is lost. Nevertheless, the ICD-11 now classify psychological violence as a trauma under the definition 'extremely threatening or horrific event or series of events' (World Health Organization, 2018) and strong empirical evidence support the link between psychological violence and symptoms of anxiety and depression (Jordan et al., 2010; Lagdon, Amour, & Stringer, 2014). Few studies further indicate that psychological violence does appear to be an independent predictor of PTSD (Lagdon et al., 2014). This is supported by a recent study that demonstrates how certain non-Criterion A events, characterized as psychological trauma, should be considered traumatic events, as they are associated with especially C-PTSD (Hyland et al., 2020). To date, however, no studies have examined the unique association between psychological partner violence and C-PTSD.

Psychological violence is defined by the European Institute of Gender Equality (EIGE) as 'Any act or behaviour which causes psychological harm to the partner or former partner. Psychological violence can take the form of, among others, coercion, defamation, a verbal insult or harassment' (p. 45; EIGE, 2017). Recent epidemiological studies estimate that psychological violence is the most common form of IPV in both Europe (EUAFR, 2014) and the US (Black et al., 2011), affecting between 35% to 49% of men and women. These numbers are considerably higher than the 2.5% of men and women who report psychological violence in a recent Danish study. Still, psychological violence is also the most common form of violence in Denmark (Ottosen & Østergaard, 2018). Initially, psychological violence gained more attention, when researchers found that psychological violence was a risk factor for later physical violence (Langhintichsen-Rohling, 2005; Murphy & O'Leary, 1989; O'Leary, Malone, & Tyree, 1994). It then became evident that female victims actually perceived psychological IPV to be worse than physical IPV (Follingstad, 2009; Follingstad, Rutledge, Berg, Hause, & Polek, 1990). Today, psychological violence has even been issued an independent legal offence in some European countries (Aas & Andersen, 2017; Home Office, 2015; Justitsministeriet, 2019). Despite this, knowledge regarding the traumatic response to psychological violence remains scarce.

Given the early research on complex trauma symptomatology, described above, it is interesting that psychological violence has been overlooked in traumatic stress studies. A key feature of psychological violence is the systematic and continuous devaluation of a partner and thereby a prolonged exposure. Psychological violence, sometimes referred to as coercive control, resembles the state of captivity, described by Herman (1992), in which the perpetrator possesses a sense of control of the partner. It is therefore likely that psychological violence can cause as much harm, or possibly more, as physical or sexual violence. Indeed, acts of psychological violence such as coercion, defamation and verbal insults, specifically target the victim in ways that relate to a person's self-concept and ability to initiate and maintain healthy relationships.

In response to the current challenges described above, the present study aims to address the association between specific subtypes of IPV (i.e. physical, sexual and psychological) and the traumatic response in female victims of IPV taking residence in Danish Women Shelters. C-PTSD has never been examined in a Danish sample of female IPV victims and no studies have investigated the association between specific subtypes of IPV and C-PTSD. Thus, the aim of the present study is fourfold: (1) To establish the prevalence of PTSD and C-PTSD among female victims of IPV in four Danish Women Shelters; (2) To investigate potential differences in the associations between subtypes of IPV (i.e. physical, psychological and sexual) and PTSD and C-PTSD, respectively; (3) To investigate other moderating variables that differentiate PTSD and C-PTSD symptomatology (e.g. previous trauma and sociodemographic variables); and (4) To study the associations between PTSD and C-PTSD and additional trauma responses (i.e. dissociation, somatization, negative affect, tonic immobility, well-being and feelings of shame and guilt).

Based on previous estimates of Danish Women Shelters, we expect to find a high prevalence of physical, sexual and psychological IPV (Socialstyrelsen, 2019). We expect all three types of IPV to have strong association with PTSD and C-PTSD (Golding, 1999; Lagdon et al., 2014). Based on Herman's early work (Herman, 1992), and recent findings by Hyland et al. (2020), we further expect psychological violence to explain additional variance of especially C-PTSD symptomatology. Moreover, previous trauma, especially childhood abuse, is expected to explain part of the PTSD and C-PTSD symptomatology (Alisic, Zalta, van Wessel, & Larsen, 2014). Finally, we expect both IPV and PTSD/C-PTSD, to be associated with other negative mental health outcomes (Karatzias et al., 2019).

2. Methods

2.1. Participants

All participants (N = 147) were women taking residence at four Danish Women Shelters following exposure to intimate partner- or family related violence. In Denmark, women exposed to violence are entitled to a stay at a Women's Shelter, which is required to offer care and support to the affected women. All women (≥18 years) taking residency at one of the four shelters during the study period were invited to participate in the study. Exclusion criteria were compliant with the rules of the shelters, i.e. women with substance abuse problems and psychotic symptoms were not enrolled at the shelters and thus not included in the study. The only other exclusion criteria was language.

2.2. Language

The questionnaire was available in Danish, English and Arabic. Women from many different ethnic minorities take residence at Danish shelters and it was not possible to accommodate all languages. As evident from interpreter assistance, the most common language was Arabic, and the questionnaire was therefore translated and proofread by a professional translation company officially used by the university, to include

this ethnic group in the study. The measures used were already available in Danish from previous studies. For the Arabic translation the original English measures were used, while the sociodemographic table and surrounding writing was translated from Danish. Unfortunately, very few English (N = 4) and Arabic (N = 4) speaking women agreed to participate. This is likely explained by the impaired communication between shelter staff and non-Danish speaking women.

2.3. Procedure

Participants were asked to fill out a questionnaire within the first ten days of their stay using self-report measures. The questionnaire was filled out in a conversation room, normally used for private conversations between the women and members of staff. The women would fill out the questionnaire on their own. Yet, a member of staff would be present to answer any clarifying questions or for support in case of potential emotional reactions.

A total of 381 women were registered at the four shelters between May 2017 until August 2019. Of these, 143 women (37.5%) were excluded from the study; 45.5% of the 143 women were excluded due to language barriers, 4.9% were too mentally affected to participate (assessed by the staff), and 49.6% left the shelter too soon. Thus, 238 women were eligible for the study. Of the eligible women, it was not possible to initiate the study within the given timeframe with 20 women (8.4%) and another five women were never asked to participate due to lack of staff resources at the shelters (2.1%). Of the 213 women who were invited to participate the response rate was 69.0%. Reason for non-participation were primarily decline due to personal reasons (26.3%), for the remaining women (4.7%) the reason was not stated. The total number of participants resulted in N = 147.

Data was collected in compliance with Danish guidelines and regulations for scientific research with human subjects. All women were informed about the purpose of the study and it was explained to them that participation was voluntary and that they could withdraw their consent at any time. Participants did not receive any payment for their contribution to the study. As demonstrated in a recent meta-analysis, trauma research has not been found to have harmful consequences for the participants (Jaffe, DiLillo, Hoffman, Haikalis, & Dykstra, 2015).

2.4. Measures

2.4.1. Exposure to violence

Two subscales of the Conflict Tactic Scale (CTS2; Straus, 1979; Straus, Hamby, Boney-McCoy, & Sugarman, 1996) were used to measure physical injury and sexual coercion. The CTS2 measures frequency on a 7-point Likert scale ranging from 0 = *never* to 6 = *more than 20 times* (>20 ×). The women were asked to indicate how often they themselves have acted in an aggressive manner and how often their partner acted like this towards them. The CTS2 has shown high internal consistency, high reliability and low confounding with social desirability across cultures (Straus, 2004). In the present study, Cronbachs alpha was .84 for the total scale and .84, and .78 for the physical and sexual subscales, respectively.

2.4.2. Psychological violence

The Psychological Maltreatment of Women Inventory (PMWI-short; Tolman, 1989) measures psychological violence on two subscales; dominance/isolation and emotional/verbal attacks. Answers are given on a 6-point Likert scale in which 1 = Not applicable, 2 = Never, 3 = Rarely, 4 = Occasionally, 5 = Frequently and 6 = Very frequently. The PMWI have demonstrated high internal consistency, as well as evidence of construct, convergent and discriminant validity (Tolman, 1989, 1999) In the present study Cronbach's Alpha was .87 for the total scale and .80 and 85 for the subscale's isolation/dominance and emotional/verbal attacks, respectively.

2.4.3. Previous trauma

Previous trauma was assessed with a list of 12 events, which constitute potential traumatic experiences; i.e. accident, loss of close relative, life-threatening disease, natural disaster, threat with weapons, shock following a loved one being exposed to something life threatening, childhood neglect, assault/violence, fire, witness to a situation where someone was in danger of death or injury, physical abuse, war, childhood sexual abuse, rape, and other (Kessler, Sonnega, Bromet, & Hughes, 1995).

2.4.4. PTSD and C-PTSD

The International Trauma Questionnaires (ITQ; Cloitre, Roberts, Bisson, & Brewin, 2013) is based on the ICD-11 and measures PTSD symptoms on three core clusters (i.e. re-experiencing the event, avoidance, and hyperarousal) as well as C-PTSD symptoms on three additional clusters (i.e. disturbances in self-organization, affective dysregulation, and negative self-concept). The ITQ is rated on a 5-point Likert scale ranging for 1 = *not at all* to 5 = *extremely*. Cronbach's alpha demonstrated good internal consistency, α = .79 for the PTSD scale and α = .91 for the C-PTSD scale, in the present study. This study was conducted before the final ITQ was published in ICD-11. Therefore, Version 1 of the ITQ was used for this study. This version consists of seven items for the PTSD-scale and 17-items for the C-PTSD scale. To meet the criteria for PTSD,

symptoms must be present (with scores ≥2) in all three PTSD symptom clusters (i.e. re-experiencing, avoidance and hyperarousal). C-PTSD requires a cut-off score for each symptom cluster (i.e., hyperactivation ≥10, deactivation ≥8, negative self-concept ≥10, and disturbed relationships ≥6).

2.4.5. Tonic Immobility Scale (TIS; Fuse, Forsyth, Marx, Gallup, & Weaver, 2007)

The present study used a modified 4-item questionnaire regarding tonic immobility with selected items from the original scale. Previous studies have supported the construct validity of restricted TI-scales (Reichenheim et al., 2014). The scale is rated on a 6-point Likert scale ranging from 0 = *not at all* to 5 = *completely*. In this study, Cronbach's alpha was .79 for the total scale.

2.4.6. The Harvard Trauma Questionnaire (HTQ; Mollica et al., 1992)

Fifteen questions from the original HTQ was included to cover hopelessness and loneliness, which is known to be associated with a traumatic reaction. The HTQ is measured on a 4-point Likert Scale ranging from 1 = *Not at all* to 4 = *Extremely*. The HTQ has demonstrated good cross-cultural validity and reliability (Mollica et al., 1992). Cronbach's alpha was .85 in this study.

2.4.7. Well-being

The WHO-5 measures well-being on a 6-point Likert scale ranging from 0 = *At no time* to 5 = *All of the time*. The WHO-5 was developed at the Psychiatric Research Unit, Mental Health Centre North Zealand in Denmark and has been found to show high validity and reliability (Topp, Østergaard, Søndergaard, & Bech, 2015). Cronbach's alpha was .88 in the present study.

2.4.8. Trauma symptoms

The Revised Trauma Symptom Checklist[1] (TSC-26; Briere & Runtz, 1989; Krog & Duel, 2003) was included in the study to cover negative affect, somatization and dissociation. Krog and Duel (2003) have previously demonstrated good reliability as well as factor and criterion validity in a Danish setting. The TSC-26 is measured on a 4-point Likert scale ranging from 0 = *never* to 3 = *very often*. Cronbach's alpha for the total scale was .93 in the present study. For the three subscales, Cronbach's alpha was .84 for negative affect, .86 for somatization, and .78 for dissociation.

2.5. Statistical power

A power analysis was applied to estimate the required sample size necessary to detect small to moderate effects (i.e. $\alpha = .05$, power $1\text{-}\beta = .80$; Cohen, 1992). The power analyses tool G*Power was used to calculate the appropriate sample size. The calculations revealed that a sample size of 76 was necessary to apply the relevant correlation analyses, while a sample 43 was necessary to apply a multiple hierarchical regression analyses with seven predictors. This was well within the final sample size of $N = 147$.

2.6. Plan for data analysis

All statistical analyses were conducted in SPSS version 25. Initially, a missing data analysis was conducted. This revealed very few missing's (average 3.86 with only $N = 9$ missing >10%). Subsequently, missing's were not considered to be a problem. Chi-square tests and t-tests were conducted to compare participant according to their trauma symptomatology (i.e. PTSD vs. C-PTSD) on all variables describing demographics and exposure to IPV or previous trauma. Cohen's D and Odds Ratios were calculated for significant findings.

Bivariate and partial correlations were applied to measure the relationship between exposure to subtypes of IPV (i.e. physical, sexual, and psychological) and mental health outcomes (i.e. PTSD, C-PTSD, negative affect, somatization, and dissociation).

Two hierarchical regression models were applied to explain the variance in trauma symptomatology (i.e. PTSD and C-PTSD). Both analyses were four-step models including childhood sexual abuse, physical/sexual violence, psychological violence, and guilt. The selected sequences of the models were based on previous research, which has demonstrated that physical and sexual IPV (Dworkin, Menon, Bystrynski, & Allen, 2017; Golding, 1999), as well as childhood sexual abuse (Paolucci, Genuis, & Violato, 2001), are well-established predictors of PTSD. Thus, the model was estimated to examine if psychological violence would add to the explained variance of PTSD and C-PTSD. The models were compared to explain differences in symptom variance between PTSD and C-PTSD.

3. Results

An overview of the data was obtained by frequency distributions. Based on these, data was assumed to be normally distributed and the plan for data synthesis could be applied. The mean age of the participants was 34.6 (SD = 10.1) and 68.3% of the women had children. Regarding nationality, 75.2% of the women had Danish citizenship and another 60.3% reported Denmark to be their country of origin. On average, the violence had been ongoing for five years. Demographic information is shown in Table 1.

Chi-square tests and independent t-tests indicated no significant differences between the PTSD and C-PTSD group when comparing the following socio-demographic variables; *age* ($t(52.2) = -1.01$, $p = .316$), *current sense of safety* ($t(47.1) = .10$, $p = .918$), *use of psychopharmacology* ($\chi^2(2) = 1.60$, $p = .450$), *current contact with perpetrator* ($\chi^2(1) = .162$, $p = .687$),

Table 1. Demographic information for all female participants (N = 147).

	M (SD)	%
Age	34.6 (10.1)	-
Perpetrator age	39.5 (11.7)	-
Time since violence started (years)*	5.2 (5.5)	-
Current sense of safety	3.9 (2.0)	-
Use of psychiatric drugs		
• *Yes*	-	11.3
Type of violence (reason for enrolment)		
• *Material*	-	41.4
• *Physical*	-	81.5
• *Psychological*	-	98.6
• *Sexual*	-	31.5
• *Financial*	-	45.2
• *Honour-related*	-	7.6
• *Stalking*	-	15.2
Perpetrator		
• *Current spouse/partner*	-	70.5
• *Former spouse/partner*	-	15.1
• *Parent(s) or stepparent*	-	4.9
• *Other family member*	-	1.3
• *Several*	-	8.2
Still in contact with the perpetrator?		
• Yes	-	49.3
Previous resident at a shelter?		
• Yes	-	18.1
Number of children	1.4 (.7)	-
Is the perpetrator the father of the children?		
• Yes	-	74.3
Custody of children		
• Shared custody	-	84.4
• Mother has custody	-	15.6
• Father has custody	-	-
Current job status		
• Employed or self-employed	-	38.2
• Student	-	18.8
• Housework/domestic	-	4.2
• Retired	-	1.4
• Job searching, sick-leave, social benefits, etc.	-	37.4
Current job status of the perpetrator		
• Employed or self-employed	-	55.2
• Student	-	6.7
• Housework/domestic	-	2.2
• Retired	-	4.5
• Job searching, sick-leave, social benefits, etc.	-	31.4
Educational level		
• No education/primary school	-	0.7
• Secondary school	-	32.2
• Vocational/short higher education	-	24.7
• Medium higher education	-	21.9
• Long higher degree (master)	-	20.5
Educational level of the perpetrator		
• No education/primary school	-	3.4
• Secondary school	-	38.8
• Vocational/short higher education	-	14.7
• Medium higher education	-	27.6
• Long higher degree (master)	-	15.5
Citizenship		
• Danish	-	71.0
• Other	-	29.0
Citizenship of the perpetrator		
• Danish	-	75.0
• Other:	-	21.4
Country of origin**		
• Denmark	-	67.7
• Other:	-	32.3
Country of origin of the perpetrator		
• Denmark	-	55.6
• Other:	-	44.4

*Measured in full years from violence started until arrival at shelter.
**N = 33 women disclosed what their country of origin as 'other than Denmark'; These women came from 25 different countries from four different continents, which made it difficult to categorize and report in a meaningful way.

previous resident at shelter ($\chi^2(1) = .28$, $p = .597$), *perpetrators relationship with child[ren]* ($\chi^2(1) = .39$, $p = .532$), *custody* ($\chi^2(1) = .01$, $p = .905$), *job status* ($\chi^2(4) = 4.42$, $p = .352$), *education level* ($\chi^2(4) = 1.24$, $p = .872$), *citizenship* ($\chi^2(1) = .34$, $p = .560$), and *country of origin* ($\chi^2(1) = .16$, $p = .686$).

As evident from Table 2, women with C-PTSD had on average experienced more previous trauma events ($M = 4.7$) compared to those with PTSD ($M = 3.7$) and those with no PTSD symptoms ($M = 3.4$). The difference in total previous traumas between the PTSD and C-PTSD group was non-significant. Bivariate analysis indicated that the C-PTSD group had experienced significantly more childhood sexual abuse ($\chi^2(1) = 4.22$, $p = .04$; OR = 1.77, CI 95%, .65, 4.81) compared to the PTSD group.

3.1. Exposure to violence and symptom severity

The women reported being victims of both frequent and severe physical, psychological, and sexual violence (Table 3). When comparing exposure to violence, women with symptoms of C-PTSD had been exposed to more violence measured on all subtypes except for 'threat to kill if leaving the perpetrator', in which the PTSD group scored higher. These differences were only significant for psychological violence (measured by the PMWI), as indicated by an independent t-test, with small to medium effect sizes; *verbal/emotional* (Cohen's $d = .53$), *dominance/isolation* (Cohen's $d = .39$), and *total PMWI* (Cohen's $d = .55$). The women reported conducting relatively few violent acts themselves and there was no significant difference between those with PTSD and those with C-PTSD; [*physical* M = 2.0 (SD = 3.1) t(36.2) = −1.6, $p = .109$], *psychological* [$M = 3.2$ (SD = 2.6) $t(47.6) = -.90$, $p = .371$], and *sexual* [$M = .1$ (SD = .6) t(29.9) = −.87, $p = .390$], respectively.

As measured by the ITQ, 77.6% of the women reported symptoms in all three PTSD clusters, while 21.1% reported symptoms in all C-PTSD symptom clusters (resulting in 56.5% meeting symptoms of PTSD only). The C-PTSD group further reported more severe PTSD symptomatology in the three PTSD clusters $t(57.0) = -4.09$, $p = <.0001$ (Table 4). Among those with neither PTSD nor C-PTSD ($N = 33$), 64% reported PTSD at s subclinical level. Those with C-PTSD reported significantly more trauma related symptoms as measured by the TSC-26 with large effect sizes; *Negative affect* (Cohen's $d = 1.45$) *somatization* (Cohen's $d = .82$), *dissociation* (Cohen's $d = 1.06$), and *total TSC-scores* (Cohen's $d = 1.22$), as well as by the total HTQ (Cohen's $d = 1.55$). Looking at specific items of the HTQ, feelings of both guilt and shame were more profound among those with C-PTSD [$t(52.5) = -5.2$, $p = .000$, Cohen's $d = 1.11$] compared to PTSD [$t(58.4) = -3.0$, $p = .004$, Cohen's $d = .62$], respectively (Table 4).

Regarding alternative traumatic responses, tonic immobility was relatively common in this sample.

Table 2. Previous trauma.

	Non-PTSD % *N* = 33	PTSD % *N* = 83	C-PTSD % *N* = 31	*Group comparison*
Accident	14.8	25.7	48.1	$\chi^2(1) = 3.55, p = .06$
Loss of close relative	59.3	55.7	63.0	$\chi^2(1) = .72, p = .396$
Life-threatening disease	14.8	10.0	14.8	$\chi^2(1) = 2.79, p = .249$
Natural disaster	3.7	2.9	3.7	$\chi^2(1) = .04, p = .844$
Threat with weapons	14.8	22.9	25.9	$\chi^2(1) = .07, p = .79$
Shock following a loved one being exposed to something life threatening	29.6	25.7	40.7	$\chi^2(1) = 1.88, p = .170$
Childhood neglect	48.1	45.7	48.1	$\chi^2(1) = .196, p = .658$
Assault/violence	38.5	47.1	51.9	$\chi^2(1) = .04, p = .850$
Fire	14.8	10.0	7.4	$\chi^2(1) = .18, p = .672$
Witness to a situation where someone was in danger of death or injury	22.2	21.4	22.2	$\chi^2(1) = .001, p = .974$
Physical abuse	22.2	35.7	44.4	$\chi^2(1) = .33, p = .565$
War	18.5	11.4	7.4	$\chi^2(1) = .38, p = .54$
Childhood sexual abuse	18.5	14.3	33.3	$\chi^2(1) = 4.22, p = .04$
Rape	7.4	15.7	22.2	$\chi^2(1) = .28, p = .599$
Other	7.4	17.6	22.2	$\chi^2(1) = .22, p = .643$
Total number of previous traumas M(SD)	3.4 (1.9)	3.7 (2.3)	4.7 (3.2)	$t(39.1) = -1.32, p = .195$

Frequency of previous experienced trauma. Frequencies were compared between those with PTSD and C-PTSD, respectively.

Table 3. Exposure to violence victimization.

	Non-PTSD M(SD) *N* = 33	PTSD M(SD) *N* = 83	C-PTSD M(SD) *N* = 31	*Group comparison*
CTS2: Physical	10.5 (8.7)	*13.0 (9.9)*	*16.4 (10.3)*	$t(42.3) = -1.47, p = .15$
CTS2: Sexual	2.8 (5.1)	4.5 (5.0)	4.8 (4.8)	$t(49.3) = -.21, p = .837$
PMWI: Verbal/emotional	23.6 (7.9)	28.6 (5.4)	31.4 (5.1)	$t(50.68) = -2.49, p = .016$
PMWI: Dominance/isolation	16.5 (7.1)	21.9 (7.9)	24.5 (5.2)	$t(73.16) = -1.98, p = .052$
Total PMWI	39.7 (13.8)	50.8 (11.6)	56.0 (6.8)	$t(82.5) = -2.77, p = .007$
Threats to kill if partner leaves (%)	61.5%	57.0%	55.2%	$\chi^2(1) = .03, p = .868$
Threats of suicide if partner leaves (%)	25.9%	40.0%	66.7%	$\chi^2(1) = 5.78, p = .016$

Exposure to violence comparing those without a trauma reaction and those with PTSD and C-PTSD, respectively.

Table 4. Symptom severity.

	Non-PTSD *N* = 33 M(SD)	PTSD *N* = 83 M(SD)	C-PTSD *N* = 31 M(SD)	*Group comparison*
PTSD	8.9 (4.6)	19.3 (4.2)	22.7 (3.9)	$t(57.0) = -4.09, p = .000$
Re-Experiencing	3.4 (3.3)	7.1 (2.6)	9.4 (2.1)	-
Avoidance	3.1 (2.5)	5.9 (1.7)	6.3 (1.7)	-
Hyperarousal	3.1 (2.4)	6.3 (1.7)	7.1 (1.3)	-
C-PTSD	22.8 (13.6)	29.8 (10.8)	53.7 (7.3)	-
Emotion (hyper)regulation	6.7 (4.3)	7.8 (3.2)	14.4 (3.2)	-
Emotion (hypo)regulation	5.8 (4.3)	8.5 (4.6)	15.8 (3.1)	-
Negative self-concept	5.7 (4.4)	7.9 (4.6)	13.9 (2.1)	-
Disturbed relationships	3.7 (3.3)	5.1 (3.7)	9.6 (1.6)	-
TSC-26	24.5 (12.3)	34.3 (13.2)	50.6 (13.6)	$t(46.9) = -5.30, p = .000$
Negative affect	10.8 (6.2)	13.2 (4.9)	20.3 (4.9)	$t(53.7) = -6.66, p = .000$
Somatization	11.1 (5.7)	16.0 (7.1)	21.8 (7.1)	$t(46.3) = -3.67, p = .001$
Dissociation	3.6 (3.3)	4.8 (3.5)	8.5 (3.5)	$t(52.8) = -4.91, p = .000$
HTQ symptoms (qns 17–31)	17.3 (8.3)	21.9 (6.9)	32.8 (7.2)	$t(35.8) = -6.4, p = .000$
WHO-5	9.4 (5.4)	6.7 (5.1)	4.2 (3.8)	$t(72.9) = 2.8, p = .006$
Tonic Immobility	10.3 (4.9)	12.9 (5.0)	15.1 (3.8)	$t(68.0) = -2.25, p = .028$

Symptoms severity of PTSD and C-PTSD. Comorbid symptom is compared between those with PTSD and C-PTSD.

Women with C-PTSD had experienced significantly greater tonic immobility, compared to those with PTSD (Cohen's $d = .50$). The general well-being was low among the women, as measured by WHO-5, with the C-PTSD group reporting significantly less well-being (Table 4).

3.2. Correlation analysis

A bivariate correlation showed that all types of IPV (i.e. psychological, physical and sexual) correlated positively with the mental health outcomes (i.e. *PTSD, C-PTSD, negative affect, somatization* and *dissociation*). Effect sizes were small to medium and psychological violence had slightly larger effect sizes on all mental health outcomes compared to physical and sexual IPV (Table 5).

When controlling for the other types of violence, psychological violence overall correlated significantly with *PTSD*, C-*PTSD*, *negative affect* and *somatization*, but not with *dissociation* (Table 6). Psychological violence had the strongest correlation with *PTSD* ($r = .35p < .01$) and a slightly smaller correlation with *C-PTSD* ($r = .28$, $p < .01$). Interestingly, when looking at the subtypes of psychological violence, the

Table 5. Correlation matrix of trauma symptoms and IPV.

	1	2	3	4	5	6	7	8
1. PTSD	1							
2. C-PTSD	.61**	1						
3. Negative Affect	.33**	.66**	1					
4. Somatization	.31**	.45**	.67**	1				
5. Dissociation	.26**	.49**	.68**	.76**	1			
6. Physical Violence	.21*	.28*	.25**	31**	.25**	1		
7. Sexual Violence	.22**	.20*	.19*	.32**	.26**	.46**	1	
8. Psychological Violence	.38**	.33**	.26**	.39**	.29**	.46**	.40**	1

Bivariate correlation. **Sig. at the.01 level (2-tailed); *Sig. at the.05 level (2-tailed). Physical and sexual violence as measured by the CTS2; Psychological violence as measured by the PMWI (total score).

Table 6. Partial correlation matrix.

Controlling for Physical and Sexual IPV								
	1	2	3	4	5	6	7	8
1. PTSD	1							
2. C-PTSD	.61**	1						
3. Negative Affect	.29**	.61**	1					
4. Somatization	.21*[a]	.44**	.64**	1				
5. Dissociation	.14	.42**	.65**	.72**	1			
6. Psychological Violence	.35**	.28**	.25*	.24*	.19	1		
7. Subtype: Emotional/Verbal	.28**	.25*	.24*	.15	.10	.84**	1	
8. Subtype: Dominance/Isolation	.32**	.23*	.18	.28**	.22*	.87**	.45**	1
Controlling for Psychological IPV								
Physical violence	.01	.12	.13	.17	.13			
Sexual violence	.06	.01	−.02	.17	.08			

Partial correlation first controlling for physical and sexual violence and then controlling for psychological violence.
**Sig. at the.01 level (2-tailed); *Sig. at the.05 level (2-tailed) [a] p =.051. Physical and sexual violence as measured by the CTS; Psychological violence as measured by the PMWI (total score + subscales).

verbal/emotional subtype correlated significantly with *PTSD*, C-*PTSD* and *negative affect* (r = 28, r = .25 and r = .24, respectively), while the subtype *dominance/isolation* significantly correlated with *PTSD, C-PTSD, somatization* and *dissociation* (r = 32, r = 23, r = .28 and r = .22, respectively). Contrary, neither physical nor sexual violence was significantly correlated with *PTSD, C-PTSD, negative affect, somatization* or *dissociation*, when controlling for psychological violence (Table 6).

3.3. Regression

Two hierarchical regression models were estimated to explain the variance in symptoms of PTSD and C-PTSD, respectively. In the final model for PTSD (Table 7) *previous trauma* (childhood sexual abuse) was entered in Step 1, as this is a well-documented risk factors for PTSD. However, *previous trauma* only explained .2% of the variance in PTSD symptoms; F (92) = .15, p = .700. Thus, there was no clear evidence supporting a significant influence on the variance in PTSD symptoms. Then, *physical* and *sexual violence* was entered in the model. *Physical* and *sexual violence* explained a variance of 8.1% F(90) = 3.98, p = .022. The model now explained 8.3% of the variance in PTSD. In Step 3, *psychological violence* was added, with the two subtypes *emotional/verbal* and *dominance/isolation*, which explained another 12.8% of variance, F(88) = 7.16, p = .001. The model now explained 21.2% of the variance. Finally, adding *guilt* in step 4 only explained an additional 2.4% of the variance, F(87) = 2.71, p = .104. Again, this addition was non-significant. The total model explained 23.5% of PTSD Symptoms and psychological violence accounted for most of the variance.

In the second model (Table 7) the same four steps was conducted to explain the variance in C-PTSD. In Step 1, *previous trauma* (*childhood sexual abuse*) explained 2.7% of the variance in C-PTSD, F (86) = 2.39, p = .126. Again, there was no clear evidence supporting a significant influence on the variance in C-PTSD symptoms. In step 2, *physical* and *sexual violence* explained 9.5% of the variance, F(84) = 4.53, p = .014. The model now explained 12.2% of the variance in C-PTSD. In step 3 *psychological violence* (*emotional/verbal* and *dominance/isolation*), explained an additional variance of 6.8%, F (82) = 3.43, p = .037, and the model now explained 18.9% of the total variance. Finally, in step 4 *guilt* explained an additional variance of 10.8%, F (81) = .12.4, p = .001. The final model explained 29.7% of the variance in C-PTSD.

4. Discussion

The present study is the first study known to the authors, to examine the association between subtypes of IPV and both PTSD and C-PTSD. This was examined in a sample of female IPV victims taking

Table 7. Linear regression for PTSD and C-PTSD.

	PTSD				C-PTSD			
	β	*p*	R^2	ΔR^2	β	*p*	R^2	ΔR^2
Step 1			.002, *p* = .700	-.009, *p* = .700			.027, *p* = .126	.016, *p* = .126
(Constant)		**<.0001**				**<.0001**		
Childhood Sexual Abuse	-.04	.700			.17	.126		
Step 2			.083, *p* = **.022**	.052, *p* = **.022**			.122, *p* = **.014**	.137, *p* = **.014**
(Constant)		**<.0001**				**<.0001**		
Childhood Sexual Abuse	-.05	.614			.15	.152		
Physical IPV	.13	.259			.24	**.046**		
Sexual violence	.21	.072			.12	.315		
Step 3			.211, *p* = **.001**	.166, *p* = **.001**			.189, *p* = **.037**	.14, *p* = **.037**
(Constant)		**<.0001**				**.004**		
Childhood Sexual Abuse	-.10	.324			.11	.262		
Physical IPV	-.04	.700			.12	.338		
Sexual violence	.07	.547			.03	.810		
Emotional/Verbal	.21	.08			.23	.068		
Dominance/Isolation	.30	**.019**			.13	.334		
Step 4			.235, *p* = .104	.182, *p* = .104			.297, *p* = **.001**	.245, *p* = **.001**
(Constant)		**<.0001**				**.004**		
Childhood Sexual Abuse	-.11	.244			.08	.423		
Physical IPV	-.04	.757			.11	.335		
Sexual violence	.08	.496			.05	.655		
Emotional/Verbal	.17	.171			.13	.273		
Dominance/Isolation	.28	**.024**			.11	.388		
Guilt	.16	.104			.35	**.001**		

Predictor variables are evident from the rows. Regression of (1) childhood sexual abuse, (2) physical and sexual violence, (3) psychological violence, and (4) guilt, on PTSD and C-PTSD symptoms, respectively.

residence at four Danish Women Shelters while assessing confounding variables, previous trauma, and additional trauma responses.

The study found a high prevalence of both PTSD (56.5%) and C-PTSD (21.1%) among the women. The high prevalence of traumatic stress is in accordance with previous findings among female victims of IPV (Golding, 1999) and both PTSD and C-PTSD were associated with more symptoms of negative affect, somatization, and dissociation. When comparing those with PTSD and C-PTSD, no difference was found on sociodemographic variables, which could indicate that differences in symptom severity should not be explained by differences in social vulnerability between the two groups. The PTSD and C-PTSD groups did differ, however, with those meeting the C-PTSD criteria experiencing more IPV, particularly psychological violence, and childhood sexual abuse. Those with C-PTSD further responded to the violence with more tonic immobility.

Previous studies have primarily examined the association between acts of physical and sexual violence and symptoms of PTSD (2003; Golding, 1999). Interestingly, this study found the strongest correlations between psychological violence and accompanying mental health problems. Indeed, when controlling for psychological violence neither physical nor sexual violence correlated with any of the mental health measures (i.e. PTSD, C-PTSD, negative affect, somatization and dissociation). Contrary, psychological violence was not only found to correlate with mental health outcomes, but subtypes of psychological violence uniquely correlated with different symptoms. While emotional/verbal violence correlated with negative affect, dominance/isolation correlated with somatization and dissociation. Although both subtypes of psychological violence correlated with PTSD and C-PTSD, regression analyses found that dominance/isolation had a stronger impact on PTSD symptoms, while emotional/verbal violence had a stronger impact on C-PTSD. These results help illustrate why it is important to study the subtypes of IPV to deepen our understanding of the unique effect of each subtype on mental health. This information cannot only be helpful for treatment purposes, but psychological violence is also the most common form of IPV, and the most likely subtype to occur on its own (Black et al., 2011; EUAFR, 2014). Thus, it is important to acknowledge the severe consequences that psychological violence has on mental health.

Although this study examines the independent effect of different subtypes of IPV, it is important to stress that most of the participants had experienced various forms of IPV, as well as previous trauma, and that each subtype of IPV helped explain the variance in symptoms of PTSD and C-PTSD. This is in line with previous research, which have demonstrated a cumulative effect of childhood and adult interpersonal trauma on mental health (Green et al., 2000; Nishith, Mechanic, & Resick, 2000). While it is important to recognize the cumulative effect of various traumas, researchers have argued that it is still imperative to study individual as well as abuse characteristics and uncover the interconnections among types of abuse (Scott-Storey, 2011).

It is further important to note that most of the variance in PTSD and C-PTSD is still unexplained.

Hence, the IPV subtypes and previous traumas measured in this study, were not sufficient to explain the total variance in symptoms. Many underlying factors may influence the development of psychopathology like PTSD, and previous research have identified risk factors such as gender (Christiansen & Elklit, 2008), personality (Jakšić, Brajković, Ivezić, Topić, & Jakovljević, 2012), social support (Brewin, Andrews, & Valentine, 2000; Gros et al., 2016), and genetics (Banerjee, Morrison, & Ressler, 2017). For instance, a comprehensive study conducted by the Psychiatric Genomics Consortium-PTSD group, estimate that genetics explain up to 29% of the variance in PTSD symptoms in women (Duncan et al., 2018). These factors have not been accounted for in the present study.

By controlling for psychological violence, the results in this study expand on previous findings regarding the effect of physical and sexual violence on mental health (Golding, 1999). However, a possible explanation for this could be due to the small sample size. Future research should replicate these findings using a larger sample to better understand the association between subtypes of IPV and PTSD and C-PTSD, respectively. Moreover, childhood sexual abuse did not explain much of the variance in neither PTSD nor C-PTSD symptoms, as would have been expected from previous research (Karatzias et al., 2019).

4.1. Limitations

Although the current study addresses a knowledge gap in the IPV literature, there are several limitations. This is a cross-sectional study and thus, the findings do not help to determine cause and effect between subtypes of violence and PTSD and C-PTSD. Also, the study does not help to identify the association between the violence and mental health over time. The study uses self-report measures that might be influenced by recall bias (Tarrant, Manfredo, Bayley, & Hess, 1993) and a relatively small sample size limits the division of victims into trauma groups (i.e. non-PTSD, PTSD, and C-PTSD). Finally, participants are not representative of all women exposed to IPV and due to lack of non-Danish speaking women in the study, they cannot be said to be representative of the four shelters either.

The female victims were assessed within the first 10 days of their stay at the shelter, although the ICD-11 requires PTSD symptoms to be present for several weeks before the diagnostic requirements can be met (World Health Organization, 2018). This is required because victims are likely to show elevated symptoms of PTSD within the first weeks, of which some victims experience spontaneous remission (Cahill & Pontoski, 2005). However, a systematic review by Santiago and colleagues (2013) have documented that prevalence rates of PTSD continue to increase one year after an intentional trauma (i.e. purposeful human traumatic actions such as IPV). Moreover, participants may over- and underreport some symptoms due to lack of insight into own symptomatology. Based on clinical experience, it could be expected that some participants might not be aware of their avoidant behaviours, while at the same time, they might overreport symptoms of re-experiencing due to disabling memories. Thus, the results might not be the complete picture of the trauma symptomatology in this sample. In addition, it is part of the procedure to talk to the women about the violence they have experienced when they are enrolled at the shelter. This may have resulted in greater insight into the experienced violence than what would otherwise be expected.

Previous trauma was assessed to understand the women's trauma history. The scale asks the women to self-identify if they have experienced various forms of previous trauma (e.g. rape and childhood sexual abuse). Hence, the scale will only identify those women who self-identify as victims. Some of the listed traumas are further associated with social stigma. Therefore, previous trauma might be underreported in the present study. The scale further asks about traumas that may overlap with the experiences that the women have had in their abusive relationship (e.g. rape, violence, threats with weapons). It is possible that some participants might have misunderstood and reported experiences of IPV as previous traumas.

4.2. Future directions

Future research would benefit from longitudinal studies assessing the association between subtypes of IPV and the long-term mental health consequences. It could be theorized that physical and sexual violence, both of which contains a physical aspect, might inflict a strong sense of threat and initiate an acute traumatic response, while the consequences of psychological violence could possibly develop over time, when the victim starts to feel free from the partners control. These results are part of a prospective study that follows the women throughout their stay and again at three months follow-up, which will allow for elaboration on these findings in future research. Moreover, research could benefit from replicating these findings in a national representative sample.

Findings in the present study demonstrated more tonic immobility among victims with C-PTSD. However, these results were not elaborated further. Tonic immobility is a peri-traumatic response and

future research should examine if tonic immobility moderates the relationship between IPV victimization and C-PTSD. Previous research suggest that guilt partly mediates the relationship between tonic immobility and PTSD (Bovin et al., 2014). This may also be true for IPV victims and C-PTSD, but more research is needed to establish this link.

4.3. Clinical implications

Despite the above-mentioned limitations, results from the present study could have important clinical implications. The study found that a relatively large subgroup (21.1%) of the women had symptoms of C-PTSD. C-PTSD patient have specific treatment needs (Cloitre, 2015) and Danish service providers should be trained to accommodate these needs. Danish Women Shelters are not treatment facilities but instead a security measure, which is obligated to provide care and support for female victims of IPV (Retsinformation, 2019). To allow IPV victims in Danish shelters to gain access to adequate trauma-focused treatment, safety care providers should closely collaborate with general practitioners for assessment and referral.

Previous research has illustrated that untreated PTSD and C-PTSD can lead to chronic impairment in the victim (Cahill & Pontoski, 2005). Furthermore, PTSD have been found to not only be a consequence of IPV, but also a risk factor for future revictimization (Kuijpers, van der Knaap, & Winkel, 2012; Perez & Johnson, 2008). These results suggest a need to evaluate the current shelter service, which is provided to victims of IPV, to examine whether the shelters are equipped to provide the proper care and support.

The study further supports the hypothesis that psychological violence is an independent risk factor for PTSD and C-PTSD. This emphasizes the need to strengthen preventive efforts and inform both service providers and the general population about the severity and impact of psychological violence.

Finally, the majority of the participants were mothers, and many brought their children to the shelters. These are children who are likely to have experienced violence in the home, and further have been compelled to move away from their home and familiar surroundings. Future research will hopefully assess the needs of these children and help the affected families.

5. Conclusion

The prevalence of PTSD and C-PTSD symptoms appear to be high in women taking residence in Danish Women Shelters. Both PTSD and C-PTSD are associated with symptom severity in comorbid symptoms such as negative affect, dissociation and somatization. Though the effect sizes were small to medium, psychological violence was found to be the strongest risk factor for all mental health outcomes, compared to physical and sexual violence. Although future research should replicate these results, findings in this study emphasize the importance of recognizing psychological violence as an independent traumatic event with severe mental health consequences.

Note

1. *Important correction*: The TSC-26 was translated and proofread into Arabic by a professional translation company. Despite this, a mistake was uncovered late in the process on question 15 (i.e. 'Do you feel scared or on guard?'). Only four participants filled out the questionnaire in Arabic. To avoid the error affecting the results the item was scored as 'missing' for these participants (N=4).

Data Availability

Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

Disclosure statement

The authors declare no conflicts of interest.

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