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The structure of ICD-11 post traumatic stress disorder in a clinical sample of refugees based on the International Trauma Interview

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Abstract

Background: The ICD-11 proposes fundamental changes to the PTSD diagnostic criteria, prompting thorough validation. While this is ideally carried out based on diagnostic interviews, most—and in the case of transcultural psychiatry *all*—studies have relied on self-reported measures. In this study, we used the International Trauma Interview (ITI) to assess the factor structure of ICD-11 PTSD symptoms in a sample of trauma-affected refugees.

Method: The ITI was administered with a sample of refugees ($n = 198$), originating mainly from the Greater Middle East. The symptom ratings were subjected to a confirmatory factor analysis (CFA), comparing the ICD-11 concordant three-factor model with alternative two- and one-factor models.

Results: The overall fit was adequate for both the two- and three-factor models, but favored the two-factor model. Results for both models indicated local misspecifications and that item 5, *hypervigilance*, displayed a suboptimal loading.

Conclusion: The results generally support the use of the ITI in a severely trauma-affected refugee population, albeit with particular attention needed in the administration of item 5. The superior fit of a two-factor model warrants further testing across populations.

KEYWORDS

confirmatory factor analysis, cross-cultural, ICD-11, posttraumatic stress disorder, refugees

1 | BACKGROUND

The posttraumatic stress disorder (PTSD) diagnosis in the ICD-11[1] has been drastically shortened relative to ICD-10 and current and previous editions of the Diagnostic and Statistical Manual of Mental Disorders to include only 6 symptoms, covering *re-experiencing in the here and now*, *avoidance* and *persistent sense of threat*. These are considered hallmark symptoms of PTSD, while other symptoms—now excluded from ICD-11—constitute more

of an overlap with disorders like depression and general anxiety.[2] The intent of the simplification was to maximize the clinical utility of the PTSD diagnosis by making it more readily recognizable across different clinical contexts and cultures.[3] While the current evidence mostly supports the clinical utility of the revised diagnosis (e.g., Reference [4]), much of the evidence is built on self-report measures and clinical interviews not specifically designed for assessment in accordance with the ICD-11 criteria.[3] Structured clinical interviewing is normally considered to be the gold standard for assessing PTSD. To date, very few structured measures for assessing ICD-11 and complex PTSD have been developed. One such measure is the International Trauma Interview (ITI[5]). Only two studies have used the International Trauma Interview, a clinician-administered diagnostic interview for assessing ICD-11 PTSD. So far, only two studies have been published on the validity of the ITI with a Swedish and a Lithuanian sample, respectively.[6,7] Additionally, Forbes[8] used the Clinician Administered PTSD Scale for DSM-5 (CAPS-5[9]) to assess ICD-11 PTSD, with the selected items resembling Part 1 of the ITI. There are no published studies on the ITI in non-western populations.

A novel aspect of the ICD-11 is the inclusion of Complex PTSD as a unique disorder alongside PTSD within the cluster of "Disorders specifically associated with stress". Most factor analytical studies so far have focused on the relationship between the overlapping symptoms of PTSD and Complex PTSD (e.g., Reference [6]). Most studies have relied on self-reports, using the International Trauma Questionnaire (ITQ[10]). As an exception on both accounts, Forbes et al.[8] assessed the factor structure of ICD-11 PTSD relying on six proxy items from the CAPS-IV. They found that a two-factor model, collapsing re-experience and avoidance, offers a plausible alternative to the three-factor model, giving both a more parsimonious model and more inclusive criteria. This shows that further testing of the factorial structure of ICD-11 PTSD is still relevant, particularly when high quality interview-based data are available.

One of the complications of assessing PTSD is presented by the need to establish the trauma-relatedness of each symptom.[11] This can be difficult to address in self-reported measures, as evidenced by deviations in self-responses and interview-based responses.[12] Furthermore, these response differences have been found to affect the factor structures of each modality.[13] Finally, in the context of transcultural psychiatry, slight shifts in item translations can have an impact on the factor structure, as exemplified by Vindbjerg et al.[14] When relying solely on self-report, such shifts will exert a systematic bias throughout the sample.

As more thorough alternatives to PTSD self-report measures, diagnostic interviews such as ITI or the Clinician Administered PTSD Scale (CAPS[9]) require additional time and resources. This is particularly evident in transcultural psychiatry, where a trained clinician will often take 2 h to complete a translated CAPS interview, particularly when an extensive trauma history is involved. This makes it exceedingly difficult to obtain a sufficient sample size for validation purposes.

One approach to acquiring more assessment data for research projects is through the integration of research and routine clinical work. A framework for this is exemplified in the Treatment and Research Integrated Model (TRIM[15]) employed at the Competence Centre for Transcultural Psychiatry (CTP) in Copenhagen. The TRIM has demonstrated a high-inclusion rate, at over 85% of the patients receiving treatment at the CTP, and has enabled an unprecedented series of randomized trials with trauma-affected refugees.[16–20] Anticipating the advent of the ICD-11, the CTP has integrated the first part of the ITI into the standard assessment for PTSD. This covers the ICD-11 PTSD symptoms and can typically be administered within a single session. Patients fulfilling the diagnosis are then offered to enter a treatment course for PTSD, and more complex manifestations of PTSD can instead be gauged as part of the case formulation. This is an informed compromise that secures high quality clinical information and research data and establishes a reliable diagnosis of PTSD.

In the current study, we administered part 1 of the ITI (PTSD section only) with a sample of trauma-affected refugees. The aim was to evaluate the internal construct validity of ICD-11 PTSD in the context of trauma-affected refugees. We did so by replicating the analyses of Forbes et al.,[8] comparing alternative models of PTSD, based on the ICD-11 symptom selection. As Part 2 of the ITI was not administered, thus leaving out ratings of disturbances in self-organization, we were unable to investigate models of complex PTSD.

2 | METHODS

2.1 | Subjects

The sample consists of 198 refugees, who received treatment for PTSD at the Competence Centre for Transcultural Psychiatry, a part of the mental health services of the Capital Region of Denmark. Each patient had either been granted asylum or was family reunited with a refugee in Denmark. All patients were diagnosed with PTSD (F43.1) in accordance with the ICD-10 criteria. The diagnosis was established during two- to three-hour assessment, involving the Schedules for Clinical Assessment in Neuropsychiatry (SCAN[21]), the ICD-11 diagnostic interview for PTSD, and the ICD-10 research criteria. A comorbid diagnosis of depression (F32.x or F33.x) was made for 71.7% of the sample. Excluded were all patients

meeting ICD-10 criteria for mental and behavioral disorders due to dependent psychoactive substance use (F1x.24–F1x.26) or Schizophrenia, Schizotypal or delusional disorders (F20–F29).

The sample was made up of an even gender distribution, with 50.2% women and 49.8% men. The main countries of origin were: Syria 28.0%, Iraq 26.1%, Afghanistan 12.6%, Iran 9.2%, and Lebanon 7.3%. The average time since arrival in Denmark was 13.3 years (SD = 9.58). This distribution includes 35.9% who had arrived within 4 years of the assessment and consisting mainly of Syrian refugees (79.1%). Years since the first trauma showed a bimodal distribution in this sample, with more than 20 years for 63.4% of the sample and less than 5 years for 18.6% of the sample. The former group comprised mainly patients from Iraq, Afghanistan and Lebanon (61.3%), while the latter mostly consisted of patients from Syria (80.0%). Most patients had between 5 and 10 or 10 and 15 years of education before arrival (35.8% and 38.2%, respectively).

In the complete sample, the prevalence of (overlapping) trauma exposure was 36.0% for torture, 42.6% for imprisonment, 36.6% for violence exercised by relatives, and 37.4% for head trauma.

2.2 | Instruments

The ITI is a semi-structured clinician-administered interview measure, consisting of two sections. The first section assesses ICD-11 PTSD symptoms and would enable the clinician to make a PTSD diagnosis. The second section, not administered in this study, evaluates problems associated with disturbance in self-organization (DSO) and would enable a diagnosis of complex PTSD to be made. Respondents are normally asked to complete a trauma screening questionnaire before completing the ITI. The first section of the measure is based on the CAPS-5,[9] with minor modifications to some items to reflect differences in the ICD-11 criteria. An initial set of questions seeks to establish that the event fulfills the criteria for trauma exposure according to ICD-11 and provides some contextual information for the interviewer. Section 1 includes six PTSD items, two of which assess reliving in the here and now (trauma-related nightmares and intrusive memories or flashbacks), two items assessing avoidance features (memories, thoughts and feelings, or external reminders) and two items assessing persistent perception of heightened current threat (hypervigilance and heightened startle). Items are scored on a five-point scale from 0 = symptom is absent to 4 = extreme. In order to count toward PTSD diagnostic status, a score of moderate (=2) or more is required to indicate threshold-level difficulties. Two further items assess impairment in social and occupational functioning resulting from these symptoms on a 5-point scale from 0 = no adverse impact, to 4 = extreme adverse impact. The second section includes six items assessing DSO symptoms with two items evaluating emotion dysregulation (hyperactivation and deactivation), two items evaluating negative self-concept (feeling a failure and feeling worthless) and two items evaluating disturbed relationships (difficulties sustaining relationships and difficulties feeling close to others). Items are scored on a five-point scale from 0 = not at all to 4 = extremely. Since most interviews were conducted through interpreters and concerns about overburdening participants the DSO section was not administered in this study. Version 3.1 of the ITI was evaluated in a community sample of trauma-exposed individuals in Sweden.[6] Confirmatory factor analysis supported a two-factor model consistent with the ICD-11 formulation, the ITI was found to have satisfactory interrater reliability and acceptable internal reliability and good construct validity when compared against other measures.

In the current study, a Danish translation of the ITI was used. The procedure for translation was as follows: the original English version of the interview was translated by two bilingual translators to Danish. The two translators compared their two versions and in collaboration produced a joint version. This version was then translated back into English by an independent translator. The back-translated version was compared to the original English version for inconsistencies. Any such inconsistencies were discussed with the translators and any necessary adjustments were made to the translated version to accommodate any inconsistencies. Finally, the back-translated version was reviewed and signed off by one of the ITI developers.

Following the completion of this study, a number of revisions have been made primarily to the DSO section to add additional prompt questions and clearer scoring criteria. Evaluations of this revised version have recently been completed in trauma-exposed samples in Lithuania, and the UK[7,22] with other studies close to completion in Denmark and Germany/ Switzerland. Findings from the Lithuanian and UK studies both support the two-factor model and the reliability and validity of the ITI.

2.3 | Procedure

Patients were referred by their family doctor to psychiatric treatment at the Mental Health Services in the Capital Region of Denmark. Within the mental health services, patients were referred to the Competence Centre for Transcultural Psychiatry (CTP) based on suspected culturally mediating factors in symptom expression or to optimize treatment. At the CTP, patients underwent a

standardized diagnostic assessment, in which the ITI was carried out. A translator took part in the assessment in 63.0% of the cases. Assessments were carried out between March 2016 and June 2018.

2.4 | Models

A three-factor model was tested, with pairs of items representing *re-experiencing in the here and now*, *avoidance*, and *sense of threat*. This reflects the ICD-11 theory of a three-cluster structure of PTSD symptoms. Also included was a two-factor model, combing the four items of re-experiencing and avoidance. Forbes et al.[8] found this model to be a "potentially preferred" alternative to the three-factor model. Finally, we tested a single-factor model as the most parsimonious alternative.

2.5 | Statistical analysis

Data Analysis was performed with the Mplus software package (Version 7.31,[23]). Variables were defined as categorical. Indices used to evaluate the fit of each model were the comparative fit index (CFI), the Tucker–Lewis index (TLI), and the root mean square of approximation (RMSEA). Fit indices were evaluated according to guidelines recommended by Hu and Bentler,[24] with CFI and TLI ≥ 0.90 and RMSEA ≤ 0.06 indicating an acceptable fit. The comparative fit between models was evaluated with Akaike Information Criterion (AIC) and Bayesian Information Criteria (BIC), as well as chi-square difference testing[25] for nested models.

We used the default estimator for categorical variables in Mplus, the weighted least squares means and variance adjusted estimator (WLSMV). As an exception, maximum likelihood estimation (MLR) was used to obtain AIC and BIC, as these indices were not available in Mplus for categorical data with WLSMV.

Missing data were handled with pairwise deletion.

In addition to the assessment of construct validity, the impact on caseness was assessed for each model. For the ICD-11 PTSD criteria, a minimum score of 2 is required for at least one symptom from each cluster. Merging the re-experiencing and avoidance clusters allows for additional cases, where the threshold is met for both symptoms within one of the original clusters while none were met in the other cluster. This particular symptom pattern was not possible within the sample studied here, as all participants met the criteria for ICD-11 PTSD. Instead, to differentiate the models, we compared the number of severe cases with each model, based on a threshold score of 3.

3 | RESULTS

Item means and standard deviations for the responses to the ITI are presented in Table 1. The mean item score was 2.67 (SD = 0.37, range 1.9–4). Missing responses ranged from 9.09% to 18.18% across items.

Fit statistics for the alternative CFA models are presented in Table 2. The chi-square test rejected all models, although the two-factor model approached fit ($p = 0.045$). Of the absolute fit indices, the CFI and TLI were acceptable across all models, while the RMSEA showed mixed results. All RMSEA values exceeded the 0.06 cut-off, but the 90% confidence intervals were wide and both the two- and three-factor models displayed lower bounds below 0.06. For the relative fit indices, the AIC slightly favored the two-factor model over either alternative by at least 3.5 points, while the BIC provides strong support for the two-factor model over the three-factor model with a difference of 10.0. The subsequent chi-square difference tests support this, with the two-factor model offering a significantly better fit than the single-factor model (χ^2 [1] = 12.975, $p < 0.001$), while the three-factor model offered no better fit than the two-factor model (χ^2 [2] = 0.275, $p = 0.872$). The diminishing returns of the three-factor solution were also reflected in a 0.91 correlation between the avoidance and re-experiencing factors (Table 3).

Modification indices pointed out a residual correlation between items 1 and 3 as the main source of misfit across all models. The corresponding MI values ranged from 9.27 to 14.10 while the expected fully standardized parameter change (StdYX E.P.C.) ranged from 0.42 to 0.56. Also prominent was a residual correlation between items 1 and 4, with MI values ranging from 7.58 to 10.06 and StdYX E.P.C. from −0.41 to −0.55.

In terms of item loadings, item 5 presented as a somewhat poorly performing outlier. In the unidimensional model, item 5 had a factor loading of 0.56, while all remaining loadings exceeded 1.00. This pattern also manifested in a raw item-rest correlation of just 0.25, against 0.44–0.59 for the remaining items. Based on feedback from clinicians, which is elaborated in the discussion section, the item-rest correlation was recalculated separately for the lower-half and upper-half scorers on the remaining items. This revealed item 5 to be an outlier only in the upper-half group.

A total of 67 patients (59.3%) met our criteria for severe PTSD with the three-cluster solution, while 73 (64.6%) met the same criteria with the two-cluster solution. This implies a 9.00% increase in severe cases when using the more liberal criteria of the two-cluster solution.

TABLE 1 Mean scores, standard deviations (SD), skewness and kurtosis for the ITI.

ICD-11 symptom cluster	ICD-11 symptom	Item no.	*n*	Avg. score	SD	Skewness	Kurtosis
Re-experience	Nightmares	1	180	2.97	0.75	−1.15	6.07
	Flashbacks	2	153	2.50	0.84	−0.74	4.13
Avoidance	Avoidance of internal reminders	3	168	2.77	0.82	−0.72	4.10
	Avoidance of external reminders	4	162	2.56	1.00	−0.91	3.76
Sense of threat	Hypervigilance	5	166	2.46	0.98	−0.88	3.59
	Startle reaction	6	171	2.51	0.92	−1.17	4.37

TABLE 2 Fit Statistics for the tested models.

Model	χ^2 (*df*)	*p*	RMSEA (90% CI)	CFI	TLI	AIC	BIC
Single-factor	26.955 (9)	0.001	0.100 (0.058–0.145)	0.961	0.934	2252.507	2351.155
Two-factor	15.832 (8)	0.045	0.070 (0.010–0.121)	0.983	0.968	2248.118	2350.055
Three-factor	16.258 (6)	0.012	0.093 (0.040–0.149)	0.977	0.944	2251.580	2360.093

Abbreviations: AIC, Akaike information criterion; BIC, Bayesian information criterion; CFI, comparative fit index; df, degrees of freedom; RMSEA, root mean square error or approximation; SRMR, standardized root mean square residual; TLI, Tucker–Lewis Index.

TABLE 3 Factor correlations for the two- and three-factor models of PTSD.

Two-factor model	Re-experiencing and avoidance	Sense of threat
Re-experiencing and avoidance		
Sense of threat	0.639	

Three-factor model	Re-experiencing	Avoidance	Sense of threat
Re-experiencing			
Avoidance	0.907		
Sense of threat	0.695	0.625	

4 | DISCUSSION

To our knowledge, this is the first study to evaluate the ITI with refugees. The results generally support the theorized factor structure, indicating that the ICD-11 construct of PTSD carries over to this highly chronic and culturally diverse sample of refugees. While CPTSD-specific responses were not collected for this study, our results offer a prerequisite for the potential validity of the CPTSD, given that the CPTSD is an extension of the construct supported here.

In line with Forbes et al.,[8] we also found support for the more parsimonious two-factor model, combining re-experiencing and avoidance. A number of previous studies have reported a correlation of 0.90 or above for these two factors with the three-factor ICD-11 model,[8,26–28] indicating that they can be difficult to distinguish. This was replicated in this study, with a correlation of 0.91. Modification indices pointed to the item nightmares as a main contributor to this high correlation, showing large residual correlations with both avoidance items when fitted to the single- and three-factor models. While other ICD-11-based studies have reported lower correlations between the re-experiencing and avoidance factors[29–33] or have explicitly found the 3-factor model to provide a superior fit to the 2-factor model,[34,35] these are all based on self-report data. At least for refugees, we suspect the mode of assessment to be particularly influential on avoidance. The original validation study of the Harvard Trauma Questionnaire[36] demonstrates a test–retest correlation of just 0.32 for internal avoidance. In a similar sample to this study, Vindbjerg et al.[37] also reported poor discrimination for the avoidance items. In our clinical experience, severely trauma-affected refugees often report a struggle to avoid, but with potentially little success. This presents them with some ambiguity, about whether to rate actual avoidance or avoidance-related distress. The results from this study indicate that the ITI is successful in addressing this potential ambiguity.

The clinical implication of a two-factor model would be a wider inclusion of cases, relative to the more strict three-factor model. Those excluded with the three-factor model would suffer from both of the re-experiencing symptoms, but neither of the avoidance symptoms, or vice versa. Our results indicate, that these patterns cannot be reliably distinguished from PTSD in the current sample, and as such may warrant the diagnoses. The extent of this issue is not clear, as the study only included patients who fulfilled ICD-10 PTSD criteria. However, we found a substantial increase of 9% of *severe* PTSD cases in this study. To

properly assess the increase in PTSD, a more diverse sample is needed, including both PTSD cases and non-cases. More importantly, however, there is still limited evidence for the two-factor model, while evidence supporting the three-factor model is mounting. This underlines the importance of replicating the current study.

Looking for potential improvements to the ITI, we note that item 5, hypervigilance, provided the poorest loading in this study. The item reads: "In the past month, have you been especially alert or watchful, even when there was no specific threat or danger?". The clinicians of this study report that patients would often ask for clarification of this item. Part of the challenge was to establish a clear distinction between actual and perceived threat, particularly with severely affected patients. This was supported by the fact that the item-rest correlation was only compromised in the half of the sample with the most severe symptoms. In this regard, it is worth noting that the symptom severity of this sample was greater than that of the complex PTSD subsamples of the two previous ITI-validation studies.[6,7] Also, both of those studies reported good performance of item 5. Taken together, these results indicate that the administration of item 5 may require further consideration when administrated with particularly trauma-affected refugees.

5 | LIMITATIONS

While the use of clinician-administered ratings rather than self-reports is a key strength of this study, the sample size is still modest and missingness was substantial for some items. Also, while the ITI was exclusively administered by trained professionals, based on a validated translation, cultural and linguistic factors are likely to have reduced the reliability of some responses. Furthermore, while not previously tested, the factor structure of the PTSD symptoms may potentially differ across PTSD and complext PTSD subsamples. As the DSO symptoms were not assessed in this study, were not able to test this hypothesis. Finally, while the sole inclusion of PTSD patients is a strength in terms of internal construct validation, this also reduced our ability to contrast case selection between the alternative models.

6 | CONCLUSIONS

In conclusion, the results of this study support the use of the ITI with a refugee population and through the support of an interpreter. The results slightly favored the two-factor model over the ICD-11 concordant three-factor model. This may relate to the extensive trauma exposure and intense symptomatology of this particular sample, thus calling for further evaluations of the performance of ITI in a wider sample of refugees. Finally, further work is also required to evaluate the performance of disturbance in self-organization (DSO) items contributing to a diagnosis of complex PTSD in refugee populations.

AUTHOR CONTRIBUTIONS

Erik Vindbjerg conducted the analysis and wrote the first draft of the manuscript. Hinuga Sandahl, Jessica Carlsson, Neil P. Roberts and Erik Vindbjerg planned the study. Jessica Carlsson and Hinuga Sandahl acquired the data. Erik Lykke Mortensen assisted in the analysis. All authors contributed to the drafting and revisions of the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interests.

PEER REVIEW

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DATA AVAILABILITY STATEMENT

Research data are not shared.

ETHICS STATEMENT

All participants filling out the questionnaires have given informed consent. The data collection has been approved by the Danish National Committee on Research Ethics (project ID H-15014503), the Danish Medicines Agency (EudraCT: 2015-004153-40) and the Danish Data Protection Agency (2012-58-0004).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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