

The Child PTSD Symptom Scale among Yemeni Schoolchildren: Factorial Validity

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Abstract

This study assessed factorial validity and reliability of an adapted Arabic version of the self-report of the Child CPSS Symptom Scale (CPSS-5-RS) based on the DSM-5. The sample included 902 displaced school boys (52%) and girls (48%) who had a mean age of 13.95 years (SD=2.3) in Sana'a city. The participants had experienced internal conflict and airstrikes during a two-year period prior to the study (2015-2016). Principal Components Analysis, using Varimax rotation was conducted and yielded 19 items that loaded on three retained factors with an eigenvalue greater than one and explained 35.59% of the total of variance. Confirmatory Factor Analysis followed showing good fit indices ($\chi^2(902) = 313.85, p \leq 0.001$, and CMINDF= 2 as desired with best-fit indices of TLI (.92), CFI (.94), IFI (.94) and RMSEA (.035). The internal consistency presents an acceptable reliability evidence that ranged from 0.73 for cognitive symptoms; 0.63 for emotional psychological symptoms, 0.60 for behavioral symptoms, and 0.78 for the total score. Further studies are needed to verify the findings in the different samples. Overall, the Arabic version of the CPSS is a sound, reliable and valid instrument that can be used by researchers and social workers to assess the symptoms of Posttraumatic disorders among the Yemeni children.

Keywords: trauma, PTSD symptoms, the CPSS scale, Yemeni schoolchildren, factorial Validity.

1. Introduction

Posttraumatic Stress Disorder (PTSD) is one of the common mental health problems. PTSD may develop among individuals who experienced life-threatening events such as community violence, war, combat, car accident, sexual assault and natural disasters. The fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (American Psychiatric Association, 1994) clustered PTSD symptoms into the following three categories: re-experiencing the event (Criteria B; e.g. intrusive thoughts, nightmares), avoidance of cues and reminders of the event and emotional numbing (Criteria C e.g. avoidance people and places, detachment), and hyper arousal (Criteria D; e.g. exaggerated startle, hyper vigilance) (King, King, Leskin, & Weathers, 1998, p. 90). However, some changes were introduced in the DSM-5; the PTSD was moved out of the anxiety disorders section in the DSM-IV to a new created section of trauma and stress related disorders (Phillips, 2015 & American Psychiatric Association, 2013). In addition, the American Psychiatric Association (2013) added four new clusters of symptoms to this disorder: intrusion, avoidance, negative alterations in cognition and mood, and alterations in arousal and reactivity (Serrano-Ibáñez et.al. 2018).

The topic of PTSD attracted the attention of researchers, clinicians, and practitioners of mental health. Different methods and techniques were developed as measuring and screening tools for this phenomenon (Wevodau, 2016). The majority of the PTSD tools were established in the form of structured interview to fit the purpose of clinical administration and thus is limited by requiring the time and expertise of a qualified interviewer (Davidson et al., 1997). The measures of the PTSD

have increased over time. Strand, Sarmiento, and Pasouale (2005) reviewed 35 measures (25 in-depth and 10 brief tools), which were available for use by researchers and practitioners. Some measures were developed to assess PTSD among children such as Children's PTSD Inventory for Clinical Administered Measures (PICAM) (Saigh et al., 2000); Clinical-Administered PTSD Scale for Children and Adolescents (CAPS-CA; Nader, 1997; Nader et al., 1998), and the PTSD Symptom Scale (PSS) (Foa, Riggs, Dancu, & Rothbaum, 1993). In specific, the CPSS Scale (CPSS-5) (Foa, McLean, Zang, Powers, & Kauffman, Rauch, Porter, Knowles, 2016) was modified by Foa et al (2018) as a self-report measure for PTSD in alignment with the diagnostic Manual of Mental Disorders (5th ed. ; DSM-5: American Psychiatric Association, 2013).

Most of the PTSD instruments were developed in western cultures, and few were adapted to different languages and contexts. For example, the Child PTSD Symptom Scale (CPSS) was adapted and tested in Hebrew (Rachamim et al., 2011), Turkish (Kadak, Boysan, Ceylan, & Çeri, 2014), Nepal (Kort et. al., 2011), and Spanish (Serrano-Ibáñez et al., 2017). However, in Yemen and to the best of our knowledge no single instrument was validated yet to assess PTSD for traumatized children either for clinical or research purposes. Thus, this study aims to examine construct validity and factorial validity of the CPSS-5, and to establish internal consistency for the CPSS measure, based on data collected from Yemeni schoolchildren, using Arabic as the median language.

2. Background

Prior to the war and current conflict, Yemen was one of most fragile countries, ranking 5th out of 197 countries¹. Yemeni citizens met serious obstacles and unlimited economic and social challenges (Adra, 2013; WFD, 2012), a situation that has further deteriorated after the war (International Medical Crops, 2019 & UNOCHA, 2018). The population live in a grave humanitarian situation. In 2019, it was estimated that 79% of the population (24.1 millions) are in need of humanitarian assistance, 3.34 millions are internally displaced, 17.8 million people require emergency food assistance and 8 million are totally dependent on external assistance (UNOCHA, 2018). Children are particularly vulnerable; their rights are continuously violated in all aspects whether education, safety or health (War child UK, 2019& UNICEF, 2019); 7.4 million children are in need of assistance, 2 million under-5 are malnourished and child violation rose by 7% in 2019 (UNOCHA, 2018). Yemeni children lack access to sufficient nutrition, social care and health services (UNICEF, 2018; UNICEF, 2019).

Yemeni children suffer psychological trauma (War child UK, 2019 & AL-Ammar, 2018), more evidently during the first two years of the war (2015-2016) when Sana'a city came under heavy airstrikes. Children similar to the rest of the population experienced extraordinary physical, psychological, and emotional challenges. However, children, due to the still-developing neurological system, are more sensitive and susceptible to psychological trauma and its impact (Al-Ammar, 2018). This unfortunate situation is further compounded by the inadequate social and protection services (UNICEF, 2018 & UNICEF, 2019). While, a number of support centers were established in few cities, thousands of children in Yemen are still in urgent need of more systematic psychological support and mental health services².

3. Method

The study was cross sectional and descriptive. It was carried out in the public School in two districts in the capital city of Sana'a namely, *AL-Saybiyne2* and *Al-Hasabah* between December 2015 and January 2016.

3.1 Population

The study population included students who were Internally Displaced Population (IDP) in the capital city of Sana'a. The IDPs consist of two groups, the first are the people who left their homes and moved to other districts within Sana'a city. That is, due to the heavy airstrikes targeting the areas close to alleged military targets i.e., Attan area, Niqum mountain, and the neighborhood of Sana'a airport. The second group are those who had moved to Sana'a from more severely affected (Ta'iz, Sa'da, Hajjah, Lajj, and Aden).The researchers framed the study population of displaced students based on the records of the educational offices in the capital city of Sana'a³. Accordingly, 10,000 IDPs students attended 123 public

¹ www.carleton.ca/cfip

² Sanaa Center for Strategic Studies et al. (2017). The Impact of war on Mental Health in Yemen: A neglected crisis, <https://sanaacenter.org/publications/analysis/5119>.

³ The total number of educational districts offices in Sanaa: Old Sana'a' Shoub, Azal, al-Sabiyne1, Al-Sabiyne2, Al-Hasabah, al-Wahyda, Al-Tahir, Mayeen, al-Thawrah, and Bani Al-Hareth.

schools during the two years period following the stating war (2015-2016). The study targeted the public schools only, because the private schools faced withdrawal of students to the governmental ones because of families' loss of income following the closure of several private business.

3.2. Sample

The study targets 1000 participants consisting 10% of the IDPs students. This sample is based on the recommendation of Gay and Airasion (2000) that stated the minimum number of subjects of the sample for descriptive research should be between 10- 20% of the population. Hair et al suggested 200 is the minimum sample size required if SEM (Structural Equation Model) analysis is employed (Hair et al, 2006). Using multiple stage cluster sampling, two out of all 11 educational districts (18%) were selected i.e., Al-Sabiye2 and Al-Hasabah. A list of public schools, their locations and size was obtained from the respective Education Districts Offices during mid-school year 2015/2016. Using simple random sampling, 19 public schools were selected in *Al-Sabiye2* and *Al-Hasabah* districts in Sana'a city. Using cluster sampling technique, the targeted students in each school were invited to participant in the study; 902 students answered the Arabic version of the PTSD questionnaire, the CPSS-5 measure.

3.3. Instrument (CPSS-5)

The Child PTSD Symptoms Scale (CPSS-5) is 27-item self-report scale that assesses trauma among children aged (8-18) years. The CPSS-5 was developed based on the original CPSS symptom scale for the DSM-5 (Foa, Asnaani, Zang, Capaldi, & Yeh, 2018). It consists of two parts; 20 items built on the DSM-IV criteria from part one. Part 2 assesses the functional of impairment in relation to the symptom. Participants rate the frequency and distress of the symptoms they experience over a month prior to data collection. A 5- point Likert scale is used in part one: 0 (*not at all*), 1 (*once a week or less/a little*), 2 (*2 to 3 times a week/somewhat*), 3 (*4 to 4 times a week/ a lot*), and 4 (*6 or more times a week/almost always*). The total score in part one ranges 0-80. In comparison, statements in part two are dichotomous as either absent (0) or present (1) and yield a total impairment severity score ranging from 0 to 7. This study identified the psychometric properties of the first part only (20 items of the PDS-5 symptom ratings). The CPSS-5 has an excellent internal consistency (Cronbach's alpha=0.924), and convergent validity with CPSS-1-5 ($r=0.904$), and discriminant validity with multidimensional Anxiety Scale (MASC) for children and Child Depression Inventory (CDI)¹.

3.4. Procedures

The Child PTSD Symptoms Scale (CPSS-5) was adapted to the Yemeni context, in terms of the language and content. The process started with forward and backward translation between English and Arabic, the native language in Yemen (Brislin & Lonner, 1973). The translation was done, jointly by two educational experts who had good knowledge of English and Arabic languages and were familiar with psychological terms. A third expert revised the English backward translation against the original version of the CPSS-5. In terms of the content, all the 20-items were retained expect item 16 because of its contradictory content "*Doing things that might hurt yourself (i.e. taking drugs, drinking alcohol, running away, cutting yourself)*", researchers replaced with "feeling about future plan or hopes cannot come true". Finally, a pilot study conducted on 93 participants from public schools in Amran governorate and the capital of Sana'a city where residents were expected to face war –related trauma. The pilot test showed that items were clearly laid and stage show good of item-total correlation for 20-items (0.62-0.23), showing common things in which to increase the reliability of the test (Nunnally & Bernstein, 1994). The Data were collected for the actual study over a three-week period between December 24th and January, 15th, 2016. Permissions were obtained from the respective Districts Educations Offices and then from the schools administrations. Researchers and two trained data collectors discussed with psychologist in each school to select a target schoolchildren who expected to face PTSD symptoms, and to meet then in groups of (10-20) students and explained to them the purpose and the research items. Data collectors sometimes read the questions for younger students and those who those had poor reading ability. The data of actual study collected over three weeks.

¹The CPSS-5 and scoring method obtained via personal contact the first researcher with the Director of Practicum Training and PTSD Training and Consultation Coordinator. Researchers expressed deepest thanks and gratitude to Dr. Sandy Capldi, for her cooperation and sharing the CPSS-5 and its psychometric properties, and scoring.

3.5. Ethical Consideration

The study clearance was obtained from the American Institute for Yemeni Studies¹. Necessary permissions were also obtained from the Directorate of Educational Office in Capital city of Sana'a, where selected public schools were located. Then, the schools' administrations were approached in the targeted districts of Al-Sabiye² and Al-Hasabah. They were informed about the aim and procedures of the study and asked to arrange for the parental consents and students' assents. An assigned social specialist or a psychologist approached the students in the respective schools and those who agreed were included. Data were collected anonymously.

4. Data Analysis

Prior to conducting the Confirmatory Factor Analysis (CFA), the technique of Principal Component Analysis (PCA) was applied using SPSS, version 24, with Varimax rotation (Hair., Andron, Tatham, & Black, 1998) was run to examine the structure of the CPSS-5 based on data collected from 902 IDPs Yemeni schoolchildren in Sana'a city.

The Analysis Moment Structure (AMOS) version 24 (Arbuckle, 1983, 2016) was used to perform the CFA, adopting Maximum Likelihood (ML) estimation with estimate means and intercepts to validate the CPSS-5 measurement model as shown in Figure 1. CFA examined the outcomes of PCA that constitute the hypothesized model of the CPSS-5, in three factors, the first one consists of 8-items (P1T1-P1T8) grouped on the cognitive symptoms, second factor (P1T9-P1T16) presenting emotional/psychological symptoms, while the third factor (P1T17-P1T20) grouped behavioral symptoms as show in the Table 1.

To assess the fit of the 20-item measurement model, the analysis estimated multiple fit indices as follow: (1) Chi-square (χ^2) index measuring the overall fit for the hypothesized CPSS-5 model, and insignificant χ^2 is desired to indicate that there are no differences between the covariance matrixes of the sample restricted covariance model (Hu & Bentler, 1995; Byrne, 2001). (2) The minimum value of the discrepancy between the observed data and the hypothesized model divided by the degree of freedom (CMIN/DF), and the value should range 3-5 to be acceptable (Hu, & Bentler, 1995). (3) Several fit indices such as the Comparative Fit Index (CFI), the Incremental index of Fit (IFI), and Tucker-Lewis Coefficient (TLI) should be close to 1, reflecting a good fit of the model (Hu, & Bentler, 1995 & Hair, Anderson, Tatham & Black, 1998). Finally, the value of Root Mean Square Error of Approximation (RMSEA) should be less than 0.08, and is better is to be close to zero (Rigdon, 1996; Schumacker & Lomax, 1996). Internal consistency reliability assesses reliability index of 20-item on three extracted factors as recommended by Nunnally & Bernstein (1994).

5. Results

Sample Characteristics

A total 1000 displaced students participated in this study with more than 99% response rate. However, 902 of the respondents completed the scale's items and these were used in the analysis. Table 1, presents the demographic variables of the students. The sample comprises 468 males (52%) and 434 females (48%). The mean age of the sample is 13.95 (SD= 2.3) with an age range of 10- 27 years. The majority of them were clustered around 13, 14 and 15 years old (67%). The fact that the students' age is normally distributed encourages researchers to draw conclusion on the psychometric indicators with confidence. In terms of to the grade level, the majority of students were in the 9th grade (286; 31.6%), 8th grade (280; 31 %), and 7th grade (165; 18.3%), Students' families had a mean number of 7.78 (SD= 3.3), and only 17.33% had good income, while the remaining had low or irregular (64%) or no income at all (7.6%).

¹ The data collection of this study was granted by the American Institute for Yemeni Studies (AIYS), in 2016.

Table 1: Demographic Characteristics of the Sample

Sample Characteristic (N=902)	Frequency	%
Age (Mean years (SD))	13.95(2.3)	
Range of age	10 years	
Family size (Mean number (SD))	7.78 (3.3)	
Gender		
Male	468	52
Female	434	48
Grade		
Third	11	1.2
Fourth	11	1.2
Fifth	47	5.2
Sixth	41	4.5
Seventh	165	18.3
Eight	280	31.0
Ninth	285	32.0
Tenth	55	6.1
Eleventh	4	0.4
Twelfth	1	0.1
Thirteen	1	0.1
Fourteen	1	0.1
status of family income (regular/irregular)		
Yes	366	40.6
No	523	58
Level of family income		
No income	69	7.6
In need	71	7.9
Low/irregular income	573	64
Good Income	156	17.33

Principle Component Analysis

The assumptions of Principle Component Analysis (PCA) was supported to perform PCA. The scale 20 inter-variable correlation does not exceed the recommended 0.30 value (Hair, Anderson, Tatham, and Black, 1998), Kaiser-Myer-Olkin (KMO) measure indicates the overall sampling is statistically adequate (0.89). Bartletes of Sphericity is significant [χ^2 (902) = 2802.79, $p \leq 0.001$], and the scores of the 20-item communality are greater than 0.30 except the item 14 (emotional numbing), which is 0.07. The finding of Varimax rotation retained three factors on the 20 items with Eigen value greater than 1 and explained 35.59% of the total of variance. Three components were loaded on 19 items only as shown in Table2, because *item 14 has poor loading* less than 30% and excluded. The values loading range between 0.33 and 0.65. The first factor loaded on 8 items, related to *cognitive symptoms*, while the second one loaded on 7 items of *emotional/psychological symptoms*. The third factor was loaded on 4 items pertaining to *behavioral symptoms* (Table 2).

Table2: Factor Loadings of the PCA for the CPSS-5

Item No.	Item code	Item-total correlation	Factor1	Factor2	Factor3
P1T2	Dreams	0.37	0.63		
P1T5	Physical reaction	0.44	0.62		
P1T3	Repeated event	0.39	0.55		
P1T1	Intrusive thoughts	0.45	0.54		
P1T8	Core of the event	0.31	0.52		
P1T6	Avoid thoughts	0.43	0.50		
P1T7	Avoid activities	0.46	0.49		
P1T4	Emotionally upset	0.46	0.49		
P1T10	Blaming yourself	0.29		0.62	
P1T13	Feeling distance	0.41		0.56	
P1T11	Negative feeling	0.41		0.55	
P1T12	Losing interest	0.40		0.54	
P1T16	Future plan	0.31		0.49	
P1T9	Feeling bad	0.43		0.49	
P1T15	Acting irritable	0.0.29		0.42	
P1T19	Concentration	0.42			0.66
P1T18	Jumpy	0.43			0.61
P1T17	Overly careful	0.28			0.59
P1T20	Sleep quality	0.42			0.58
Cronbach's Alpha		0.78	0.73	0.63	0.60

Confirmatory Factor Analysis

The Hypothesized Model of CPSS-5

The measurement model of the CPSS-5 has 20 items loaded on three sub-construct: the first factor related to cognitive symptoms loaded on eight items (P1T1-P8T8); the second factor consists of 8 item representing emotional-psychological symptoms (P9T9-P16T16); the third factor is related to behavioral symptoms with four items (P17T17-P20T20). Figure1 shows the results of the estimated three-factor model of the CPSS-5 for schoolchildren in Yemen. The parameters are statistically significant and they are free from offending estimates. The value of these parameters, ranging between 0.21-0.60, exceeds the t-value of factor loadings (greater than |2|). The inter-factor correlations among the three sub-constructs are positive, ranging between 0.68 and 0.78. The squared Multiple Correlation (SMC) explained reasonable values in the 20 items as observed variables. The SMC range of values from 0.11 to 0.36 reflects good reliabilities with one exception; item 14 (P1T14). This item had low loading (0.04), and variance explanation is (0.21) in which undermines the reliability of the second factor of emotional-psychological symptom. The overall-fit of conducting CFA are encouraging and the CPSS-5 model is consistent with the data. (1) Chi-square was statistically significant ($\chi^2(902) = 325.813, p \leq 0.001$) (Hair., Anderson, Tatham, & Black, 1998 & Kline, 2005), (2) the minimum discrepancy to degree of freedom (CMIN/ DF) = 1.95 which is close to the recommended value of 2 (Kline, 2005), and (3) The multiple goodness-of-fit indexes were CFI = 0.94, TLI=0.92, IFI = 0.94, and RMSEA= 0.032 (Hu & Bentler, 1995; Kline, 2005). All of these show good fit indices (Hu & Bentler, 1995; Byrne, 2001; Schumacker & Lomax, 1996).

In summary, the overall fit of the hypothesized model on the 20-item measurement model summarized in Figure1, shows that the CPSS-5 is consistent with the data collected from 902 Yemeni schoolchildren exposed to trauma experiences. The factor loadings of the 20 items were substantial and statistically significant expect for item 14 (P1T14) which had low loading (0.21) and contribute poorly to the variance (0.04). This finding reduced the reliability Cronbach's alpha of factor 2

(emotional-psychological symptoms) to 0.53 compared to 0.74 for factor (cognitive symptoms), and 0.60 in factor3 (behavioral symptoms).

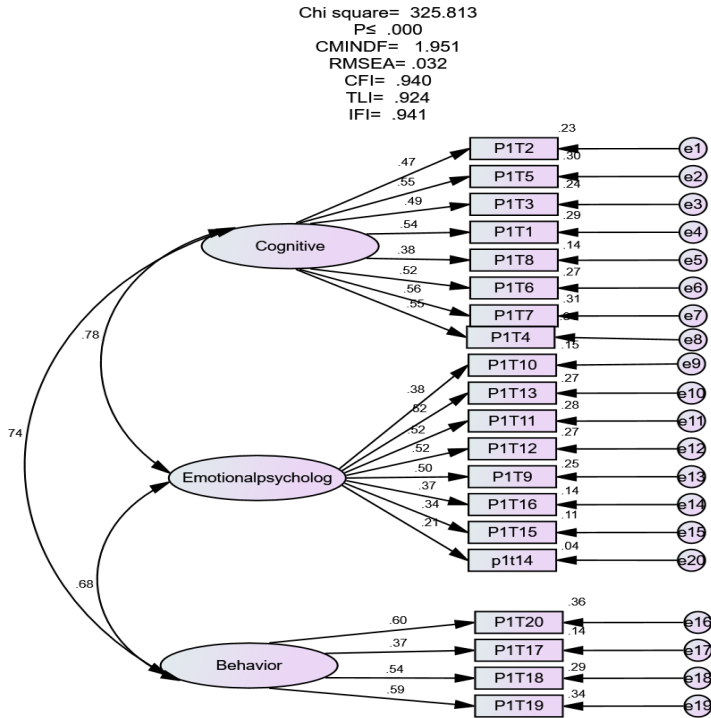


Figure1: The Hypothesized Model of the CPSS-

Hence, the hypothesized model was revised excluding the problematic item 14 (P1T14) as presented in Figure 2. The reliability indices were also recomputed. The Alpha value of factor 2 (emotional-psychological symptoms), increased from 0.53 to 0.63, while the reliability indicators remained robust and constant at 0.74 for factor 1 (cognitive symptoms), and 0.60 for factor 3 (behavioral symptoms). In general, the results are encouraging for the CPSS-5 model showing good psychometric characteristics (factorial validity and reliability).

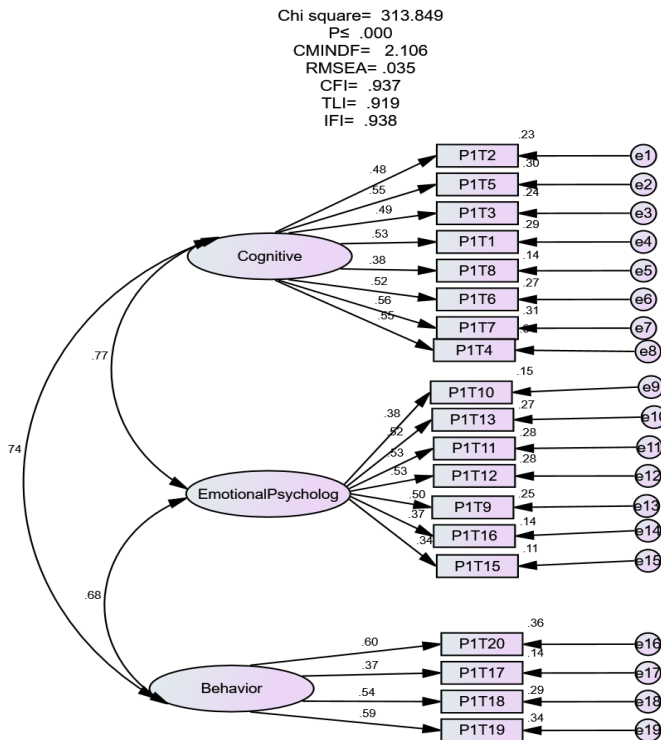


Figure2: The Revised Measurement Model of the CPSS-5

However, to determine the usefulness of the CPSS-5 model for Yemeni schoolchildren, three alternative models on the 20-measurement were estimated in order to seek the best -fit for the data from IDPs students in public schools in Sana'a city (N=902). Figure 3 and Table 3 show the goodness of fit and parameter estimate for these three alternative models and the revised one:

Single factor, first order of the CPSS-5 (Figure 3A),

Two factors, first order of the CPSS-5 (Figure 3B),

Four- factors, first order of the CPSS-5 (Figure 3C).

5.3.2.. Comparison of the Revised Model with the Alternative Models

As shown in Figure 3 and Table 3, we examined three alternative models in order to determine the best fit and usefulness of the revised CPSS-5 model. The results are as follow:

The first alternative model (Figure 3A) is a single-factor, first order solution based on conducting CFA on all the 20 items on one factor. The value of chi-square is large compared to the other three models ($\chi^2(902) = 479.363, p \leq 0.001$). Other fit indices were not encouraging though: TLI (.86), CFI (.88), IFI (.88) and RMSEA (.045) (Schumacker & Lomax, 1996). The parameters estimate of the 20-measurement also ranged between 0.20 (P1T14) and 0.54 (P1T5).

The second alternative model is built on two-factor first order solution (Figure 3B). While, the value of chi-square [$\chi^2(902) = 419.349, p \leq 0.001$] was less than the values of the first alternative model, it was much higher than the revised model

(Figure3C). The overall fit indices were poor i.e., TLI (.87), CFI (.89), IFI (.89) and RMSEA (.044), and less than the recommended values (Hu & Bentler, 1995; Schumacker & Lomax, 1996).

The third alternative model is a four-factor first order solution (Figure 3D) show overall good-fit indices but the chi-square [$\chi^2(902) = 305.972, p \leq 0.001$] was smaller than achieve in the previous two alternative models, and the revised model. The index of CMINDF= 1.87 is close to the recommended value of 2. The other overall fit indexes were within the desired values. The results of TLI (.93), CFI (.95), IFI (.95) and RMSEA (.031) are statistically acceptable (Blentler, 1990; Hu & Bentler, 1995; Kline, 2005). The reliability indices for the four- factor model of the CPSS-5-RS were 0.74 for factor1 (cognitive symptoms, the loaded items are ranged P1T1-P1T20); 0.58 for factor2 (behavioral symptoms, the loaded items of P1T17-P1T20). While reliability index of two new factors of emotional symptoms (P1T10 to P1T13) is 0.58, and (0.30) of factor four which loaded on items of negative feeling, the loaded items P1T9, P1T14, P1T15, P1T16, showing low the reliability index.

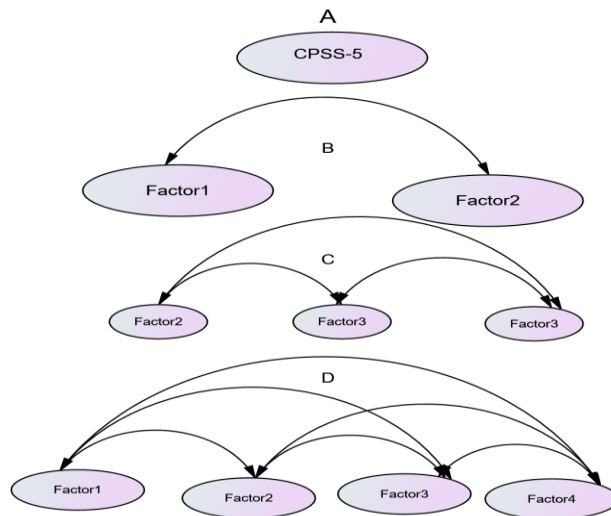


Figure3: The Three Hypothesized and Alternative Models of the CPSS-5

Thus, the revised model (Figure 3C; Figure 3 and Table 3) show overall best fit indices among the three alternative models [$\chi^2(902) = 313.85, p \leq 0.001$], and CMINDF= 2 as desired and recommended. Similarly, the indices of TLI (.92), CFI (.94), IFI (.94) and RMSEA (.035). Overall fit indices are reasonable and the parameters estimate show higher estimations (.37-.60), with variance explained ranged between (0.11-0.36) compared to the three alternative models. Furthermore, the estimation of reliability for the three sub-construct were 0.74 (cognitive symptoms), 0.63 (Emotional psychological symptoms), and .60 (Behavioral symptoms) were acceptable reliability indicators (Hair, Anderson, Tatham & Black, 1998).

Table3: Goodness-of-Fit indices, Parameters estimates for Three Alternative Models and the Revised Model

Fit Indices	Comparing Models for the CPSS -5-RS			
	Alternative Models			
Number of loaded factors*	1- factor	2- factor	4- factor	Revised Model (3- factor)
χ^2	479.36	419.35	305.97	313.85
P value	0.001	0.001	0.001	0.001

CMIN = χ^2/df		2.82	2.78	1.87	2.11
CFI		0.88	0.89	0.95	0.94
TLI		0.85	0.87	0.93	0.92
IFI		0.88	0.899	0.95	0.94
RMSEA		0.045	0.044	.031	.035
Item Code	Standardized Parameter Estimation for The Observed Measures				
	Items Content	1-factor	2-factor	4-factor	3-factor
P1T1	Having upsetting thoughts or pictures about it that came into your head when you did not want them to.	0.52	0.53	0.54	0.53
P1T2	Having bad dreams or nightmares	0.44	0.46	0.47	0.48
P1T3	Acting or feeling as if it was happening again (seeing or hearing something and feeling as if you are there again)	0.46	0.48	0.49	0.49
P1T4	Feeling upset when you remember what happened (for example, feeling scared, angry, sad, guilty, confused).	0.46	0.55	0.55	0.55
P1T5	Having feelings in your body when you remember what happened (for example, sweating, heart beating fast, stomach or head hurting).	0.54	0.54	0.55	0.55
P1T6	Trying not to think about it or have feelings about it	0.51	0.51	0.52	0.52
P1T7	Trying to stay away from anything that reminds you of what happened (for example, people, places, or conversations about it)	0.50	0.55	0.56	0.56
P1T8	Not being able to remember an important part of what happened.	0.54	0.55	0.38	0.38
P1T9	Having bad thoughts about yourself, other people, or the world (for example, "I can't do anything right", "All people are bad", "The world is a scary place")	0.36	0.36	0.54	0.50
P1T10	Thinking that what happened is your fault (for example, "I should have known better", "I shouldn't have done that", "I deserved it")	0.46	0.36	0.39	0.38
P1T11	Having strong bad feelings (like fear, anger, guilt, or shame)	0.32	0.49	0.55	0.53
P1T12	Having much less interest in doing things you used to do	0.47	0.50	0.55	0.53
P1T13	Not feeling close to your friends or family or not wanting to be around them	0.46	0.50	0.55	0.52
P1T14	Trouble having good feelings (like happiness or love) or trouble having any feelings at all	0.46	0.49	0.23	0.0
P1T15	Getting angry easily (for example, yelling, hitting others, throwing things).	0.20	0.36	0.37	0.34
P1T16	Feeling about plan or hopes cannot come true.	0.31	0.34	0.40	0.37
P1T17	Being very careful or on the lookout for danger (for example, checking to see who is around you and what is around you)	0.34	0.32	0.38	0.37
P1T18	Being jumpy or easily scared (for example, when someone walks up behind you, when you hear a loud noise).	0.31	0.48	0.45	0.54
P1T19	Having trouble paying attention (for example, losing track of a story on TV, forgetting what you read, unable to pay attention in class).	0.48	0.48	0.59	0.59
P1T20	Having trouble falling or staying asleep.	0.49	0.49	0.59	0.60

Notes: * on the form of two-factor, the items of cognitive symptoms are (P1T1 to P1T8, P1T19 & P1T20), and items loaded on factor2, which related to psychological symptoms (P1T9 to P1T18). While the form of four-factor loading as follows: factor1 (P1T1-P1T8) items related to cognitive symptoms, factor2 the items of P1T17, P1T18, P1T19, & P1T20 related to behavioral symptoms, and the third factor that related to emotional symptoms (P1T0, P1T11, P1T12, & P1T13), and four items of negative feeling grouped on factor four (P1T14, P1T15, P1T16, P1T9). The last model solution consists of three factors in which the eight items (P1T1 to P1T8) categorized on factor1; factor2 grouped on 8-item (P1T9 to P1T16), and factor3 comprised four items related to behavioral symptoms (P1T17, P1T18, P1T19, & P1T20).

Discussion

This study investigated the construct validity and factorial validity of the CPSS-5 based on data collected from 902 IDPs Yemeni schoolchildren. This tool measures PTSD for traumatized children and young people (8-18 years) and maps directly onto the DSM-5 PTSD symptoms criteria. So far, little attention was given to the construct validity of the factor structure (Kadak, Boysam, Ceylan, & Ceri, 2014). The majority of the studies on the psychometric properties of the CPSS sought criterion validity, convergent validity, and/or discriminant validity (e.g., Foa, Asnaani, Zang, Capaldi, & Yeh, 2018; Foa, McLean, Zang, Zhong, Powers, Kauffman, Rauch, Porter, & Knowles, 2016; Foa, Johanson, Feeny, and Treadwell, 2001; Nixon, Meiser-stedman, Yule, Clark, Perrin, & Smith, 2013).

The underlying structure of PTSD symptoms is accounted by the DSM-5 four-factor model. These factors reflect the intrusive experiences, avoidance, arousal, and persistent alterations in mood and cognitions (Smith, Dalgleish, & Meiser-Stedman, 2019). Two statistical methods were applied in our case i.e. exploratory PCA followed by the confirmatory analysis CFA. The CPSS-5 in our data demonstrated statistical evidence supporting construct validity of the PTSD. Only nineteen items loaded on three valid and reliable rotated factors (cognitive, emotional-psychology, and behavioral aspects) with eigenvalue more than one and explained 35.59% of the total of variance. The loading values of parameters estimation of the three-extracted sub-scale ranged from 0.33 to .65. Conducting CFA on four forms for the CPSS-5 (single factor; two-factor, three-factor and four-factor structure), provide statistical fit-indices supporting also, three-factor structure solution (see Table 3 and Figure 3). Factor one of 8-item reflects repeated thoughts and the event experience was labelled as "*cognitive symptoms*". The second factor of 7-item pertains to emotional, psychological and negative feelings and was referred to as "*emotional-psychological symptom*". The third factor loaded on 4-item related to behavioral problems as consequences of traumatizing events, and it was named as "*behavioral symptoms*".

It is observed that the revised model featured with (1) the feasibility of the 19-parameter estimate, (2) the appropriateness of the 19-standard error, and (3) the statistical significance of the parameters' estimate as mentioned by Byrne (2001). In the current study, analysis supported three factors of the CPSS based on the DSM-5 criteria similar to what is reported by Gudino & Rindloub (2014) who used CFA on data collected from Latino children. Similarly, Sack, Seeley, Him, & Clarke (1998), found good fit for the three-factor model with good factorial validity (CFA=0.99) among war-traumatized Cambodians. The three factors were intrusion, avoidance and emotional numbing. Other studies reported different structure validity in different contexts e.g. the four-factor "numbing" PTSD model (King, King, Leskin, & Weather, 1998; Rasmussen, Smith, & Keller, 2007 & Michalopoulos et al., 2015) and the 4-factor "dysphoria" PTSD model (Serrano-Ibáñez et al., 2018 & Simms, Watson, & Doebbell, 2002). A model of 6 factors was reported by Specker et al., (2018) who supported 6-factor structure of re-experiencing, avoidance, negative affect, anhedonia, dysphoric arousal and anxious arousal from a sample of traumatized international refugees in Australia, using CFA analysis, another six-factor model (intrusion, avoidance, negative affect, anhedonia, dysphoric arousal, and anxious arousal factors) emerged as the best fitting model among Chinese earthquake survivors (Lu et al, 2014). In contrast, the findings of Charak et al. (2014) support two four-factor models of emotional numbing and dysphoria, and the results of factors analysis EFA and CFA show only one-factor structure associated with high reliability ($\alpha = 0.93$) among 206 6th -12th grade students from public schools in rural Northern Mississippi (Stewart, Ebesutani, Drescher, and Young, 2015).

Authors in western cultures also reported varying structures. For instance, Davidson et al. (1997) PCA study of the DTS on 353 men and women yielded a single factor with very high internal consistency (0.99). Such findings contradict those from non-western context. Michalopoulos et al. (2015) for example reported an inconsistent model fit as will be explained in the following section.

In the current study, both the PCA and the CFA show that the three factors have clustered differently from the DSM- PTSD guidelines (American Psychiatric Association, 2013) and factors loaded only on 19-item. Item 14 had low loading (0.21)

and contribute poorly to the variance (0.04), thus it was deleted, and the item's content of 'unable to feel emotions' seems to be problematic, and this is similar to what is reported by Michalopoulos et.al. (2015). The latter studied three sample refugees of sexual assault survivors from Democratic Republic of Congo (DRC), Burmese refugees in Thailand, and Iraqi refugees torture survivors. The lack of model fit in Iraq was related to the item "unable to feel emotions", which consistently had low factor loadings in all models tested as reported by Michalopoulos et.al. (2015, p.7). The cultures in Iraq and Yemen are closely related and this may well explain the similarities in the findings (Michalopoulos et.al. 2015).

The internal consistency of this study was computed using Cronbach's alpha for the three sub-constructs with values of .74 (cognitive symptoms), .63 (emotional and psychological symptoms), and .60 (behavioral symptoms). The reliability of the three sub-scales is lower than that reported in the Western studies. Foa et al., (2001) cites that the internal consistency reliability for sub-construct re-experiences (.80), avoidance (.73), and (.70) for arousal. Researchers used other methods such as test-retest reliability and inter-rater reliability-Kappa index with excellent reliability for total severity scores (0.99) and good index using test-retest reliability (0.79) (Foa et al., 2018).

7. Conclusion and limitation

Due to the lack of validated measurement scales of mental health in Yemen, researchers did not apply others methods for computing validity i.e. criteria validity or discriminant validity. Similarly, alternative methods were not available for assessing reliability. Further studies are required to validate different tools and methods of mental health issues in Yemen and other Arab-speaking countries. Future research can apply structural equation modeling (SEM) to look into the role of the demographic variables such as the economic status and other demographic characteristics as predictors of PTSD using CPSS-5. The finding that 19 items loaded in our model instead of 20 calls for repetition of the same analysis on different groups to verify the content of the scale. Our results validate the CPSS-5 model only on 19-items instead of 20 items due to deletion of item14. Accordingly, further research is needed to revalidate the CPSS-5 on different sample from a child or youth populations in Yemen. Despite these limitations, the current Yemeni version of the CPSS-5 is proved a robust tool for the researchers and social workers to screen for and measure PTSD symptoms among the Yemeni children.

Acknowledgment:

Researchers thanks Dr. Hussyn Al-Bahygi, professor in teaching English Language at Sana'a university and Mr. Mohammed al-Maghbishi, PhD candidate in Educational Assessment for their efforts and bot good cooperation.

Great thanks goes to Dyef Al- Arasy and Ahamed Al-Hamzi, two MA students at Faculty of Education, Sana'a University, 2016 for both cooperation during data collection.

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