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Assessing reliability and validity of the Arabic language version of the Post-traumatic Diagnostic Scale (PDS) Symptom Items

Anne E. Norris^{*} and Karen J. Aroian^a

aWayne State University College of Nursing and Department of Anthropology, Cohn Building, 5557 Cass Avenue, Detroit, MI 48202, Aroian@wayne.edu

Abstract

Arab immigrant women are vulnerable to posttraumatic stress disorder (PTSD) because of gender, higher probability of being exposed to war-related violence, traditional cultural values, and immigration stressors. A valid and reliable screen is needed to assess the incidence of PTSD in this population. This study evaluated the reliability and validity of an Arabic language version of the symptom items in the Posttraumatic Diagnostic Scale (PDS) in a sample of Arab immigrant women ($n = 453$). Reliability was supported by Cronbach's alpha values for the Arabic language version (0.93) and its subscales (0.77-0.91). Results of group comparisons supported validity: Among women who had lived in a refugee camp and had emigrated from Iraq – a country where exposure to war and torture is common -- those who were exhibiting depressive symptoms (CES-D score above 16) or who reported moderate-to-severe impairment in functioning had significantly higher mean PDS total and symptom subscale scores than women who had not had these experiences or were not exhibiting depressive symptoms. Scores on the PDS and its subscales were also positively correlated with the Profile of Mood States (POMS) depression and anxiety subscales and negatively correlated with the POMS vigor subscale.

Keywords

Stress Disorders; Post-Trauma; Psychometrics; Women; Emigration and Immigration; Instrument Construction

1. Introduction

Arab immigrant women are at high risk for posttraumatic stress disorder (PTSD) because of their gender, likely exposure to war-related violence and torture, exposure to immigration-related stressors, and traditional cultural orientation. The incidence of PTSD is consistently higher in women than in men (Nemeroff et al., 2006). Even when women and men are subjected to the same type of trauma, women have about twice the risk of developing PTSD and their symptoms are more likely to persist (Kessler, 2000; Kimerling et al., 2004), arguing a role for biological factors (Olf et al., 2007). Many Arab immigrants, particularly those from Iraq, have experienced war-related violence, including torture (e.g., Gorst-Unsworth and Goldenberg, 1998; Jamil et al., 2002, 2005). Although exposure to war-related violence does not necessarily

^{*}corresponding author: Boston College William F. Connell School of Nursing, 140 Commonwealth Ave, Chestnut Hill, MA 02467, E-mail: norrisa@bc.edu, 617-552-0745 (fax), 617-552-6810.

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lead to PTSD (Kessler et al., 1995), the incidence of PTSD is known to increase in war-exposed populations during and after war (e.g., Somasundaram and Sivayokan, 1994). Moreover, some well-designed studies suggest that torture also increases the risk for PTSD (e.g., Silove et al., 2002). Immigration-related stressors (e.g., language difficulties, separation from family, and gender role conflict) also contribute to posttraumatic symptoms by exacerbating the effects of pre-migration trauma (Steel et al., 1999; Tracy, 1999; Kimerling et al., 2004). Lastly, the lives of immigrant women from traditional cultures revolve closely around home and family and are more dependent on male providers (e.g., husband or son). Hence, fleeing one's home and the threat or actual loss of male relatives may be particularly distressing for these women, thereby increasing their risk for PTSD (Basoglu et al., 2002).

Accurate assessment of PTSD in Arab immigrant women is hampered by the dearth of reliable and valid Arabic language measures of PTSD. The purpose of this study was to evaluate the reliability and validity of an Arabic language version of the symptom items in the Post-traumatic Diagnostic Scale (PDS; Foa et al., 1997) in a sample of Arab immigrant women. The construct, divergent, and discriminate validity hypotheses, respectively, were as follows: Scores on the Arabic PDS symptom item total and subscale scores will correlate positively with scores on the Profile of Mood States (POMS) depression and anxiety subscales, and the Daily Hassles Scale (DHS; Kanner et al., 1981). Scores on the Arabic PDS symptom item total and subscale scores will correlate negatively with the POMS vigor subscale and will be uncorrelated with the age of the participant's youngest child. Scores on the PDS symptom item total and subscale scores will be higher for certain categories of women: women who have lived in a refugee camp, women who have emigrated from Iraq where dual exposure to war and torture appears more frequent than it is for women from other Arab countries, women who reported a lower level of functioning, and women who reported a higher level of depression.

1.1. Posttraumatic Diagnostic Scale

The Posttraumatic Diagnostic Scale (PDS; Foa, 1995) is one of the most commonly used measures for the assessment of PTSD (Elhai et al., 2005). It was developed with men and women, and its scoring does not vary with gender (Kimerling et al., 2004). It is also a self-report measure, which eliminates the cost and burden associated with clinical evaluation.

The PDS queries about trauma exposure and functioning, and it can be used to generate a diagnosis of PTSD consistent with the DSM-IV (American Psychiatric Association, 1994) or as a stand-alone measure of PTSD symptom severity. The PDS was based on the PTSD Symptom Scale (PSS; Foa et al., 1993), an earlier measure that became outdated when the DSM-III was revised into the DSM-IV. Additional sections were added to the PSS and the wording of the original symptom items was revised to improve clarity (Foa et al., 1997).

The PDS comprises four sections. Section I contains a checklist of traumatic events, and respondents indicate whether they have experienced or witnessed each of these events. An "other" category is included so that respondents can write in events not included in the checklist. In Section II, respondents indicate which event has disturbed them the most in the past month (their "most bothersome" event), and they provide a brief description of this event. They then report how long ago this event happened and complete a series of yes/no questions regarding this event that assess Criteria A (did they or someone close to them experience personal harm, feel their life was endangered, feel helpless and terrified, etc.). Section III contains the 17 PTSD symptom items that assess Criteria B (re-experiencing symptoms), C (avoidance symptoms), and D (arousal symptoms). The frequency of each symptom's occurrence in the past month is rated on a four point scale, ranging from 0 (not at all or only one time) to 3 (five or more times a week or almost always). The last section contains nine yes/no items designed to assess Criterion F (general satisfaction with life, functioning overall and in different life domains – work, home, family, etc.).

A total symptom severity score (SSS; Foa, 1995) can be calculated from the 17 PDS symptom items in Section III that correspond to the three symptom subsets referred to as DSM-IV Criteria B, C, and D. Responses to these symptom items can be analyzed at the subscale level, providing data about both the number and severity of symptoms within a particular subset, allowing for dimensional assessment.

Reliability and validity of the PDS symptom items were initially evaluated in a sample of men and women who had experienced some type of high-magnitude stressor ranging broadly from those specific to a war setting (33%) to those such as a natural disaster (31%; Foa et al., 1997). Reliability was supported by a Cronbach's alpha of 0.92 and a test-retest reliability coefficient of 0.83. Validity was supported by strong correlations ($r = 0.73-0.79$) between the PDS SSS and measures of depression (BDI) and anxiety (STAI-S, STAI-T). Findings for the three symptom subscales were consistent with those observed for the total set of items, and not surprisingly, these three subscales were highly intercorrelated ($r = 0.72$ to 0.82). These initial psychometric data have been replicated for alternative language versions of the PDS, including those in the German (Steiglitz et al., 2001), Spanish (Novy et al., 2001), Bosnian (Powell and Rosner, 2005), and Danish (Fuglsang et al., 2004) languages.

2. Methods

2.1 Sample

Study participants were relatively recent Arab Muslim immigrant women who have lived in metropolitan Detroit since 1989 ($n = 546$). Participants were recruited through verbal advertisement by bilingual research assistants who were also immigrants and representative of the countries of origin in the local Arab community. The local Arab immigrant community is the largest Arab community in the U.S., with a conservative estimate of about 200 to 250 thousand Arab immigrants living in ethnic enclaves in metropolitan Detroit (Schopmeyer, 2000; Zogby, 1998).

All participants were part of a larger study about the effect of maternal emotional status and parenting on adjustment of adolescent children of foreign-born Arab Muslim mothers. PTSD was a major construct of interest in the larger study because many Arab immigrants, particularly those from Iraq and Lebanon, have been exposed to war; those from Iraq have also suffered from severe ethnic and political persecution, including torture and imprisonment at the hands of their own government, a situation that is reported as more devastating than if the perpetrator was from another country (Jamil et al., 2002). Only Muslims were recruited because Islam is a minority religion with vastly different expectations for women and adolescents, which poses another layer of complexity for adjusting to the U.S. English ability was not required. Participants had the choice of being interviewed in English or Arabic. However, almost all study participants chose Arabic (97%).

Participants were dropped from the analyses if they chose to complete the interview in English ($n = 18$) or failed to answer one or more PDS symptom items ($n = 75$). Comparisons of retained ($n = 453$) and deleted ($n = 93$) participants indicated that retained participants were more at risk for PTSD: Retained participants were more likely to have been born in Iraq, lived in a refugee camp, and immigrated as refugees ($P < 0.01$). They also reported living longer in a refugee camp than participants who were deleted from the analysis ($P < 0.01$). However, the two groups did not differ on demographic characteristics unrelated to trauma: age; education; language ability; marital status; or number of children ($P > 0.05$).

The mean age of the sample was 40.16 ($SD = 6.27$) years. Most participants were married (85.4%). These characteristics reflect the fact that only women with one or more adolescents were eligible for participation in the larger study. Over half (52.5%) of the sample was born

in Iraq and a third (33.6%) was born in Lebanon. The remaining 13.9% were born in 1 of 12 other Arab countries in the Middle East or Northern Africa. Median length of time living in the U.S. was 9.23 years. Almost equal numbers had entered the U.S. as refugees (53.0%) or immigrants (40.2%), with the remaining 6.8% entering on tourist, student, or work visas before seeking permanent residence. Only 17.0% spoke English. Almost two thirds had less than a high school education (64.5%) and only 8.9% had a college degree. The majority were homemakers who were not looking for work (81.2%); only 16.1% were employed full or part-time. Of the 387 women who had husbands currently in the home (i.e., not widowed, divorced, or separated), 53.4% of their husbands were employed either full or part time, and the remaining 46.1% were unemployed. Almost half (43.0%) of the husbands had less than high school education, but 20.8% had a college degree.

Over a third of the participants (44%) reported living through or witnessing three or more traumatic events. The six most commonly reported types were military combat or war zone (88.6%); serious accident, fire, or explosion (70.3%); imprisonment (48.1%); political/ethnic persecution, including interrogation and being forced to flee one's homeland (47.7%); life-threatening illness (38.9%); torture (38.6%); and natural disaster (31.7%). Less than 6% reported having experienced any type of physical or sexual assault not related to war or political/ethnic persecution. Immigrants from Iraq were significantly more likely to have experienced torture (59.6%) than those from Lebanon (17.2%) or other countries (11.3%; Chi-square = 92.24, $df = 2$, $P < 0.001$).

Almost half (49.1%) identified war or political/ethnic persecution as the most bothersome traumatic event, but 25% provided an "other traumatic event" as the most bothersome. Other traumatic event included more normative stressors, such as divorce or illness or death of a family member. Yet, 86.6% of the participants who identified a more normative event as the most bothersome also reported one or more of the six most commonly reported types of traumas described previously. The most bothersome traumatic event was used as the context for answering Parts 2, 3, and 4 of the PDS.

2.2 Data collection

Data collection occurred in study participants' homes. All data were collected in face to face interviews by Arab women and participants were given \$30.00 for their time.

Arabic language versions of data collection materials were developed through translation and back-translation and discrepancies were resolved through discussion by a team of bilingual experts. The translation team was five Arab immigrant women from Middle Eastern countries that were representative of the origin countries of our study population. They had an average of approximately 12 years of experience providing written and verbal Arabic translation to local health and social services. The goal of the translation was loyalty of meaning and equal familiarity and colloquialness in both English and Arabic (Werner and Campbell, 1970).

In addition to the Arabic PDS, study participants completed a battery of questionnaires including a demographic and migration questionnaire, the Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977), the Profile of Mood States (POMS; McNair et al., 1971), the Daily Hassles Scale (DHS; Kanner et al., 1981), and other measures not used in analyses presented here. The PDS was described earlier. Hence only the CES-D, the POMS, and the DHS are described here.

The CES-D assesses depression, specifically the presence of 20 depressive symptoms, based upon how respondents felt during the past week. Items are scored from 0 (*rarely*) to 3 (*most of all of the time*) with a high score reflecting increased depressive symptomatology. Construct validity has been demonstrated by positive correlations with other measures of depression,

such as the Hamilton Depression Rating Scale ($r = 0.44$), the Raskin Rating Scale ($r = 0.54$) and the Symptom Checklist-90 ($r = 0.83$) (Radloff, 1977). Reliability coefficients are high (Cronbach's $\alpha = 0.90$) among general population samples (Radloff, 1977). Internal consistency reliability was 0.91 in the sample used for the analyses presented here.

The POMS is a widely used measure that assesses six distinct affective mood states, including Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor-Activity, Fatigue-Inertia, and Confusion-Bewilderment. The items consist of one-word or short phrase descriptions of emotions that are rated on a five-point scale of intensity (not at all, a little, moderately, quite a bit, and extremely). The internal consistency coefficients for the six subscales range from 0.84 to 0.95 in a sample of female psychiatric outpatients (McNair et al., 1971) and test-retest reliabilities range from 0.61 to 0.69 following four weeks of outpatient treatment (McNair and Lorr, 1964). Only the Depression-Dejection, Tension-Anxiety, and Vigor-Activity subscales were used in the analyses presented here. The internal consistency reliability for these subscales ranged from 0.87 for Vigor-Activity to 0.92 for Depression-Dejection in this sample.

The DHS consists of 117 short statements about problems with family, health, money, neighbors, etc. Severity of each existing problem is measured on a 3-point scale, ranging from somewhat to extremely severe. Construct validity is evidenced by correlations with theoretically related concepts, including major life events ($r = 0.36$), psychological symptoms on the Hopkins Symptom Checklist ($r = 0.66$), and negative affect as measured by Bradburn and Caplowitz Affect Scales ($r = 0.34$) (Kanner et al., 1981). The internal consistency reliability was 0.95 in the sample used for analyses presented here.

2.3 Data preparation and analysis

The data analysis proceeded in two steps. First, Cronbach's α was used to evaluate internal consistency of the PDS symptom item total (Symptom Severity Score or SSS) and subscale scores. Second, a series of analyses were used to evaluate validity. Pearson's product moment correlation was used to evaluate construct and divergent validity. Specifically, the SSS and the symptom subscales were correlated with measures of depression (CES-D, POMS depression subscale), anxiety (POMS anxiety subscale), stress (Daily Hassles Scale or DHS), vigor (POMS-Vigor) and age of the participant's youngest child. The t -test was used to assess discriminant validity. We compared groups who should score higher with respect to PTSD symptoms with those who should score lower: (a) women who had emigrated from Iraq as compared to those who had not; (b) women who had spent time in a refugee camp as compared to those who have not; (c) women who scored above 16 on the CES-D (recommended cut off score for depression; Radloff, 1977) as compared to those who scored below; and women who reported moderate or severe impairment in functioning on the PDS Section IV as compared to those who reported little or no impairment.

3. Results

3.1 Reliability

The Cronbach's α coefficient for the total symptom scale was 0.93. The Cronbach's α for the Re-experiencing subscale was higher (0.90) than the α s obtained for the Avoidance (0.78) and Arousal (0.83) subscales. However, the three PDS symptom subscales were highly intercorrelated ($r = 0.64$ to 0.72).

3.2 Validity

Both correlation (Table 1) and t -test analyses (Table 2) supported the validity of the Arabic PDS. Measures of depression (CES-D, POMS Depression-Dejection subscale), anxiety (POMS Anxiety-Tension subscale), and stress (Daily Hassles Scale) were either moderately

or strongly correlated with the symptom subscale and SSS scores arguing for construct validity. Divergent validity was supported by a negative correlation with the POMS Vigor-Activity subscale and a lack of correlation with the age of the participant's youngest child.

Data in Table 3 argue for discriminant validity. Women in the sample who were more at risk for PTSD (i.e., those who had experienced torture or had lived in a refugee camp) scored higher than women without these risk factors ($P < 0.001$). Women who scored above 16 on the CES-D (had scores indicating high depressive symptomatology) scored significantly higher on the PDS than women who had scores below this cut-off ($P < 0.001$). And, women who reported moderate to severe impairment in functioning scored significantly higher on the PDS than women reported little to no impairment ($P < 0.001$).

4.0 Discussion

Findings from this study support the reliability and validity of the Arabic PDS symptom items in a sample of Arab immigrant women. The Cronbach's *alpha* value for the total score replicates the value obtained by Foa (1995) for the English version. Scale validity is supported by evidence of construct, divergent, and discriminant validity.

The magnitude of the correlations we obtained between the PDS symptom items and other measures of depression and anxiety in the construct validity analyses were somewhat lower than those obtained by Foa (1995). However, we used different measures of depression and anxiety. Moreover, other non-English versions of the PDS symptom items tended to have correlations that were somewhat lower than those obtained by Foa with her English language version. This suggests that the difference in magnitude could reflect differences in cultural expression of negative emotions.

The most notable limitation of our study is that we do not have independent clinical assessment data such as a SCID for our participants. Hence, we were unable to assess the specificity and sensitivity of the Arabic PDS symptom items. However, our study findings concerning reliability and validity support comparing PTSD diagnoses based on the Arabic PDS symptom items with SCID based DSM-IV diagnoses as the next step for future research.

A second limitation of our study is the sample, which did not include Arab men. Although previous work with the English version of the PDS supports reliability and validity of the PDS in men, additional research is needed to confirm that the Arabic PDS symptom items are valid and reliable for Arab men. Arab men may be more reluctant to report symptom experiences than Arab women. The literature also suggests that post-migration stressors contribute to posttraumatic symptoms by exacerbating the effects of pre-migration trauma (Steel et al., 1999; Tracy, 1999; Kimerling et al., 2004). Arab immigrant women may experience a different configuration of post-migration stress or have a different pattern of post-migration adjustment than men. For example, women may be more distressed by family separation and experience more gender role conflict, whereas men may experience more work related stressors and discrimination. A question for future research is whether such differences might mitigate gender differences in symptomatology. Thus far, the limited research available regarding Arab immigrants does not address this question.

Nevertheless, existing literature regarding Arab immigrants suggests that the relationships between the study variables we observed in our participants would also be present in Arab immigrant men. For example, studies of Arab immigrant men living in the United States have found a significant association between meeting the diagnostic criteria for PTSD and being from Iraq as compared to other Middle Eastern countries (e.g., Jamil et al., 2002). Likewise, the women participants in our study who had emigrated from Iraq were significantly more symptomatic than women who had emigrated from other countries.

If men had been included in our sample we would have expected them to be less symptomatic relative to our women participants. There is a preponderance of gender differences reported in the growing literature regarding traumatized persons from Arabic and other Muslim countries. Additionally, there is growing evidence for a neurobiological component to women's increased vulnerability to PTSD (Olf et al., 2007).

Like women in the west, Arab women who have experienced trauma report more distress than men (Al-Khawaja, 1997). For example Punamaki et al (2005) observed that although Palestinian men reported more lifetime traumatic events, Palestinian women were more likely to report symptoms which met DSM criteria for PTSD and other psychiatric disorders. These gender differences appear to hold even if the traumatic events that men and women experience differ because of cultural practices like gender segregation in which women's travel and work outside the home is limited relative to men's (Cardoza et al., 2005). For example, the prevalence of PTSD symptoms was higher in women than men (48% met diagnostic criteria as compared to 32%) in data from the Centers for Disease Control and Prevention's (CDC) 2002 national survey of postwar Afghani mental health despite the previous presence of gender segregation secondary to the influence of the Taliban (Cardoza et al., 2005). An exception to the gender difference may arise if men are more likely than women to have experienced torture (de Jong et al., 2001) or multiple traumas (Ai et al., 2002). For example, de Jong et al observed higher rates of PTSD in Palestinian men than women that corresponded to gender differences in the experience of torture.

Despite limitations, study findings have implications for cross cultural research. They support the universality of the conceptual relationships between PTSD symptoms, depression, and anxiety, and the presence of these phenomena in persons who have experienced aversive events. Study findings also suggest that Arab immigrant women, like women in the west, are not culturally biased against reporting psychiatric symptoms.

Additionally, study findings about the reliability and validity of the Arabic PDS symptoms support its clinical utility. The Arab immigrant women in our study were recruited from the community and not from psychiatric treatment facilities. Nonetheless, many of these women reported experiencing or witnessing multiple traumatic events. Unfortunately Arabs in select countries in the Middle East are likely to be similarly traumatized. Because of cultural taboos against seeking psychiatric help or the potential to accept multiple traumas and horrendous events as typical during times of war and ethnic strife, many Arabs with similar trauma histories may never come to the attention of psychiatric professionals. The Arabic PDS symptom items could be used for large scale preliminary screening of PTSD symptoms by paraprofessionals in non-clinical settings. Early detection of PTSD is essential for appropriate referral to psychiatric professionals for treatment. Psychiatric treatment can decrease suffering and increase quality of life.

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Table 1Evaluation of construct and divergent validity. ^a

	Subscale Scores			Total Score
	Re-experiencing	Avoidance	Arousal	SSS
CES-D	.50	.60	.66	.66
POMS Depression-Dejection	.45	.56	.61	.61
POMS Anxiety-Tension	.42	.51	.56	.61
Daily Hassles Scale	.45	.52	.52	.55
POMS Vigor-Activity	-.29	-.35	-.39	-.39
Youngest Child's Age	.05	.06	.06	.06

^aAll correlation values (*r*) listed in Table 1 are significant ($P < .001$) with the exception of those involving the youngest child's age ($P \geq .19$).

Table 2

Evaluation of discriminant validity.

	Subscales			Total Score
	Re-experiencing	Avoidance	Arousal	
Country of origin:				
Iraq (<i>n</i> = 238)				
Mean	7.63	5.67	6.33	19.63
(<i>SD</i>)	(4.53)	(4.62)	(4.40)	(11.77)
Other (<i>n</i> = 215)				
Mean	4.28	2.74	2.67	9.70
(<i>SD</i>)	(4.26)	(3.60)	(3.25)	(9.78)
<i>t</i> -test	8.09	7.56	10.61	9.81
(<i>df</i>)	(451)	(441.68)	(434.42)	(447.97)
sign.	<i>P</i> < .001	<i>P</i> < .001	<i>P</i> < .001	<i>P</i> < .001
Lived in refugee camp				
Yes (<i>n</i> = 168)				
Mean	7.57	5.34	6.28	19.18
(<i>SD</i>)	(4.62)	(4.27)	(4.31)	(11.38)
No (<i>n</i> = 285)				
Mean	5.15	3.66	3.60	12.40
(<i>SD</i>)	(5.15)	(4.38)	(3.97)	(11.56)
<i>t</i> -test	4.53	3.99	6.72	6.07
(<i>df</i>)	(451)	(451)	(451)	(451)
sign.	<i>P</i> < .001	<i>P</i> < .001	<i>P</i> < .001	<i>P</i> < .001
Functioning (impairment of)				
Mod./Sev. (<i>n</i> = 183)				
Mean	8.90	7.02	7.14	23.06
(<i>SD</i>)	(4.23)	(4.59)	(4.17)	(19.90)
Little/Non (<i>n</i> = 270)				
Mean	4.11	2.42	2.87	9.40
(<i>SD</i>)	(3.98)	(3.14)	(3.44)	(9.13)
<i>t</i> -test	12.24	11.82	11.48	13.96

	Subscales			Total Score
	Re-experiencing	Avoidance	Arousal	
(<i>df</i>)	(451)	(295.73)	(339.90)	(343.86)
sign.	$P < .001$	$P < .001$	$P < .001$	$P < .001$
CES-D Score > 18				
Yes (n = 248)				
Mean	7.84	6.21	6.57	20.62
(<i>SD</i>)	(4.59)	(4.65)	(4.45)	(11.92)
No (n = 199)				
Mean	3.81	1.89	2.12	7.81
(<i>SD</i>)	(3.84)	(2.52)	(2.39)	(7.19)
<i>t</i> -test	10.13	12.51	13.52	14.04
(<i>df</i>)	(444.23)	(394.61)	(396.37)	(414.94)
sign.	$P < .001$	$P < .001$	$P < .001$	$P < .001$