The Range of Symptoms in Refugees of War
The New Mexico Refugee Symptom Checklist-121

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Abstract: The range of symptoms experienced by refugees of war has not been empirically assessed. The New Mexico Refugee Symptom Checklist-121 (NMRSCL-121) was developed utilizing established guidelines and evaluated for its psychometric properties. Community-dwelling Kurdish and Vietnamese refugees reported 48 ($SD = 31$) persistent and bothersome somatic and psychological symptoms on the NMRSCL-121. Internal consistency and test-retest reliability for the total scale and for most subscales were acceptable, and construct and concurrent validity for the NMRSCL-121 data was shown. There were modest ethnic group differences on symptom severity and psychometric properties of NMRSCL-121 subscales. The NMRSCL-121 produces reliable and valid assessments of a wide range of symptoms in 2 broad community samples of displaced adult refugees.

Key Words: Refugees, symptoms, health, war trauma, assessment, measurement, instruments.

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Refugees experience multiple somatic and psychological symptoms. However, these symptoms are often not characteristic of currently defined posttraumatic stress disorder (PTSD), depression, or other psychiatric disorders (APA, 1994; Brett et al., 1988; Green et al., 1985; Horowitz et al., 1980; Van der Kolk et al., 1996), and the somatic symptoms are poorly defined and understood (Cervantes et al., 1989; Cheung, 1993; Hauff and Vaglum, 1993; Westermeyer et al., 1989). Refugees also have higher levels of self-rated impairment than the general population (Allden et al., 1996; Hollifield et al., 2005; Mollica et al., 1993; Mollica et al., 1999).

Knowledge about the full-range of symptoms experienced by refugees is lacking. The few extant instruments that assess symptoms or health status in refugees were developed by expert rational methods in clinical samples (Hollifield et al., 2002). They also assess specific health domains—such as PTSD or depression—that have been defined in nonrefugee populations and thus may not be the most appropriate constructs for traumatized refugees (Basoglu et al., 1994a; Punakami, 1989). Psychometric assessment of symptom measures for refugees is also lacking. The New Mexico Refugee Symptom Checklist-121 (NMRSCL-121) was empirically developed to assess the broad range of symptoms in 2 community samples of externally displaced refugees. Psychometric properties of the NMRSCL-121 were also evaluated.

METHODS

Study Design

The NMRSCL-121 was developed in phase I and evaluated for reliability and validity in phase II of the New Mexico Refugee Project, a cross-sectional study designed to improve measurement of trauma and health status in refugees. Qualitative and quantitative methods were used to develop the NMRSCL-121. Seven additional instruments were selected a priori to evaluate concurrent and construct validity (under "Instruments" and "Data Analyses"). Eighty participants were consecutively sampled for a second administration of the NMRSCL-121 4 to 6 weeks after the first to determine test-retest reliability.

Participants and Sampling

Two hundred fifty-two (135 Kurdish and 117 Vietnamese) community-dwelling refugees were purposely sampled in Albuquerque, NM; Colorado Springs, CO; and San Diego, CA. The stratified (by trauma type, ethnicity, and gender) purposive sampling method, population characteristics, and power calculations are described in previous reports (Hollifield et al., 2005; 2006). Participants provided verbal and written informed consent and were reimbursed $20 for their participation. The study was approved by the Institutional Review Board at the University of New Mexico.

Instruments

Instrument Translation

Translation must be adapted for specific purposes (Westermeyer and Janca, 1997). All extant questionnaires for the project were translated into Kurdish and Vietnamese using standard, back and forth blinded techniques and consensus approaches (Brislin, 1970). Instruments were administered to individuals during 1 session in the same order for all participants as part of the larger battery of assessments.

Development of the NMRSCL-121

A preliminary quantitative version of the NMRSCL, developed by an expert rational approach having 67 items organized into 15 scales, was administered to 30 refugees. Participants were instructed to check an item if that symptom had been persistent and bothersome over the past year. Thirty-seven different refugees participated in an in-depth interview (IDI) designed to identify both physical and mental symptoms that were persistent and distressing over a 1-year period. A more complete description of the methodology for data collection and synthesis utilizing the IDI has been published (Hollifield et al., 2005). Briefly, interviewers were Kurds and Vietnamese trained to use a standard format with probes. A code-book was used to systematically extract data from interviews. Preliminary NMRSCL and IDI data were tabulated, and clearly redundant items were deleted. Since the primary goal was to identify the full range of symptoms in refugees, we tended toward retaining rather than deleting similar items. An iterative process

combining expert judgment with preliminary exploratory factor analysis and reliability analysis resulted in 121 items in 12 subscales: (1) PTSD and depression, (2) musculoskeletal, (3) sensory, (4) cardiopulmonary, (5) gastrointestinal, (6) anxiety, (7) urinary, (8) posttraumatic vulnerability, (9) neurologic and bleeding, (10) skin sensation, (11) menstrual, and (12) constitutional. The first and largest factor includes currently defined and population specific symptoms of PTSD and depression. Factor 8 was somewhat distinct from factor 1 and includes cognitive anticipatory anxiety symptoms about retraumatization. Both of these factors were somewhat distinct from factor 6, comprising anxiety and panic symptoms. The NMRSCL-121 (Appendix) was formatted for use and testing in phase II. Possible responses for each item range from 0 (not at all) to 4 (extremely) as an indicator of the degree to which the symptom had been persistent and bothersome over the past year. Scoring is either a sum of dichotomous values (i.e., number of symptoms) or a sum of 5-point (0 to 4) severity scores.

War-Related Trauma Measures

The Trauma Experiences Questionnaire (TEQ), developed in our research (Hollifield et al., 2005) by partly adapting criteria used by Thompson and McGorry (1995), was used to sample participants into the first strata of having experienced either torture, nontorture war-related trauma, or no war-related trauma. The United Nations' Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (UN, 1985) definition of torture was operationalized into a checklist for identifying "torture" survivors. "Nontorture war-related trauma" survivors met criteria for having experienced war-related events but not torture, and "no war-related trauma" participants identified themselves as not having experienced torture or criterion level other war-related events.

The Comprehensive Trauma Inventory-104 (CTI-104) produces valid and reliable data that assess a broad range of war-related traumatic events in refugees (Hollifield et al., 2005; Hollifield et al., 2006). It has English, Kurdish, and Vietnamese versions, is self-administered (except when literacy is low), and has 104 items in 12 trauma type scales. A participant checks whether or not the event was experienced and, if so, how much impact the event had in terms of producing fear or threat. Each item has 5 possible responses: 0 = "did not happen," 1 = "a little fear or threat," 2 = "moderate fear or threat," 3 = "a lot of fear or threat," and 4 = "extreme fear or threat." Scoring may be either a sum of dichotomous values (number of events) or a sum of severity scores.

Symptom Health Measures

The Hopkins Symptom Checklist-25 (HSCL-25) assesses anxiety and depression symptoms, is valid for the general US population and for Indochinese refugees (Derogatis et al., 1974; Mollica et al., 1987; Winokur et al., 1984), and has transcultural validity (Butcher, 1991; Kinzie and Manson, 1987). Both continuous and dichotomous scoring was used for analyses. Item-average cutoff scores of ≥1.75 for each scale predict "clinically significant" anxiety and depression in general United States and refugee samples and are valid as diagnostic proxies (Derogatis et al., 1974; Winokur et al., 1984).

The Posttraumatic Symptom Scale-Self Report (PSS-SR) predicts PTSD diagnosis in US populations (Foa et al., 1993). Cronbach's α for internal consistency is 0.91, and 1-month test-retest reliability is 0.74. The 17 items on the scale, each scored from 0 to 3 for symptom frequency, are essentially DSM-IV PTSD diagnostic items. The PSS-SR may be scored as: (1) continuous, (2) ordered, based on severity, or (3) a dichotomous diagnostic proxy (i.e., "PTSD" vs. "no PTSD"). PSS-SR continuous scores and the diagnostic proxy were highly correlated with war-related trauma in Kurdish and Vietnamese refugees (Hollifield et al., 2006), and Cronbach α in these samples was 0.95.

Impairment Health Measures

The Medical Outcomes Study Short Form-36 (SF-36) is a brief, psychometrically well-tested quality of life measure for adolescents and adults, which may be self or interviewer administered (McHorney et al., 1993; Ware et al., 1993). The SF-36 measures 8 domains of daily functioning and is valid for cross-national comparisons (Aaronson et al., 1992).

The Sheehan Disability Inventory (SDI) has three, 10-point Likert scales that measure impairment due to the disruption of daily activities in work, social, and home/family life, and a 5-point global disability rating scale (Sheehan, 1983). α coefficients for the 4 scales range from 0.56 to 0.86.

The Sense of Coherence-13 (SOC-13), developed in work with Jewish holocaust survivors, measures a global coping resource in the face of overwhelming stress. The SOC provides continuous data and has been supported cross-culturally (Antonovsky, 1987). It produces data with acceptable reliability and validity in Hebrew and in English (Antonovsky, 1983; Antonovsky, 1984) and with acceptable test-retest reliability in Cambodian refugees (Cheung, 1995).

Data Analyses

Descriptive

The prevalence and range of symptom number and severity scores for the NMRSCL-121 are described. Ethnicity by gender factorial analysis of variance (ANOVA) and repeated measures multivariate ANOVA were used to detect group differences.

Reliability

Cronbach's α for the total NMRSCL-121 and the 12 subscales were calculated. Test-retest correlations for the total NMRSCL-121 and each of the 12 subscales were calculated. Each reliability test was conducted for the total sample and for each ethnic subsample.

Validity

Confirmatory factor analyses for each subscale of the NMRSCL-121 and a second order factor analysis of the 12 subscales were conducted to guide instrument development. Concurrent and construct validity were evaluated for the total sample and for each ethnic subsample by correlating the total NMRSCL-121 and each of its subscales with: (1) trauma on the TEQ and on the CTI-104, (2) health outcomes of anxiety and depression on the HSCL-25 and PTSD on the PSS-SR, and (3) health outcomes of impairment on the SF-36, the SDI, and the SOC-13.

RESULTS

Descriptive

Participants

Of the 252 participants, 135 (54%) were Vietnamese and 117 (46%) were Kurdish, and 135 (54%) were men and 117 (46%) were women. The ethnic groups were similar on years in the United States. (Kurds = 7.0, Vietnamese = 7.8, *NS*), current income (Kurds = 2.6, Vietnamese = 2.3, *NS*, where 2 = $15 to $20K/y, and where 3 = $20 to $25K/y), work hours per week (Kurds = 24.7, Vietnamese = 21.2, *NS*), and the percentage who had been in the military (24% for both). The age range was 19 to 77, the mean age was 44 (14), and the Vietnamese were older than the Kurds [47 vs. 39 years, t (250) = 4.79, $p < 0.01$]. Kurds had a higher average education than the Vietnamese [13.4 vs. 11.0 years, F (1251) = 20.0, $p < 0.01$]. Trauma characteristics by ethnicity and gender were recently reported (Hollifield et al., 2006). Nonparticipation rates are not available since chain-referral sampling allows those not interested not to contact the research team.

NMRSCL-121 Symptoms for the Total Sample

The mean number of symptoms reported was 48 (31), with a range from 0 to 118. Quartiles (25th, 50th, and 75th) were 19, 43, and 73 symptoms, respectively. The mean NMRSCL-121 severity score was 91 (77), with a range from 0 to 348. Quartiles for severity were 32, 67, and 133, respectively. Correlation between dichotomous (symptom number) and sum (severity) values was 0.91 for the full scale and ranged from 0.86 to 0.91 for the 12 subscales. Unless specified, the remainder of the analyses used severity scores.

NMRSCL-121 Symptoms by Ethnicity and Gender

A gender by ethnic group ANOVA showed that Kurds reported more total symptom severity than Vietnamese [means = 104.6 (85.3) vs. 78.8 (67.2), Cohen's $d = 0.33$, ethnic main effect, $F_{(1,250)} = 6.9$, $p < 0.01$], and there was no significant main effect for gender [means = male 93.5 (83.1) vs. female 87.6 (69.7), $d = 0.08$, $F_{(1,250)} = 0.27$, $p < 0.61$], or for an ethnic X gender interaction [$F_{(1,250)} = 0.01$, $p = 0.93$] (Table 1). Ethnicity accounted for 2.7% of the variance in severity scores, and gender accounted for only 0.2% of the variance.

A factorial ethnicity and gender multivariate ANOVA on the 12 subscale scores showed both ethnicity [$F_{(12,23)} = 7.9$, $p < 0.01$] and gender [$F_{(12,237)} = 8.1$, $p < 0.01$] main effects on symptom severity with no ethnicity by gender interaction. Follow-up univariate ANOVA showed ethnic group differences were significant for 6 of the 12 subscales (Kurds reporting more severity than Vietnamese on all 6). Gender differences reached statistical significance for only 2 of the 12 scales (sensory and menstrual, which both have gender specific items).

Reliability

Internal Reliability

For the complete sample, the 12 subscales showed a range of internal consistency from 0.55 to 0.97 with 9 scales greater than 0.81 (Table 1). This variation is partly due to the variability of number of items in each subscale. For each ethnic subsample, Cronbach's value and range across subscales was generally similar to the complete sample. Exceptions were the "neurologic and bleeding" and "constitutional" subscales where the Vietnamese data were less internally consistent than the Kurdish data.

Test-Retest Reliability

For the complete sample, the total NMRSCL-121 test-retest correlation was 0.81 (Table 1). Eleven subscales had acceptable retest reliabilities ranging from 0.62 to 0.81 with 9 of the 12 scales above 0.70 (only the menstrual subscale for women, $n = 34$, had an unacceptable retest correlation of 0.50). Mean scores for the total NMRSCL-121 were not significantly different from test to retest [means = 133.5 vs. 124.9, $t_{(79)} = 1.3$, $p = 0.20$], yet changed significantly for 3 subscales: Depression and PTSD [means = 59.3 vs. 51.6, $t_{(79)} = 2.8$, $p < 0.01$], posttraumatic vulnerability [means = 7.7 vs. 6.5, $t_{(79)} = 1.4$, $p < 0.05$], and neurologic and bleeding [means = 2.0 vs. 2.6, $t_{(79)} = 2.4$, $p < 0.02$]. Retest correlations were similar by ethnic subgroup for the total NMRSCL-121 and for 7 of the 12 subscales. Reliability values were ≥ 0.64 for 11 of 12 subscales for Kurdish data and for 10 of 12 subcales for Vietnamese data.

Validity

Discriminant Validity of Subscales: Correlations and Factor Analyses

Discrimination between subscales was partly shown by variability of correlations between them (range, 0.01 to 0.83) (Table 2). Many of the low correlations involved the menstrual scale; when removed the correlations ranged from 0.31 to 0.83 (all $p < 0.01$). There was a similar range of variability for both Kurdish and Vietnamese data. z tests comparing subscale correlations by ethnicity showed significant differences for 21 of the 66 comparisons, and in all 21 cases the subscales were more correlated for Kurdish than Vietnamese data. Put another way, the Vietnamese data showed more discrimination between subscales than the Kurdish data.

By contrast, a second order factor analysis of the 12 subscales supports one primary factor of the NMRSCL-121 that explains 57%

TABLE 1. Mean (*SD*) NMRSCL-121 Severity Scores by Ethnicity and Gender and Severity Scale Reliability

Scale (No. Items)	Total Sample (N = 252)	Kurds (n = 135)	Vietnamese (n = 117)	Males (n = 135)	Females (n = 117)	α Coefficient (n = 252)			Test Retest (4–6 Wk) Correlation (n = 80)		
						Total	K	VN	Total	K	VN
Depression and PTSD (41)	41.2 (35.2)	47.9 (36.9)ᵃ	35.3 (32.8)	42.8 (36.6)	39.3 (33.6)	0.97*	0.98	0.97	0.81*	0.79	0.85
Musculoskeletal (10)	7.8 (8.4)	9.7 (9.6)ᵃ	6.2 (7.0)	7.5 (8.8)	8.2 (8.0)	0.91*	0.93	0.88	0.78*	0.78	0.75
Sensory (13)	7.6 (8.8)	6.6 (8.7)	8.5 (8.8)	8.7 (10.1)ᵇ	6.3 (6.8)	0.92*	0.91	0.90	0.75*	0.77	0.70
Cardiopulmonary (10)	5.7 (7.5)	6.6 (8.9)	5.0 (6.1)	6.0 (8.0)	5.4 (7.0)	0.92*	0.94	0.89	0.72*	0.69	0.80ᶜ
Gastrointestinal (11)	6.5 (7.2)	7.8 (8.0)ᵃ	5.3 (6.1)	6.9 (7.9)	6.0 (6.2)	0.88*	0.89	0.87	0.72*	0.66	0.83ᶜ
Anxiety (10)	7.7 (8.1)	8.4 (8.6)	7.1 (7.6)	7.3 (8.5)	8.1 (7.6)	0.91*	0.91	0.91	0.62*	0.69ᶜ	0.53
Urinary (3)	1.7 (2.5)	1.9 (2.7)	1.5 (2.4)	2.0 (2.6)	1.4 (2.4)	0.81*	0.82	0.79	0.71*	0.69	0.74
Posttraumatic vulnerability (7)	5.1 (6.0)	6.9 (6.6)ᵃ	3.5 (4.9)	5.6 (6.5)	4.5 (5.3)	0.89*	0.88	0.89	0.70*	0.64	0.77ᶜ
Neurologic and bleeding (4)	1.4 (1.9)	1.5 (2.2)	1.3 (1.6)	1.2 (2.2)	1.5 (1.5)	0.57*	0.71ᵈ	0.34	0.72*	0.70	0.75
Skin sensation (4)	2.3 (3.3)	3.0 (3.9)ᵃ	1.7 (2.5)	2.3 (3.3)	2.3 (3.2)	0.82*	0.86	0.75	0.75*	0.74	0.73
Menstrual (2) (N = 117)	1.4 (1.8)	1.4 (1.8)	1.4 (1.8)	N/A	1.4 (1.8)	0.55*	0.61	0.65	0.50*	0.22	0.86ᵈ
Constitutional (6)	3.3 (3.2)	3.7 (3.7)ᵃ	2.8 (2.5)	3.2 (3.6)	3.3 (2.7)	0.62*	0.70ᶜ	0.48	0.67*	0.69	0.60
Total severity scale (121)	90.8 (77.1)	104.6 (85.3)ᵃ	78.8 (67.2)	93.5 (83.1)	87.6 (69.7)	0.98*	0.98	0.98	0.81*	0.81	0.82

ᵃ$p < 0.05$ comparing Ethnic group on symptom severity scores.
ᵇ$p < 0.05$ comparing Gender on symptom severity scores.
ᶜ$p < 0.05$ comparing ethnic group on α or test-retest coefficient.
ᵈ$p < 0.01$ comparing ethnic group on α or test-retest coefficient.
*All α coefficient and test-retest correlation p's < 0.01.
K indicates Kurds; VN, Vietnamese.

TABLE 2. Scale Correlations Comparing Ethnic Group

	Tot		D/P		Musc		Sens		Card		GI		Anx		Urin		PVuln		Neur		Skin		Menst	
	K	VN	K	VN	K	VN	K	VN	K	VN	K	VN	K	VN	K	VN	K	VN	K	VN	K	VN	K	VN
D/P	0.93	0.94																						
Musc	0.79	0.78	0.62	0.64																				
Sens	0.83	0.79	0.65	0.66	0.68	0.66																		
Card	0.85	0.77	0.70	0.64	0.68	0.62	0.83*	0.65																
GI	0.80	0.63	0.63*	0.42	0.66	0.50	0.78*	0.53	0.75*	0.58														
Anx	0.89	0.85	0.83	0.78	0.74*	0.60	0.71	0.57	0.69	0.61	0.62	0.56												
Urin	0.64	0.55	0.51	0.41	0.58	0.50	0.58	0.49	0.55	0.55	0.58	0.44	0.57	0.44										
PVuln	0.76	0.78	0.78	0.77	0.43	0.49	0.51	0.55	0.51	0.51	0.52	0.43	0.67	0.76	0.44	0.31								
Neuro	0.74	0.58	0.56	0.46	0.66	0.54	0.77*	0.45	0.66*	0.48	0.64*	0.43	0.68*	0.45	0.50	0.40	0.51	0.34						
Skin	0.76	0.52	0.65*	0.39	0.64*	0.45	0.63	0.52	0.67*	0.41	0.63	0.47	0.67*	0.39	0.40	0.34	0.55*	0.23	0.65	0.49				
Menst	0.31	0.18	0.25	0.15	0.36*	0.11	0.22	0.03	0.25	0.16	0.20	0.24	0.31	0.18	0.27	0.03	0.11	0.01	0.17	0.22	0.33*	0.09		
Const	0.71	0.55	0.56	0.44	0.58	0.44	0.72*	0.42	0.70*	0.44	0.64*	0.44	0.54	0.43	0.54	0.41	0.45	0.29	0.73*	0.52	0.62*	0.36	0.19	0.27

$*p < .05$ comparing ethnic group.
Tot indicates Total NMRSCL-121 Severity Scale; D/P, depression/PTSD; Musc, musculoskeletal; Sens, sensory; Card, cardiopulmonary; GI, gastrointestinal; Anx, anxiety; Urin, urinary; PVuln, posttraumatic vulnerability; Neur, neurologic and bleeding; Skin, skin sensation; Menst, menstrual; Const, constitutional.

of the variance with an internal consistency of 0.98. However, that high consistency is largely due to the large number of items (Nunnally and Bernstein, 1994). Subscale loadings show that a potential second factor comprised of the 2 menstrual scale items accounts for 8% of the variance. When the menstrual scale is removed, one factor with consistent loadings emerges, accounting for 61% of overall variance. The sample size precluded conducting reliable factor analyses by ethnic group. Further details of factor and reliability analyses are available from the authors.

Concurrent Validity: NMRSCL-121 Correlations With Symptom Health Measures

The NMRSCL-121 total score was strongly correlated with HSCL-25 depression ($r = 0.75$, $p < 0.01$) and anxiety ($r = 0.75$, $p < 0.01$), and with PSS-SR PTSD ($r = 0.63$, $p < 0.01$), and did not vary by ethnic group (Table 3). Strong correlations were found between symptom health outcome measures and the analogous scale on the NMRSCL-121: (1) HSCL-25 depression with NMRSCL-121 PTSD/depression ($r = 0.81$, $p < 0.01$), (2) HSCL-25 anxiety with NMRSCL-121 anxiety ($r = 0.72$, $p < 0.01$), and (3) the PSS-SR with NMRSCL-121 PTSD/depression ($r = 0.76$, $p < 0.01$) and posttraumatic vulnerability ($r = 0.70$, $p < 0.01$). All 12 subscales were also reliably correlated with HSCL-25 depression (mean $r = 0.50$, range = 0.26 to 0.81, all $p < 0.01$), with HSCL-25 anxiety (mean $r = 0.52$; range, 0.26 to 0.76; all $p < 0.01$), and with PSS-SR PTSD (mean $r = 0.48$; range, 0.28 to 0.76; all $p < 0.01$). Except for a lower correlation between the NMRSCL-121 menstrual subscale and the 3 concurrent health measures, these correlation ranges were similar for each ethnic group. However, z tests comparing correlations by ethnic group showed that the association between: (1) NMRSCL-121 "neurologic and bleeding" and "skin sensation" with HSCL-25 anxiety was stronger for Kurds than Vietnamese, (2) NMRSCL-121 "skin sensation" with PSS-SR PTSD was stronger for Kurds than Vietnamese, and (3) NMRSCL-121 "PTSD/depression" and "posttraumatic vulnerability" with PSS-SR PTSD was stronger for Vietnamese than Kurds.

Construct Validity: Discriminating by Entry Criteria on the TEQ and Correlation With the CTI-104

The NMRSCL-121 discriminated between the 3 TEQ study entry groups (torture vs. nontorture war-related trauma vs. no war-related trauma) in a 1-way ANOVA [$F (3,247) = 8.75$, $p < 0.01$]. There were more NMRSCL-121 symptoms in those tortured than in the nontorture war-related trauma group [means = 56 (32) vs. 45 (31), $d = 0.34$, $p = 0.05$], and the no war-related trauma group [means = 56 (32) vs. 31 (22), $d = 0.92$, $p < 0.01$]. There were also more reported symptoms in the nontorture war-related group than in the no war-related trauma group [means = 45 (31) vs. 31 (22), $d = 0.42$, $p = 0.06$]. Ethnic group analyses showed similar patterns, yet the NMRSCL-121 discriminated by TEQ group better for the Vietnamese [$F (3,131) = 9.14$, $p < 0.01$] than the Kurds [$F (3,113) = 1.27$, $p < 0.29$]. This difference was mostly accounted for by a relatively higher number of symptoms and larger standard deviation for the Kurds in the nontorture war-related and no war-related trauma groups, and by a small number of participants in the no war-related group for the Kurds. As shown in Table 4, CTI-104 war-related traumatic events were moderately to strongly correlated with the NMRSCL-121 severity score ($r = 0.47$, $p < 0.01$) and 11 of 12 NMRSCL-121 subscales (mean $r = 0.42$; range, 0.30 to 0.46; all $p < 0.01$). The menstrual scale was not associated with war trauma. A z test comparing correlations of ethnic subgroups showed a stronger association for the Kurds between war trauma and 2 symptom scales, neurologic and bleeding and constitutional.

TABLE 3. Concurrent Validity: Correlation of the NMRSCL-121 With Established Symptom Health Measures

Scale (No. Items)	Depression (HSCL-25)			Anxiety (HSCL-25)			PTSD (PSS-SR)		
	Total	Kurds	VN	Total	Kurds	VN	Total	Kurds	VN
Depression and PTSD (41)	0.81	0.80	0.82	0.76	0.77	0.73	0.76	0.72	0.83*
Musculoskeletal (10)	0.52	0.48	0.52	0.54	0.55	0.46	0.49	0.45	0.46
Sensory (13)	0.45	0.50	0.48	0.44	0.56	0.41	0.43	0.50	0.54
Cardiopulmonary (10)	0.52	0.51	0.53	0.56	0.56	0.54	0.53	0.52	0.54
Gastrointestinal (11)	0.47	0.48	0.40	0.49	0.50	0.43	0.46	0.48	0.35
Anxiety (10)	0.65	0.66	0.65	0.72	0.72	0.73	0.61	0.62	0.66
Urinary (3)	0.34	0.38	0.26	0.34	0.37	0.30	0.28	0.28	0.28
Posttraumatic vulnerability (7)	0.66	0.63	0.64	0.66	0.61	0.67	0.70	0.61	0.79*
Neurologic and bleeding (4)	0.42	0.48	0.32	0.49	0.58*	0.35	0.39	0.47	0.29
Skin sensation (4)	0.44	0.47	0.33	0.50	0.56*	0.31	0.48	0.54*	0.26
Menstrual (2) ($N = 117$)	0.26	0.19	0.18	0.26	0.18	0.21	0.28	0.19	0.09
Constitutional (6)	0.40	0.43	0.30	0.44	0.49	0.31	0.35	0.37	0.22
Total severity scale (121)	0.75	0.73	0.77	0.75	0.75	0.72	0.63	0.69	0.77

*$p < 0.05$ comparing ethnic group.
All total sample correlations $p < 0.01$.

Construct Validity: NMRSCL-121 Correlations With Impairment Health Measures

The total NMRSCL-121 score was moderately to strongly correlated with all 8 SF-36 scales ($r = 0.35$ to 0.58, all $p < 0.01$, Kurds $r = 0.14$ to 0.63, Vietnamese $r = 0.28$ to 0.59), all 3 SDI scales ($r = 0.53$ to 0.55, all $p < 0.01$, Kurds $r = 0.52$ to 0.59, Vietnamese $r = 0.47$ to 0.57), the SDI Global Disability Scale ($r = 0.40$, $p < 0.01$, Kurds $r = 0.32$, Vietnamese $r = 0.45$), and the SOC-13 ($r = 0.37$, $p < 0.01$, Kurds $r = 0.38$, Vietnamese $r = 0.32$) (Table 4). Of the 12 NMRSCL-121 subscales, all except menstrual were moderately to strongly correlated with the impairment health measures.

DISCUSSION

Years after their forced migration, refugees of war experience many significant somatic and psychological symptoms. As assessed by The New Mexico Refugee Symptom Checklist–121 (NMRSCL-121), refugees experienced on average 48 persistent and bothersome symptoms with a mean severity score of 91, or an item average of 1.90 (moderate) on a scale of 0 to 4 for the symptoms indicated. The NMRSCL-121 assesses a broader range of symptoms than is available in extant measures. As previously reviewed, of the current instruments used to assess health status in refugees, only 2 were well developed in refugee populations, 6 were not as well developed, and 8 were simply adapted for use with refugees (Hollifield et al., 2002). The NMRSCL-121 conformed to 5 criteria recommended for instrument development (Weathers et al., 1997), utilizing multiple methods to identify symptoms and their expression that are experientially and culturally relevant to both men and women, and to soldiers and civilians. The full NMRSCL-121 has acceptable internal and retest reliability as well as moderate to strong construct and concurrent validity.

Assessing the broad range of symptoms is important. The majority of reports about the long-term health of refugees focus on symptoms of PTSD, depression, and anxiety, yet somatic symptoms are common in traumatized refugees (Allodi and Cowgill, 1982; Cunningham and Cunningham, 1997; Eitinger, 1960; Emmelkamp et al., 2002; Gilgen et al., 2005; Hougen, 1988; Hougen et al., 1988; Mollica et al., 1993; Moore and Boehnlein, 1991; Pederson, 1949; Perron and Hudelson, 2006; Prorokovic et al., 2005; Weinstein et al., 1996). Furthermore, somatic and not psychological symptoms are more commonly presented to primary care when a psychiatric disorder is subsequently found to be present. This has been shown for both refugee (Gilgen et al., 2005) and nonrefugee samples in disparate cultural settings (Bridges and Goldberg, 1985; Hollifield et al., 1994; Katon et al., 1986). An instrument that assesses somatic and psychological symptoms together more accurately reflects current distress and may be useful for research and clinical practice.

The cause or consequences of somatic symptoms in refugees is not well understood (Castillo et al., 1995). Few studies have conducted complete psychiatric and medical evaluations of somatic symptoms. Unexplained somatic complaints have been associated with low acculturation, high treatment seeking, the presence of psychiatric disorders, and self-identified medical problems, but not with objective evidence of medical illness (Cervantes et al., 1989; Cheung, 1993; Hauff and Vaglum, 1993; Westermeyer et al., 1989). However, Ta et al., (1996) used history, review of medical records, physical examination, and laboratory assessment in 266 Southeast Asian refugees from a psychiatric outpatient clinic and concluded that 146 patients had at least one medical condition, and that their psychiatric disorder may have been caused or exacerbated by the medical condition in 48 of the cases (18% of the total).

In the current study, 9 somatic and 3 psychological constructs were identified during development of the NMRSCL-121. Correlations between the 9 somatic subscales of the NMRSCL-121 and depression, anxiety, and PTSD on the HSCL-25 and PSS-SR were less (range $r = 0.26-0.56$) than correlations between the 3 psychological subscales of the NMRSCL-121 and the HSCL-25 and the PSS-SR (range $r = 0.61-0.81$). This may suggest that some of the variance of somatic symptoms on the NMRSCL-121 is due to nonpsychiatric factors, consistent with data from Ta (Ta et al., 1996). However, correlations between the NMRSCL-121 somatic subscales and the HSCL-25 and PSS-SR are not insignificant. Furthermore, if somatic distress reflected age-related medical illness, the older Vietnamese would be expected to have more severe symptoms. Yet Kurds had significantly worse symptoms on 4 of the 9 somatic subscales, and there were no ethnic differences on the other 5 subscales. In addition, the second order factor analysis supported one primary symptom factor (61% of the overall variance), implying that the somatic symptoms in these populations may have a contribution from psycho-physiological processes. The neurobiology of PTSD and anxiety predicts the presence of somatic involvement as part of the disorder (Prins et al., 1995, regarding

TABLE 4. Construct Validity: Correlation of NMRSCL-121 With Trauma and Impairment Health Measures

NMRSCL-121 Scale (No. Items)	Trauma CTI-104			SF-36 PF	SF-36 RP	SF-36 BP	SF-36 GH	SF-36 V	SF-36 SF	SF-36 RE	SF-36 MH	SDI WI	SDI SLI	SDI FLI	SDI GD	SOC
	Total	K	VN													
Depression and PTSD (41)	0.42*	0.32	0.48	0.33*	0.33*	0.50*	0.57*	0.42*	0.45*	0.35*	0.62*	0.52*	0.53*	0.53*	0.40*	0.42
Musculoskeletal (10)	0.38*	0.29	0.40	0.34*	0.40*	0.62*	0.49*	0.32*	0.49*	0.24*	0.35*	0.41*	0.39*	0.40*	0.34*	0.21*
Sensory (13)	0.41*	0.40	0.55	0.37*	0.36*	0.35*	0.48*	0.24*	0.41*	0.28*	0.29*	0.43*	0.46*	0.42*	0.26*	0.14**
Cardiopulmonary (10)	0.39*	0.35	0.43	0.31*	0.37*	0.45*	0.50*	0.31*	0.43*	0.28*	0.40*	0.42*	0.42*	0.42*	0.35*	0.23*
Gastrointestinal (11)	0.38*	0.40	0.26	0.17*	0.35*	0.34*	0.37*	0.17*	0.31*	0.27*	0.30*	0.30*	0.38*	0.39*	0.26*	0.19*
Anxiety (10)	0.38*	0.35	0.41	0.26*	0.34*	0.44*	0.46*	0.24*	0.42*	0.29*	0.47*	0.44*	0.44*	0.43*	0.33*	0.34*
Urinary (3)	0.30*	0.26	0.33	0.22*	0.16**	0.36*	0.38*	0.25*	0.36*	0.15**	0.22*	0.29*	0.34*	0.32*	0.23*	0.16**
Posttraumatic vulnerability (7)	0.46*	0.34	0.48	0.26*	0.30*	0.40*	0.41*	0.30*	0.37*	0.33*	0.53*	0.40*	0.46*	0.50*	0.32*	0.39*
Neurological and bleeding (4)	0.35*	0.48***	0.15	0.22*	0.33*	0.36*	0.41*	0.21*	0.42*	0.22*	0.37*	0.44*	0.46*	0.46*	0.28*	0.27*
Skin sensation (4)	0.31*	0.32	0.19	0.17*	0.28*	0.34*	0.33*	0.23*	0.32*	0.22*	0.36*	0.34*	0.39*	0.41*	0.32*	0.25*
Menstrual (2) (N = 117)	-0.04	-0.08	-0.20	0.01	0.03	0.11	0.19**	0.15	0.12	0.08	0.16	0.08	0.13	0.11	0.12	0.17
Constitutional (6)	0.30*	0.38***	0.09	0.12	0.31*	0.29*	0.26*	0.22*	0.30*	0.27*	0.31*	0.33*	0.35*	0.32*	0.18*	0.21*
Total severity scale (121)	0.47*	0.40	0.51	0.35*	0.40*	0.54*	0.58*	0.38*	0.50*	0.36*	0.56*	0.53*	0.55*	0.55*	0.40*	0.37*

*$p < 0.01$.
**$p < 0.05$.
***$p < 0.05$ on z test comparing ethnic group correlations of NMRSCL-121 subscales and CTI-104 trauma.
All correlations between NMRSCL-121 scales and the SF-36 and the SOC are negative, indicating that more symptoms are associated with worse functioning and a lower sense of coherence.
PF indicates physical functioning; RP, role-physical; BP, bodily pain; GH, general health; V, vitality; SF, social functioning; RE, role-emotional; MH, mental health; WI, work impairment; SLI, social/life impairment; FLI, family life impairment; GD, global disability; SOC, Sense of Coherence-13.

autonomic nervous system reactivity; and Cannistraro and Rauch, 2003, regarding central neural networks). This further supports the utility of an assessment that combines somatic and psychological symptoms and the need for further research about the long-term somatic and psychological health consequences for refugees.

These data also provide further grist for the debate about how to classify trauma induced symptoms. In our study, PTSD and depression symptoms clustered together in the largest scale. This scale also had items identified by refugees during in-depth interviews that are not current PTSD and depression symptoms (e.g., "weakness," "headaches," and "heat"), or with words or syntax that are different from current items, such as "feeling defeated," "feeling homesick," and "tense mind." Parenthetically, feeling homesick was endorsed by the largest number of refugees and had the highest average severity score of any symptom. The PTSD/depression subscale was somewhat distinct from the 7-item posttraumatic vulnerability subscale on factor analysis, although placing these 7 items into the PTSD/depression subscale did not reduce internal scale consistency. Both of these subscales were somewhat distinct from the 10-item anxiety subscale. The menstrual subscale was the only scale with poor internal consistency, poor retest reliability (in Kurds), low correlation with psychological subscales, and no association with trauma events on the CTI-104.

The primary limitation to this study and to the potential utility of the NMSCL-121 was that our sample was from 2 refugee groups in 3 US cities. Survivors of other conflicts and those not displaced may have different symptoms. Pre and postwar factors were not assessed in this study and are also associated with symptoms in refugees (Porter and Haslam, 2005). The data suggest some ethnic and/or contextual variability regarding symptom severity and psychometric properties of NMRSCL-121 subscales. The reasons for this variability may be due to differences in trauma experiences (Hollifield et al., 2006), to cultural variability in symptom expression, or to measurement error. Another potential limitation to the validity of the scale is that the comparative health measures were not diagnostic assessments. However, the most valid self-report measures available for this context were used, and Western diagnostic interviews may not be the most appropriate "gold standard" for refugees (Basoglu et al., 1994a; Basoglu et al., 1994b; deGirolamo and McFarlane, 1996; Punakami, 1989). The instruments reported here were part of a larger battery administered in uniform order to all participants. There may have been participant fatigue and order effects not accounted for. However, order effects would likely produce small or modest main effects that would not reduce the general magnitude of relationships between dependent and independent variables. Finally, we did not include a nonrefugee comparison group. About 80% of healthy individuals experience somatic symptoms in any one week (Kellner, 1991). In one study, civilians endorsed many psychosomatic complaints, and only 15% fewer than refugees (Prorokovic et al., 2005). It will be important to further evaluate refugees compared with other traumatized and nontraumatized populations to determine if symptoms of refugees are unique to their experience and whether services for refugees should be specialized or not.

The NMRSCL-121 improves on defining and reliably assessing the broad range of chronic physical and psychological symptoms in externally displaced refugees. These data were cross-sectional and retrospective and thus do not allow for causal inferences (e.g., symptoms due to war-related trauma). It is also not yet clear to what degree the subscales are separate or overlapping constructs. A study with a larger sample size is necessary to conduct more reliable factor analyses. We recommend the NMRSCL-121 for use with various refugee groups because of its good psychometric properties and because of the small measurement variance attributable to ethnicity and gender even in these 2 disparate groups. Attention to translation methods and scale presentation is critical when adapting any scale, particularly for research. It

would be reasonable to exclude the 2-item menstrual subscale when using the NMRSCL for trauma research since the subscale was not associated with war-related trauma. If efficiency of administration is desirable, such as in field work, the scale could be formatted to "yes" and "no" answers for items because of the high correlation between symptom number and severity. However, further testing of this adaptation is needed. It appears that it may be self- or interviewer-administered, although we did not evaluate scale performance comparing these 2 methods. Further work is also required to determine if the NMRSCL-121 might be reduced in length or in response choice without sacrificing precision of prediction. Such work might also assess if the NMRSCL-121 is a sensitive and/or specific instrument for detecting disorders and/or diseases, or if it is a measure of general somatic and psychological distress and impairment associated with war-related trauma.

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APPENDIX 1   The New Mexico Refugee Symptom Checklist-121

Instructions: Using the scale beside each symptom, please indicate the degree to which the symptom has been bothersome to you over the past year. If the symptom has not been bothersome to you during the past year, circle "NOT AT ALL."

Symptoms	NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY
1. Weight loss	0	1	2	3	4
2. Weight gain	0	1	2	3	4
3. Weakness	0	1	2	3	4
4. Tiredness	0	1	2	3	4
5. Fever	0	1	2	3	4
6. Chills	0	1	2	3	4
7. Fatigue	0	1	2	3	4
8. Sweats	0	1	2	3	4
9. Rashes on your skin	0	1	2	3	4
10. Itching	0	1	2	3	4
11. Swollen glands	0	1	2	3	4
12. Poor vision	0	1	2	3	4

Symptoms	NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY
13. Blurred vision	0	1	2	3	4
14. Poor hearing	0	1	2	3	4
15. Ringing in your ears	0	1	2	3	4
16. Tingling in your ears	0	1	2	3	4
17. Poor ability to taste	0	1	2	3	4
18. Poor ability to feel	0	1	2	3	4
19. Poor ability to smell	0	1	2	3	4
20. Chest pains or chest heaviness	0	1	2	3	4
21. Shortness of breath at night	0	1	2	3	4
22. Palpitations of heart	0	1	2	3	4
23. Fast or strong heart beat	0	1	2	3	4
24. Throbbing vessels	0	1	2	3	4
25. Coughing	0	1	2	3	4
26. Wheezing during breathing	0	1	2	3	4
27. Sneezing	0	1	2	3	4
28. Trouble breathing	0	1	2	3	4
29. Shortness of breath	0	1	2	3	4
30. Choking	0	1	2	3	4
31. Problems swallowing	0	1	2	3	4
32. Heartburn	0	1	2	3	4
33. Nausea	0	1	2	3	4
34. Vomiting	0	1	2	3	4
35. Gas	0	1	2	3	4
36. Abdominal pain	0	1	2	3	4
37. Heavy stomach	0	1	2	3	4
38. Diarrhea	0	1	2	3	4
39. Constipation	0	1	2	3	4
40. Bleeding in vomit or stool	0	1	2	3	4
41. Appetite problems	0	1	2	3	4
42. Pain with urination	0	1	2	3	4
43. Urgency of urination	0	1	2	3	4
44. Frequent urination	0	1	2	3	4
45. Pain with menstruation	0	1	2	3	4
46. Irregular menses (bleeding)	0	1	2	3	4
47. Decreased interest or sex drive drive	0	1	2	3	4
48. Problem getting or maintaining an erection	0	1	2	3	4
49. Pain with intercourse	0	1	2	3	4
50. Sexually satisfied too soon	0	1	2	3	4
51. Muscle, bone, joint pains	0	1	2	3	4
52. Tense muscles	0	1	2	3	4
53. Shoulder, back, or head pain	0	1	2	3	4
54. Pain with walking	0	1	2	3	4
55. Pain in your muscles or bones during cold	0	1	2	3	4
56. Stiffness	0	1	2	3	4
57. Twitching (in your muscles)	0	1	2	3	4
58. Shaking (in your body)	0	1	2	3	4
59. Swelling in your arms or legs	0	1	2	3	4

(Continued)

Symptoms	NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY
60. Leg cramps	0	1	2	3	4
61. Grinding of your teeth	0	1	2	3	4
62. Thinking that your body has changed in any way	0	1	2	3	4
63. Headaches	0	1	2	3	4
64. Dizziness	0	1	2	3	4
65. Numbness	0	1	2	3	4
66. Tingling in your extremities	0	1	2	3	4
67. Seizures or convulsions	0	1	2	3	4
68. Loss of consciousness	0	1	2	3	4
69. Problems walking	0	1	2	3	4
70. Fear	0	1	2	3	4
71. Nervousness	0	1	2	3	4
72. Sudden attacks of anxiety	0	1	2	3	4
73. Panic feelings	0	1	2	3	4
74. Worry that is excessive	0	1	2	3	4
75. Generally anxious	0	1	2	3	4
76. Jumpy or fidgety	0	1	2	3	4
77. Fear or jumpiness at loud noises	0	1	2	3	4
78. Fearful of things such that you avoid them (such as small places, crowds, heights, smells, or being in public or around certain people)	0	1	2	3	4
79. Fear when thinking of past life events	0	1	2	3	4
80. Feeling like you have no future	0	1	2	3	4
81. Feeling like you might suddenly die	0	1	2	3	4
82. Thinking that your illness will shorten your life	0	1	2	3	4
83. Thinking that somebody is watching you	0	1	2	3	4
84. Thinking that the enemy is still close and coming up on you	0	1	2	3	4
85. When you see something that reminds you of the war (e.g., jet, police), thinking that it is coming for you	0	1	2	3	4
86. Thinking that past horrible events will happen again	0	1	2	3	4
87. Feeling unsafe	0	1	2	3	4
88. Thinking that the universe is a horrible and fearful place	0	1	2	3	4
89. Feeling like you do not belong anywhere	0	1	2	3	4
90. Lack of emotional feelings for other people	0	1	2	3	4
91. Feeling like nothing is beautiful	0	1	2	3	4
92. Feeling down, sad, or blue most of the time	0	1	2	3	4
93. Turning blue	0	1	2	3	4
94. Feeling troubled	0	1	2	3	4

Symptoms	NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY
95. Feeling discontent	0	1	2	3	4
96. Loss of interest in your daily activities	0	1	2	3	4
97. Wanting to be alone	0	1	2	3	4
98. Loneliness	0	1	2	3	4
99. Feeling homesick	0	1	2	3	4
100. Concentration problems	0	1	2	3	4
101. Disturbing dreams or nightmares	0	1	2	3	4
102. Problems falling asleep	0	1	2	3	4
103. Restless sleep	0	1	2	3	4
104. Problems staying asleep	0	1	2	3	4
105. Memory problems	0	1	2	3	4
106. Feeling defeated	0	1	2	3	4
107. Feeling worthless	0	1	2	3	4
108. Anger or irritability	0	1	2	3	4
109. Thinking that life is shortened	0	1	2	3	4
110. Abnormal or irregular mind	0	1	2	3	4
111. Mind in crisis	0	1	2	3	4
112. Tense mind	0	1	2	3	4
113. Thoughts are hard to get hold of	0	1	2	3	4
114. Too much thinking or too many thoughts	0	1	2	3	4
115. Too many thoughts or feelings of painful events in the past	0	1	2	3	4
116. Confused or disorganized	0	1	2	3	4
117. Jumbled thoughts	0	1	2	3	4
118. Heat	0	1	2	3	4
119. Feeling you are out of your body	0	1	2	3	4
120. Feeling helpless	0	1	2	3	4
121. Feeling hopeless	0	1	2	3	4

Scoring
New Mexico Refugee Checklist–121 (NMRCL-121)

The 12 subscales are comprised of the items listed. For a symptom score, add the number of items scored 1, 2, 3, or 4. For a symptom severity score, sum the score of items in each scale.

Scale 1: PTSD/Depression: 3, 4, 7, 62, 63, 79–82, 89, 91–121
Scale 2: Musculoskeletal: 51–58, 60, 69
Scale 3: Sensory: 12–19, 41, 47–50
Scale 4: Cardiovascular: 11, 20–26, 28, 29
Scale 5: Gastrointestinal: 27, 30–39
Scale 6: Anxiety: 61, 70–78
Scale 7: Urinary: 42–44
Scale 8: Posttraumatic Vulnerablity: 83–88, 90
Scale 9: Neurologic and Bleeding: 40, 64, 67, 68
Scale 10: Skin Sensation: 9, 10, 65, 66
Scale 11: Menstrual 45, 46
Scale 12: Constitutional: 1, 2, 5, 6, 8, 59