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The Refugee Health Screener-15 (RHS-15): development and validation of an instrument for anxiety, depression, and PTSD in refugees

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ABSTRACT

Objective: Screening for emotional distress in newly arrived refugees is not a standard practice due to multiple barriers, one being the absence of a valid screening instrument for multiple refugee populations. The Refugee Health Screener-15 (RHS-15) was empirically developed to be a valid, efficient and effective screener for common mental disorders in refugees.

Method: Development followed published methods. Two hundred fifty-one refugees from three countries were screened at their public health visit with a pilot instrument, and 190 were administered diagnostic proxy instruments (DPs). Data analyses using multiple methods selected the best items for classification on DPs. Follow-up clinical service data were obtained.

Results: Post hoc analyses of the developed RHS-15 showed good sensitivity(range .81 to .95) and specificity (range .86 to .89) to DP's in two of three ethnic groups. Seventy-four percent of positive cases accepted treatment services. Of those, 79% engaged in treatment, and 92% continued treatment more than 3 months.

Conclusions: The RHS-15 is a screener for common mental disorders in newly-arrived refugees in public health. The RHS-15appears to be effective, but further prospective research in a broad range of refugee groups is required to establish generalizability. Strengths, limitations, methods to apply the RHS-15 for optimal performance, and future directions for research and implementation are discussed.

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1. Introduction

The United Nations High Commissioner for Refugees identifies 16 million refugees and asylees and 26 million internally displaced persons in the world as of mid 2009 [1]. Over 1.8 million reside in the United States [2]. All have experienced extremely stressful events related to war, migration, and resettlement. The majority experience multiple distressing symptoms, and a significant minority suffer from diagnostic-level psychiatric disorders [3–11], which are associated with stressful events in a dose-dependent manner [8,12–14]. Furthermore, the stress-psychiatric disorder relationship is associated with other health problems, particularly cardiovascular [15–24] and inflammatory [18,19,25–27] symptoms and disease [28].

This high burden of distress and illness might suggest a policy of routine screening for mental health during resettlement, as is done for tuberculosis [29]. Recommendations for mental health screening at the domestic medical examination are supported by the Centers for Disease Control [30]. A primary barrier to screening is the lack of an efficient and valid culturally-responsive instrument for detecting common disorders across refugee groups. Thus, existing screening guidelines recommend, for example, use of an instrument not developed or validated in refugees. Other barriers to screening include time, cost, refugees' help-seeking behaviors, accessibility and availability of services, language, and cultural or conceptual differences in health perceptions [31]. Finally, there is lack of knowledge about the incidence, persistence, and costs of mental disorders in newly arrived refugees, as well as the cost-effectiveness of screening and treatment. These barriers and lack of knowledge have been forces inhibiting routine screening in newly arrived refugees.

There has been preliminary work about screening in refugees. Perceptions of mental health screening in Bosnian-US refugees suggested that screening is important during resettlement [31]. Sondergaard and colleagues developed a 15-item Health Leaflet to screen for posttraumatic stress disorder (PTSD) in two Iraqi groups: the Leaflet was 0.70 sensitive and specific to diagnosis, with two items accounting for discriminatory performance [32]. Savin and colleagues

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found that 14% of the 1,058 adult refugees in the Colorado Refugee Program screened positive for a psychiatric disorder using an instrument developed by an expert consensus process. Of those offered services, 37% accepted and 63% declined [33].

The primary challenge to developing a screening instrument is that "refugees" are heterogeneous groups who collectively experience many distressing psychological and somatic symptoms [5]. Theoretically, a screening instrument should include symptoms that optimally predict common disorders in multiple refugee groups with high efficiency. Two instruments have been developed in refugees for specific syndrome identification. The Vietnamese Depression Scale (VDS) consists of 15 items that identify depression in Vietnamese refugees [34]. The Harvard Trauma Questionnaire (HTQ) has a 30-item section assessing symptoms as a proxy for posttraumatic stress disorder (PTSD) [35,36]. Both instruments were developed by expert consensus methods for use in the clinical setting. A screening instrument that is efficient and valid for detecting common disorders in multiple groups would be useful.

We report on the development and properties of the Refugee Health Screener-15 (RHS-15). This three-step process started with testing an initial Refugee Health Questionnaire (RHQ) screener, followed by selection of items for and post hoc testing of the RHS-15, ending with evaluating potential effectiveness of screening. The RHS-15 was developed for use during resettlement health evaluation at Public Health Seattle King County (PHSKC) in partnership with community mental health agencies as part of The *Pathways to Wellness* project (P2W). Ethical review and approvals were conducted by the Pacific Institute for Research and Evaluation and the ethics committee at PHSKC.

2. Methods

2.1. Design and hypotheses

A cross-sectional design was used for development and metric evaluation of the RHQ and the RHS-15, and a prospective design for evaluating potential effectiveness of screening. The *a priori* hypothesis was that the RHQ and the RHS-15 would be reliable and valid to diagnostic proxies for PTSD, anxiety, and depression. Prospective preliminary evaluation of screening effectiveness was defined by providing access to care, having a screen-related diagnosis, and engaging in care.

2.2. Sample frame, sampling, setting

Step 1 began with re-analysis of data from the New Mexico Refugee Project, specifically of The New Mexico Refugee Health Symptom Checklist-121 (NMRSCL-121), to develop the initial RHQ [5]. The sample frame for Steps 1 and 2 was all refugees aged ≥14 from three countries (Bhutan, Burma, and Iraq) speaking four languages [Nepali, Karen, Burmese (Karenni and Chin ethnic groups) and Arabic] at PHSKC, the clinic in Seattle that conducts the health evaluation for all refugees entering King County. This sample frame was chosen because these were the most numerous refugee groups being resettled during the study period. Consecutive sampling of all eligible persons was conducted on pre-specified days by the P2W coordinator at PHSKC. The Step 3 sample was all refugees who screened positive on the initial RHQ and were referred for care.

2.3. Instruments, procedures, and data analyses

2.3.1. Translationof instruments

Translation is complex and must be adapted for specific purposes [37]. All instruments were translated using a rigorous, iterative back-and-forth participatory consensus process with refugees from each language group. This process ensured relevant language-specific semantics and cultural equivalence yielding accuracy and clarity of meaning across groups [14,38].

2.3.2. Diagnostic proxy instruments for step one and two

Few instruments that assess symptoms as diagnostic proxies (DPs) in refugees are available [39]. None are definitive diagnostic equivalents. *The Hopkins Symptom Checklist-25* (HSCL-25) is a valid indicator of anxiety and depression for the general US population and for Indochinese refugees [39–42] and demonstrates transcultural validity [43,44]. Item-average scores ≥1.75 predict clinically significant anxiety (ANX) and depression (DEP) on the respective scales in general US and refugee samples and are considered valid DPs [40,42].

The Posttraumatic Symptom Scale-Self Report (PSS-SR) predicts PTSD diagnosis in US populations [45]. Cronbach alpha is 0.91, and one-month test-retest reliability is 0.74. The 17 items on the scale, each scored from 0 to 3 for symptom frequency, are *DSM-IV* PTSD diagnostic items. The PSS-SR may be scored as continuous or a dichotomous DP. PSS-SR continuous scores and the DP are highly correlated with war-related trauma and impairment in Kurdish and Vietnamese refugees [14], and Cronbach alpha in these samples was 0.95.

2.3.3. Step 1: development of and testing the initial screening instrument, the RHQ

The NMRSCL-121 assesses the broad range of distressing symptoms and is a reliable and valid predictor of traumatic experiences, PTSD, anxiety, and depression in Kurdish and Vietnamese refugees [5]. Re-analyses using SPSS (Version 18; IBM, Armonk, NY, USA) aimed to identify NMRSCL-121 items that were best classifiers to the three DPs. All but six of the 121 items were significantly correlated with all DPs. Twenty-seven items were the most highly correlated with DPs, had good scale consistency ($\alpha = .92$) and discriminated those with vs. those without each DP (item average mean (SD): PTSD, 1.55 (1.36) vs. 0.67 (1.05); ANX, 1.82 (1.39) vs. 0.58 (0.95); DEP, 1.73 (1.40) vs. 0.61 (0.98); all *P*s <.01). While optimal classification varied slightly by DP, a 0.88 item average proved to optimize sensitivity and specificity to the DPs collectively and was thus used as the cutoff score for the RHQ. These items, along with items chosen by expert consensus to assess personal psychiatric history, reactivity, coping, and a Distress Thermometer (DT) — which has been used as a proxy for psychological distress in non-refugee populations [46] — comprised the initial screener, the 33-item RHQ, available from the authors.

Internal scale reliability (Cronbach alpha) and validity (general linear models: *t* tests, and analyses of variance) analyses were conducted using SPSS to determine the validity of the RHQ. Sensitivity and specificity of cutoff scores to DPs were determined by logic written in SPSS.

2.3.4. Step 2: selection of items for and post hoc testing of the RHS-15

To construct the RHS-15, correlations of RHQ items with DPs were conducted. Three items (stress reactivity, treatment history, and family history) were not significantly correlated with DPs, and were eliminated from further analyses. To optimize classification potential, we pooled the remaining RHQ and all DP items, resulting in 72 items for analyses. Correlations revealed strong item-DP associations. Naïve Bayesian classification (BAY), discriminant analysis (DA), and chi-square (CHI) for each item by DP were applied and contrasted to identify the best set of items to classify on each DP. In addition to the three DPs (PTSD, ANX, DEP), another classifier "moderate-severe PTSD" defined by a PSS-SR score of ≥16 (PSS) was used.

The Naïve Bayes classifier utilized MATLAB's nb algorithm (MATLAB Statistics Toolbox; MathWorks, 3 Apple Hill Drive, Natick, MA, USA). Optimization of the classifier was accomplished by a custom-written program that constructed a classifier for all possible combinations of items and selected the subset that yielded that largest sensitivity. Initial classifier models of the RHQ and of symptoms within one DP (e.g., PTSD) classifying on any DP were constructed. DA and CHI were conducted with SPSS.

A grid of strength of association of item by classification method was constructed. Items that were best classifiers by BAY on at least 3

of the 4 DPs or by the 2 other methods were considered for final BAY, set to optimize for sensitivity. BAY was most respected for final item selection since it accounts for the complexity of item interactions when classifying on a given DP.

For post hoc analyses of the new RHS-15, original data from the 190 cases with both RHQ and DP data were abridged and interpolated using unit-value assignment rules to standardize to the new scale. Scale alpha, validity to DP, and various cut-point metrics were determined for the full sample and by ethnic group.

2.3.5. Step 3: potential screening effectiveness

The percentage with a positive screen who accepted care, who had a screening-relevant diagnosis, and who stayed in care at least 3 months was determined by descriptive data and diagnostic information from mental health providers.

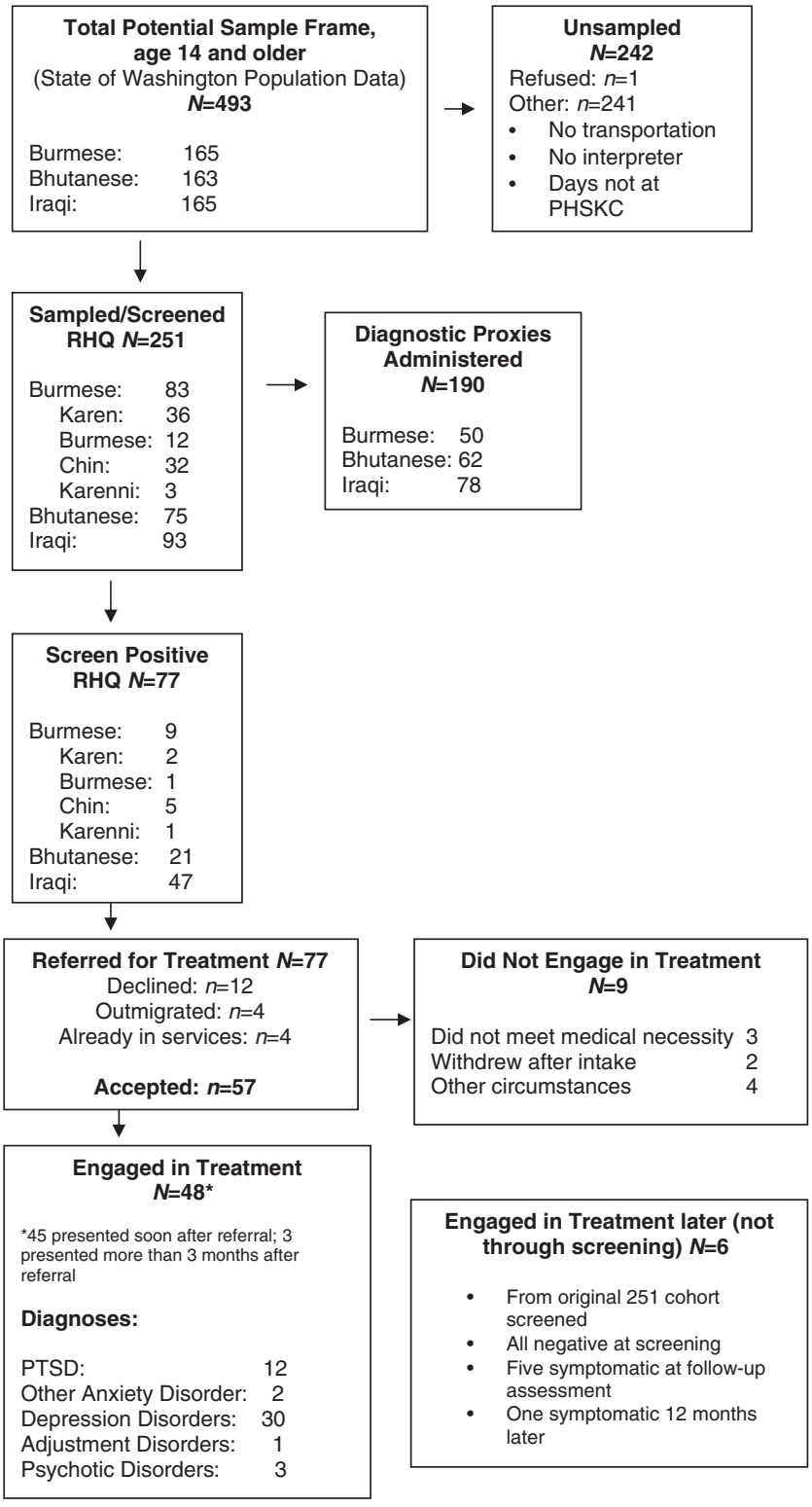

Fig. 1. Sample frame, sample, and subject flow.

Table 1
Sensitivity and specificity of the RHQ by cutoff score to each diagnostic proxy

	RHQ Cutoff Score															
	20		21		22		23		24		25		26		27	
	Sn	Sp	Sn	Sp	Sn	Sp	Sn	Sp	Sn	Sp	Sn	Sp	Sn	Sp	Sn	Sp
Anxiety	.85	.80	.81	.82	.79	.84	.79	.84	.79	.85	.77	.86	.77	.86	.74	.87
Depression	.86	.83	.84	.86	.81	.87	.81	.87	.79	.87	.78	.89	.78	.89	.72	.89
PTSD	.77	.81	.75	.86	.70	.85	.70	.85	.69	.85	.67	.87	.67	.87	.63	.87

Sn=Sensitivity.
Sp=Specificity.

3. Results

3.1. Description of sample

Fig. 1 shows the sample frame, sample, and flow. During the project period county data showed 493 potential participants in our 4 language groups. Because we consecutively sampled on certain days and not on others, 251 refugees age ≥14 years [92 Iraqi, 76 Nepali Bhutanese, and 83 Burmese (36 Karen and 45 Burmese speaking] were screened with the RHQ between April 2010 and November 2010. Only one person refused, and 241 were not sampled due to lack of interpreters, transportation problems, and mostly due to limited sampling days. Those screened were administered DPs within 2 weeks of screening: 190 (RR=76%) were administered the proxies. Those missed were due to shortage in available interpreters, out-migration, and other reasons (e.g., active medical illness). Comparisons of demographics between those screened and not screened were not administratively possible. There were no differences between refugees who were and were not administered the DP's on age (M=32.5, SD=11.8 vs. M=29.8, SD=11.9, $t_{249}=1.5$, $P=.12$) or gender (female 50% vs. 38%, $\chi^2_1=.09$), but there were differences on ethnicity (Nepali 33% vs. 21%, Iraqi 41% vs. 25%, Burmese 26% vs.54%, $\chi^2_2=16.1$, $P<.01$).

3.2. Step one: initial RHQ screener

Seventy-seven refugees (30.7%) screened positive on the RHQ. The prevalence and the mean RHQ scores varied by ethnic group [Nepali 28%, score M=16.9, SD=18.0; Iraqi 50.5%, score M=32.3, SD=27.1; Burmese 10.8%, score M=12.2, SD=11.0; F(2)=23.8, $P<.01$ by score]. Simple pairwise comparisons showed significant differences between Nepali and Iraqi ($t=4.2$, $P<.01$) and Iraqi and Burmese ($t=6.3$, $P<.01$) but not Nepali and Burmese ($t=2.0$, $P=.05$) refugees.

Table 1 shows the sensitivity and specificity (S/S) of the RHQ to each DP by the established and alternative cut-off scores. RHQ scores were significantly correlated with respective PTSD, ANX, and DEP DPs (0.60, 0.69, 0.70, all r's <0.01) and scores (0.76, 0.80, 0.81, all r's <0.01). Discriminant validity was shown for the mean (SD) scores by RHQ positive vs. negative cases [PTSD, M=21.1 (14.2) vs.

Table 2
Synthesis of 24 best classifiers showing 14 items selected by final naïve Bayesian classification analysis

Item number	Item description	Diagnostic proxy				
		PSS-SR ≥6	PTSD diagnosis	HSCL-25 anxiety	HSCL-25 depression	Any proxy
Items entered and selected by BAY						
NM 5_1	Muscle, bone, joint pain	X		X	X	
NM 5_12	Feeling down, sad, blue				X	
NM 5_19	Too much thinking/thoughts				X	
NM 5_22	Feeling helpless					X
"Coping"	Ability to cope with things			X		
PSS 3	Reliving trauma experience	X				
PSS 5	Body reactions to reminders				X	
PSS 11	Feeling emotionally numb	X	X	X		X
PSS 17	Jumpy, easily startled				X	
HSCL 1	Scared for no reason		X	X	X	X
HSCL 3	Faint, dizzy, weak			X		
HSCL 9	Spells of terror or panic	X				
HSCL 10	Restless, can't sit still	X				
HSCL 11	Low in energy, slowed down				X	
Sensitivity*		1.00	0.89	1.00	1.00	0.96
Specificity*		0.94	0.83	0.91	0.93	0.86
Items entered and NOT selected by BAY						
NM 5_27	Nausea					
HSCL 4	Nervous or shakiness inside					
HSCL 7	Feeling tense or keyed up					
HSCL 13	Crying easily					
HSCL 18	Feeling blue or depressed					
Items NOT entered into final BAY analysis						
NM 5_2	Tense muscles					
NM 5_4	Pain with walking					
NM 5_20	Thought intrusion of trauma					
NM 5_23	Hopelessness					
NM 5_24	Palpitations/strong heart					

"NM" is an item from the New Mexico Refugee Symptom Checklist; "PSS" is an item from the Posttraumatic Stress Symptoms-Self-Report; "HSCL" is an item from the Hopkins Symptom Checklist.
* Optimized for highest possible sensitivity to current data set, and values assume optimal scores to proxy diagnoses in BAY analyses.

Table 3
Sensitivity and specificity of the RHS-15 (first 14 items) by cutoff score to each diagnostic proxy (interpolated data)

	RHS-15 (first 14 items) cutoff score															
	9		10		11		12		13		14		15		16	
	Sn	Sp	Sn	Sp	Sn	Sp	Sn	Sp	Sn	Sp	Sn	Sp	Sn	Sp	Sn	Sp
Anxiety	.98	.77	.98	.82	.96	.85	.94	.86	.89	.88	.83	.92	.83	.92	.81	.93
Depression	.97	.79	.97	.84	.95	.87	.95	.89	.91	.92	.84	.95	.84	.95	.83	.96
PTSD	.92	.80	.89	.84	.86	.87	.81	.87	.81	.91	.72	.93	.72	.93	.69	.93

Sn=Sensitivity.
Sp=Specificity.

M=5.1 (5.9), t=8.6, $P<.01$; Anxiety item average, M=2.1 (0.7) vs. M=1.3 (0.3), t=9.0, $P<.01$; Depression item average, M=2.2 (0.7) vs. M=1.3 (0.3), $t=10.0$, $P<.01$]. The DT cutoff of ≥5 alone provided sensitivity/specificity of 0.60/0.93, 0.66/0.93, and 0.68/0.93 for PTSD, ANX, and DEP respectively. A score of ≥6 reduced sensitivity (.37/.50/.44) and did not appreciably affect specificity (.96/.97/.97), while a lower cutoff score reduced specificity. Scale reliability of the 27 symptom items was α=0.96. The addition of the coping item and the DT did not change alpha.

Sixty-three of the 77 RHQ screen positives completed the DP's. Of those, 44, 42 and 46 were positive, and 19, 21 and 17were negative for PTSD, ANX and DEP. The positive and negative predictive values of the RHQ symptom score were 0.70/0.84, 0.67/0.91 and 0.74/0.90 for the respective DPs.

3.3. Step 2: selection of RHS-15 items and metric testing

3.3.1. Selecting items from the three analytic methods

Twenty items were best classifiers for at least three of the four DPs by BAY and were considered for final analyses. Five of these were not included in the final BAY analysis because they were not classified by other methods or overlapped clinically with other selected items. Four items were best classifiers by the other two methods but not three of four DPs by BAY and were included in the final analysis. Table 2 shows all 24 of these items.

3.3.2. Final BAY analysis for RHS-15 item selection

Eighteen symptom items and the coping item were subjected to final BAY analysis (results shown Table 2). The DT was not entered since consensus was to include it on the final RHS-15 as a valuable clinical measure. In addition to the four DPs, a model of classifying best for Any Proxy was constructed to capture items that might classify well for any DP but would not necessarily be a best classifier for any specific DP. Thirteen items best classified on at least one specific DP, and three items best classified on any DP. Within DP, the classified items demonstrated good optimal S/S. Two items, "terror" and "low in energy, slowed down" were not highly significant in DA and χ^2 analyses, were thought to be less clinically relevant than other items assessing similar symptoms and were omitted from the final instrument. Two items, "nervous inside" and "crying easily" were strong classifiers by initial BAY for 3 DPs, were in the top 10 of 75 items by χ^2 on 3 DPs and were added to the final instrument.

3.4. Metric properties of the RHS-15

3.4.1. Abridging and interpolation of data set

For post hoc analyses, the data set was abridged to include new RHS-15 items and the three DP scales. Then, because the items comprising the RHS-15 were from three scales with different item responses, data were interpolated to provide equivalency to the planned 0 to 4 RHS-15 item responses. Using the same logic for determination of the RHQ cutoff score (item average 0.88), a total score of ≥12 for the 14 symptom items was established as the RHS-15 cutoff score. The DT was included as the 15th item to evaluate its added utility. The current recommended case identification is a score of ≥12 on the first 14 items OR a DT score of ≥5.

3.4.2. Metrics of RHS-15

Cronbach alpha for items 1–14 was 0.93 and for items 1–15 was 0.92. Table 3 shows the S/S of the RHS-15 (first 14 items) to each DP by the established and other cut-scores. A score of ≥12 provided S/S of 0.81/0.87, 0.94/0.86, and 0.95/0.89 for PTSD, ANX and DEP respectively. RHS-15 scores were significantly correlated with the respective PTSD, ANX and DEP DP's (0.74, 0.80, 0.81, all r's <0.01) and scores (0.90, 0.93, 0.91, all r's <0.01). Discriminant validity was shown for the mean (SD) DP scores by RHS-15 (first 14 items) positive vs. negative

Table 4
Sensitivity, specificity, and case identification by recommended and alternative RHS-15 Scoring (RHS Score OR DT Score)

	RHS cutoff (Items 1-14)	11	11	11	12	12	12	13	13	13
	DT Cutoff	4	5	6	4	5	6	4	5	6
Sens/Spec using combined scoring										
Anxiety	Sensitivity	0.98	0.98	0.98	0.96	0.96	0.96	0.92	0.92	0.92
	Specificity	0.74	0.76	0.82	0.75	0.77	0.82	0.77	0.79	0.85
Depression	Sensitivity	0.98	0.98	0.96	0.98	0.98	0.96	0.96	0.96	0.95
	Specificity	0.77	0.79	0.84	0.79	0.80	0.86	0.81	0.83	0.89
PTSD	Sensitivity	0.90	0.90	0.89	0.87	0.87	0.86	0.87	0.87	0.86
	Specificity	0.77	0.79	0.84	0.77	0.79	0.84	0.80	0.83	0.88
Cases identified										
Anxiety positive (*n*=53)	RHS only	51	51	51	50	50	50	47	47	47
	DT only	35	31	22	35	31	22	35	31	22
	RHS + DT	51	51	51	50	50	50	48	48	48
Depression positive (*n*=58)	RHS only	55	55	55	55	55	55	53	53	53
	DT only	43	39	24	43	39	24	43	39	24
	RHS + DT	56	56	55	56	56	55	55	55	54
PTSD positive (*n*=64)	RHS only	55	55	55	52	52	52	52	52	52
	DT only	41	38	23	41	38	23	41	38	23
	RHS + DT	57	57	56	55	55	54	55	55	54

Table 5
Positive and negative predictive values by RHS-15 cutoff score

		RHS-15 (first 14 items) cutoff score										
		9	10	11	12	13	14	15	16	17	18	19
PTSD	PPV	.70	.74	.76	.75	.83	.84	.84	.83	.89	.91	.93
	NPV	.95	.94	.92	.90	.91	.87	.87	.85	.85	.85	.83
ANX	PPV	.62	.68	.71	.72	.75	.80	.80	.81	.85	.87	.90
	NPV	.99	.99	.98	.98	.95	.93	.93	.93	.91	.91	.90
DEP	PPV	.67	.73	.76	.78	.84	.89	.89	.91	.94	.93	.95
	NPV	.98	.93	.97	.98	.96	.93	.93	.93	.90	.90	.88

Shaded column is the current recommended cutoff score.

cases [PTSD, M=21.7 (13.2) vs. M=3.9 (3.8), $t=10.9$, $P<.01$; Anxiety item-average, M=2.1 (0.6) vs. M=1.2 (0.2), $t=11.9$, $P<.01$; Depression item-average, M=2.2 (0.7) vs. M=1.2 (0.2), $t=12.3$, $P<.01$].

Table 4 shows the predictive capacity of the recommended case cut-score and other possible cut-scores. It also shows the case identification yield in raw numbers. Overall, the addition of the DT improves sensitivity and diminishes specificity at any given cut-score and slightly improves the number of cases identified.

Table 5 shows the positive (PPV) and negative (NPV) predictive values of the recommended and other cut-scores. NPV is of course optimal with lower cut-scores, and has a significant decrease above 13. PPV is best at higher cut-scores, with a significant decrease between 17 and 14 dependent on DP.

Table 6 shows the S/S of the RHS-15 to the DPs by ethnic group for three cut-scores. In spite of the relatively small number of cases for the Nepali and Burmese compared to the Iraqi, these data are instructive. S/S values are similar for Nepali and Iraqi groups, which are both different from the Burmese. And, the positive predictive value for each DP at the recommended cut-score is also not as good for the pooled Burmese group data.

3.4.3. Step 3: preliminary evaluation of effectiveness

Of the 77 positive screens, 57 (74%) accepted referral and 4 (5%) were already in services. Forty-eight of the 61 (78.7) completed intake and began treatment. Of these 48, 30 (62.5%) were primarily diagnosed with depression, 12 (25%) with PTSD, 2 (4.2%) with other anxiety disorders, 1 (2.1%) with adjustment disorder and 3 (6.3%) with a psychotic disorder. At the time of data collection, 30 were still in service, and all but four remained in care for at least 3 months.

4. Discussion

The RHS-15 is an empirically developed screening instrument for common mental disorders in refugees. Strengths of the RHS-15 are its metric properties, the efficiency of administration and its demonstrated preliminary effectiveness and desirability in meeting a clear need. These strengths stem from utilizing empirical multi-method participatory research methods. Initial items came from qualitative work respecting the voice of Vietnamese and Kurdish refugees [5]. Participatory community translation helped ensure cultural equivalence for important words and phrases of distress. Statistical analyses to choose items focused on triangulating best methods for classification.

Current limitations of the RHS-15 are that prospective efficacy and effectiveness testing is yet to be reported, and metric properties appear different in one of the three groups, although the limited sample size precludes definitive interpretation. The RHS-15 was developed with data of refugees from three countries (Iraq, Burma, Bhutan) using post hoc analyses. The generalizability to other ethnic groups is pending further evaluation. The post hoc analyses included items as independent variables that were also items in the dependent DPs. This method likely created a bias of item selection for the RHS-15 in favor of items from the HSCL-25 and PSS-SR and against items from the RHQ. However, the goal was to select items that would best detect significant distress (implied by DPs) across refugee groups as part of a program designed to provide early intervention. This goal outweighed what could be a more purist statistical goal.

The development of the RHS-15 was driven by the need to efficiently and effectively assess probable diagnostic-level distress for

Table 6
Sensitivity and specificity of the RHS-15 by ethnic group

		RHS-15 (first 14 items) cutoff score					
		10		12		14	
		Sens	Spec	Sens	Spec	Sens	Spec
PTSD	Nepali	1.00	0.94	1.00	0.94	0.90	0.98
	Iraqi	0.93	0.67	0.84	0.73	0.80	0.82
	Burmese	0.60	0.85	0.50	0.88	0.20	0.95
ANX	Nepali	0.91	0.94	0.91	0.94	0.82	0.98
	Iraqi	1.00	0.61	0.94	0.71	0.89	0.78
	Burmese	1.00	0.86	1.00	0.91	0.50	0.98
DEP	Nepali	1.00	0.94	1.00	0.94	0.90	0.98
	Iraqi	0.95	0.66	0.93	0.80	0.88	0.89
	Burmese	1.00	0.86	1.00	0.91	0.50	0.98
Any DP	Nepali	0.92	0.98	0.92	0.98	0.77	1.00
	Iraqi	0.92	0.84	0.85	0.92	0.77	0.96
	Burmese	0.71	0.94	0.64	0.97	0.29	1.00

Nepali: $N=63$, DP cases PTSD=10, ANX=11, DEP=10, Any=13.
Iraqi: $N=77$, DP cases PTSD=44, ANX=36, DEP=42, Any=52.
Burmese: $N=50$, DP cases PTSD=10, ANX=6, DEP=6, Any=14.
Shaded column is the current recommended cutoff score.

newly arriving refugees so that early support/treatment is offered to diminish illness burden. Evidence of the high burden of anxiety and mood disorders in displaced refugees demonstrates the need for screening [3]. However, the lack of good data about metric, clinical, and social utility of screening is a barrier to developing and implementing screening. This is particularly evident for refugees who come from a heterogeneous range of experiences, cultural orientations, and symbolic expressions of help-seeking for distress and illness. While these barriers are valid problems, the first step is to have a culturally and linguistically valid instrument to further investigate the value of screening for reducing mental and general health distress. Without screening, and given a conservative 10% prevalence of significant mental disorder [3], over 5,500 refugees from FY 2011 data remain at risk for non-detection of serious public health conditions (accessed 8/15/12 at http://www.acf.hhs.gov/programs/orr/data/fy2011RA.htm).

With that in mind, published principles for instrument development were followed [47]. The purpose and construct of the RHS-15 is to fill an important gap in public health screening for a range of common mental disorders across refugee populations; the design is for ease of use by clinicians and refugees; and the development and metric testing was conducted using empirical data and multiple methodologies to maximize efficiency and efficacy. The psychometric properties of the RHS-15 are very good, the items selected via an iterative empirical process are both somatic and psychological, and data about the S/S at various cut-scores will allow organizations to choose scoring based on local conditions (i.e., available time and resources).

The RHS-15 stands in contrast to other instruments developed for detecting single disorders in refugees. In a convenience sample of 91 patients, the 30-item HTQ demonstrated excellent internal consistency (alpha=.96), 1-week item retest reliability ranging from poor to excellent (r=.32-.85; median r=.59), and the suggested average item score of ≥2.5 had sensitivity of 0.78 and specificity of 0.65 to PTSD diagnosis by clinical interview [48]. In a community study the S/S of the ≥2.5 cutoff score for diagnosing PTSD was 0.16 and 1.00, respectively, and a cut-score of 1.17 was more optimal for classifying PTSD [49].The 15-item VDS assesses physical and psychological symptoms associated with depression in the West and symptoms unrelated to western concepts, is valid in discriminating between Vietnamese refugees with depression and those with anxiety or schizophrenia, and a cut-score of 13 of a possible 34 demonstrated 0.91 sensitivity and 0.96 specificity for diagnosing *DSM-III* major depression by clinical interview in a community sample [34]. Information about properties of other instruments assessing specific symptom groups has been previously published [39].

Practically, the RHS-15 is useful. It may be self- or clinician-administered via interpreters, and the time of administration is between 4 and 12 minutes depending on conditions. It is not known if type of administration biases case identification as in epidemiological research [3].The RHS-15 is now included at PHSKC as part of routine health screening, and feedback from clinic staff is positive after initial concerns about time, workload, and possible adverse effects on patients. After training that the RHS-15 is a screening tool, very much like a PPD for tuberculosis where staff screen but do not definitively address complicated treatment needs, concerns about administering the RHS-15 diminished. For example, during focus groups at PHSKC one nurse stated, “offering the RHS-15 is less painful than… immunizations; it takes less time and no one really cries.” With continued use, the lack of side effects, and the critical referral process to P2W clinical partners, concerns faded and utility increased. Key features of the P2W program included: (1) a central point of entry, (2) availability of trained interpreters, (3) integration with the general health screening visit, and (4) availability of partner community mental health agencies. Additionally, an outreach component was a critical factor for enhancing referral acceptance. By partnering with community leaders, P2W conducted outreach to refugee communities, offering trainings and information about mental health services with the goal of reducing stigma and increasing access. This resulted in community referrals in addition to enhancing access from direct screening. Of those that entered services in one organization, 90 were from community referral over the 3-year P2W project: these included some who were previously screened and some who had not been screened at PHSKC and all from communities where P2W conducted outreach. As a result of the P2W project and outreach to the refugee resettlement community in the United States, The RHS-15 is being utilized clinically, for pilot research, and in replication projects across the country (see Acknowledgments).

In addition to these ongoing pilot projects, the field will benefit from future comparative effectiveness research between the RHS-15 and shorter or other extant measures, different periods (i.e., on arrival vs. 6 months in country), and different methods (i.e., simply providing screening and referral vs. screening and referral with outreach support). These studies should compare both clinical effectiveness and cost so that policy decisions about screening are well informed to ultimately benefit vulnerable refugee populations.

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