



Arabic validation of the hopkins symptom checklist-25 (HSCL) in a Lebanese sample of adults and older adults

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Abstract

Screening for anxiety and depression is essential for treatment. Participants aged 30 years and above ($n = 290$) were screened for anxiety and depression using the HSCL-25-Arabic in Lebanon. Confirmatory factor analysis was used to determine the best fit of the data. Five models were tested: (1) the tripartite model including five correlated factors: two related to anxiety, two to depression and a mixed factor describing general distress, (2) the tripartite model considering no correlation between anxiety and depression, (3) the original two-factor model assuming an association between depression and anxiety; (4) the two-factor model considering no correlation between factors; (5) the bifactor model including anxiety and depression, and a general factor underlying all items assuming no association between the three. The bi-factor model showed the best fit followed by the two-factor model. The HSCL-25-Arabic discerns symptoms of anxiety and depression as distinct with a general factor underlying all items.

Keywords Anxiety · Depression · Factor analysis · Lebanon · Mental health

Introduction

Anxiety and depression are the most prevalent mental health disorders worldwide. In the general population, the global point prevalence of Major Depressive Disorder (MDD) is 4.7%; across the entire lifespan (Ferrari et al. 2013), and 2.5% in children and adolescents (Polanczyk et al. 2015). Mental health disorders are known to be associated with a significant increase in all-cause mortality. In 2013, major depression was the second leading cause of years lived with disability, and anxiety was the seventh (Vos et al. 2015). Without the proper assessment and treatment, anxiety and depression can increase the risk of several conditions such as stroke and somatic symptoms (Pacella et al. 2013; Penninx et al. 2013), as well as social and economic repercussions, mostly in low-income and middle-income countries (World Health Organization 2015). It is also well established that populations who experienced political instabilities and conflicts have a significantly higher rate of depression (Canetti et al. 2010; Momartin et al. 2006). However, there

remains a substantial imbalance between disease burden, financing, and service access in these countries (Vos et al. 2015).

Lebanon is a middle-income small country in the Middle East with roughly 4 million people and a history of repeated conflicts. In 2008, Karam et al. reported that a quarter of (25.8% out of a sample of 2857) the Lebanese adults suffered from at least one mental health disorder at some point in their life according to the DSM-IV, and 10.5% from more than one disease. The two most common disorders were anxiety (16.7%) and mood-related disorders (12.6%), with major depression being the most prevalent one (9.9%). Karam and colleagues (Karam et al. 2008) also showed that war exposure significantly increased the risk of the first onset of anxiety, mood, and impulse control disorders. More recent data from Lebanon suggests that for individuals between the ages of 18 and 59, anxiety has a prevalence rate of 16.6%, while mood disorders prevalence rate is 13.3%. For individuals aged 60 years and above, the former is 12.3%, while the latter is 9.1% (Karam et al. 2016).

Given the high prevalence of mental health disorders, accurate screening is essential for subsequent diagnosis and management. In general, research instruments that are psychometrically validated in Arabic are scarce, and at times the validation process lacks the necessary steps needed to enhance rigor and reproducibility (Abu-Hilal et al. 2011; Chaaya et al. 2008; Phung et al. 2014; Rahman et al. 2009).

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The Hopkins Symptoms Checklist

The Hopkins Symptom Checklist (HSCL) originated from the Cornell Medical Index (Wider 1948), and was further expanded by investigators at Johns Hopkins University in the 1950s (Frank et al. 1957; Parloff et al. 1954). It was developed initially to measure common psychoneurotic complaints of outpatients (Lipman et al. 1965). There are several versions of this instrument in which items range from a count of 25 to 90 and differ in the constructs measured (e.g. HSCL-25, HSCL-35, and SCL-90) (Derogatis et al. 1974; Derogatis et al. 1973; Hesbacher et al. 1980). Shorter versions of the instrument also exist (HSCL-10 and HSCL-5); they perform almost as well as HSCL-25 for adolescents (Strand et al. 2003). The 90-item checklist includes measures of psychotic and paranoid symptoms, in addition to anxiety and depression symptoms (Derogatis et al. 1974). On the other hand, the 25-item version focuses more on the presence and intensity of depression and anxiety symptoms (e.g., fear, dizziness, self-blame) (Hesbacher et al. 1980; Nettelbladt et al. 1993). Different versions of the HSCL have been validated in several populations and using a variety of methods. For example, the HSCL-25 was validated against the Clinical Interview for DSM-IV (SCID); major depression diagnosis, in HIV-positive pregnant women in Tanzania (Kaaya et al. 2002), and against the Present State Examination (PSE-9) in a Swedish sample (Nettelbladt et al. 1993).

The test has been widely used to screen for anxiety and depression among different populations, including immigrants and refugees (Jakobsen et al. 2011; Lavik et al. 1999; Tinghög and Carstensen 2010), older adults (Fröjdth et al. 2004), trauma victims (Halepota and Wasif 2001), and HIV-positive pregnant women (Kaaya et al. 2002).

The HSCL-25 has been translated and validated from English into several languages including Arabic (Mahfoud et al. 2013), Russian, Serbo-Croatian, Farsi (Kleijn et al. 2001), Vietnamese (Hinton et al. 1994), Swedish (Fröjdth et al. 2004), Tibetan (Lhewa et al. 2007), and Urdu (Halepota and Wasif 2001).

The cutoff score of the English version is 1.75 for the total score and each of the two sub-scores (Winokur et al. 1984) as well as for several other languages (Mollica et al. 1987). A mean score of 1.75 has been defined as the cut-off point for ‘caseness,’ in other words, the presence of depression. This instrument has often been used with a cut-off of 1.75 even though exceptions exist. For instance, Kaaya et al. (2002) used 1.06 as a cut-off, and Ventevogel et al. (2007) used 1.05 as a cut-off for male participants, and 2.25 for female ones. The validity of the 1.75 cut-off criterion has been evaluated with different diagnostic psychiatric interviews around the world and often found to be an accurate cut-off (Mollica et al. 1987; Nettelbladt et al. 1993; Sandanger et al. 1998; Veijola et al. 2003; Hollander et al. 2007). Therefore, in this study, we did

not address the criterion validity, and we focused more on confirming the construct validity in Arabic.

Several studies analyzed the psychometric properties of the HSCL-25 and its translations. The internal consistency of the various versions of the HSCL-25 was generally good for the total score, as well as the anxiety and depression scores with Chronbach’s alphas respectively greater or equal to 0.90, 0.76, and 0.85 (Al-Turkait and Ohaeri 2010; Jakobsen et al. 2011; Kaaya et al. 2002; Kleijn et al. 2001; Lee et al. 2008). However, the number of studies examining the dimensionality of the HSCL-25 in various languages remains quite low. It is still unclear how anxiety and depression are represented in the test. Few studies analyzed the factorial distribution of the test items and showed the following. The simplest factorial model is the 1-factor model; it considered anxiety and depression as one factor (Laurent and Ettelson 2001; Olino et al. 2008). Other findings backed a 2-factor model, this was proposed for the English version of the HSCL-25, it identified anxiety and depression as two distinct factors (Mouanoutoua and Brown 1995; Ventevogel et al. 2007). Several other models were suggested as well, the higher order, the bi-factor, and the tripartite models.

The higher-order model is similar to the 2-factor model, it considered anxiety and depression as two distinct factors but added a third higher-order factor that relates anxiety and depression (Al-Turkait et al. 2011; Byrne 2005; Patrick et al. 2007).

The bi-factor model, in particular, added a third general factor in addition to the anxiety and depression factors and considered the three factors uncorrelated (Al-Turkait et al. 2011; Holzinger and Swineford 1937; Patrick et al. 2007; Reise et al. 2007). This model has been suggested to be the best factor solution by Glaesmer et al. (2014).

Nevertheless, the tripartite model seems to spark the most interest in research as it divides the 25-items into five correlated factors: two factors specific to anxiety (core anxiety and autonomic anxiety), two factors specific to depression (core depression and somatic depression) and a fifth mixed factor describing general distress composed of non-specific items shared by anxiety and depression. This mixed factor accounts for the shared comorbidities of anxiety and depression disorders (Al-Turkait et al. 2011). The anxiety and depression factors correlate more with the mixed factor nonspecific items. Al-Turkait et al. (2011) showed in a sample of 624 Kuwaiti Arabic speaking students that this tripartite model along with the bifactor model are superior to the higher-order, 2-factors, and 1-factor models, although all models had a good fit of the data. They conducted an exploratory factor analysis. To start, they identified five factors; core anxiety, core depression, general distress mixed, autonomic anxiety, and somatic depression, then using confirmatory factor analysis they compared the different models. Their findings supported the bifactor and tripartite model with five factors correlated, which confirms

the existence of two separate factors for core anxiety and depression and the third factor for nonspecific symptoms. They also showed that the 2-factor, with anxiety and depression and higher order factors correlated model, had a good fit. To our knowledge, Al-Turkait et al. conducted the factorial structure of the HSCL-25 in 2011, and to date, this was the only study that explored the factorial structure of the HSCL-25 in the Arab world. Their findings, however, were limited to college students. To further examine the validity of HSCL-25 in Arabic, analyses should be performed on other age groups; this was addressed in this study.

Moreover, although Mahfoud et al. (2013) conducted the initial Arabic validation of the HSCL-25 in Lebanon, they performed minimal analysis of its dimensionality in this context. Also, the study was limited to a sample of 156 married women aged 18–54 years, living in a disadvantaged area in Beirut. The HSCL-25 Arabic validity was assessed against the Mini-International Neuro-psychiatric Interview (MINI) to generate cutoff scores for probable depression and anxiety as indicated by the MINI.

Therefore, the aim of this study was to explore the validity of the HSCL-25 further in the Lebanese cultural context by analyzing the factorial structure of the HSCL-25-Arabic in a sample of adults and older adults. The primary focus will be on the bi-factor and tripartite models since they have been shown to have higher explanatory power than the other models (Al-Turkait et al. 2011; Glaesmer et al. 2014). Our findings add to the evidence related to the validity of the HSCL-25 items in Arabic, more specifically in Lebanon.

Materials and Methods

Participants and Procedure

This study was conducted as part of a larger project; a convenience sample of 224 participants aged 30 years and above who were recruited from the American University of Beirut Medical Center (AUBMC) outpatient clinics and the community including older adults nursing homes (Darwish et al. 2015, 2018). Patients with a history of neurological disorders, traumatic brain injury, psychiatric disorders, cognitive impairment, and history of excessive substance use were excluded. Other exclusion criteria were the usage of antidepressants, mood stabilizers, or medications known to affect cognitive performance for the three months preceding the study. All participants went through health screenings, in addition to a battery of cognitive tests including the Hopkins Symptoms Checklist-25 (HSCL-25)-Arabic (Evans et al. 2014; Mahfoud et al. 2013). The Arabic/Lebanese version of the HSCL-25 that was translated by Mahfoud et al. in 2013 was

used in this study. The HSCL-25 is a brief anxiety and depression screening test that consists of 25 self-report questions with four response options each (1 = not at all, 2 = a little, 3 = quite a bit, and 4 = extremely). The period of reference is the past week. Ten of the items screen for anxiety and the remaining 15 for depressive symptoms, allowing to compute two sub-scores for anxiety and depression and a general score, which is the mean of all the items' scores (Winokur et al. 1984).

The study was approved by the Institutional Review Board of the American University of Beirut, and all participants gave written consent to take part in the study.

Statistical Analyses

Statistical analyses were carried out using STATA (STATA version 13.1) and AMOS (AMOS version 23.0) for Windows. Descriptive statistics were used to describe the background characteristics of the study sample (including age, gender, and education) and the responses to the HSCL-25 items in table Confirmatory factor analysis (CFA) was run to theoretically test the goodness of fit of the following factor models described by Al-Turkait et al. (2011): (1) the tripartite model (proposed by Clark and Watson); (2) the tripartite model described in (1) except that the anxiety specific factors as not correlated with the depression-specific factors. (3) the original two-factor model with a correlation between the depression factor and the anxiety factor; (4) the two-factor model assuming no correlation between the factors; and (5) the bifactor model.

Given the multivariate non-normality of the data found after the Doornik–Hansen normality test, Bollen and Stine's bootstrap approach was used to generate bootstrapped goodness of fit measures using $N = 500$ replications (Bollen and Stine 1992). Goodness of fit was evaluated using the following criteria: the normed χ^2 CMIN/DF < 3 (Kline 2011), the Goodness of Fit Index (GFI) > 0.85 ; Adjusted Goodness of Fit Index (AGFI) > 0.80 ; Comparative Fit Index (CFI) > 0.90 ; TLI > 0.9 . Parsimony Comparative Fit Index (PCFI) > 0.6 , and

Table 1 Demographic data of the participants

	Frequency	Percentage
Sex		
Male	76	33.9
Female	148	66.1
Education (Years)		
0	7	3.1
1 to 8	47	21.0
9 to 11	18	8.0
12 to 13	34	15.2
≥ 13	117	52.2

Root Mean Square Error of Approximation (RMSEA) <0.08 (Al-Turkait et al. 2011; Enns et al. 1998; Hooper et al. 2008). Akaike Information Criterion (AIC) was also computed and

compared between the five models; a lower AIC value indicates a better fit. Standardized regression coefficients were also reported.

Table 2 Responses to the items of the HSCL-25

Items	Responses								M ± SD
	1 (not at all) أبداً		2 (a little) قليلاً		3 (quite a bit) و		4 (extremely) كثيراً		
Anxiety	Frequency	%	Frequency	%	Frequency	%	Frequency	%	
1.Suddenly scared for no reason خوف فجائي من دون سبب	181	80.8	21	9.4	15	6.7	7	3.1	1.32 ± 0.74
2.Feeling fearful عج بالخوف	154	68.8	37	46.5	18	8	15	6.7	1.53 ± 0.90
3.Faintness, dizziness or weakness إذا بلغا دوخة أو غف جديد	148	66.1	53	23.7	19	8.5	4	1.8	1.46 ± 0.73
4.Nervousness or shakiness inside توتر أو جفة في داخلي	163	72.8	27	12.1	25	11.2	9	4	1.46 ± 0.85
5.Heart pounding or racing دقت قلب قوية أو سرعة	167	74.6	33	14.7	16	7.1	8	3.6	1.4 ± 0.77
6.Trembling جفة	194	86.6	24	10.7	4	1.8	2	0.9	1.17 ± 0.48
7.Feeling tense or keyed up أعج بتوتر أو تزعجيب	48	21.4	77	34.4	60	26.8	39	17.4	2.4 ± 1.01
8.Headaches وجع الرأس	121	54	63	28.1	27	12.1	13	5.8	1.7 ± 0.89
9.Spells of terror or panic نوبات عجب أو ذع	214	95.5	5	2.2	3	1.3	2	0.9	1.08 ± 0.39
10.Feeling restless, can't sit still أعج باحور	114	50.9	54	24.1	35	15.6	21	9.4	1.83 ± 1.01
Depression									
11.Feeling low in energy, slowed down إذا بنق بانا بدي	96	42.9	67	29.9	47	21	14	6.3	1.91 ± 0.94
12.Blaming yourself for things أو نفخي عي أو	102	45.5	69	30.8	27	12.1	26	11.6	1.9 ± 1.017
13.Crying easily ابكها بسهولة	126	56.3	38	17	33	14.7	27	12.1	1.83 ± 1.08
14.Loss of sexual interest or pleasure عجم اغنبة أو اتعة باجن	126	56.3	42	18.8	41	18.3	15	6.7	1.75 ± 0.98
15.Poor appetite عج باهية	165	73.7	26	11.6	26	11.6	7	3.1	1.44 ± 0.82
16.Difficulty falling asleep, staying asleep عجبة أن اغفو و/أو أن أبقي نالاة	130	58	48	21.4	28	12.5	18	8	1.71 ± 0.97
17.Feeling hopeless about the future أعج باي من اتقب	144	64.3	44	19.6	19	8.5	17	7.6	1.59 ± 0.93
18.Feeling blue أعج باحن	103	46	68	30.4	34	15.2	19	8.5	1.86 ± 0.97
19.Feeling lonely عج باوحدة	137	61.2	48	21.4	23	10.3	16	7.1	1.63 ± 0.93
20.Thoughts of ending your life تاودندي أفكا أن أنهي جيأتي	216	96.4	3	1.3	3	1.3	2	0.9	1.07 ± 0.38
21.Feeling of being trapped or caught أعج بلزني مقيدة أو محدودة	111	49.6	75	33.5	24	10.7	14	6.3	1.74 ± 0.89
22.Worrying too much about things أفق كئني أعي أو	64	28.6	54	24.1	48	21.4	58	25.9	2.45 ± 1.16
23.Feeling no interest in things أعج بجم هذا بال أو	142	63.4	45	20.1	21	9.4	16	7.1	1.6 ± 0.98
24.Feeling everything is an effort أعج أن كي يندب جهدا	78	34.8	54	24.1	54	24.1	38	17	2.23 ± 1.104
25.Feeling of worthlessness أعج أنني عجيبة اقية	194	86.6	16	7.1	6	2.7	8	3.6	1.23 ± 0.67

Results

Sample Description

Complete data on the 25 items were available for 214 participants. The mean age of the participants was 53.24 years ($SD = 14.71$) with a majority of females (66.1%) and 13 or more years of education (52.2%) (Table 1). Table 2 shows the responses to the items of the HSCL-25 scale. The percentages of respondents who experienced ‘a little or extremely’ the anxiety and depression symptoms ranged from 2.2% to 47.3% for the total scale, with a range of 2.2–44.2% within the ten items describing anxiety and 2.2–47.3% within the 15 items describing depression.

Confirmatory Factor Analysis

The CFA fit indices are summarized in Table 3. The five models showed adequate fit with a CMIN/DF < 3, PCFI > 0.6 and GFI greater than 0.8, close to the cutoff value of 0.85. The bifactor model consisting of the depression and anxiety and a general factor that includes all items with no correlation between the three factors showed the best fit with CMIN/DF < 3, GFI > 0.85, AGFI > 0.8, RMSEA < 0.08, while both the CFI = 0.84 and TLI = 0.81 did not reach the cutoff value of 0.9. This model also had the lowest AIC which also indicated the best fit.

The two-factor model with correlated anxiety and depression factors showed the next best fit. The poorest fit was for the tripartite model with five factors, two related to anxiety, two related to depression and a mixed factor, with no correlation between the anxiety and depression factors.

The CFA regression coefficients of the five models were all significantly different from zero. For the bifactor model, the factor-item loadings (standardized coefficients) of the general factor ranged from 0.27 to 0.61.

When the correlations between the factors were allowed, high correlations were noted. In the two-factor model, the

association between depression and anxiety was 0.75. For the tripartite model, when enabling all pairwise relationships between the five factors, the correlations ranged between 0.60 (core depression and autonomic anxiety) and 0.91 (core depression and general distress). For the tripartite model, when the correlations between the anxiety and depression factors were not allowed, the correlations ranged from 0.31 (core anxiety and general distress) to 0.84 (core depression and general distress). The standardized regression coefficients’ ranges of all models are displayed in Table 3.

Discussion

In this study, we investigated the dimensions of the HSCL-25-Arabic in a sample of Lebanese adults and older adults. The bifactor, tripartite non-correlated, and 2-factor correlated models showed adequate fit of the data, which is in line with both the findings of Al-Turkait et al. (2011) and Glaesmer et al. (2014). We found that the best model was the bifactor model which shows that anxiety and depression are two distinct disorders related to a general factor underlying all the items and represents mental distress in general. This third general factor accounts for the high comorbidity between anxiety and depression and illustrates the superiority of the bifactor model compared to the simpler 2-factor model. While our results showed an adequate CFI index for the bifactor model (0.842), it did not reach the recommended cut-off of 0.90. Nevertheless, the bifactor model met the other accepted fit indices (Hooper et al. 2008). We recommend the use of HSCL-25 Arabic when screening for anxiety and depression in Lebanon.

Populations who experience many political and economic turmoils are often left with a significantly high burden of anxiety and depression. These symptoms are often not noticed, hence underdiagnosed, consequently leading to more comorbidities, more anxiety and depression, and a higher burden of diseases in general. The first step in breaking this

Table 3 Responses to the items of the HSCL-25-Arabic

Model	Description	CMIN/DF	GFI	AGFI	CFI	TLI	PCFI	AIC	RMSEA (90% CI)	Standardized regression weight range
1	Tripartite model; five factors correlated	2.26	0.83	0.80	0.78	0.75	0.69	717.62	0.08 (.07, .08)	0.37, 0.76
2	Tripartite model; no correlation between anxiety and depression factors	2.68	0.82	0.78	0.70	0.67	0.63	833.99	0.09 (.08–.10)	0.32, 0.77
3	Two factors anxiety/depression correlated	2.19	0.83	0.79	0.79	0.77	0.72	700.66	0.07 (.07–.08)	0.26, 0.76
4	Two factors anxiety/depression not correlated	2.57	0.81	0.78	0.72	0.69	0.66	806.21	0.08 (.08–.09)	0.25, 0.77
5	Bifactor model: two factors anxiety/depression and a third factor underlying all items. The three factors uncorrelated	1.97	0.86	0.81	0.84	0.81	0.70	641.33	0.07 (.06–.07)	–0.03, 1.83

vicious cycle is in the use of valid and user-friendly screening tools to facilitate earlier detection and management. With accurate screening leading to better diagnosis, more epidemiological studies become possible thus improved population studies and more precise estimates of the prevalence of these mental health disorders. In the Lebanese context, such information is scarce.

In addition to valid screening tools, increasing the ability of primary health care providers in Lebanon to identify anxiety and depression symptoms in patients is crucial. This requires additional clinical training of the Lebanese health care providers, on mental health in general, and anxiety and depression symptoms in particular. When a valid screening tool is coupled with a health care provider with proficient mental health assessment skills, the identification of cases becomes optimal.

Confirming the validity of the HSCL-25 screening tool for anxiety and depression in Arabic was addressed in this study. But, the sample did not include people younger than 30 years old, further validation studies on younger subjects are needed. It requires exploration on a larger random sample with younger age groups included to improve the generalizability of the instrument, in addition to a further investigation of its sensitivity and specificity.

Another limitation of this study is intrinsic to the confirmatory factor analysis method; the factors are a mathematically driven framework that may not account for some latent variables that cannot be measured directly in addition to the subjectivity of indices interpretations. Therefore, in our future studies, we may investigate the discriminant and criterion validity of the Hopkins against other screening tools.

This is the first study that explored the HSCL-25 anxiety and depression dimensions in Lebanon where few screening tests are adequately validated. This study also used a sample of adults and older adults as compared to the sample of college students used in the study by Al-Turkait et al. (Al-Turkait et al. 2011). Our findings add to the cross-cultural validity of the HSCL-25 Arabic. This will allow for better screening and later diagnosis of patients both at an individual and epidemiological level, thus improving the quality of treatment received and rigor of the research studies.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Authorship Statement All the authors listed above meet authorship criteria. All authors are in agreement with the present manuscript.

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