EXPLORATORY FACTORIAL ANALYSIS AND RELIABILITY OF THE MALAY VERSION OF CENTRE FOR EPIDEMIOLOGICAL STUDIES – DEPRESSION SCALE (MCES-D) IN A GROUP OF MALAYSIAN JUNIOR DOCTORS

Z. Ahmad Sabki, M.P.M. N.Z. Zainal, M.Phil., Ph.D. Ng Chong Guan*

Department of Psychological Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur 50603 (MALAYSIA)

*Corresponding author: chong_guan@um.edu.my

DOI: 10.7813/2075-4124.2014/6-2/B.50

ABSTRACT

Objectives: This study aimed to examine the internal reliability, factorial construct and concurrent validity of the Malay version of Center for Epidemiological Studies Depression (MCES-D) scale among a group of junior doctors in Malaysia.

Methods: The English version of CES-D scale was translated into Malay language using backtranslated technique. Both version of CES-D, and Hospital Anxiety Depression Scale (HADS) were distributed to a group of 117 junior doctors in a teaching hospital in Malaysia. Principal axis factoring with oblique rotation was performed to explore the factor structure of the scale.

Results: The results showed satisfactory internal consistency reliability (Cronbach’s alpha 0.778) with temporal stability over a 2-week period. Exploratory factor analysis suggested four factors, labeled as ‘Depressed Affect’, ‘Positive Affect’, ‘Interpersonal Problems’ and ‘Somatic Complaints’. All the factor scores were correlated significantly with HADS and English CES-D scale.

Conclusion: The results suggesting that MCES-D is appropriate for assessment of depression among educated Malaysian adults.

Key words: Depression, factorial validity, junior doctors, Malay version, reliability

1. INTRODUCTION

Junior doctors or interns are known to be vulnerable to depression. Internship, which is a period of hospital-based service training of new medical graduates has been associated with stress, burn-out, depression, anxiety and even suicide (1-5). High prevalence of depression has been reported among junior doctors than in the general population (6-8). Female interns, increased work hours, preceived medical errors, stressful life events and burnout during internship year are strongly correlated to depression (9, 10).

Instrument used to measure depressive symptoms among junior doctors varies from one study to another. Among the commonly used rating scales were Spielberger State – Depression Scale (11), Beck Depression Inventory (12), Chinese version Zung’s self administered Depression Scale (13), 9-item Patient Health Questionnaire (PHQ-9) (14) and Center for Epidemiological Studies - Depression (CES-D) scale (15).

The CES-D scale has been used often to measure depressive symptomatology in the general population. The advantage of the CES-D in comparison to other scales is that it focuses primarily on cognitive and affective component with demonstrated validity in differentiating between individuals with and without depressive symptoms. The factor structure of CES-D scale described by Radloff (1977) consists of four dimensions that reflect the construct of depression: Depressed Affect, Positive Affect, Somatic-Retarded Activity, and Interpersonal Relations (15). CES-D scale has been translated and validated in many languages and demonstrated good psychometric properties (16-22). CES-D scale has been translated into Malay language and back translated (23) but its reliability and validity have yet to be tested in the Malaysian population.

In this study, we aimed to explore the internal reliability, factorial structure and concurrent validity of the Malay translated CES-D scale among the junior doctors working in a teaching hospital in Malaysia. This would provide new, preliminary information on the scale’s usefulness as a screening tool for depression in culturally diversified and highly educated group of population.
2. METHODS

Study design and setting
This was a cross-sectional study conducted in University Malaya Medical Centre (UMMC). UMMC is a government-funded medical institution located in Pantai Dalam, southwest corner of Kuala Lumpur, the capital of Malaysia. It is a 1000-bed referral center and Malaysia's premier teaching hospital for both undergraduate and postgraduate medical training of various disciplines.

Participants
A total of 117 junior doctors from the various disciplines were recruited by purposive sampling. The first author (ZAS) conducted two Continuous Medical Education (CME) seminars in UMMC in 2013 which were attended by the doctors. During the seminars, the objectives and nature of the study was explained. Those junior doctors who agreed and consented for the study were recruited.

The demographic profiles i.e. age, sex, race/ethnicity, year and university graduated, previous and current posting (rotation): General/Internal Medicine, General Surgery, Orthopedics, Ear Nose and Throat, Paediatrics, Obstetrics and Gynaecology, Anaesthesiology, Accident & Emergency and Ophthalmology; and residency related characteristics of the participants were collected. The English and Malay version of the CES-D were distributed among the attendees. The Malay version of Hospital Anxiety and Depression Scale (HADS) was also given to the participants for the assessment of depressive and anxiety symptoms. The respondents’ identities were kept completely anonymous. The sample size estimated was 100 participants for the current study based on the calculation of five subjects per items in the CES-D scale (24). All questionnaires were self-administered, although assisted guidance was available by one of the authors (ZAS) of this study. A total of 110 junior doctors were re-tested at two weeks after the first administration of the Malay translated CES-D scale.

Measurement
Center for Epidemiologic Studies-Depression (CES-D)
The Center for Epidemiologic Studies-Depression (CES-D) scale was used to assess depression by asking the respondents to rate each item (e.g. “I felt depressed”) on a scale from 0 to 3 to indicate how often the respondent felt that way over the previous week. An endorsement of 0 indicated that she/he felt that way “rarely or none of the time”, while endorsing 3 indicated that she/he felt that way “most or all of the time”. Four of the items were worded as positive statements to control for response bias. The positive CES-D items were: “I felt that I was as good as other people”, “I felt hopeful about the future”, “I was happy,” and “I enjoyed life”. Scoring was reversed for positive items when CES-D scores were calculated. CES-D scores ranged from 0 to 60, with higher scores used to indicate more severe depressive symptoms. A cut-off score of 16 is now frequently used to identify potential clinical depression (15). They were given the original CES-D scale and followed by the Malay translated version.

Malay version of the Hospital Anxiety and Depression Scale (HADS)
The Malay version of the Hospital Anxiety and Depression Scale (HADS) was used and this scale was a self-administered questionnaire that screened for anxiety (7 items) and depressive (7 items) symptoms. It demonstrated good reliability. The anxiety (HADS-A) and depression (HADS-D) subscales are scored from 0 to 3 (four-point likert scales), giving maximum scores of 21 for anxiety and depression respectively. HADS has a good reliability and has been validated among the Malaysian population. “Caseness” is considered when the total score of each subscale is above 7 (25, 26).

Ethical Approval
The ethical approval was obtained from the Medical Ethics Committee at the University Malaya Medical Centre (MEC, UMMC) prior to the commencement of the study.

Statistical analyses
The results were analyzed using Statistical Package for Social Sciences (SPSS) version 20. The descriptive statistics were used to examine the baseline characteristic data such as mean age, gender distribution, religion, ethnicity, and duration of internship postings were assessed. The internal consistency of the MCES-D scale was assessed using the Cronbach’s α coefficient. The test-retest reliability was examined by using intra-class correlation. Factor extraction model used was principal axis factoring with oblique rotation method because no previous study has examined factorial construct of the scale as well as to understand the latent (unobserved) variables (27). The number of factors or constructs to obtain was decided using Kaiser’s criteria (i.e. the Bartlett’s test of sphericity must be significant and large, and the Kaiser-Meyer-Olkin (KMO) measure of Sampling Adequacy must be more than 0.6 to be factorizable). A new factor or component is obtained if: (a) eigenvalues are greater than 1, (b) minimum factor loadings of 0.30, and (c) meaningful interpretation of factors that share some conceptual meaning (28). The internal consistency of each factor was confirmed by calculating Cronbach’s α. Concurrent validity was examined between MCES-D, CES-D and HADS (Malay) using Spearman’s correlation.
3. RESULTS

From a total of 117 interns, there were almost equal distribution of gender, Chinese and Malay ethnicity and whether they received their undergraduate training in local universities or abroad. 52.2 % were female, 42.7% were Malays and Chinese, with the mean age was slightly higher in female (27.02 ±1.50 years). Of all the interns 49.6% received their medical degree from local universities in Malaysia and 24 % were currently doing either Pediatrics or Orthopedics posting. The sociodemographic profiles of the interns are shown in Table 1.

The alpha coefficient of the Malay version CES-D scale was good (Cronbach’s α = 0.778) which was well within the acceptable range of 0.70–0.80 (28). Test-retest reliability (Intraclass Correlation Coefficient) was 0.788 (95% CI: 0.724, 0.843) and this significant correlation supported the temporal stability of the MCES-D scale over an average time of two weeks.

All initial communalities were > 0.30 except for items 13 (“I talked less than usual.”), and 2 (“I did not feel like eating; my appetite was poor”). All 20 items had factor loading above 0.35 and therefore contributed to the factor structure. The principal axis factoring gave favorable values of the Kaiser–Meyer–Olkin (0.856) and a significant value ($p < 0.001$) of Bartlett’s Test of Sphericity, therefore the data were suitable for further factor analysis.

A four-factor structure was found that explained 48.73 % of the total variance. Factor 1 was labeled “Depressive Affect” and all eleven items were related to negative affect and cognitive plus anxiety symptoms. Factor 2 was labeled “Positive Affect” consisted of four items related to feeling happy with self, people around them and future. Factor 3 labeled “Interpersonal Problems” (three items) which described problems related to people around them and how they felt about it. The last two items loaded under Factor 4, labeled “Somatic Complaints” and these two items described poor concentration and lethargy. Item descriptions, factor loadings, communality estimates, and internal consistency of each factor are presented in Table 2.

Table 3 showed the correlation between the total and four factor scores of Malay version of CES-D (MCES-D), the HADS (Malay) (Total and subscale for Depression and Anxiety) and the original English Center for Epidemiologic Studies - Depression (CES-D) scale. Parallel reliability of MCES-D and CES-D scales were good as shown by Spearman’s correlation of 0.736 ($p < 0.01$). All factor scores were significantly correlated with each other except for Factor 3 (Interpersonal Problems) and Factor 4 (Somatic Complaints). The total and all factor scores of MCES-D scale were significantly correlated with total, depression and anxiety sub-scores of HADS (Malay) score and CES-D scale. Factor 2 (Positive Affect) was significantly and negatively correlated with total and anxiety sub-scores of HADS (Malay) and CES-D scale. As expected, moderate and significant correlations among the measures indicated that more depressive symptomatology was associated with more severe anxiety.

The result showed that 57.3 % of the junior doctors scored 16 and above with 34.2% were female and 23.1% were male. Mean MCES-D scores among those graduated from local universities were significantly lower than those graduated from abroad ($F(1, 117) = 5.929, p < 0.05$). As for the individual factor scores of MCES-D, locally graduated junior doctors reported lower mean factor score on Depressive Affect ($F(1, 117) = 6.305, p < 0.05$) compared to overseas graduated (Figure 1).

4. DISCUSSION

In this study, the self-report CES-D scale was explored for its internal reliability and factorial validity following “forward-backward” translation to Malay (MCES-D). In terms of psychometric properties of the MCES-D scale, we discovered a satisfactory internal reliability and temporal stability of the MCES-D scale among the junior doctors working in one of the teaching hospitals in Malaysia. However the alpha coefficient and intraclass correlation were slightly lower than previous studies conducted in other Asian populations (29-31) probably due to smaller sample size of 117. Tests of concurrent validity further confirmed the significant correlations with the Hospital Anxiety Depression Scale.

According to Conway and Huffcutt (2003), study using Exploratory Factor Analysis (EFA) would generate a good quality research on construct validity when a common factor model (e.g principal axis factoring), multiple number-of-factors criteria, and oblique rotations were used. Using these criteria in our study, our results of EFA supported the original four-factor structure of the CES-D scale (Radloff, 1977). In a recent meta-analysis, Shafer (2006) found that the original four-factor structure identified by Radloff (1977) has generally been supported across studies and these four factors were Depressed Affect, Positive Affect, Somatic Symptoms, and Interpersonal Problems. However there were deviations regarding which items loaded on each factor as in this study. Items 5 and 7 (“I had trouble keeping my mind on what I was doing”, “I felt that everything I did was an effort”) maintained in the Somatic Symptoms like the original CES-D but item 20 (“I could not get going”) loaded in the Interpersonal Problem and the other four items (1, 2, 11 and 13) loaded in Depressed Affect.

Few studies found that some items in the Depressed Affect and Somatic Complaints loaded together. Study among the Puerto Rican Americans showed a four-factor structure in which negative affect and somatic symptoms loaded on one factor, which was similar to another study among Latinos suggesting an overlapping of depressive and somatic symptoms which made the distinction between the two difficult. The lack of distinction between these factors also supports previous findings among other Asian-American groups (30). The different responses to the CES-D items could be explained by the cultural and ethnic differences in the expression of symptoms related to depression and translation issues as potential contributors to the disparity (32).

Using the traditional cut-off of 16 (15), this study found that 57.3% of the junior doctors had depressive symptoms, which is comparable to the rate of 54.2% reported in previous study among middle-aged women in Peninsular Malaysia (23). MANOVA also showed that among the junior doctors, female doctors graduated from...
universities abroad had higher mean score on Depressive Affect. This study also found that 16.2% of the interns rated their job satisfaction as “poor” and 12.8% were overseas graduated. According to Bovier and Perneger (2003), workload and time available for family, friends or leisure were among the predictors of dissatisfaction among the physicians and therefore it is important to assess potential predictors of depression among junior doctors in the future studies.

This study is not without limitations. Although a sample of 177 subjects is sufficient based on the concept of five samples per item in CES-D (24), the sample is considered small and includes only junior doctors in teaching hospital in urban area of Kuala Lumpur, Malaysia; therefore, is not representative of the general population. MacCallum et al. (1999) concluded that in order to produce undistorted results often samples need to be quite large (e.g., 400 or greater). This study was conducted in one of the few teaching hospitals in Malaysia and therefore this analyses should be replicated with other junior doctors in other teaching hospitals as well as the government hospitals. However despite these shortcomings, the respondents were represented almost equally across gender, main ethnic in Malaysia (Malay and Chinese) and between local and overseas graduated junior doctors. When studying depression in Malaysian adults, the MCES-D scale is useful for screening out non-depressed individuals and should be followed by a diagnostic tool in subjects with scores above the cut-off in order to identify those with clinical depression.

In conclusion, our results demonstrated a satisfactory internal reliability and factorial validity of the four-factor solution of Malay version CES-D scale. The cultural and ethnic differences in the expression of symptoms related to depression and translation issues could be the potential contributors to the difference in the items loading as compared to the original CES-D scale and further studies on MCES-D scale is recommended to observe for cultural bias among the different ethnic groups in Malaysian population.

ACKNOWLEDGEMENT

This study was supported by an institutional research grant from the University of Malaya Research Grant (UMRP012/2012A). We thank all of the house officers involved in this study. All the authors contributed equally to the study.

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