REVIEW ARTICLE

A Systematic Review on The Validated Measures Used to Assess Anxiety in Malaysia

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ABSTRACT

The current study aims to investigate the validated measures used to assess anxiety in Malaysia through a systematic review. The PsycINFO and MEDLINE databases, and 28 local journals were used to search for published papers in this particular area. Twenty articles met the inclusion criteria and reviewed. The results showed that majority of the studies have validated self-report inventories, rather than structured clinical interviews. The preferred measures validated were Depression Anxiety and Stress Scale, Hospital Anxiety and Depression Scale, and General Health Questionnaire-12 item. The psychometric properties of the validated measures were also reported in this review. In general, the measures have a wide range of reliability, validity, and factor structures. However, not all of the studies adhere to the standard procedures for adapting Western-based measure. The limitations of the studies under review were also being highlighted.

Keywords: Validation, measure, anxiety, Malaysia, systematic review

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INTRODUCTION

The Diagnostic and Statistical Manual of Mental Disorders, Fifth edition (DSM-5) by American Psychiatric Association defined anxiety disorders (AD) as any disorders with features of excessive fear, anxiety, and related behavioural disturbances (1). They are several diagnoses under the umbrella of AD, including generalised anxiety disorder (GAD), social anxiety disorder, agoraphobia and panic disorder. AD has been labelled as the most common mental illness in the world (2) and the World Health Organizations (WHO) considered AD as one of a core disorder that should be assessed in the World Mental Health (WMH) surveys (3). The meta-analytic review of 202 studies conducted in 94 countries globally managed to discover that the lifetime prevalence of AD are in the range between 12.9% and 16.6% (2,3). Steel and colleagues also reported that AD has the highest annual prevalence, affecting 1 in 15 persons, followed by mood disorders and substance disorders (2). Moreover, more than 19 million American adults are diagnosed with AD in a given year (4) making AD the single largest mental health problem in the country (5).

In Malaysia, anxiety has emerged as one of the most commonly reported mental health problems. Based on the Fourth National Health and Morbidity Survey (NHMS–IV), the prevalence of GAD among Malaysians was 1.7% and this is comparable to international figures of 1.9% - 2.5% (6). The survey was conducted by using a validated tool, MINI International Neuropsychiatric Interview (MINI) to specifically assess GAD, instead of using screening tools applied in the three previous versions of NHMS for psychiatric morbidity to assess distresses, such as depression, anxiety, social impairment, and hypochondriasis (7).

Similar to the results reported globally (8, 9) it was highlighted that the number of female GAD patients in Malaysia is almost double that of males, with represented by 2.2% for female and 1.3% males. In term of ethnicities, GAD is the highest amongst Indians (4.5%), followed by other Bumiputeras including indigenous people and natives of Sarawak and Sabah (2.0%), Malays (1.7%), and Chinese (1.0%). However, other types of AD, such as panic disorder, agoraphobia, social anxiety disorder, and specific phobia have remained under-detected among Malaysians despite the available information on GAD. This result may reflect the fact that the issues of AD in Malaysia have not received the attention they deserved, thus, causing AD in Malaysia to remain

fragmented and unclear.

Looking into the Malaysian context, the problems of undiagnosed and under-treated AD patients are rooted in the poor assessments on this disorder. The lack of practise in the validating Western-based psychological assessments added to the shortage of culturally appropriate assessment tools in many developing countries (10), including Malaysia. Therefore, it is important to understand the range of instruments available locally in order, to see which of these instruments have adequate psychometric properties for the Malaysian population, furthermore, this review could identify the needs for validating newly developed Western-based psychological tools that may have better psychometric properties. This is because psychometrics involve evaluating the reliability (consistency) and validity (accuracy) of a measurement instrument. Establishing an instrument's reliability and validity will ensure that an instrument can consistently measure what it is suppose to measure at any point of time and context.

There are many measures available to specifically assess the construct of AD. These measures are in various forms, such as self-report inventory and interview form. Self-report inventory is more desirable as it may reduce the impression management made by the test takers. In addition, it is more economical because it can be administered in a group of test takers and can be completed within minutes. An example of anxiety related self-report measure is Becks Anxiety Inventory (BAI) that contains only 21 items and can be administered within 5 to 10 minutes, simply scored, and interpreted. Meanwhile, assessment in forms of interviews may not be cost and time effective compared to self-report inventory, it is useful as it provides an in-depth understanding of the construct measured since it allows probing to get more detailed responses and elicit large amount of information from the respondents. MINI International Neuropsychiatric Interview (MINI) is an example of the diagnostic tool that can assess several disorders including AD, via interviews.

With this in mind, the current study aims to investigate the available validated psychological tools to measure AD in Malaysia through conducting a systematic review. This review may give the overview of how AD is being assessed in Malaysia.

METHODS

Relevant research papers were obtained by literature searches on electronic databases, namely, PsycINFO and MEDLINE databases. The search terms used were [(anxiety) OR (panic) OR (phobia) OR (distress) AND [(assess*) OR (measure*)] AND (Malaysia), and the combination of these terms as identifiers. In addition, 28 local journals related to medicine, health sciences, psychology, and social sciences in Malaysia were manually searched and scrutinized for additional published papers in this area. Some of the journals are Medical Journal of Malaysia, Malaysian Journal of Medical Sciences, Malaysian Journal of Medicine and Health Sciences, International Journal of Public Health Research, Malaysian Journal of Psychiatry, and Jurnal Psikologi Malaysia.

The following are the inclusion criteria for the current review: (a) the study provides information on the use of anxiety measures, (b) anxiety measures used have been at least validated in terms of its semantic or conceptual or contextual features, (c) the study assessed anxiety-related constructs in the participants, (d) the study was conducted for Malaysian population, (e) the study was conducted in Malaysia, and (f) the study was published in a peer-reviewed journal. A study will be excluded if: (a) it was not written in English or Malay language, and (b) it was published earlier than 1980.

Data extraction
One reviewer extracted the characteristics of the study and input them into the data extraction forms specifically designed for the review. Any discrepancies were, then, evaluated by a second reviewer and conclusions were finalized via discussion.

Encoding results
The chosen studies were sorted based on the order of publication year. The details of the studies were extracted into five features: (a) author/s and year of publication, (b) participants characteristics and settings of study, (c) measures used in the study, (d) procedures involve in validation and (e) three main psychometric properties which are factor structure, reliability and validity.

RESULTS

The search strategy identified 349 unique articles and after identification, selection, and screening of articles based on PRISMA flow chart (refer Figure 1), only 20 studies were included for systematic review.
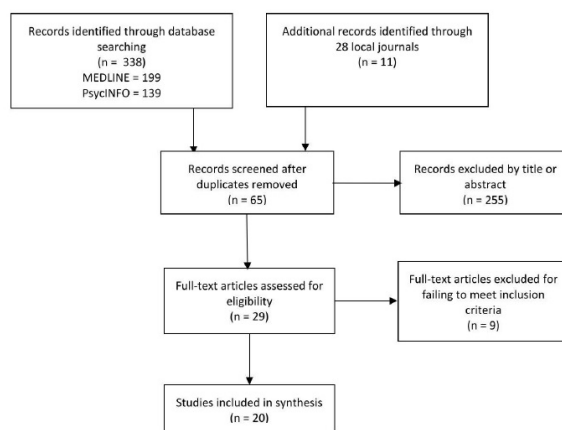
Figure 1: Study selection flowchart

Table I lists the validation studies on measures used to assess anxiety reported between 2002 and 2015.

Table I: Characteristics of included studies

Study	Participants	N	Age M	Gender F	Ethnicity	Measures	Procedure	Factor Structure (CV)	Reliability	Validity
Study 1 (12)	college students	278	18	64%	M: 1.4% C: 83.1% I: 9% O: 0.4%	GHQ-12	used English & Chinese translated version	CFA (1st order) MGCFA (2 languages)	NA	NA
Study 2 (13)	patients attended a pre-operative assessment in the anaesthetic clinic	200	45	74%	NA	P: APAIS S: STAI-S	several forward & back-ward translation into Malay language, pilot study, harmonization	EFA	α: .90-.93	Concurrent: r .59***, Sensitivity, Specificity, Predictive values
Study 3 (14)	adolescents/ students from schools	1765 (n=388 from M'sia)	15 (for M'sia)	52.1% (for M'sia)	NA	DASS-21	back-translation into Malay language	MGCFA (4 nations)	α: .72-.89	NA
Study 4 (15)	coronary artery disease patients	189	55	31.2%	M: 66.7% C: 14.3% I: 18%	HADS	used Malay version, but NR on which version/ transla-tion procedures involved	EFA, CFA (1st order), Discriminant validity of construct	NA	NA
Study 5 (16)	university students	306	22	85%	M: 65.7% C: 30.1% I: 2.3% O: 2%	GHQ-12	used Malay version from NHMS II study	EFA	α: .84† ITS	NA
Study 6 (17)	undergraduate medical degree applicants	706	19	60.9%	M: 47.2% C: 39.9% I: 9.2% O: 3.7%	DASS-21	NR on which version used/ translation procedures involved	CFA (1st order)	α: .72-.76	NA
Study 7 (18)	general community	2630 (n=1013 from M'sia)	33 (for M'sia)	78% (for M'sia)	NA	P: DASS-21 S: BAI, BDI, PANAS, PSQ	back-translation into the Malay language, harmonization with cultural context	EFA CFA (1st order) MGCFA (6 nations)	α: .68-.88	Convergent**, Discriminant***
Study 8 (19)	cancer in- & out-patient	80	50	70%	M: 87.5% O: 12.5%	P: HADS S: MMQoL	used Malay version, but NR on which version/ transla-tion procedures involved	Convergent** & Divergent** validity of construct	α: > .70	Discriminant**
Study 9 (20)	a) Interviewers b) Patients with MDD & GAD, and healthy, non-psy-chiatric volunteers	339 a) n=229 b) n=30 MDD n=20 GAD n=60 healthy, non-psy-chiatric volunteers	NA	NA	NA	MINI Version 6.0 for GAD Version 5.0 for MDD	a) Rigorous translation & independent back-transla-tion procedures involved by psychiatrists, clinical psychologists, and public health officers to ensure contextual, semantic, and conceptual equivalence b) 6 hours of MINI training workshop for the inter-viewers involving lecture, role-playing, and video rating c) Interviewers and experts involved in the video rating were blind towards each other's diagnosis	NA	Inter-rater reliability using Fleiss' kappa statistics (range in from .67 to .85 for 2 sessions)	Face validity es-tablished during translation procedure Predictive Validity -separate anal-ysis conducted on ND, GAD, MDD-LT, MDD-C, -Kappa value range from .88-.97 -Sensitivity range from .89-1 -Specificity range from .93-1 -PPV range from .82-1 -NPV from .98-1
Study 10 (21)	undergraduate medical students (except final year)	411	range 19-24 most fall under 21-22	56.5%	M: 99.5% O: 0.5%	P: DASS-42 S: HADS	2 forward& 2 backward translations into the Malay language by medical & language experts, harmonization with previ-ous translation from Musa et al. (2007)	EFA	α: .87-.95	Concurrent: r .68-.87
Study 11 (22)	husbands of breast cancer patients	67	51	100% male	NR	HADS	purchased & used copyrighted HADS-Malay version	NA	α: .79-.88 TR: ICC .35-.42	Sensitivity to change (ESI)**, Discriminant**
Study 12 (23)	undergraduate students, general community, medi-cal patients, patients with depression	1090	26	75.2%	NA	P: BAI S: FQ, DASS-21, ASI, CCQ	back-translation into Malay language, harmonization with cultural context	EFA	α: .91†	Concurrent: r .16**- .68**
Study 13 (24)	couples attended infertility clinic at a public university	248	32	50%	M: 93.5% C: 2.8% I: 2.4% O: 1.2%	P: DASS-21 S: HADS	used Malay version, but NR on which version/ transla-tion procedures involved	NA	NA	Concurrent: r .49- .67

Table I: Characteristics of included studies

Study	Participants	N	Age M	Gender F	Ethnicity	Measures	Procedure	Factor Structure (CV)	Reliability	Validity
Study 14 (25)	diabetic patients attended retail pharmacies	153	range 20-60 most fall under 51-60	51%	M: 78.4% C: 10.55 I: 11.1%	DASS-21	used validated Malay DASS-21 from Musa et al. (2007)	EFA	α: .74-.79	Concurrent: r .41-.65
Study 15 (26)	premature ejaculations (PE) patients	267	range 20->60 most in 40-49 for PE, 30-39 in control	100% male	M: 43.1% C: 38.2% I: 18% O: .8%	HADS	used English version	NA	α: > .80 TR: ICC > .80	Sensitivity to change***, Discriminant (ESI)***
Study 16 (27)	attendees/ general medical patients in gov. clinics	263	range 18-55 most fall under 30-39	62%	M: 77.6% C: 11.4% I: 10.3% O: 0.8%	DASS-21	2 forward& 2 backward translations into Malay language by medical & language experts, harmonization, pre-testing	CFA	α: .74-.84	Concurrent: r .54-.68
Study 17 (28)	automotive assembly workers	184	40	11.4%	NA	DASS-14	2 forward & 1 backward translation into the Malay language by content & language experts, harmonization, pilot test	EFA	α: .88-.91 ITC: r .31-.74	NA
Study 18 (29)	psychiatric in- & out-patients, their relatives & visitors	59	35	71%	M: 51% C: 29% I: 20%	P: CIS-R S: SCID	back-translation into Malay language, harmonization with cultural context	NA	NA	Specificity, Sensitivity, PPV, NPV
Study 19 (30)	urological patients: LUTS, TURP, & control group	237	LUTS: 64 TURP: 70 Control: 50	NR	C: 66.9% I: 31.2% O: 2%	STAI	NR on which version used/ translation procedures involved	NA	α: .86† TR: ICC .86† r .76†	Sensitivity to change (ESI)****, Specificity, Discriminant***
Study 20 (31)	urological patients: TURP & control	40	TURP: 71 Control: 50	NR	NA	GHQ-12	back-translation into Malay language	NA	α: .65† TR: ICC .67†	Sensitivity to change (ESI)**, Sensitivity**, Specificity, Discriminant

Notes: NA = Not available, NR = Not reported. **Participants**: MDD = Major Depressive Disorder, GAD = Generalized Anxiety Disorder, LUTS = lower urinary tract symptoms; TURP = patients admitted for transurethral resection of the prostate; . N = M'sia = Malaysia; gov. = government. **Age M**: mean age in year. **Gender F** = reported female participants in %. **Measure**: P = Primary measure used for validation; S = Secondary measured used in the study; HADS = Hospital Anxiety and Depression Scale; STAI = State-Trait Anxiety Inventory; DASS-21 = Depression, Anxiety, and Stress Scale-21 item; GHQ-12 = General Health Questionnaire-12 item; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; PANAS = The Positive and Negative Affect Schedule; PSQ = Personal Strain Questionnaire; NHMS II = National Health Morbidity Survey II; FQ = Fear Questionnaire; ASI = Anxiety Sensitivity Index; CCQ = Catastrophic Cognitions Questionnaire; CIS-R = Clinical Interview Schedule-Revised; SCID = Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders; MMQoL = Malay McGill Quality of Life Questionnaire; MINI = MINI International Neuropsychiatric Interview; APAIS = Amsterdam Preoperative Anxiety and Information Scale; STAI-S = STAI-State. **Factor Structure (CV)**: CV = construct validity; EFA = exploratory factor structure; CFA = confirmatory factor structure; MGCFA = multi-group CFA. **Reliability**: α = Cronbach's alpha; TR = test-retest reliability; ICC = Intraclass Correlation Coefficient; † = value for total scale; ITS = item-total statistics; ITC = item-total correlations. **Validity :** ESI = effect size index; ** = p < .01; *** = p < .001; **** = p < .0001; ND = No Disorders; GAD = Generalized Anxiety Disorders; MDD-LT = Major Depressive Disorder-Lifetime; MDD-C = Major Depressive Disorder-Current; PPV = Positive Predictive Value; NPV = Negative Predictive Value.

Type of participants involved in the studies

A total of 6,518 participants were included in the review, with sample size ranging from 40 to 1090. The validation studies involved subjects from different background such as students, general community, general medical patients, and psychiatric patients. Students participated in the studies were from secondary schools, college, and university. General communities consist of participants from automotive assembly workers and relatives/visitors of patients in a hospital. However, two studies (Study 7 and 12) did not specify the type of general communities under study. Various types of general medical patients were involved in the studies such as patients with coronary artery disease, cancer, infertility, diabetic, premature ejaculations, urological patients, and other patients with general medical issues. Study 12 and 18 were the only studies that involved psychiatric patients in their validation studies. Study 12 utilized patients with depression and Study 18 utilized various in- and out-patients of the psychiatric department without specifically mentioned if patients with anxiety disorders are part of the sample. Therefore, it is important to highlight that previous validation studies related to measures used to assess anxiety in Malaysia were not conducted specifically on psychiatric patients with AD.

The mean age of participants involved in the studies ranged between 15 to 71 years old. Majority of the participants in the studies obtained are female except for few studies that only involved male as participants (Study 11, 15). Nonetheless, Study 19 and 20 did not report information on gender.

Meanwhile, in terms of ethnicity, Malays (n = 1,844), followed by Chinese (n = 963), Indian (n = 315), and others (n = 98), participated in the validation studies. However, the above information is not absolute since there were eight studies (Study 2, 3, 7, 9 11, 12, 17, and 20) which did not report the ethnicities information of the participants. Moreover, two studies (Study 8 and 10) combined the number of non-Malay participants involved in their validation studies.

Measures used to assess anxiety in Malaysia

Eighteen out of 20 studies used and validated self-report measures and only two studies (Study 9 and Study 18) used interview-type measure. Nine out of 18 studies (Study 3, 6, 7, 10, 12, 13, 14, 16, and 17) used and

validated Depression Anxiety and Stress Scale (DASS). From these nine studies, Study 17 and Study 10 used and validated DASS-14 item and DASS-42 item, respectively. While, the other seven studies used and validated DASS-21 item. Apart from DASS, Hospital Anxiety and Depression Scale (HADS) and General Health Questionnaire-12 item (GHQ-12) were used and validated in four studies (Study 4, 8, 11, and 15) and three studies (Study 1, 5, and 20), respectively. Moreover, Beck Anxiety Inventory (BAI) and State-Trait Anxiety Inventory (STAI) were used and validated in Study 2 and 19, respectively. One study used and validated preoperative anxiety measure, Amsterdam Preoperative Anxiety and Information Scale (APAIS).

Even though DASS is the most prevalent measure used and validated in the Malaysian context, BAI is considered as the most widely used and well-researched measures of anxiety used to assess the severity of anxious symptoms within the global adult psychiatric population (31).

Procedures of adaptations used to validate the anxiety measure

The process of backward translations is applied to ensure semantic equivalence of the target culture, harmonisations of the translated items with the common language used and the reflection of cultural context, and testing the comprehensions of the translated items to lay subject (32-34)

Ten out of 20 studies (Study 2, 3, 7, 9, 10, 12, 16, 17, 18, and 20) used backward translations as part of their adaptation procedure to validate the anxiety measures in their study. Next, eight studies (except Study 3 and Study 20) continued the backward translation procedure with the process of harmonization with Malaysian cultural context. In addition, three out of the eight studies (Study 2, 16, and 17) conducted a pre-testing or pilot test to test the comprehensions of the translated items to some samples of the subjects. All of the ten studies translated the original scale to the Malay language.

Apart from the above studies, six more studies (Study 4, 5, 8, 11, 13, and 14) used Malay translated version of the scale. However, only Study 5, 11, and 14 reported the source of translated version.

Statistical analysis used to validate anxiety measure

The use of factor analysis may test the conceptual and contextual equivalence of the translated scales in the Malaysian context. Apart from testing the concepts or constructs, other psychometric properties of the translated scale could be assessed using other types of statistical analysis such as Cronbach's alpha, correlation, t-test and others. The use of these tests will inform the user on the credibility of the translated scales in terms of its reliability (e.g., internal consistency and stability) and validity (e.g., concurrent, convergent, divergent, discriminant, sensitivity and specificity, and predictive/

sensitivity to change).

Factor structure of the adapted anxiety measure

Twelve out of 20 studies conducted factor analysis in order to examine the factor structure of anxiety measure in the Malaysia context. From these 12 studies, eight studies (Study 2, 4, 5, 7, 10, 12, 14, and 17) conducted exploratory factor analysis (EFA) to explore the factor structure of the anxiety measure in the current context. However, only Study 4 and 7 confirmed the factor structure found using confirmatory factor analysis (CFA). Three studies (Study 1, 6, and 16) conducted CFA without a prior test of EFA. Two from these studies (Study 1 and 7) further draw understanding about the invariance of the factor structure for different types of the sample by using multi-group factor analysis (MGFA). Only Study 3 directly conducted MGFA without the test of EFA and CFA prior to it.

Reliability of the adapted anxiety measure

The majority of the studies provided the information of the internal consistency. Three studies (Study 5, 12, and 20) provided the internal consistency of the total scale and it ranges between α .65 and α .91. Twelve studies provided the internal consistency for each factor in the adapted scale and it ranges between α .68 and α .95.

Apart from the internal consistency, four studies (Study 11, 15, 19, and 20) reported the stability of the adapted scale using test-retest reliability and it ranges between r .35 and r .86. The reported results for both internal consistency and stability of the adapted scales were significant.

Validity of the adapted anxiety measure

Six studies (Study 2, 10, 12, 13, 14, and 16) communicated the concurrent validity of the adapted scales with the relevant criterion scales and the significant correlations range between r .16 and r .87. Meanwhile, only Study 7 testified the convergent validity of the adapted scale with the relevant criterion scales and the significant correlations range between r .50 and r .60. However, none of the studies reported the divergent validity of the adapted scale.

DISCUSSION

The current study aims to systematically review the validated measures used to assess AD in Malaysia. The systematic review found that a majority of the studies (n=18) validated self-report measures rather than an interview-form measures. Self-report measures are more time-efficient, easy to be administered, and more cost effective, hence, clinicians and researcher tend to favour to them. Based on the self-report measure for anxiety that has been validated in Malaysia, a majority of the studies (n=9) have chosen to validate the DASS. There is a wide range of research on DASS and it has been studied in various languages and cultures. Nonetheless,

DASS, specifically DASS-21 has been shown to have relatively culture-free items as the items do not mention any aspects related to culture or religion. A study also reported that the psychometric properties of DASS are sound enough to be applied to both clinical and non-clinical populations (35).

In addition, the popularity of DASS is due to the fact that it is in the public domain (i.e., free access) to the researchers and clinicians. Furthermore, DASS has the capability to gauge three different constructs, depression, anxiety and stress at the same time (36). Hence, it is to no surprise that researcher and clinicians in Malaysia are more inclined towards the study and the usage of DASS.

Several limitations of the studies reviewed are mentioned below. Knowing these limitations may allow future researchers to improve the study design on psychometric properties of the measures used to assess AD, and hence will improve the effectiveness in measuring AD.

Limitations found in past literature
Samples of the studies
Based on the review, we have found that none of the studies have involved or specifically mentioned patients with anxiety disorders as part of their sample, instead, the sample is simply described as psychiatric patients. Furthermore, very limited studies have used different types of the sample in their validation which has limit the use of the validated scale in a different type of population. Based on this, there is a dire need for future research to incorporate different types of samples including patients with anxiety disorders for validation of anxiety measures. This will increase the robustness of the validated scale.

Measures used in the studies
The measures used in the validation studies are mostly comprised of screening tools. Only one study the validated gold-standard diagnostic measure (i.e., Clinical Interview Schedule-Revised) and one study validated the well most researched and used symptoms measures of anxiety (i.e., BAI) in the Malaysian context. Moreover, none of the studies have validated the cognitive measures of anxiety. Future studies are highly encouraged to adapt and validate the diagnostic tools in measuring AD in order to assist clinicians to comprehensively assess patients with AD in Malaysia. Since AD is a psychological disorder caused by individual's cognitive distortions (37), cognitive measures are needed to be adapted and validated to assist clinicians and researchers to measure treatment outcomes.

Procedures of adaptations used
Only three studies used the adaptation procedure suggested by Behling and Law (32), and Brislin (33) to ensure the semantic equivalence of the original scale with the adapted scale. Therefore, prior to its first use, it is crucial for future studies to ensure that the methodology for the adaptation of anxiety scales adheres to standard procedure of adapting Western-based measure into other culture.

Statistical analysis used to validate the adapted anxiety measure
The conceptual and contextual equivalence of the adapted scale could be tested by using statistical factor analysis. However, based on the review, less than half of the studies have conducted factor analysis to understand the factor structure of the adapted scale in the Malaysian population. Furthermore, these studies have mostly used EFA to explore the factor structure of the scale but very limited studies confirmed it. Future research on validation studies of the anxiety measure in Malaysia should consider focusing on this area.

Apart from the above, there are very limited studies that reported various types of reliability and validity tests for the adapted scales. For example, only a handful of studies have tested these tests for their stability and no studies have reported the divergent validity of the adapted anxiety scale with other relevant criterion measures. Therefore, future studies are encouraged to conduct various types of statistical analysis in order to provide detailed information on the psychometric properties of the adapted anxiety scale. This suggestion is deemed as important in order to assist test users in making decisions on the usability of the validated anxiety scales. It will also offer an insight on whether locally developed tests are needed, especially if psychometric properties of adapted anxiety scale were found to be invalid or unreliable.

CONCLUSION

Even though there are some limitations in the methodology and reporting of results, it can be concluded that efforts have been taken to adapt and validate the anxiety measures for the Malaysian population prior to its use. The results of the systematic review indicates that validated self-report measures are popular tools to assess anxiety in Malaysia. These measures include Depression Anxiety Stress Scale, Hospital Anxiety and Depression Scale, and General Health Questionnaire-12 item. Future studies are encouraged to focus on the adapting and validating diagnostic tools and cognitive measures in assessing anxiety by using robust procedures of adaptations and statistical analysis recommended. These will provide more comprehensive view on anxiety and create more confidence on the use of scales in understanding and diagnosing anxiety disorder among the Malaysian population.

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REFERENCES

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-5). American Psychiatric Pub; 2013 May 22.
2. Steel Z, Marnane C, Iranpour C, Chey T, Jackson JW, Patel V, et al. The global prevalence of common mental disorders: a systematic review and meta-analysis 1980–2013. International journal of epidemiology. 2014;43(2):476-93.
3. Kessler RC, Aguilar-Gaxiola S, Alonso J, Chatterji S, Lee S, bstьn TB. The WHO world mental health (WMH) surveys. Psychiatrie (Stuttgart, Germany). 2009;6(1):5 [cited June 2017].
4. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. Archives of general psychiatry. 2005;62(6):593-602.
5. National Institute of Mental Health. Facts about anxiety disorders 2005 [cited June 2017]. Available from: https://www.nimh.nih.gov/health/statistics/any-anxiety-disorder.shtml
6. Institute for Public Health. The fourth National Health and Morbidity Survey 2011 (NHMS IV 2011). Vol. II: Non-communicable diseases. Kuala Lumpur: Ministry of Health Malaysia 2015 [cited June 2017]. Available from: http://www.iku.gov.my/images/IKU/Document/REPORT/nhmsreport2015vol2.pdf
7. Institute for Public Health. The third National Health Morbidity Survey 2006 (NHMS III). General Findings. Kuala Lumpur: Ministry of Health Malaysia 2008 [cited:June 2017]. Available from: http://www.iku.gov.my/images/IKU/Document/REPORT/2006/GeneralFindings.pdf
8. Boyd A, Van de Velde S, Vilagut G, De Graaf R, Florescu S, Alonso J. Gender differences in mental disorders and suicidality in Europe: results from a large cross-sectional population-based study. Journal of affective disorders. 2015;173:245-54.
9. Seedat S, Scott KM, Angermeyer MC, Berglund P, Bromet EJ, Brugha TS, et al. Cross-national associations between gender and mental disorders in the World Health Organization World Mental Health Surveys. Archives of general psychiatry. 2009; 66(7):785-95.
10. Abubakar A, Fischer R. The factor structure of the 12-item General Health Questionnaire in a literate Kenyan population. Stress and Health. 2012;28(3):248-54.
11. Chin EG, Drescher CF, Trent LR, Darden M, Seak WC, Johnson LR. Searching for a screener: Examination of the factor structure of the General Health Questionnaire in Malaysia. International Perspectives in Psychology: Research, Practice, Consultation. 2015;4(2):111.
12. Lai LL, Loh PS. Validation of the Malay version of the Amsterdam Preoperative Anxiety and Information Scale (APAIS). The Medical journal of Malaysia. 2015;70(4):243-8.
13. Mellor D, Vinet EV, Xu X, Mamat NH, Richardson B, Romбn F. Factorial invariance of the DASS-21 among adolescents in four countries. European Journal of Psychological Assessment. 2015.
14. Kaur S, Zainal NZ, Low WY, Ramasamy R, Sidhu JS. Factor Structure of Hospital Anxiety and Depression Scale in Malaysian patients with coronary artery disease. Asia Pacific Journal of Public Health. 2015;27(4):450-60.
15. Ibrahim N, Osman ZJ, Jan KO, Ismail SI, Kar PC, Mukhtar F, et al. Reliability and factor structure of the general health questionnaire-12 among university students. Malaysian Journal of Medicine and Health Sciences. 2014;10(2):53-60.
16. Yusoff MS. Psychometric properties of the depression anxiety stress scale in a sample of medical degree applicants. Int Med J. 2013;20(3):295-300.
17. Oei TP, Sawang S, Goh YW, Mukhtar F. Using the depression anxiety stress scale 21 (DASS-21) across cultures. International Journal of Psychology. 2013;48(6):1018-29.
18. Lua PL, Wong SY. The reliability of the malay versions of hospital anxiety depression scale (HADS) and McGill quality of life questionnaire (MQOL) among a Group of Patients with Cancer in Malaysia. Malaysian Journal of Psychiatry. 2012;21(1).
19. Mukhtar F, Bakar AK, Junus MM, Awaludin A, Aziz† SA, Midin M, et al. A preliminary study on the specificity and sensitivity values and inter-rater reliability of mini international neuropsychiatric interview (MINI) in Malaysia. Advisory Board, Associate Editors and Brain Fag Syndrome (BFS), Sleep Editorial Board Members iii-v And Beliefs About Sleep Among Secondary School Students In Information for Authors vi Nigeria 165-175. 2012:157.
20. Ramli M, Rosnani S, AR AF. Psychometric profile of malaysian version of the Depressive, Anxiety and Stress Scale 42-item (DASS-42). Malaysian Journal of Psychiatry. 2012;21(1).
21. Yusoff N, Low WY, Yip CH. Psychometric properties of the Malay Version of the hospital anxiety and depression scale: a study of husbands of breast cancer patients in Kuala Lumpur, Malaysia. Asian Pac J Cancer Prev. 2011 Jan 1;12(4):915-7.
22. Mukhtar F, Zulkefly NS. The Beck Anxiety Inventory for Malays (BAI-Malay): A preliminary study on psychometric properties. Msian J Med Health Sci. 2011;7(1):73-9.
23. Musa R, Ramli R, Abdullah K, Sarkarsi R. Concurrent validity of the depression and anxiety components in the Bahasa Malaysia version of the Depression Anxiety and Stress Scales (DASS). ASEAN Journal

of Psychiatry. 2011;12(1):XX-.

24. Ramli M, Salmiah MA. Validation and psychometric properties of Bahasa Malaysia version of the Depression Anxiety and Stress Scales (DASS) among diabetic patients. Malaysian Journal of Psychiatry. 2009;18(2).

25. Fatt QK, Atiya AS, Heng NG, Beng CC. Validation of the hospital anxiety and depression scale and the psychological disorder among premature ejaculation subjects. International journal of impotence research. 2007;19(3):321.

26. Musa RA, Fadzil MA, Zain ZA. Translation, validation and psychometric properties of Bahasa Malaysia version of the Depression Anxiety and Stress Scales (DASS). ASEAN Journal of Psychiatry. 2007;8(2):82-9.

27. Edimansyah BA, Rusli BN, Naing L. Reliability and construct validity of the Malay version of the depression anxiety stress scales (DASS) in automotive assembly workers in Malaysia. Malaysian Journal of Public Health Medicine. 2007;7(1):25-30.

28. Subramaniam K, Krishnaswamy S, Jemain AA, Hamid A, Patel V. The clinical interview schedule-revised (CIS-R)–malay version, clinical validation. The Malaysian journal of medical sciences: MJMS. 2006;13(1):58.

29. Quek KF, Low WY, Razack AH, Loh CS, Chua CB. Reliability and validity of the Spielberger State-Trait Anxiety Inventory (STAI) among urological patients: a Malaysian study. The Medical Journal of Malaysia. 2004;59(2):258-67.

30. Loh CS. Reliability and Validity of the Malay Version of the General Health Questionnaire (GHQ-12) Among Urological Patients. Med J Malaysia. 2002;57(2):169.

31. Orsillo SM. Measures for acute stress disorder and posttraumatic stress disorder. InPractitioner's guide to empirically based measures of anxiety 2002 (pp. 255-307). Springer, Boston, MA.

32. Behling O, Law KS. Translating questionnaires and other research instruments: Problems and solutions. Sage; 2000 May 24.

33. Brislin RW. Back-translation for cross-cultural research. Journal of cross-cultural psychology. 1970;1(3):185-216.

34. Presser S, Couper MP, Lessler JT, Martin E, Martin J, Rothgeb JM, Singer E. Methods for testing and evaluating survey questions. Public opinion quarterly. 2004;68(1):109-30.

35. Yusoff MS. Psychometric properties of the depression anxiety stress scale in a sample of medical degree applicants. Int Med J. 2013;20(3):295-300.

36. Crawford JR, Henry JD. The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample. British Journal of Clinical Psychology. 2003;42(2):111-31.

37. Clark DA, Beck AT. Cognitive theory and therapy of anxiety and depression: Convergence with neurobiological findings. Trends in cognitive sciences. 2010;14(9):418-24.