A Validity Study of Malay-translated Version of Perceived Stress Scale

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ABSTRACT: In Malaysia, no local psychometric instrument to perceive stress is available. The aim of this study is to translate the Perceived Stress Scale (PSS) in the national language of Malaysia, and validate the Malay-translated versions of the PSS. The validation process was conducted among female prisoners to enable use of the Malay-translated PSS among prison population, in order to perceive stress and provide recommendation for rehabilitation. A cross-sectional study was designed. Ninety female prisoners were purposively selected as the participants. A back-to-back translation was done followed by confirmatory factor analysis and reliability testing. The Malay-translated instrument was retested among 40 participants after one-week interval. As the Malay-translated version of the instrument was found appropriate for factor analysis through preliminary analysis, the factor structure was found comparable to the original versions. The Cronbach's alpha coefficient was acceptable (α = .64) with high total test-retest reliability (R=.72). The study concluded that the Malay-translated version of the PSS was found to be comparable to the original version and to previous studies, and therefore is valid and reliable to be used in identifying stress among Malaysian prison population.

Keywords: Perceived-Stress scale, female prisoner, validity, reliability.

Introduction

Stress is one of the most assessed life experiences among people worldwide. Stress has been related to many life factors such as health status, the well-being as well as diseases [1-5]. The use of psychometric instrument to measure stress is especially important. Early detection of stress may prevent negative consequences and provide opportunities for treatment and rehabilitation. In Malaysia, published study on stress among prisoners is so far not available since there is no local psychometric instrument to perceive stress. Specific study on stress among prisoners is important to enable effective treatment and rehabilitation in prison. To enable such study, specific instrument to measure stress is needed, and the instrument itself needs to be adequate and reliable to assess the stress accurately.

The Perceived Stress Scale (PSS), designed by Cohen, Kamarck, and Mermelstein (1983), is one of the most used psychometric instruments to measure stress as judged by the respondents themselves. Several versions of PSS are available including a short 4 items scale, 10 items scale and 14 items scale. The 10 and 14 items scales are commonly used in studies. The PSS uses the five-point Likert scale based on the frequency of the stressful event experienced by the respondent (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often). The higher the score of the PSS, the higher the stress perceived by the partcipant. The established reliability of the original PSS is 0.85 [6].

Since PSS was used widely and universally, the original English version of the PSS had been translated into many other languages including Chinese [7], Japanese [8], Spanish-Chilean [9], Hungarian [10], and European Spanish [11,12]. However, no published study based on the Malay-translated versions of the PSS was reported. Since Malay language is the official language in Malaysia, there is an urgent need for a valid and reliable Malay version of PSS.

The current study aims to validate and determine the reliability of the Malay-translated versions of the PSS used among female prisoners. The results of the current study will enable a valid and reliable Malay-translated version of the PSS to be applied for such studies among prison population in Malaysia.

Method

Study design and participants

A cross-sectional study was designed for the current study. The sampling sites were prisons in Peninsular Malaysia having female inmates. Two of the prisons were the sampling frame. Convenient sampling method was employed based on availability of the participants. The participants could communicate, read and write in Malay indepently.

Calculation of the sample size was done separately for factor analysis and reliability testing. The sample size for factor analysis was calculated based on Gorsuch's (1983) suggestion [13]. The total number of items in the instrument is multiplied by 5 and the resulting number gives the required sample for the study [13]. For reliability testing, Cronbach's alpha formula was used to calculate the sample size. The higher value of the two calculations was taken as the final sample size. A 20 percent dropout was included in each estimation. For the current study, the required sample size was 90. For test-retest reliability testing, the calculated sample size was 40.

Translation process

Prior to the validation process, the authors translated the original version of the PSS into Malay. The translation script was read through and checked thoroughly to ensure proper use of word and sentence. This was followed by back-translation where the Malay version was translated back into English by an expert in the field. The expert was ensured that he had no prior knowledge of original English version. Comparison was then made between the English-translated version and the original English version. Finally, a language expert checked through the final Malay version for any grammatical or language error.

Data collection

The data was collected done at prisons situated in the Peninsular Malaysia. The selected participants were informed of the purpose of the current study and all relevant information was communicated. All doubts were clarified and the participants were assured that they could withdraw from the study at any time during the data collection process. Upon their agreement to participate, a respondent information sheet was given and a consent form was signed prior to data collection.

Each participant was given a set of Malay-translated version of the PSS. The average time taken to complete the instrument was three minutes. After completion, it was returned to the researcher. One week later, the same instrument was retested among some selected participants at the same prisons.

Analysis

The data was analysed using SPSS version 19.0. The demographic information was summarized using descriptive statistics. A confirmatory factor analysis was performed to assess the construct validity of the Malay-translated version of the PSS,. The factor structure of the translated instrument was assessed using principal component analysis with varimax rotation, as suggested by previous studies [8]. Prior to the factor analysis, preliminary analysis for factor analysis was examined to evaluate the adequacy of the translated instrument [14]. For the preliminary analysis, the value of the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, individual Measure of Sampling Adequacy (MSA) and the Bartlett's test of sphericity were observed. The acceptable limit of the KMO value is .50 [15], whereas the individual MSA is expected to exceed .50 [16]. Items with individual MSA below .50 were excluded from the analysis since they affect the overall value of the KMO [16]. However, the exclusion depends on the value of KMO. Lastly, the Bartlett's test of sphericity is expected to be significant since it indicates the appropriateness of factor analysis for the translated instrument [16].

The assessment of the factor structure was then conducted. Using the SPSS application to conduct the confirmatory factor analysis, the number of factor was fixed as two based on previous studies [1, 8]. The number of factors presented the subscale or content domain of the instrument and each factor explained a certain percentage of variance. Items highly loaded into each factor were examined during assessment of the factor structure (factor loading). Finally, comparison was made to previous studies. To assess reliability, the internal consistency reliability of the translated version was measured using the Chronbach's alpha coefficient (α). For test-retest reliability, the Pearson's correlation coefficient for the total score and individual items was calculated.

Results

Demographic information

The age of the participants ranged from 17 to 53 years old. The mean age was 28.81 years. As shown in Table 1, majority (87.8%) of the participants were Malay. Most of them were married (52.2%), had the secondary education as their highest education (80.0%), and were frequently changing jobs (42.2%). In childhood, most of the participants lived with biological parents (80.0%) and had 4-5 siblings (35.6%).

Table 1: Summary of participants' demographic information (n= 90)

Information	*N*	*%*
Ethnicity		
Malay	79	87.8
Chinese	6	6.7
Indian	5	5.6
Marital status		
Single	22	24.4
Married	47	52.2
Divorcee	16	17.8
Widow	5	5.6
Highest education		
Never been to school	3	3.3
Primary	9	10.0
Secondary	72	80.0
Tertiary	6	6.7
Employment prior to incarceration		
Permanent job	34	37.8
Always changing jobs	39	42.2
Unemployed	18	20.0
As a child, lived with:		
Both parents	72	80.0
Either parent and a stepfather/stepmother	8	8.9
Grandparents	7	7.8
Relatives	2	2.2
Foster family	1	1.1
Number of siblings		
Single child	4	4.4
1 – 3	25	27.8
4 – 5	32	35.6
More than 7	29	32.2

Factor analysis

For the preliminary analysis, the KMO Measure of Sampling Adequacy value was equal to .70. The individual MSA ranged from .63 to .78. Since all items had individual MSA more than .50, none was excluded from the analysis. The Bartlett's test of sphericity was also significant ($p < .001$). Overall, the preliminary analysis was satisfactory.

Based on the original version and previous studies [1, 8], two factors were extracted from the Malay-translated version of the PSS. Factor loading of the translated instrument was similar to the original version (as shown in Table 2). Items in Factor 1 were item number 1, 2, 3, 6, 9, and 10. The items represent negative perceptions, which explained 27.37% of variance. Items in Factor 2 were item number 4, 5, 7, and 8. Factor 2 represents positive perceptions and explained 22.64% of variance. Both factors explained half (50.01%) of the variability in the Malay-translated version of the PSS.

Table 2: Factor loadings for the Malay-translated version of the PSS

Items No	Factor loadings	
	Factor 1	Factor 2
1	.589	
2	.628	
3	.649	
4		.767
5		.715
6	.662	
7		.532
8		.798
9	.802	
10	.612	

Reliability testing

The Malay-translated version of the PSS produced the Chronbach's alpha of .64. For individual factor, the Chronbach's alpha for Factor 1 was .74 and for Factor 2 was .68. Pearson's correlation coefficient, which represents the test-retest reliability, for the total score was satisfactory (R=.72). As shown in Table 3, individual items showed that most of the items had the Pearson's R lower than .50 with the lowest being item number 9 (R=.27) and the highest was item number 5 (R=.63).

Table 3: Pearson's coefficient (R) for individual item and total score for the Malay-translated version of the PSS

Items	Pearson's R
Item 1	.31
Item 2	.41
Item 3	.42
Item 4	.51
Item 5	.63
Item 6	.38
Item 7	.43
Item 8	.49
Item 9	.27
Item 10	.49
Total	.72

Discussion

As the preliminary analysis confirmed that factor analysis was appropriate for the Malay-translated version of the PSS, two factors were extracted from the instrument. The item loadings were found matched to the original version and a previous study [1, 8]. As suggested by the original version, the two factors represent negative and positive perceptions of stress among the participants [1, 8]. No problem was found with the item loading since all the items highly fit into their respective factors. The finding showed that the Malay-translated version of the PSS was valid for use.

The published internal consistency of the original version of the PSS was very high (α = .85), demonstrating the high reliability of the original version. Note that reliability refers to the consistency of an instrument to measure a construct such as psychological construct when it is given to the same person at a separate time or given to a different person under a similar condition [15]. The Chronbach's alpha is suggested to be within .70 and .80 for the instrument to be considered as reliable [15]. However, in the case of a psychological construct, variety of the constructs being measured may affect the Chronbach's alpha value to go below .70 [17]. Number of items in an instrument also affects the value Chronbach's alpha heavily [18]. In the current study, the total Chronbach's alpha of the Malay-translated version of the PSS was lower than .70 (α = .64). This might be explained by factors such as number of items and the psychological

construct. Nevertheless, it exceeded the acceptable value ($\alpha > .50$). On the other hand, the individual Chronbach's alpha for both factors were higher than the total Chronbach's alpha, with factor 1 had the Chronbach's alpha above .70.

The Malay-translated version of the PSS had high total Pearson's correlation coefficient (R=.72). The test-retest reliability evaluates the consistency between two measurements when an instrument is given to the same person twice [19]. Several factors such as the time interval between test and retest [20], and the effect of memory [21] may affect the test-retest reliability. The individual Pearson's correlation coefficient demonstrated inconsistency between test and retest in most items ($R < .05$). Item number 9 which had the lowest correlation coefficient (R=.27) required the participants to recall past experiences: *In the last month, how often have you been angered because of things that were outside of your control?* The inconsistency in response to this item might be explained by the memory effect [21]. Nevertheless, the total correlation coefficient was high and considered reliable.

As mentioned earlier, the PSS had been translated in many other languages. This included the 14-items version of the PSS. Several published studies on the translated versions were found [7-12]. The 10-items version of the PSS had been translated and validated in Japanese [8]. The Japanese version of the PSS was termed as PSS-J and it was compared to the original version in the study. The participants were pharmacy and nursing students who were recruited in London and Tokyo to respond to respective versions of the PSS. In the study, exploratory factor analysis was conducted, which revealed two factors structure explaining 42.6% of variance. The internal consistency of the PSS-J was .74. No test-retest was conducted in the study [8].

The 10-items version of the PSS was also translated in Hungarian with comparison to the 4-items and 14-items versions [10]. Participants from a stress-management program were recruited in the study and a test-retest was conducted after five days. The Chronbach's alpha of the Hungarian 10-items version of the PSS was .85 with the Pearson's correlation R equal to .99. In the study, all three versions of the PSS were found closely correlated to each version [10]. In European Spanish version, the internal consistency of the 10-items version was equal to .81 [11]. Groups of people who were possibly highly stressed such as HIV patients were selected as the participants. Both the 10-items and 14-items versions were applied in the study. Test-retest within two weeks interval produced the Pearson's correlation coefficient of .77 [11]. Several translations of the 14-items version were also reviewed. In Chinese, the Chronbach's alpha of the 14-items version was .81 [7]. In another European Spanish version, the 14-items PSS produced the internal consistency of .83 [12]. Confirmatory factor analysis was conducted in the study, revealing two factors structure of the 14-items version. Nonetheless, none of the previous studies involved prisoners.

The limitation of the current study is associated with the study population, which involved only female inmates. No control group or free-living participants were taken. It is also worth noting that the prisoners experienced more stressful situation than free-living people. The validation and reliability testing thus might or might not be affected. Therefore, the validity and reliability of the current Malay-translated version of the PSS should be more specific for female inmate's population rather than Malaysian in general. Based on this limitation and with reference to the Malay-translated version of the PSS, a local psychometric instrument could be designed to measure stress in the future.

Conclusion

The confirmatory factor analysis and reliability testing of the Malay-translated version of the PSS were found to be satisfactory. The Malay version of the PSS conformed to the original version and to previous studies, indicating the validity and reliability of the Malay-translated version of the instrument to measure stress among the Malaysian population, especially female prisoners in future study. Further study using different population samples is highly suggested with reference to the findings and limitation in the current validation work.

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