

Validation of the Maslach Burnout Inventory-General Survey (MBI-GS) to assess burnout among Army personnel of Sri Lanka

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Abstract

Background

The military is a well-known vulnerable occupational setting for burnout. However, due to the lack of a validated tool translated into Sinhala – the country's primary spoken language, and adapted for the Sri Lankan military context, it is unable to investigate the true burden.

Aim

To validate the Maslach Burnout Inventory-General Survey (MBI-GS) to assess burnout among Army personnel of Sri Lanka.

Method

Sinhala translation, military culture adaptation, and judgmental validity assessment were performed on the Maslach Burnout Inventory-General Survey (MBI-GS) with the participation of experts. Criterion and construct validity were then examined with a sample of 229 army personnel. They were selected from among Army soldiers who visited the Army Hospital, Colombo for medical fitness assessments, using systematic sampling. To evaluate reliability, Cronbach's alpha was calculated.

Results

It was suggested to remove item 12 from the translated MBI-GS at the cultural adaptation. "Modified two factor model with deleted items six and twelve, plus added correlate error terms" was identified as the best fitting model by the confirmatory factor analysis (CFA). The receiver operating characteristic (ROC) curve was generated to assess criterion validity and area under the curve (AUC) was 0.970. At the point of 28.5, sensitivity and specificity were 92.3% and 87.9%, respectively. Satisfactory reliability was demonstrated, Cronbach's alpha values being greater than 0.7 for all scales.

Conclusions

The MBI-GS translated to Sinhala, culturally adapted and validated was found to be a valid and reliable tool for assessing burnout among Army personnel of Sri Lanka.

Keywords: MBI-GS, validation, Army, Sri Lanka

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Introduction

In many occupational settings, burnout is a leading mental health issue. Burnout is defined as a state of mental, physical and emotional exhaustion caused by unmanaged, prolonged emotional and interpersonal stressors at work (1).

Initially, the majority of studies on burnout were conducted on human service occupations. Later, this evolved to other occupations so that modified versions of burnout measuring tools that could be used universally were introduced. There are numerous studies that show that human service professionals are not the only ones

who suffer from burnout (12). It was measured in a wide range of occupations, including entrepreneurs (3), managers (4) and the military (5).

Maslach Burnout Inventory (MBI) is the most widely accepted and used psychometric tool for assessing burnout. It is based on a syndromic metaphor and includes three dimensions: emotional exhaustion, depersonalization, and reduced professional efficacy. By the early 2000s, MBI had been used in more than 90% of scientific publications in the burnout field (2). Though some alternative tools for measuring burnout such as the Copenhagen Burnout Inventory (6), Burnout

Measure (7, 8), and Oldenburg Burnout Inventory (9) were introduced later, the MBI remains the “gold standard” due to its established validity and reliability across nations and professions. Even though small deviations in construct validity were discovered in some different cultural and occupational contexts during MBI validation, the overall validity and syndromic approach of MBI were established (2).

MBI was initially available in two versions: the Human Services Survey (HSS) and the Educators Survey (ES). Student Survey (MBI-SS) was also created as a sub-version later. However, due to the exclusivity of these versions to specific professions, the authors later developed a new version that can be used universally for a wider range of general applications across various occupations: The Maslach Burnout Inventory-General Survey (MBI-GS) (10). MBI-GS was concerned with the employee’s relationship to the work environment, whereas MBI-HSS and MBI-ES were concerned with the employee’s relationship with clients, students, or patients. In MBI-GS, exhaustion is measured by items that detect fatigue but do not directly attribute one’s tiredness to the client base. Items measuring cynicism reflect apathy or a disinterest in work in general, not necessarily in other people. Finally, items measuring professional efficacy cover a much broader range of topics, including both social and non-social aspects of occupational achievement. The MBI-GS has sixteen items, while MBI-HSS and MBI-ES each have twenty-two. Out of those 16, five are related to exhaustion, five are related to depersonalization, and six are related to reduced personal efficacy. Factorial validity and consistency of the MBI-GS have been assessed across occupational groups in several countries located in different geographical and socio-demographic settings; in Norway, assessed across different occupational groups (11), in Poland among three different occupation groups (12), in Malaysia (13), and in Pakistan across different economic working contexts (14). Despite the fact that the three factor model was established in the majority of the validation studies, several studies produced different results: a two factor model emerged in the education sector (15), a four factor model was observed among Spanish ICT employees (16), and a five factor model was observed among Australian law enforcement managers (17).

Other versions of the Maslach Burnout Inventory, aside from MBI-GS, have been translated and validated in Sri Lanka across a variety of occupational categories. Previously, the MBI-HSS was translated, adapted, and validated among Sri Lankan nursing officers (18) and prison officers (19). The MBI-ES was validated among preschool teachers (20), and the MBI-SS was validated among advanced level students (21).

Military service is one of the well-known occupational settings where burnout can occur. Military tasks are tense, filled with stressful experiences, and are prone to burnout (22). Military burnout has been identified as one of the pitfalls of organizational health in all publications because it negatively affects the performance, commitment, retention, cohesion, morale, and physical health of military personnel, which can reduce the organization’s efficiency, effectiveness, and productivity (23). Even though there is a high risk of increased burden of burnout among army personnel due to the accumulation of known determinants of burnout in the Sri Lankan Army context over the last 15 years of postwar era, the burden was not assessed. One major reason for this is the lack of an appropriate tool validated for the Sri Lankan military setting to assess individual burnout levels.

The Sri Lanka Army is made up of a diverse range of professional groups and job categories spread across fighting, support, and service regiments, with the majority not expected to perform direct client-facing tasks. As a result, MBI-GS became the best available tool option for burnout assessment in Sri Lanka Army personnel, despite the fact that it had not been translated and validated to any Sri Lankan occupational context prior to this validation.

The aim of this study was to translate MBI-GS to Sinhala language adapt to military culture and assess validity in terms of judgmental, construct, and criterion, as well as internal consistency, in order to obtain an appropriate tool to assess burnout in Sri Lankan military personnel.

Method

Translation to the Sinhala language was done using the forward-backward translation method (24). A Panel of translators including two English teachers who are experts in bilingual translations and two psychologists were involved in the process.

This was followed by cultural adaptation and assessing the judgmental validity. This meticulous process was done involving a multidisciplinary team of experts in community medicine, military preventive medical service, military psychiatry, military psychology, and military administration. Three aspects were evaluated; relevance in assessing burnout among military personnel, appropriateness of the wording and acceptability in the military context. Expert panel was asked to rate their agreement on a scale of 0 to 10 separately with regard to the above three aspects and to mention if there were any special concerns or modifications relevant to each item. Then the responding rates were summarized and items which got 60% or above for all three aspects were accepted and resent to panel members after adding

suggested modifications. Items which were scored less than 60% were taken and discussed separately to decide whether to go for major modifications or to remove them from tool. Then the judgmental validity, including face, content, and consensual validity was evaluated (25). An independent panel of multidisciplinary experts in above mention fields and who were not involved in the translation and adaptation process assessed content and consensual validity. Three soldiers who were among the fifteen that took part in the pretesting of the tool were employed to evaluate the face validity.

Then the data collection using the translated and adapted tool was carried out during July and August 2020 to investigate construct and criterion validity as well as internal consistency. Study participants were the military personnel undergoing annual medical fitness examinations at Army Hospital Colombo. People with a psychiatric disease, those who did not actively serve in an Army establishment of Sri Lanka over the previous year and whose service was shorter than a year were excluded. The minimum number of participants required was calculated separately using the formula presented by Hulley (26) for two groups: with burnout and without burnout. The expected values for specificity (85%) and sensitivity (95%) were obtained from Chen et al.'s earlier validation research (13). Systematic sampling technique was used for sampling. The attendance register for the medical fitness test served as the sampling frame. Every 10th candidate of the register was selected to the sample. Each participant was administered the questionnaire and then was assessed by the Consultant Psychiatrist until the required sample size of those with burnout were recruited. Diagnosis made by a psychiatrist based on diagnostic entity ICD 11 QD 85 (27) was used as the gold standard for the criterion validity assessment. It was necessary to recruit 229 persons till the required minimum samples for both groups were gathered. The sample size was assured to be adequate, with a case-to-item ratio of 1:14.3. It is recommended that 5 to 10 times the sample size per item, with a sample size greater than 200, is sufficient to conduct factor analysis (28). Construct validity of the instrument was assessed using CFA to assess how the MBI-GS is replicated in the data set of the study.

Data analysis

Several statistical tests were performed on validation data prior to conducting CFA to see if they met the required assumptions. A random sample of bivariate scatter plots was examined to ensure the linearity of the data. Factorability was evaluated using the anti-image correlation matrix, the Bartlett test of sphericity, and the Kaiser-Meyer-Olkin sample adequacy measure. Variance inflation factor (VIF) values were used to ensure that there was no multi-collinearity.

Confirmatory factor analysis was carried out using software package LISREL 8.80. Non-normal distributions were discovered by histograms, and calculation of standardized skewness and kurtosis values. Thus, in CFA, the robust maximum likelihood method was used, and the Satorra-Bentler scaled chi-squared statistic was used in the analysis. The goodness of fit parameters were assessed for several number of models which were different from each other according to number of factors, number of items loaded to factors, modified with added error terms, etc. Various types of goodness of fit parameters including χ^2 minimum fit function test, root mean square error of approximation (RMSEA), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Non-Normed Fit Index (NNFI) and Standardized Root Mean Square Residual (SRMSR) were calculated to evaluate and select the best fit model.

Criterion validity was evaluated by generating a receiver operating characteristic (ROC) curve using the psychiatrist's diagnosis as the gold standard. Sensitivity, specificity, predictive values, and likelihood ratios were computed to establish the best cut off values. Reliability was assessed by calculating Cronbach's alpha.

Results

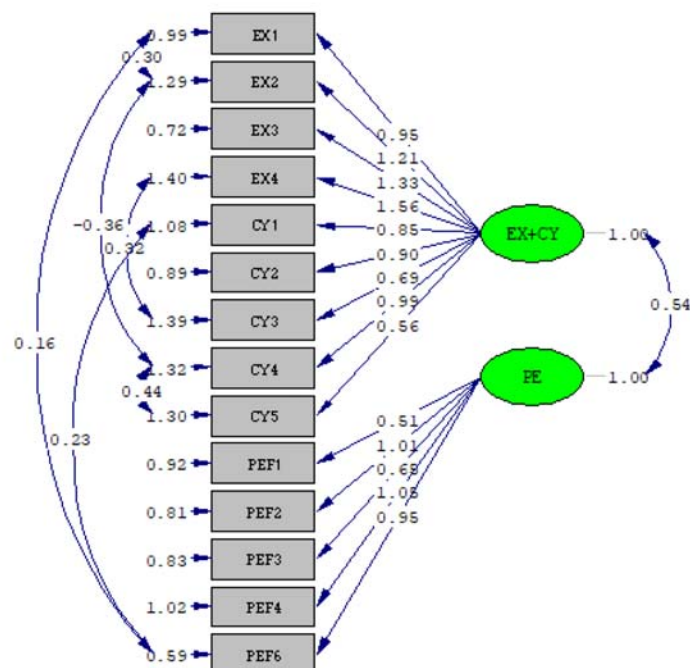
In total, 229 Army personnel including 13 officers (5.6%) and 216 soldiers (94.4%) were among study participants. The response rate was 100%. Nearly half ($n=124$, 54%) were below 30 years of age and in rank wise half of study populations ($n=173$, 48%) were corporals and lance corporals. One tenth of participants ($n=21$, 9.2%) were female and sixty percent ($n=138$) were married. Basic personal character profile is summarized in Table 1.

All the items except item twelve got an average mark above 70% and minor modifications were made to item numbers 1, 2, 6, 8, 10 and 13 in the adaptation process. Most of the experts were of the opinion that item number 12 makes an ambiguity in assessing burnout within a military setup.

CFA was performed by testing several models to identify the best fitting model for the data set. Initially one factor, two factor and three factor models were assessed and best goodness of fit parameters yielded a two factor model. Then, modified two factor models with deleted items were examined referring to available literature on deleting items and feedbacks of adaptation process (12, 14). Best fit indices were for the two factor model after deleting items six and twelve. Ultimately GFIs were further improved by adding error terms as suggested by the software concluding "Modified two factor model with deleted items six and twelve, plus added correlate error terms" was the best fitting model which enabled the explanation of most of the covariance of validation data set (Figure 1). Summary of goodness of fit parameters for studied different models are illustrated in Table 2.

Table 1. Basic characteristics of the study participants

Character	Number	Percentage %
Age		
<20	5	2.2
21-30	119	51.9
31-40	81	35.4
41-50	24	10.5
>50	0	0
Rank		
Private	63	27.6
L.Cpl / Cpl	110	48.2
Sergeant and above	43	18.9
Officer rank	13	08.3
Sex		
Male	208	90.8
Female	21	09.2
Marital status		
Married	138	60.2
Unmarried	90	39.4
Divorced	1	00.4



Normed $\chi^2=146.6$ $\chi^2/df=1.93$ RMSEA= 0.069 SRMR=0.051 GFI=0.92

Figure 1. Two factor modified model with item 6 and 12 deleted and added correlate errors – Path diagram.

Table 2. Goodness of Fit Indices of the tested models of the MBI-GS

Model	Normed	df χ^2	P value	χ^2/df	RMSEA	90% CI of RMSEA	CFI	NNFI	SRMR	GFI
One Factor	508.46	90	<0.0001	5.65	0.15	0.13-0.17	0.86	0.84	0.11	0.75
Two Factor	294.09	89	<0.0001	3.30	0.098	0.08-0.12	0.94	0.92	0.064	0.87
Three Factor	299.20	87	<0.0001	3.44	0.1	0.08-0.12	0.93	0.92	0.064	0.87
Two Factor+ item 13 deleted	263.31	76	<0.0001	3.46	0.105	0.08-0.12	0.93	0.91	0.065	0.86
Two Factor+ item 11,13 deleted	212.34	72	<0.0001	2.95	0.12	0.08-0.12	0.93	0.91	0.079	0.85
Two Factor+ item 6,12 deleted	235.85	76	<0.0001	3.10	0.096	0.07-0.09	0.94	0.92	0.061	0.86
Two Factor+ item 6,13,12 deleted	211.78	72	<0.0001	2.94	0.12	0.10-0.14	0.89	0.91	0.065	0.82
Two Factor+ item 6,11 deleted	212.65	72	<0.0001	2.95	0.11	0.08-0.13	0.88	0.90	0.065	0.83
Two Factor+ item 11,13 deleted	234.53	72	<0.0001	3.26	0.12	0.10-0.14	0.78	0.85	0.068	0.80
Two factor+ item 6,12 deleted+added correlate errors	146.6	76	<0.0001	1.93	0.069	0.45-0.85	0.97	0.96	0.051	0.92

The ROC curve was constructed using the total score for MBI-GS as the test variable and the clinical diagnosis of the consultant psychiatrist as the state variable. According to the clinician, 49 (21.4%) of the 229 participants had clinical burnout. Area under the curve (AUC) was 0.97 (Figure 2). The cut-off point of 28.5 provided the best sensitivity and specificity combination. Coordinates of the ROC curve with relevant sensitivity and specificity values are summarized in Table 3. At that level, the sensitivity, specificity, positive and negative predictive values were 92.3%, 87.9%, 78.0%, and 98.2% respectively. In the reliability assessment, the Cronbach's Alpha value for all MBI-GS subscales was greater than 0.7, while for the total scale was 0.884.

Discussion

Every weekday, Army medical fitness tests are held at Army Hospital Colombo for Army personnel from all over the country. This test is supposed to be taken annually or before many other events, such as Army courses, UN

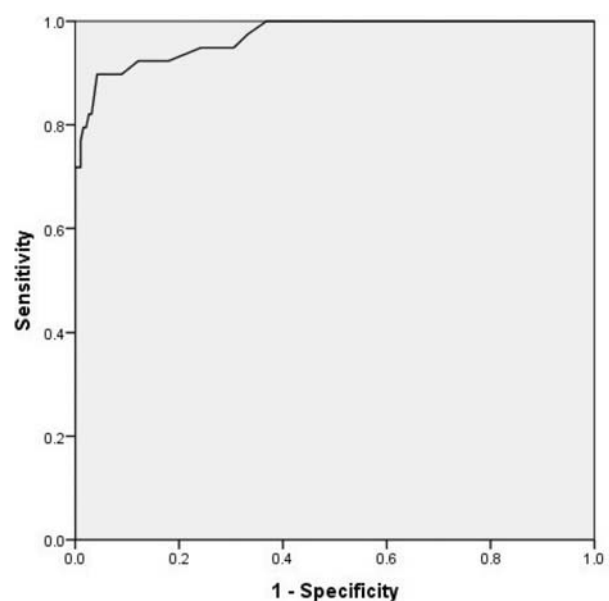


Figure 2. ROC Curve for the total score of MBI-GS against the clinical diagnosis of the psychiatrist.

Table 3. Coordinates of the ROC Curve illustrating relevant sensitivity and specificity values related to cut off points

Cut off points	Sensitivity	1 - Specificity
18.5000	1.000	.406
19.5000	1.000	.367
20.5000	1.000	.333
21.5000	.980	.294
22.5000	.959	.267
23.5000	.959	.239
24.5000	.959	.211
25.5000	.959	.200
26.5000	.939	.133
27.5000	.939	.111
28.5000	.939	.072
29.5000	.918	.039
30.5000	.878	.028
31.5000	.816	.022
32.5000	.816	.017
33.5000	.735	.011
34.5000	.714	.011
36.0000	.694	.006
37.5000	.694	.000
38.5000	.653	.000
39.5000	.412	.000

missions, physical tests, promotions, and so on. As a result, it could be assumed that the study sample, which was drawn from personnel who attended Army Hospital Colombo for this medical fitness test, was representative of the entire Army population, with similar socio-cultural and occupational profiles.

In the cultural adaptation process, item number twelve received a low rating. The original statement of item twelve was “I have accomplished many worthwhile things in the job”. Experts believe that it creates some ambiguity in judging burnout because even a burnout soldier may have a satisfied perception of what he has done in the past, whereas a non-burnout soldier may not have a satisfied history of accomplishing worthwhile things in his military history. As a result, there may be an increase in false positives and false negatives. The “Old sergeant” syndrome described by R. Sobel in 1947 among World War II soldiers is almost identical to the modern burnout phenomenon (29). That syndrome was observed

specifically among personnel who had previously worked extremely well and were satisfied with their previous performance. Furthermore, this item was removed from the scale due to poor performance in a validation study conducted in Pakistan (14).

A modified two-factor model was shown to be the best fitting model to replicate the study sample’s data set, as opposed to a three-factor model. Deviations from a three factor model were reported when validating the Maslach burnout Inventory in several countries with diverse cultural and occupational contexts (15, 16, 17). Because burnout is a psychological phenomenon, and the psychological properties of feelings and attitudes were directly assessed by the scale items, perception of underlined constructs may differ across cultural and occupational settings. In theory, emotional exhaustion represents the energetic component of the burnout construct, while depersonalization represents the attitudinal component (2). However, with a military mindset, both of these aspects could be blended together. Some researchers argue that, rather than being a three-dimensional phenomenon, burnout is equivalent to exhaustion, and that other aspects may be enclosed or covered by that (6, 7, 8, 30). As a result, in the military psychological background, the item of depersonalization may be perceived and felt in conjunction with the dominant emotional exhaustion construct.

The goodness of fit indices of two and three factor models clearly outperformed those of one factor model. This is consistent with construct validity assessments of the MBI-GS conducted in other countries among various occupational groups (12, 14, 30). Improvement in GFIs was previously seen in CFAs done in other countries by modifying and deleting the same items (12, 14). Adding error terms to achieve further improvement has previously been practiced in Sri Lanka when validating the MBI-SS version on Sri Lankan school students (21).

The clinical diagnosis made by a consultant psychiatrist based on diagnostic entity ICD 11 QD 85 was used as the gold standard reference. The majority of criterion validity assessments conducted locally (18-21) and internationally (30) employed a psychiatrist’s clinical diagnosis as the gold standard. At the best cut-off found by ROC, 28.5, the scale had a sensitivity of 93.9% and a specificity of 92.8%, both of which were highly satisfactory. Cronbach’s Alpha values greater than 0.7 demonstrated the instrument’s dependability.

Conclusions

The validated and modified (two factor model with deleted items six and twelve, plus added correlate error terms), 14-item Sinhala version of the Maslach Burnout Inventory – General Survey (MBI-GS Sinhala) was found to be a valid and reliable instrument for assessing burnout among Sri Lanka Army military personnel.

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