

Original Research



Validity & reliability of Teacher Stress Inventory-Sinhala to measure occupational stress among secondary school teachers in Sri Lanka

Enoka Priyangani Wickramasinghe^{1*}, Rohini De A Seneviratne², Nalika Sepali Gunawardena³, Athula Sumathipala⁴, Christian Mallen⁵

¹ Ministry of Health, Sri Lanka; ² General Sir John Kotelawala Defence University, Sri Lanka; ³ World Health Organization Country Office, Sri Lanka; ⁴ Institute of Fundamental Studies, Sri Lanka; ⁵ Keele University, UK

Correspondence: enoka7@gmail.com

 <https://orcid.org/0000-0003-2129-5496>

DOI: <https://doi.org/10.4038/jccpsl.v28i1.8442>

Received on 17 June 2021

Accepted on 08 December 2021

Abstract

Introduction: Occupational stress among teachers represents a major global public health issue. Research into the prevalence of occupational stress among secondary teachers in Sri Lanka has not been conducted due to the absence of a valid and reliable instrument to accurately measure teachers occupational stress in the Sri Lankan cultural context. Teacher Stress Inventory (TSI) is a valid and reliable 49-item self-administered tool to assess occupational stress among teachers.

Objectives: To translate the TSI to Sinhalese, culturally adapt and to assess its validity, reliability and acceptability among secondary school teachers in Sri Lanka

Methods: The TSI was culturally adapted and translated to Sinhala language. This was validated among systematically selected 305 secondary school teachers in Gampaha District. Convergent and discriminant validity was assessed against the validated General Health Questionnaire-30 and Depression Anxiety Stress Scale-21. Confirmatory Factor Analysis (CFA) was performed using LISREL-8.8 to evaluate construct validity. Internal consistency and test-retest reliability and acceptability were assessed simultaneously.

Results: The original two-factor model: stressors and manifestations of stress, with model fit indices (GFI=0.76; CFI=0.96; RMSEA=0.065) was considered an appropriately fitting valid model to assess occupational stress. Its reliability was confirmed by good internal consistency (Cronbach's alpha of 0.875) and test-retest reliability (correlation co-efficient of 0.769-0.857).

Conclusions & Recommendations: The TSI-Sinhala was found to be a valid, reliable and acceptable tool recommended to estimate occupational stress among secondary school teachers in Sri Lanka. The Department of Education can utilize this tool to assess occupational stress among secondary grade teachers, to take necessary preventative and supportive interventions for teachers who are in need.

Keywords: confirmatory factor analysis, validity, occupational stress, reliability, TSI-Sinhala

Introduction

Occupational stress and burnout are widely used terms that have a significant impact on the human service industry (1). According to International Labour Organization (ILO) (1), occupations in the fields of health, education and armed forces are at greater risk of occupational stress, as they consistently deal with pervasive human behaviour (1-2). Despite the common belief in Sri Lanka that teaching is a stress-free job, global evidence suggests teaching is one of the most stressful occupations with a rising trend (1-3). The existing literature confirms that there are individual, social and organizational consequences due to occupational stress (1-2, 4-5). Moreover, work stress among teachers plays a major role in the education system (3), impacting on socio-economic milieu of a country and thus making it a key public health concern. Therefore, timely identification of occupational stress among teachers and the implementation of effective preventive strategies would be cost-effective public health interventions (2-3) that facilitate achieving the third (Ensure healthy lives and promote well-being for all at all ages) and fourth (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all) Sustainable Development Goals (SDG) (6).

The United States National Institute of Occupational Health & Safety (4) defines occupational stress as 'harmful physical, emotional, behavioural and cognitive responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker'. With increasing globalization, there has been a considerable change in the nature of teaching, the academic environment and teachers' wellbeing (3, 5). Thus, measurement of the magnitude of occupational stress among schoolteachers is a prerequisite to promote quality of their work life and prevent its adverse health consequences. Although the prevalence of burnout has been reported in 2005 as 11.6 per 1000 primary teachers from Southern Province (7), the prevalence of occupational stress among teachers is unknown due to the unavailability of a culturally valid and reliable tool in Sri Lanka. To accurately assess the level of occupational stress in teachers, a tool

evaluating the multidimensional role of teachers is needed. Whilst several instruments exist, the widely used Teacher Stress Inventory (TSI) (8) evaluates multidimensionality of work stress among teachers in terms of the sources and manifestations of stress at a given time (8). This tool has been translated and validated in several languages and used in many Asian countries (9-14).

In this backdrop, we aimed to culturally adapt and translate the TSI to Sinhalese language and assess the validity, reliability and acceptability of the original two domain model among secondary school teachers in Sri Lanka as a prerequisite to measure occupational stress.

Methods

The TSI is a self-administered instrument comprising 49 neutrally worded items which span across two domains (Table 1). Higher scores indicate higher work stress.

A panel of ten experts from the fields of education, psychiatry, psychology, community medicine, occupational and school health culturally adapted the TSI. Consensus were arrived using quantitative and qualitative methods based on a structured guide and a rating format developed by the principal investigator. The panel decided to retain all 49 items with modifications to items 33, 34 and 45, by way of giving an example to words 'depressed', 'anxious' and 'stomach acid' for better understanding in the cultural context of Sri Lanka. The panel also agreed to retain the original sequence of items and scoring method which used a 5-point Likert scale. A different panel of nine experts from relevant fields fluent in both English and Sinhala translated English TSI to Sinhala using a method based on semantic theory of translation in three consecutive rounds (15).

A multidisciplinary group of experts from the fields of psychiatry, psychological medicine, education and three community physician's familiar in validation of psychometric tools, who were not involved in the cultural adaptation or translation processes, confirmed judgemental validity (face, content and

consensual). The draft TSI-Sinhala was pre-tested among 20 secondary teachers selected from two schools not included in the main study. Following the pre-test process, the format of TSI-Sinhala was modified to include the word of each scale to be displayed in front of each item instead of scale number (e.g., scale 1 "no strength/not noticeable" to 5 "major strength/extremely noticeable").

Assessment of validity, reliability and acceptability of the TSI-Sinhala

A cross-sectional study was carried out in Types 1AB & 1C public schools in Gampaha District of the Western Province of Sri Lanka to assess the validity of TSI-Sinhala. This type of schools includes all grades from 1 to 13 (16), hence the entire range of secondary grades from 6-13 were included in the sample. A total of 305 teachers was required according to the criteria of having 5-10 times of participants to the number of items (17). They were selected using two-stage cluster sampling, in which a cluster was defined as 20 public schools in Gampaha District that employed at least 25 secondary teachers. During first stage of sampling, 15 schools were selected from the list of eligible schools, with types 1AB and 1C schools selected in 3:2 ratio and with probability proportionate to the number of teachers in the schools (16). Using computer generated random numbers, nine type 1AB and six type 1C schools were selected from each list of schools, respectively. During the second stage, 20 eligible teachers from each selected school were recruited using a random method. Next, the culturally adapted TSI-Sinhala along with the validated Sinhala versions of General Health Questionnaire-30 (GHQ-30) (18) and Depression Anxiety Stress Scale-21 (DASS-21) (19) were self-administered to them with clear instructions for completion without affecting their routine duties. Completed questionnaires were collected the same day by the principal investigator in sealed envelopes.

The study instrument was re-administered in a sub-sample of 35 secondary teachers (10% of the study sample) after two weeks, to assess test-retest reliability. The approximate time taken to complete the TSI-Sinhala and response rate was taken to assess acceptability.

Data analysis

Construct validity of TSI-Sinhala was assessed using Confirmatory Factor Analysis (CFA) performed on data of the sample of teachers using LISREL 8.8 to examine the factor structure of TSI-Sinhala (20). The factor structure was evaluated to explore whether it aligns with the two domains of the original TSI. Multi-variate normality, linearity, outliers and multi-co-linearity were assessed to confirm the compatibility of data with the statistical assumptions required for CFA (20). After ensuring fulfilment of statistical assumptions required, CFA was conducted on the covariance matrix of the TSI items. The model parameters were estimated using robust maximum likelihood method, as recommended by LISREL 8.8 for non-normal data. The χ^2 minimum fit function test, Goodness of Fit Index (GFI), Standardized Root Mean Square Residual (SRMR), the Comparative Fit Index (CFI), No-normed Fit Index (NNFI) and the Root Mean Square Error of Approximation (RMSEA) were indices used to evaluate model fitness statistically. One, two and ten factor models on data of covariance matrix of TSI-Sinhala was performed using LISREL 8.8 to evaluate the fitness of each model to the original structure of TSI.

Convergent and discriminant validity was first assessed using correlations of the ten subscales of TSI-Sinhala on the hypothesized scale structure of TSI-Sinhala (21). Secondly, evaluating the correlations between each of ten subscales of TSI-Sinhala with the stress score of DASS-21 and the total score of GHQ-30.

Reliability assessment of TSI-Sinhala was performed using the Cronbach's alpha coefficient and test-retest reliability for each subscale (Table 6). Acceptability of TSI-Sinhala was assessed by calculating self-reported completion time and response rate in this study.

Results

Response rate was 100% (N=305). The mean and median ages of teachers were 43.8 (SD=9.2) and 45.0 (inter quartile range (IQR)=36.5-51) years,

respectively. The majority consisted of females (n=258; 84.6%), Sinhalese (n=295; 96.7%) and Buddhists (n=283; 92.8%).

Construct validity

In assessing the compatibility of data with the statistical assumptions required for CFA, visual inspection of histograms of all items in the assessment of multivariate normality showed several items to have a non-normal distribution. In this sample, except item 12, all other items demonstrated high skewness and kurtosis exceeding standardized skewness and kurtosis values of +3, respectively (20). Data of the study related to feelings and emotions of participants; thus, it was reasonable to assume such skewness and kurtosis in this type of a data set consisting psychosocial information of participants. Reasonable assumption was made that no two items were highly or perfectly correlated, because the highest correlation between two items in the data set was 0.753 confirming multi-co-linearity. A summary of GFI (22-25) and the standards of good model fit used in the CFA is given in Table 3.

Model fit indices for one, ten and two factor models are summarized in Table 4. In the one-factor model, all 49 items were expected to load on to one latent factor 'teacher stress' while in the ten-factor model relevant items were expected to load according to the ten subscales (Table 1) of TSI-Sinhala. In the two-factor model, items 1-29 and items 30-49 were expected to load on to the two factors 'sources of stress' and 'manifestations of stress', respectively. One-factor and ten-factor models showed similar fit indices while the two-factor model showed improved values. The GFI, CFI and NNFI of the two-factor model were 0.76, 0.96 and 0.93, respectively indicating that it is the only model which shows characteristics of a reasonable fit. However, to evaluate if any further improvements could be achieved for the two-factor model, the original two-factor model was modified, based on the method described by previous researchers who attempted this by removing the items 6 and 48 that cross load on to subscales other than their own (12, 26) and the suggestions offered by LISREL. Following model variations were derived to compare and seek the best

fitting model of TSI-Sinhala.

Model 1: Original two factor model

Model 2: Two factor model with cross loading of items 6 and 48

Model 3: Two factor model with cross loading of items 6 and 48 and correlated error terms

Model 4: Two factor model with item 6 deleted

Model 5: Two factor model with item 48 deleted

Model 6: Two factor model with item 6 and 48 deleted

All models demonstrated a statistically significant chi-square statistic (Table 5). However, other than two factor model with cross loading of item 6 and 48, and that with cross loading of 6 and 48 error covariances, other four models showed almost similar model fit parameters indicating no improvements with modifications. The two-factor model with item 6 and 48 deleted has almost same fit indices as the original two-factor model, without showing major improvements. Hence, the original two-factor model with model fit indices (GFI=0.76, CFI=0.96, RMSEA=0.065). was decided to be the most appropriately fitting model of TSI-Sinhala.

Convergent and discriminant validity

All item-subscale correlations ranged between 0.578 and 0.959 and were statistically significant. The results of multi-trait scaling analysis confirmed convergent validity for all 49 items in the ten subscales, where each item demonstrated significant correlations of 0.4 or more with its own subscale (26). Discriminant validity was also evident for all 49 items where each item correlated more strongly with its own subscale than with any of the other nine subscales.

The correlation coefficients between the ten subscales of TSI-Sinhala and DASS Stress Score ranged from 0.29 to 0.604. 'Fatigue manifestations' (r=0.604), 'work stressors' (r=0.563) and 'cardiovascular manifestations' (r=0.557) subscales showed the highest correlations, while 'work distress'

($r=0.29$) and 'professional investment' ($r=0.364$) subscales of TSI-Sinhala showed the lowest correlations. The 'manifestations' scale demonstrated the highest correlation of 0.7, indicating that manifestations of stress are more inter-related. 'Work distress' and 'professional investment' being less related, represents the convergent and discriminant validity of TSI-Sinhala with external scales, respectively. Further, the total scores of TSI-Sinhala and DASS Stress Score showed a correlation of 0.698, indicating TSI-Sinhala being significantly related to external scales.

Total 'teacher stress' and 'manifestation of stress' scores of TSI-Sinhala showed a significant correlation of 0.47 and 0.46 with GHQ 30, respectively, confirming convergent validity. In

contrast to that, GHQ 30 scores demonstrated lower correlation with 'work stressors' ($r=0.229$) and 'professional investment' ($r=0.252$), which are occupation-specific subscales, indicating discriminant validity.

Reliability and acceptability of the TSI-Sinhala

The Cronbach's alpha value of the reliability assessment for all ten subscales was 0.875 exceeding the Nunnally's criteria of 0.7 confirming internal consistency (27) (Table 6). The significant correlation coefficients ranged between 0.769 and 0.857 confirming test-retest reliability. Mean time taken to complete TSI-Sinhala was 19 (± 5) minutes. The response rate for each item of the TSI-Sinhala was 100%.

Table 1: Structure of the Teacher Stress Inventory (TSI)

Sub-domains/sub-scales under sources of stress	No. of items	Sub-domains/sub-scales under manifestations of stress	No. of items
Time management	8	Emotional manifestations	5
Work related stressors	6	Fatigue manifestations	5
Professional distress	5	Cardiovascular manifestations	3
Discipline and motivation	6	Gastronomic manifestations	3
Professional investment	4	Behavioural manifestations	4

Discussion

The TSI is a proven valid and reliable tool to measure occupational stress in different cultures (8-14). Assessing the construct validity of TSI- Sinhala was through CFA, the most appropriate method used to evaluate the factor structure of a tool (28). All the indices used to evaluate fitness of the model confirmed the statistical fitness of the original two-factor model (8-14).

Significantly high correlations between TSI-Sinhala factors in the final two-factor model support the concept that occupational stress is a latent construct comprising of two underlying factors. This finding further confirms the feasibility of constructing a composite occupational stress measure by calculating a combined score out of the two factors.

Appraising convergent validity and discriminant validity can be done by assessing the hypothesized scale structure of the tool being validated and when another validated tool with similar and dissimilar domains exists by comparing with it. All 49 items of TSI-Sinhala demonstrated the statistically significant correlation of 0.4 or more with its own subscale indicating convergent validity (21). Each item correlated more strongly with its own subscale than with any of the other nine subscales in TSI-Sinhala, representing discriminant validity. Present study used stress scores of DASS-21 and GHQ-30 as the other tools to assess convergent and discriminant validity of subscales of TSI, as validity of those have been achieved in Sri Lanka among a multitude of population groups. Reliability of TSI-Sinhala was confirmed by good internal consistency and test-retest reliability (27).

Table 2: Selected socio-demographic characteristics of study sample of secondary teachers in Gampaha District (N=305)

Characteristic	No.	%
Age in completed years		
20-30	30	9.8
31-40	79	25.9
41-50	114	37.4
51-60	82	26.9
Highest level of education		
*GCE A/L passed	79	25.9
Diploma	26	8.5
Basic degree	183	60.0
Post graduate qualification	17	5.6
Period of service as a teacher in completed years		
1-10	113	37.1
11-20	78	25.6
21-30	89	29.1
31-40	25	8.2

*General Certificate of Education (Advanced Level)

Table 3: The Summary of goodness of fit indices used to evaluate Complementary Factor Analysis

Category of fit index	Specific name of fit index*	Standard indicator of good model fit
Absolute fit indices	χ^2 minimum fit function test	Low and non-significant ^(25,26)
	GFI	>0.9 ⁽²⁴⁾
	SRMR	<0.08 ⁽²⁵⁾
Incremental fit indices	CFI	>0.95 or 0.9 ^(26,27)
	NNFI	>0.95 ^u or 0.9 ^(26,27)
Parsimony correlation	RMSEA	<0.06 ⁽²⁸⁾

²²Hu & Bentler 1999; ²³Brown 2006, ²⁰Joreskog & Sorbom 1996, ²⁴Bentler 1990, ²⁵Brown & Cudek 1993**Table 4: Summary of model fit statistics for the one-factor, two-factor, and ten-factor models of TSI-Sinhala**

Model	Fit Indices							
	χ^2	df	p	GFI	NNFI	CFI	RMSEA	SRMR
One-factor model	5606.11	1127	0.00	0.50	0.86	0.86	0.14	0.097
Ten-factor model	5120.42	1126	0.00	0.52	0.87	0.88	0.13	0.093
Two-factor model	2332.65	1082	0.00	0.76	0.93	0.96	0.065	0.068

χ^2 =Satorra-Bentle scaled Chi-square test; GFI=goodness of fit index (>0.9 desired); NNFI=non-normal fit index (>0.9 desired); CFI=comparative fit index (>0.9 desired); RMSEA=root mean square error of approximation (<0.06 desired); SRMR=standardized root mean square residual (<0.08 desired); df=degrees of freedom

Table 5: Summary of model fit statistics for the two-factor model of TSI-Sinhala and with modifications

Model	Fit Indices							
	χ^2	df	p	GFI	NNFI	CFI	RMSEA	SRMR
1. Two-factor model	2332.65	1082	0.00	0.76	0.93	0.96	0.065	0.068
2. Two-factor model with cross loading of 6 & 48	2997.23	1079	0.00	0.57	0.87	0.88	0.13	0.093
3. Two-factor model with cross loading of 6 & 48 and error covariances	3019.65	1079	0.00	0.57	0.87	0.88	0.13	0.094
4. Item 6 deleted two-factor model	2238.65	1035	0.00	0.76	0.96	0.96	0.062	0.068
5. Item 48 deleted two-factor model	2215.02	1035	0.00	0.77	0.96	0.96	0.061	0.067
6. Item 6 & 48 deleted two-factor model	2235	989	0.00	0.77	0.96	0.96	0.062	0.067

Table 6: Cronbach's Alpha coefficients and test-retest reliability of the 10 subscales of TSI

Subscale	No. of items	Internal Consistency	Test-retest reliability
		Cronbach's Alpha value	Correlation co-efficient
Time management	8	0.864	0.834
Work stress	6	0.858	0.798
Work distress	5	0.868	0.821
Discipline and motivation	6	0.862	0.857
Professional investment	4	0.862	0.842
Emotional manifestations	5	0.86	0.78
Fatigue manifestations	5	0.856	0.797
Cardiovascular manifestations	3	0.861	0.815
Gastronomic manifestations	3	0.865	0.769
Behaviour manifestations	4	0.8872	0.828

As in any other study, the present study has its own limitations. Generalizability of findings on validity and reliability to other populations would depend on the similarities of study populations, as findings of factor analysis being specific to the study population (29). This study was conducted in the Western Province, among Sinhala speaking secondary teachers, and therefore its use in a different population needs cautious exploration.

instrument to measure occupational stress among secondary school teachers in the local settings. This tool will serve as an evidence-based tool for future studies measuring occupational stress among teachers and the determinants. The Education Department of Sri Lanka can utilize the TSI-Sinhala questionnaire to assess occupational stress among secondary grade teachers at regular intervals and provide necessary supportive services for teachers who may be having moderate to severe stress.

Conclusion & Recommendations

The TSI-Sinhala with its two-domain model was found to be a valid, reliable and an acceptable

Public Health Implications

- Teacher Stress Inventory-Sinhala is a valid and reliable tool which can be used to assess the level of occupational stress among secondary school teachers in Sri Lanka
- This will pave way to explore the magnitude of the burden of teacher stress in the country and implement appropriate interventions to prevent occupational stress among teachers and support those who experience it..

Author Declaration

Competing interests: There was no competing interests in this study

Ethics approval and consent to participate: Ethics approval was obtained from the Board of Ethics of Faculty of Medicine, University of Colombo (EC-12-187/16.01.2016) prior to the conduct of study. Permission to access school premises was obtained by the Provincial and Divisional Education Directors. Informed written consent was obtained from participants before collection of data.

Funding: Self-funded

Acknowledgements: Authors acknowledge the participants and experts involved in validation process in making this project a success. The team of educators who helped in the planning stage are also acknowledged.

Author contributions: EP was involved in the design of the study, data collection, data analysis and drafting the manuscript; RS and NG supervised the whole project and reviewing the manuscript; AS and CM were involved in drafting and reviewing the manuscript; and all authors read and approved the final manuscript.

References

1. International Labour Organization (ILO). *Workplace stress: a collective challenge*. Geneva: International Labour Office, 2016. Available from: <http://www.ilo.org/safework/documents/publication.pdf>.
2. Bhui PK. Is teaching stressful? A review of literature on global higher education sector. *Asian*

J Manag Res 2016; 6(3): 599-609. DOI: 10.25274/bcjms.v7n2.v7n2mc02.

3. Kyriacou C. Teacher stress: from prevalence to resilience. In J Langan-Fox & CL. Cooper (Eds.), *Handbook of Stress in the Occupations*, 2011: 161-173. Available from: <https://doi.org/10.4337/9780857931153.00027>.
4. National Institute of Occupational Safety and Health (NIOSH). *Stress at work*. Publication No. 99-101, 1999. Available from: <https://www.cdc.gov/niosh/docs/99-101/Stress>.
5. Leoppke R, Heron R, Bazas T, Beaumont D, Spanniard H, Konicki DL, Eisenberg B, Todd H. Global trends in occupational medicine: results of the international occupational medicine society collaborative survey. *J Occup Environ Med* 2017; 59(3): e13-116. DOI: 10.1097/JOM.00000000974.
6. United Nations. *Transforming Our World: the 2030 Agenda for Sustainable Development*. The General Assembly, 2015. Available from: <https://sdgs.un.org/2030/agenda>.
7. De Silva PV. *Burnout and other occupational health problems of female primary school teachers in the Southern Province of Sri Lanka*. MD Thesis (Community Medicine). Colombo: Post Graduate Institute of Medicine, Sri Lanka, 2005.
8. Fimian MJ. The development of an instrument to measure occupational stress in teachers: The Teacher Stress Inventory. *J Occup Psychol* 1984; 57(4): 277-293. DOI:10.1111/J.2044-8325.
9. Hanif R. *Teacher stress, job performance, and self-efficacy of woman schoolteachers*. MPhil Dissertation (Psychology). National Institute of Psychology, Quid-i-Azam University, Islam Abad, 2004. Available from: <http://pr.hec.gov.pk/jspoi/handle/123456789/5603>.
10. Jamaluddin JB. *Job related stress: an analysis of stress level among school music teachers in Malaysia*. MSc Dissertation. Selangor: University of Teknologimara, Malaysia, 2009. Available from: https://hrmars.com/papers_submitted/6862/Burnout_among_School_Teachers.pdf.
11. Samad NIA, Hashim Z, Moin S. Assessment of stress and its risk factors among primary school teachers in the Klang Valley, Malaysia. *Glob J Health Sci* 2010; 2(2): 163-171. DOI: 10.5539/GJHS.V2N2P163.

12. Boshoff SM. Validation of the Teacher Stress Inventory (TSI) in a South African context: the SABPA Study. Available from: <http://hdl.handle.net/10394/6277>.
13. Johanssen SE. *An analysis of the occupational stress factors identified by certified teachers*. Southern Electronic Theses & Dissertations. Georgia Southern University, 2011. Available from: <https://digitalcommons.georgiasouthern.edu/etd/377>.
14. Kourmoussi, N, Darviri C, Varvogli L & Alexopoulos EC. Teacher stress inventory: validation of the Greek version and perceived stress levels among 3,447 educators. *Psychol Res Behav Manag* 2015; 8: 81-88. DOI: 10.2147/PRBM.S74752.
15. Sumathipala A. & Murray J. New approach to translating instruments for cross-cultural research: a combined qualitative and quantitative approach for translation and consensus generation. *Int J Methods Psychiatr Res* 2000; 9(2): 87-95. DOI: 10.1002/mpr.83.
16. Department of Education. *School Census Preliminary Reports*. Colombo: Ministry of Education, 2016. Available from: http://www.moe.gov.lk/english/images/Statistics/stat2015-16/2016_new3.pdf.
17. Tabachnick BG & Fidell LS. *Using multivariate statistics*. New York: Harper & Row, Publishers, Inc, 1989. Available from: <https://scirp.org/reference>.
18. Abeysena C, Peiris U, Jayawardana P & Rodrigo A. Validation of Sinhala version of 30-item general health questionnaire. *Int J Collab Res on Intern Med Public Health* 2012; 4(7). DOI: 10.21276/ijmp.2016.2.5.038.
19. Dheerasinghe AS. *Prevalence of depression anxiety and stress among women aged 40 to 55 years according to their menopause status and risk factors of depression*. MD Thesis (Community Medicine). Colombo: Post Graduate Institute of Medicine, 2014.
20. Joreskog KG & Sorbom D. *LISREL8: User's Reference Guide*. Mooresville: Scientific Software; 1996. Available from: <https://www.scirp.org>.
21. Hays RD, Hayashi T, Carson S, Ware JE. *User's Guide for the Multi-trait Analysis Program (MAP)*. Santa Monica, California: The Rand Corporation, 1998. Available from: <https://www.rand.org/content/dam/rand/pubs/notes/2007/N2786.pdf>.
22. Hu LT & Bentler PM. *Cut-off criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives*. *Structural Equation Modeling*, 1999; 6, 1-55. Available from: <http://dx.doi.org/10.1080/10705519909540118>.
23. Brown TA. *Confirmatory factor analysis for applied research*. New York: Guilford Press, 2006. Available from: <http://www.kharazmi-statistics.ir/Uploads/Public/book/Methodology.pdf>
24. Bentler PM. Comparative fit indices in structural models. *Psychol Bull* 1990; 107(2): 238-246. DOI: 10.1037/0033-2909.107.2.238.
25. Browne MW & Cudeck R. *Alternative ways of assessing model fit*. In KA Bollen and JS Long (Eds.). *Testing structural equation models*, 136-162. Newbury Park, CA: Sage, 1993. Available from: <https://www.scirp.org>.
26. Hanif R & Pervez S. Levels and sources of work stress among women schoolteachers. *Pakistan J Psychol Res* 2003; 18(3-4): 97-108. DOI: 10.1037/0033-2909.107.2.238.
27. Nunnally JC & Bernstein IH. *Psychometric Theory*. McGraw-Hill, USA, 1994. Available from: <https://doi.org/10.1177/014662169501900308>.
28. Jonathon S. "A tutorial on principal component analysis." arXiv preprint arXiv:1404.1100; 2014. Available from: <https://doi.org/10.48550/arXiv.1404.1100>.
29. MacCallum RC, Widaman KF, Zhang S, Hong S. Sample size in factor analysis. *Psychol Methods* 1999; 4(1): 84-99. DOI: 10.1037/1082-989X.4.1.84.