Urdu Translation and the Validation of a 14-Item Measure to Assess Stress Management Skills in Healthcare Workers: Measurement Invariance Across Gender

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Abstract: This study aims to conduct an Urdu translation and a validation of the ISBF Stress Management Skills Scale in two distinct phases. The first phase includes the forward-back translation method for ISBF. The second phase includes cross validation and the establishment of psychometric properties for the ISBF scale. A sample of 500 adults working in health care was taken from different hospitals and dispensaries. The first phase of the study includes the forward-back translation method. The second phase includes exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) with invariance measurement. The total reliability of the scale is reported to be .812. EFA revealed a two-factor structure for ISBF scale, with configural, metric and scalar invariance across males and females, and comparable latent mean scores for males and females. CFA showed goodness-of fit indices for the two factors. The scale showed good internal consistency values. The model fit value includes the value for the goodness of fit index, which was .979, for the adjusted goodness-of fit index: .961, for the comparative fit index: .993, for the incremental fit index: .993, and for the root mean square error of approximation (RMSEA) value: .033. Good values of composite reliability and convergent validity were measured for both dimensions of the scale. The scale shows that this diagnostic tool can help to assess the skills used to manage stress. For criterion validity, the coping Inventory for Stressful Situations (CISS-21) was used, which showed positive correlations. The subscale of stress management was taken from the Health Promoting Life Style Profile II (HPLP-II), which also showed positive correlations. Significant mean differences were found between scores of healthcare workers with stress management skills and with those without stress management skills. The group of mean differences indicated the females have greater stress management skills as compared to men. The Urdu translated and validated instrument will be helpful in understanding behavior in healthcare settings.

Keywords: Stress management skills; coping; lifestyle healthcare workers; gender; invariance; Urdu; translation and validation.

Introduction

Stress management skills include methods of handling stress. Excessive stress can lead to major health concerns. It can disrupt a person's psychological, emotional,

physiological and spiritual wellbeing. Different skills and strategies may help to curb stress and promote healthy outcomes. There is a dearth in literature on effect stress management skills; such skills are culture specific, which is evident from the exhaustive list of studies concerning stress or stressors.

There is a need to explore better stress management skills. Health care workers are faced with many occupational risks. There are some different stress management skills, including animal assisted intervention programs for medical staff, Tai Chi programs for nurses, workplace interventions for residential and home care staff, resilience and prevention interventions for doctors and physicians, and preventive staff support (Fadel et al. 2023). However, an Urdu version of a stress management skills instrument was lacking, hence the scale was translated to better understand the stress management skills used by Urdu native speakers in a socio-cultural context.

Stress management skills are integral to combatting stress, which, after the impact of momentary episodic mental pressures, may lead to permanent physiological conditions associated with morbidity. Cortisol and stress hormones disturb a person's normal vitals. The flight and fight response may aid temporarily, but for repetitive stress it is important to follow a set of skills that are validated for use (Aideyan et al. 2020). Health care workers are more prone to psychological and physiological stress that lead to sleep disturbances, memory loss, poor reactivity, harming patients and even suicide (Hersch et al. 2016). If not managed, it can result in a compromised immune system, and negatively affects the limbic and neurophysiological systems. Hence, a vicious stress cycle may wreck a health care workers' overall health.

Stress management is an important topic in current era, where the incidence of chronic disease is reported to be correlated with elevated stress levels. Coping with stress and managing stress is integral to reducing stress and to curbing any diseases that are due to stressors. Coping with stress is extremely important and it is necessary to use adaptive methods for the restoration of health. It is reported that people may have chronic diseases if they avoid coping with stress and have low levels of mindfulness (Gruszczynska et al. 2022). Being in a health care environment can be stressful for the staff.

Stress in health care is important to study, as the Physician Workload Survey reports that 74% of physicians reported stress. They manage stress through unhealthy eating habits. Stress and lack of stress management skills cannot coexist in a healthy healthcare workforce. A study conducted in China reported that if stress is not managed properly then it turns into depression, anxiety, insomnia and distress, and 70% of healthcare workers report being psychologically distressed (Lai et al. 2020). A similar study in Peru was conducted in which 22% of healthcare workers had anxiety and 26% reported mental distress (Jahanshahi et al. 2020). A study in Nepal found that 38% of healthcare workers suffer from depression (Gupta et al. 2020). According to the American Psychological Association (APA 2011), men are less likely than women to have stress management skills such as reading (32% vs. 44%), and are less likely to go to a therapist to learn stress

management skills (1% vs. 5%). Pakistan also faces numerous problems related to macro factors like health, education, economic, and population related issues. The severity of stress is alarming. Another Pakistani study found out that 53.4% of the respondents were symptomatic and 18.3% were severely stressed with a 35% rate of depression (Shahid et al. 2022).

The Stress Management Skills Inventory has not been translated into the Urdu language. Urdu is the national language of Pakistan and is mostly spoken in the South Asian context. Translating the scale into the Urdu language can help give insight into the phenomenon of how stress is managed by the Pakistani population. Moreover, the developer of the scale requires the instrument to be validated for clinical samples (Wirtz et al. 2012) so a potential gap is being fulfilled in the study.

Gender differences are important to explore in health care settings, as they can pave the way for interventions. A study showed that females reported higher coping or stress management techniques (Edwards & Deborah 2000). Another study demonstrates that females manage stress in different ways and in greater number than their male counterparts (Pocnet et al. 2015). Age is considered to be an important factor in health care studies as far as stress and stress management skills are concerned. Younger workers tended to report greater stress in a study that examined perceived differences in stress levels between day and night nurses working in mental health care (Edwards & Burnard 2003). More perceived stress is present in married persons in the Asian context, which may indicate that married people are less likely to have a diverse stress management skill set (Rai et al. 2021). Stress management techniques are also helpful in significantly reducing the depression of young people in their early twenties, such as using mindful based stress reduction (Chi et al. 2018).

1. Research Aims

There are three basic aims of the following study. The first aim is to translate and adapt a stress management skills inventory. The second aim is to conduct factor analysis of the translated and adapted stress management skills inventory on the native population. The third aim is to validate the stress management skills inventory to assess construct validity and concurrent validity.

2. Method and Measures

This study was conducted in two phases. The first phase included the process of translating ISBF stress management skills into Urdu. The second phase includes the validation of psychometric properties. The exploration of factors took place through confirmatory factor analysis. It covers the tests of measurement invariance of the ISBF scale across both males and females.

The scores of ISBF were correlated with the CISS-21 scale by using correlation. As stress management and coping are inter-related, CISS-21 was selected to check the criterion validity of ISBF. The subscale of stress management formed from HPLP-II was also correlated to further assess validity. Using Independent t-test, gender differences and the scores of healthcare workers with stress management skills to those without stress management skills were measured and compared. The following measures were used:

***Stress Management Skills (ISBF)*:** This is a 14-item survey (Wirtz 2012) was used to collect and analyze data. The scale is a 5-point response scale, including 1 (= I cannot do this at all); 2 (= I cannot do this well); 3 (= I can do this medium amount); 4 (= I can do this well); 5 (= I can do this extremely well).

The inventory consists of 5 subscales: (1) Cognitive strategies and problem solving; (2) Identification and use of social resources; (3) Relaxation abilities; (4) Adequate anger expression and assertiveness; and (5) Perception of bodily tension. This scale was adapted in German, from the English version (Antoni et al. 2006) and adapted to the Urdu Language for cultural relevance. Stress management skills (ISBF) was funded by the Swiss National Science Foundation (2009-2012). The study examined the psychometric characteristics of a short questionnaire for determining stress management skills in the general population. It was reported that the questionnaire has good psychometric properties linked with subjective psychological and objective physiological stress indicators.

***Coping Inventory for Stressful Situations (CISS)*:** This is a 21-item survey (Endler & Parker 1992) that was used for convergent validity purposes. The scale is a 5-point response scale, 1 = not at all to 5 = very much.

The inventory consists of 3 subscales: (1) Task oriented coping scale; (2) Emotional oriented coping scale; and (3) Avoidance oriented coping scale. This scale was originally named the MCI and the short form of CISS is used.

***Health Promoting Lifestyle Profile-HPLP-II-Stress Management*:** Stress management is one of the subscales (Antonovsky 1987; Ardell 1986) from the Health Promoting Lifestyle Profile, which is a 52-item survey with a total of six subscales (Walker et al. 1990). The other subscales include: (1) Spiritual growth, (2) Interpersonal relations, (3) Nutrition, (4) Physical activity, and (5) Health responsibility. The scale is a 4-point response scale, 1 = never, to 4 = routinely. The subscale of stress management includes a total of 8 items.

3. Research Phases

3.1 Translation of Stress Management Skills (ISBF) in the Urdu Language

For the first phase, the translation of ISBF took place: from the source language of English to the target native language Urdu. The translation was done with the collaboration of three bilingual experts (two assistant professors and one professor) nationally and internationally. They were guided to translate the scale with precise wording. After receiving the three translations, experts in psychology (one professor, one assistant professor and one lecturer) examined the items and checked for lexical sense, grammar, literal competency and congruence. Using the Brislin method, back translation was followed by one expert (assistant professor) of the English Language (Brislin et al. 1976). The expert was not informed about the original English worded items. After pilot testing, it was established that the items contained no uncertainty and could be used for further analyses. The scale was administered for pilot testing on a sample of 50 respondents between the ages of 18–75. The results indicated that there is no uncertainty in scale items and can be moved further for analyses.

3.2 Psychometric properties of Stress Management Skills

To determine the psychometric properties of the Urdu Translation of ISBF, Cronbach alpha was used for reliability analysis. Exploratory factor analysis (EFA) was used to explore dimensions of the construct using IBM SPSS v.23. Analysis of Moment Structure (AMOS 23) was used for confirmatory factor analysis (CFA) to conduct construct the validity of factors of ISBF. Correlation with the CISS-21 and the HPLP-II subscales was used to assess convergent validity of ISBF. The scores of health workers with stress management skills were also compared with the scores of healthcare workers without stress management skills.

4. Sample

A sample of N=500 healthcare workers was collected from different hospitals (having stress management skills) and dispensaries by using convenience sampling. Written and stamped consent letters were taken from the relevant hospital and dispensary authorities for data collection. Participants who granted consent were invited to fill the paper-pencil questionnaires after informed consent. ISBF was administered on 400 participants who showed stress management skills. Out of these, 230 were females and 170 were males. A comparison group was formed for group testing. For this purpose, a separate different sub-sample of 100 healthcare workers was used as a comparison group to compare the scores of healthcare workers with stress management skills and those without any stress management skills.

5. Procedure

The approval of ISBF was obtained from the main author. The consent for the CISS-21 and HPLP-II subscales were also taken from the principal author. The prior approval was obtained from concerned authorities (the hospital's director and medical officers) and from the director of dispensaries. Ethical committee approval was also obtained, along with written informed consent, firstly from the author of the scale and from data collection heads. Participants were given instructions and were thanked for their participation.

ISBF was administered on healthcare workers with stress management skills, in the age range of 18-75, both males and females. It was administered on healthcare workers without stress management skills in dispensary settings. A total of 200 healthcare workers (33.5 % males and 66.5 % females) were requested to fill the ISBF along with the CISS-21 and HPLP-II subscales. The ISBF was administered in the Urdu language whereas the CISS-21 and HPLP-II subscales were conducted in the English language because all the subjects could understand both languages proficiently.

6. Data Analyses

After data collection, statistical analyses were used. EFA in IBM SPSSv.23 was used to determine factor structure and the dimensions of the scale. CFA in AMOS v.23 was used to evaluate factors of ISBF. Pearson product moment correlation was used to evaluate factors of ISBF among all scales. T-test was used to measure gender differences. A T-test was also conducted to measure differences of healthcare workers with stress management skills and the healthcare workers without stress management skills.

7. Results

The reliability analysis of ISBF was conducted and showed that the total alpha value of scale to be .804 indicating two factor extraction. For Factor 1, the alpha value was .891 and for Factor 2, the alpha value was .729.

7.1 Validation of ISBF

EFA was used for factor structure and dimensionality. CFA was used to evaluate factors of ISBF. CFA is the optimal solution for factor analysis. Standardized regression values were greater than .35. The graphical representation is given below.

Figure 1 depicts the factor models of two dimensions of ISBF; Table 1 shows the demographic features of the sample with respect to age, gender and marital status with frequency and percentage.

Table 2 shows the extraction value of all the items for ISBF and showed that 10 items out of 14 have satisfactory value and is above .5 to measure stress management skills. Three items below .5 were removed.
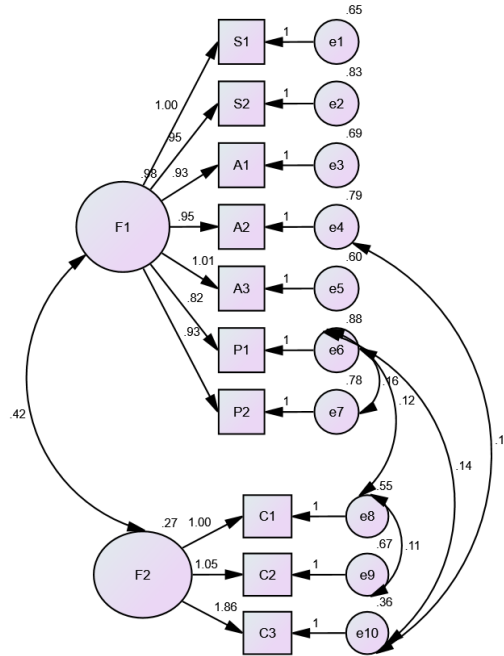

Figure 1: Illustration of two dimensional ISBF. Note: ISBF=stress management skills scale.

Demographics (*N*=400)		Frequency	Percentage %
Gender	Male	170	42.5
	Female	230	57.5
Age	Young adults (18-39)	270	67.3
	Middle-aged	112	28.0
	adults (40-59)		
	Older adults (60+)	9	2.3
Marital status	Married	118	44.3
	Unmarried	164	41.0
	Divorced	21	5.3
	Widowed	16	4.0
	Separated	19	4.8

Table 1: Demographic features of the sample with stress management skills (N=400).

Item No.	Value
2	.551
3	.713
4	.623
5	.577
6	.670
7	.592
8	.618
9	.597
11	.621
14	.586

Table 2: Communalities Values of Extraction Method by using Principal Component Analysis of ISBF (N=400). Note: ISBF = stress management skills scale.

Table shows the factor loading value of two factors for ISBF Urdu translation:

Item No.	Factor 1	Factor 2
8	.764	
11	.750	
14	.745	
5	.737	
9	.693	
7	.679	
2	.578	
3		.832
4		.760
6		.612
%variance	37.869	
Cumulative variance	47.957	
Kaiser-Meyer-Olkin measure	.940	
Bartlett's test of sphericity	3.321 < 0.0001	

Table 3: Factor Loadings for Exploratory Factor Analysis by Using Varimax Rotation of ISBF (N=400).

Goodness-of-fit indices							
Models	$\chi2$ /df	$\chi2$/df	GFI	AGFI	CFI	IFI	RMSEA
ISBF	41.803/29	1.44	.979	.961	.993	.993	.033
(2 factor)							

Table 4: Model Fit Indices for ISBF (N=400). Note: Stress management skills Scale ISBF-GFI = goodness-of-fit index; AGFI = adjusted goodness-of-fit index; CFI = comparative fit index; IFI = incremental fit index; RMSEA = root mean square error of approximation.

Construct	Items	Factor Loadings	Cronbach alpha (>.7)	CR>0.6	AVE >.5
Factor 1	A1	.737	.891	.875	.502
(identification of	A2	.693			
social resources/	A3	.750			
adequate anger	S1	.764			
expression and management	S2	.745			
Perception of bodily tension)	P1	.578			
	P2	.679			
Factor 2					
(cognitive strategies	C1	.832	.729	.781	.548
and problem solving)	C2	.760			
	C3	.612			

Table 5: The CFA Reliability and Validity Results for Final Model of ISBF (N=400). Note: CFA = confirmatory factor analysis; ISBF = stress management skills scale; CR = composite reliability; AVE = average variance extracted.

Scales	ISBF	CISS-21	HPLP-II-ST
ISBF	-	.057	.049
CISS-21	-	-	.372**

*Table 6: Correlation among Subscales of ISBF, CISS-21 and HPLP-II-ST (N=100). Note: ISBF = Stress management skills scale; CISS-21= Coping inventory for stressful situations; Health promoting life style profile subscale stress management *p<.05. p**<.01.*

Scales	RA	PB	CP	AE	SR	TC	AC	EC	ST
RA	-	.499**	.747**	.445**	.463**	.018	.004	-.022	.088
PB	-	-	.589**	.476**	.332**	.013	.101	.006	-.038
CP	-	-	-	.509**	.422**	.014	.209**	.085	-.091
AE	-	-	-	-	.473**	.043	.060	-.001	.190
SR	-	-	-	-	-	-.013	-.029	-.003	.049
TC	-	-	-	-	-	-	.748**	.733**	.406**
EC	-	-	-	-	-	-	-	.859**	.280**
AC	-	-	-	-	-	-	-	-	.346**

Table 7: Correlation Among Subscales of ISBF, CISS-21 and HPLP-ST (N=100). Note: ISBF = Stress Management Skills Scale; RA = relaxation abilities; PB = perception of bodily tension; CP = cognitive strategies and problem solving; AE = adequate anger expression and assertiveness; SR = identification and use of social resources. CISS-21 = Coping Inventory for Stressful Situations Scale; TC = task-oriented coping; EC = emotional oriented coping; AC = avoidance-oriented coping; ST = subscale of stress management.

Scales	Healthcare workers with stress management skills (N = 100)		Healthcare workers without stress management skills (N = 100)				95% CI		Cohen's d
	M	SD	M	SD	t (3.68)	p	LL	UL	
ISBF	41.30	8.29	38.05	9.62	2.750	.011	1.15406	7.0059	.361
RA	5.08	2.196	6.71	2.508	-4.890	.000	.333	-2.287	.691
CP	15.40	2.37	13.90	3.67	3.561	.000	.696	2.421	.485
AE	8.73	2.814	7.52	2.710	3.098	.002	.440	1.980	.438
SR	5.92	4.77	2.116	1.932	4.013	.000	.744	5.775	1.04
PB	6.08	1.963	5.12	1.713	3.685	.000	.446	1.474	.521

Table 8: Comparison between the Scores of Healthcare Workers with Stress Management Skills and Healthcare Workers without Stress Management Skills on ISBF and its Subscales. Note: ISBF = stress management skills scale; RA = relaxation abilities; CP = cognitive strategies and problem; AE = adequate anger expression and assertiveness; SR = identification and use of social resources; PB = perception of bodily tension.

Variable	Males (n=170)		Females (n=230)				95% CI		Cohen's d
	M	SD	M	SD	t (396)	p	LL	UL	
ISBF	31.0476	12.41006	40.4348	10.50193	-8.152	.00	-11.65	7.12	.80

Table 9: Gender Differences on ISBF.

Table 9 specified gender differences on ISBF. It showed that stress management skills are greater in female healthcare workers as compared to male healthcare workers. The value of Cohen's d specified differences between the mean scores of two groups on ISBF.

Model	χ2	df	CFI	RMSEA	Model Compare	Δχ2	Δdf	ΔCFI	ΔRMSEA
Model1	58.7	52	.999	.002					
Model2	60.1	58	.999	.002	2 versus 1	22.7	10	.008	.001
Model3	80.9	63	.999	.002	3 versus 1	26.9	17	.006	.001

Table 10: Invariance Tests for the ISBF scale across gender (N=400). Note: M1 = invariant form model (configural invariance); M2 = invariant loading model (metric invariance); M3 = invariant intercept model (scalar invariance).

Table 10 demonstrates the invariance analysis across gender for the CFA of ISBF scale. The factor structure was kept intact for both genders for checking configural variance. The results showed that the data gelled for male and female health workers, which shows that ISBF scale was configurally invariant across males and females. Metric invariance further shows that the factor loadings of items for ISBF were constrained to be exact across males and females. The results revealed that data had fitted well for the validation, which proves a strong indication of metric invariance. It was identified that there are nonsignificant chi-square difference tests and no differences were seen in other measures of fit indices, which indicated that the data has gelled well for Models 1 and Model 2, respectively. Moreover, the scalar invariance was estimated by constraining factor loadings with intercepts that were equal for males and females. This scalar invariant model showed a robustness in the data. The comparison of scalar invariant models showed insignificant chi-square difference tests in CFI and RMSEA values that showed complete scalar invariance for the ISBF scale for males and females.

7.2 Latent mean differences

The latent mean differences were checked while keeping the group of females as a reference. The latent mean was fixated at zero value for the ISBF scale. The latent mean for males was estimated. It was seen that latent means of men and women had no significant difference (CR=1.53, *p*=.052).

8. Discussion

The current study was conducted to translate and validate ISBF in the Urdu language. The results indicated a reliability of .812. The results of the EFA showed the factor structure with two principal dimensions. CFA was used to analyze model fitness for both factors, which showed an acceptable level of model fit for the two factors of ISBF. The alpha values of factors are reported as .891 and .729, respectively.

Two factors of ISBF showed good values for composite reliability and adequate convergent validity. The estimated composite reliability for Factor 1 was .875 and the estimated convergent validity was .502. For Factor 2, the estimated composite reliability was .781 and the estimated convergent validity was .781. ISBF has showed good construct

validity with items having significant positive correlations with total scores. Two factors of ISBF showed a satisfactory level of goodness-of-fit indices.

As far as the chi-square test is concerned, the value of χ2 was 41.803 with gradual freedom value as 29. The value for χ2/df =1 is deemed as perfect and any value less than 5 is considered acceptable. This model showed that χ2/df =1.441.

Similarly, the obtained values for GFI=.978, for AGFI= .979, for CFI .993, IFI .993, TLI (Tucker-Lewis Index) .989 and for NFI (normed fit index) .978 are all greater than .90. All the values indicate a good model fit (Hair et al. 2006). The value for the root mean square error of approximation (RMSEA) was .03, which must be less than .08. It indicates that the model is an acceptable fit (Hu & Bentler 1999). Hence, ISBF shows two dimensions with good values for a model fit with AGFI, and a rigorous fit with IFI. The CFA results showed that the scale has yielded two factors that show multidimensionality. The ISBF scale has five postulated subdimensions (Wirtz et al. 2012). The English version had four subdimensions (Antoni et al. 2006), however, the Urdu translated version showed two dimensions or factors. The German version had 14 items, the English version had 13 items and the Urdu version had 10 items, rendering the scale shorter.

Moreover, the CFA for translated tests show a different structure than the parent version, which means that the translation has had a profound impact on the structure of the test. Therefore, the construct of ISBF in the Urdu language is cross-culturally different in terms of factor structure (Fenn et al. 2020). The English version of the scale was administered on patients, the German version of the scale was administered on the general population, whereas the Urdu version was administered on health workers, hence the historical background in the healthcare profession in comparison of samples may have influenced the factor structure (Brzyski et al. 2016). The findings yielding two factors and not more factors are attributed to the difference between samples as mentioned in the original scale (Newell et al. 2020). As per the original scale, out of all the total constructs, all variables were retained; excluding relaxation abilities. Consistent with the findings from the original version of stress management skills, relaxation did not fit the data when not freely estimated (Antoni et al. 2006) and same holds true in this particular study.

For establishing the criterion validity of ISBF, Coping for Stressful Situations (CISS-21) or CISS-Short was used for correlation with ISBF as well as with its subscales. The results showed mostly positive correlations of all subscales of ISBF with CISS-21. The studies indicated that Coping for Stress Situations scale and Stress Management Skills Scale have a positive relationship (Manning-Geist, Meyer & Chen 2020; Rahe et al. 2002; Ebner et al. 2018). The subscale of stress management from Health Promoting Lifestyle Profile (HPLP-II) has shown strong significant positive correlations.

The discriminant validity of ISBF was calculated by comparing the scores of healthcare workers with stress management skills with the healthcare workers without stress management skills. The findings indicated significant differences between healthcare workers who had stress management skills from those who did not have stress

management skills, as mentioned in Table 8.

The ISBF scale was administered on a non-clinical population. The scale adapted and validated for clinical population settings show that it is a fit that can be administered on clinical populations as well, which increases the credibility and strength of the scale in terms of psychometrics. The correlation of ISBF with the CISS-21 and HPLP-II subscales is a great contribution to the academic literature. It was concluded that ISBF is a precise and simply administered scale, fit for both clinical and non-clinical populations.

The stress management skills questionnaire is present in English and German, yet both the scales had measurement invariance missing across males and females. Hence, guidelines were followed for calculating measurement invariance across gender (Vendenbert & Lance 2000), as in Table 10. The first step included the test of configural invariance for both groups. This led the factor loadings, residuals and intercepts for free estimation. The configural invariance was important to check for the theoretical framework for the structure to be validated for both groups. This helped the invariance test to be carried out. Since both males and females were included in the study, there is strong evidence that it includes configural invariance. The second step included metric invariance in which factors loadings were curtailed. This suggested weak invariance, so different groups had responded to the indicators. It was concluded that the ISBF scale with constrained loadings had insignificant difference in terms of gelling with data. The third step included scalar invariance, in which indicators were curtailed for males and females. It provides a strong empirical foundation for seeing how the scale behaves for both genders. The results showed strong evidence for scalar invariance. And when the indicators were not freely estimated there was insignificant difference in the data fit for the $\chi 2$, CFI, and RMSEA values. After this stage, latent means were checked. Then after this test, the latent means were compared across groups.

9. Limitations

The present study took the scale of CISS-21 and subscale of HPLP-II for correlation with ISBF. It is recommended that more scales must be used for determining the divergent validity of the scale.

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