Original Article

Psychometric properties of the Turkish version of the Moral Injury Symptom Scale- Healthcare Professional

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Abstract

Objectives: This study was carried out to examine the validity and reliability of a Turkish version of the Moral Injury Symptom Scale-Healthcare Professional (MISS-HP).

Methods: This methodological study was performed with 125 nurses working in hospitals in Turkey in March-April 2021 using online forms. IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA) and IBM SPSS AMOS Version 21.0 software (IBM Corp., Armonk, NY, USA) were used to perform the analysis.

Results: The linguistic validity of the MISS-HP was assessed using the translation-back translation technique and expert opinions. The sample size was found to be sufficient and suitable for factor analysis (Kaiser-Meyer-Olkin=0.888, chi-squared=1067.959, degrees of freedom [DF]=45, p=0.000). A 3-factor structure with 10 items was determined, and the factor load of the items ranged from 0.84 to 0.94. The fit index values were acceptable and within the limits of perfect agreement (minimum discrepancy/DF [CMIN/DF]=1.712, root mean square error of approximation [RMSEA]=0.076, standardized root mean squared residual [SRMR]=0.045, adjusted goodness-of-fit index [AGFI]=0.856, goodness-of-fit index [GFI]=0.916, Tucker-Lewis index [TLI]=0.970, relative fit index [RFI]=0.930, incremental fit index [IFI]=0.979, normed fit index [NFI]=0.950, comparative fit index [CFI]=0.978). Average variance extracted values >0.50 and composite reliability values >0.70 for each factor confirmed convergent and divergent validity of the scale. The Cronbach alpha reliability coefficient of the scale was 0.91 and the split-half reliability coefficient was 0.95. There was a statistically significant, moderate, positive correlation was seen between the Compassion Fatigue-Short Scale (CF-SS) and the MISS-HP scores (r=0.446, p=0.000).

Conclusion: The Turkish version of the MISS-HP is a valid and reliable instrument to evaluate moral injury in healthcare professionals.

Keywords: Healthcare professional; Moral Injury Symptom Scale; reliability; scale adaptation; validity.

Moral injury is a term that describes the psychological distress that results from action or a lack of action that violates a person's ethical rules or moral values.[1] It typically occurs when an individual is a victim, participant, or a passive witness to traumatic events, and the damage can have devastating effects.[2] Moral injury has been increasingly recognized as a widespread syndrome among members of the military, and progress has been made in diagnosis and treatment.[3,4] Similarly, moral injury is known to occur in nurses, doctors, and other healthcare professionals who work in difficult conditions facing high-pressure situations that can include moral ambiguity.[5,6]

Moral injury has become an important concept for healthcare professionals on the front lines of health services worldwide, especially since the outbreak of the coronavirus 2019 (COVID-19) pandemic. The numerous challenges healthcare professionals have faced and continue to confront have been well documented.[7] Among the many difficulties they face, healthcare professionals have to make decisions about prioritizing and allocating limited critical resources, such as intensive care beds or respirators, to COVID-19 patients.[8,9] The extraordinarily demanding conditions have contributed to effects such as decreased job performance, absenteeism,

What is presently known on this subject?

- Moral injury, a profound reaction to inner conflict, is a well-known syndrome among those who must face complex, traumatic circumstances, including healthcare professionals, and particularly nurses who have direct contact with patients. However, as yet, there is no instrument that can be used to evaluate moral injury in healthcare professionals in Turkey.

What does this article add to the existing knowledge?

- This validity and reliability study of a Turkish version of the Moral Injury Symptom Scale- Healthcare Professional version provides a new tool to identify those with signs of moral injury and monitor response to treatment.

What are the implications for practice?

- A reliable instrument to determine the degree of moral injury experienced by healthcare professionals in Turkey will enable comprehensive study and informed policy to address this important issue.

fear, insecurity, and anxiety among healthcare professionals.[3,10] Importantly, severe psychological problems, such as post-traumatic stress disorder, anxiety disorder, depression, and suicidal tendencies, may result.[10] Furthermore, treatment of moral injury can be more challenging and prolonged than current strategies used to treat depression or anxiety.[11]

In addition to limited research to comprehensively substantiate the significance of moral injury among healthcare professionals, there are not enough measurement tools to realistically and accurately measure the extent of injury or determine prevalence.[12,13] This has slowed greater understanding of the syndrome, the diagnosis and treatment of moral injury, and the implementation of preventive measures.[5] Several instruments have been developed and used to measure moral injury in military personnel.[3,14] Mantri et al.[5] modified the 10-item short version Moral Injury Symptom Scale-Military Version (MISS-M), developed by Koenig et al.,[15] for use with healthcare workers: The Moral Injury Symptom Scale-Healthcare Professional (MISS-HP) and performed a validity and reliability study. A Chinese version of this scale, adapted before the COVID-19 pandemic, was introduced into the literature by Zhizhong et al.[16] when the pandemic began. The results of these studies demonstrated that the MISS-HP is a valid and reliable tool to measure the level of moral injury among nurses, physicians, and other healthcare professionals.

Though there are some measurement tools adapted for Turkish populations that address some of the mental health issues of healthcare professionals, there is no tool that directly measures moral injury. A valid and reliable measurement instrument in Turkish is required to assess moral injury in healthcare professionals. The Mantri et al.[5] MISS-HP uses 10 items to assess moral injury and has been recognized as valid and reliable. The aim of this study was to determine the psychometric properties of a Turkish version of the MISS-HP.

Materials and Method

Ethical Considerations

Before the study, written permission was obtained by e-mail from Sneha Mantri and Harold G. Koenig. Approval for the research was granted by the Non-Interventional Clinical Re-

search Ethics Committee of Amasya University on March 4, 2021 (no. 30) and the participants provided informed consent.

Study Population and Sample

The study was conducted in March-April 2021 in hospitals in Turkey using an online survey; there was no sample selection. All of the nurses who responded to the questionnaires constituted the entire research sample. When determining sample size in scale adaptation studies, it is suggested that the sample be 5-10 times the number of scale items.[17] The responses of a total of 125 nurses were used in this adaption study of a scale with 10 items.

Data Collection Tools

A personal information form was used to collect sociodemographic data. The language and content validity were assessed and confirmed, and the study participants were asked to complete a Turkish version of the MISS-HP as well as the Compassion Fatigue-Short Scale (CF-SS), adapted into Turkish by Dinç and Ekinci.[18]

Personal Information Form

A 7-question form was used to request sociodemographic characteristics (age, gender, marital status, educational level) and details of working conditions (working hours, work unit, type of work).

Moral Injury Symptom Scale-Healthcare Professionals Version

The MISS-HP is a 10-item scale developed by Mantri et al.[5] for health professionals. Each item is scored on a scale from "strongly disagree" (1) to "strongly agree" (10). To reduce response bias, 4 of the items are expressed as positive statements and 6 as negative. After reverse coding the positive items (items 5, 6, 7, 10), the sum possible total score is 10-100. A cutoff score of 36 is used to identify signs of moral injury causing moderate to extreme problems with family, social, and occupational functioning.

Compassion Fatigue-Short Scale

The CF-SS is a 10-item, Likert-type, self-assessment scale consisting of secondary trauma and occupational fatigue subdimensions. Dinc and Ekinci[18] conducted a validity and reliability study of a Turkish version of the instrument. The total possible score is 13-130, based on a scale that ranges from rarely/never (1) to very often (10). There is no cutoff point; a higher score reflects greater compassion fatigue. The Cronbach alpha coefficient of the scale was 0.87, and 0.74 for the secondary trauma factor and 0.85 for the fatigue factor. In this study, the Cronbach alpha coefficient of CF-SS was 0.87, 0.74 for secondary trauma, and 0.81 for fatigue.

Pilot Test

After determining the language and content validity of the scale, a pilot study was conducted with 20 nurses to assess whether it was understandable and applicable. The pilot examination determined that the items were appropriate, and no corrections were made to the scale. The data obtained from the pilot study were not included in the study results.

Data Collection

The forms used to collect data were made available online using Google Forms survey administration software (Google LLC, Mountain View, CA, USA). Nurses who volunteered to participate in the study were enrolled. The data were collected over a period of 2 months.

Data Analysis

The language and content validity of the scale were affirmed, and exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted to evaluate structure validity. Average variance extracted (AVE) and composite reliability (CR) values were calculated for convergent and divergent validity. The Cronbach alpha value was calculated to measure scale reliability, and split-half reliability was tested to assess consistency. The results of the CF-SS were used to examine reliability using the Pearson correlation test. The cutoff score was determined using receiver operating characteristic (ROC) curve analysis. IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA) and IBM SPSS AMOS Version 21.0 software (IBM Corp., Armonk, NY, USA) were used to perform the analysis.

Shapiro-Wilk test results to assess the normality of distribution were 0.982, DF=125, p=0.101 (p>0.05). The skewness (-0.009±0.217) and kurtosis (-0.712±0.430) values were within ±1.96, confirming normal distribution of the MISS-HP values. A Q-Q plot diagram and boxplot graph also illustrate that the data converged to normality with no outlier values. A graph of the histogram showed that the data was regularly distributed as a bell curve. The CF-SS data were also found to exhibit normal distribution (Shapiro-Wilk test=0.985, DF=125, p=0.179, skewness=-0.266±0.217, kurtosis=-0.188±0.430).

It was determined that the base effect and ceiling effect values of the MISS-HP were <20% and normal.[19] For the entire scale, the floor effect was 0.8% and the ceiling effect was 0.8%; for the first factor, the floor effect was 14.4% and the ceiling effect was 0.8%, while for the second factor, the floor effect was 0.8% and the ceiling effect was 1.6%, and 1.6% and 0.8%, respectively, for the third factor.

Results

The mean age of the 125 nurses who participated in the study was 31.93±8.20 years (min-max: 21-54), 79.2% were women, 51.2% were married, and 75.2% had an undergraduate degree. Analysis of their work experience revealed that 41.6% had ≤5 years of professional experience, 22.4% had 6-10 years, and 36.0% had >10 years of experience. The data related to working hours and type of work indicated that 76.8% worked shifts, 32.0% worked in internal medicine and surgery clinics, 28.0% in an intensive care unit (including COVID-19 clinics), 20.0% in emergency departments, 10.4% in ambulance and nursing units, 5.6% in outpatient clinics, and 4.0% in administrative units.

Validity Analysis

The first stage of adaptation of the scale for use with a Turkish population was affirmation of language and content validity. Subsequently, EFA and CFA were performed to assess construct validity, and finally, convergent and divergent validity were evaluated.

Language Validity

The original English-language scale was first translated into Turkish by a native Turkish translator and then back into English by an independent translator using the back-translation technique. The researcher and a faculty member with advanced English skills compared the English and Turkish assessments, and the scale translation was consolidated. The same translation team used a language validity assessment form to score the English and Turkish equivalents 0-5. Each expert gave the items a score of 4 or 5. The scale items were then reviewed by an associate professor and a Turkish expert in Turkish language and literature, and minor changes were made to adjust synonyms to the most appropriate use in Turkish. The final Turkish version was prepared based on the opinions of 5 English-language and 2 Turkish-anguage experts as well as the researcher, who is a faculty member in the field of psychiatric nursing.

Content Validity

Once the translation process was completed, the scale was e-mailed to 10 experts in the nursing field (psychiatric nursing, general nursing, public health nursing). Seven experts (1 professor, 2 associate professors, 4 faculty members with a PhD) responded. The Davis technique was used to evaluate expert opinion. The content validity index (CVI) is determined for each item. A CVI value of >0.80 indicates sufficient validity. Items with a low CVI score should be eliminated.[20] The CVI scores of all of items of the adapted scale were >0.80: the second item of the scale yielded a CVI of 0.85 and all of the other items had a CVI=1. After minor changes to the scale items, the Turkish form of the scale was reviewed by a linguist and the content validity of the scale was confirmed.

Exploratory Factor Analysis

Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity were used to determine the adequacy of the sample for fac-

Table 1. Explanatory factor analysis results of the MISS-HP

Scale items	Factor 1	Factor 2	Factor 3
MISS8	0.958		
MISS9	0.901		
MISS2	0.834	0.144	
MISS1		0.932	
MISS4	0.146	0.830	
MISS3	0.219	0.750	
MISS5	-0.257	0.199	0.942
MISS10			0.929
MISS6	0.225	-0.125	0.853
MISS7	0.183		0.816
Variance explained by factors (%)	57.95	19.45	7.07
Total variance explained (%)=84.48			
Kaiser–Meyer–Olkin (KMO)=0.888			
Bartlett's test of sphericity=χ^2=1067.959, degrees of freedom=45, p=0.000			

MISS-HP: Moral Injury Symptom Scale-Healthcare Professional.

tor analysis and to evaluate the assumption of sphericity. The KMO value was determined to be 0.888, and the Barlett test results were chi-squared=1067.959, DF=45, p=0.000. EFA was performed using principal component analysis and promax rotation. The number of factors was limited to 3, consistent with the original scale. Table 1 shows the factor loading of the items and the respective factors. Factor loadings were found to be significant, and the explanatory power of each item was >0.60. When examining the factors and subfactors in the range, the first factor (condemnation) explained 57.95% of the total variance, the second factor (guilt/shame) explained 19.45%, and the third factor (moral distress) explained 7.07%. The total variance explained was 84.48%.

Confirmatory Factor Analysis

CFA was used to evaluate the goodness-of-fit of the multifactor model and yielded the following values: minimum discrepancy/DF (CMIN/DF)=1.712, (χ^2=54.795/DF=32, p=0.007), root mean square error of approximation (RMSEA)=0.076, standardized root mean squared residual (SRMR)=0.045, adjusted goodness-of-fit index (AGFI)=0.856, goodness-of-fit index (GFI)=0.916, Tucker-Lewis index (TLI)=0.970, relative fit index (RFI)=0.930, incremental fit index (IFI)=0.979, normed fit index (NFI)=0.950, and comparative fit index (CFI)=0.978.

Figure 1 depicts the multifactor CFA results of the MISS-HP. The lowest and highest factor loading values of the 10-item scale were 0.84 and 0.94, respectively.

Convergent-Divergent Validity

Convergent and divergent validity testing were also applied to the scale. Table 2 shows the CR and AVE values for each dimension; the respective thresholds of >0.70 and >0.50 were met.

The AVE values were less than the CR values and the square root of AVE values were greater than the factor correlation values.

Reliability Analyses

Cronbach alpha, split-half, and equivalent (parallel) form reliability analyses were conducted to determine the scale's reliability.
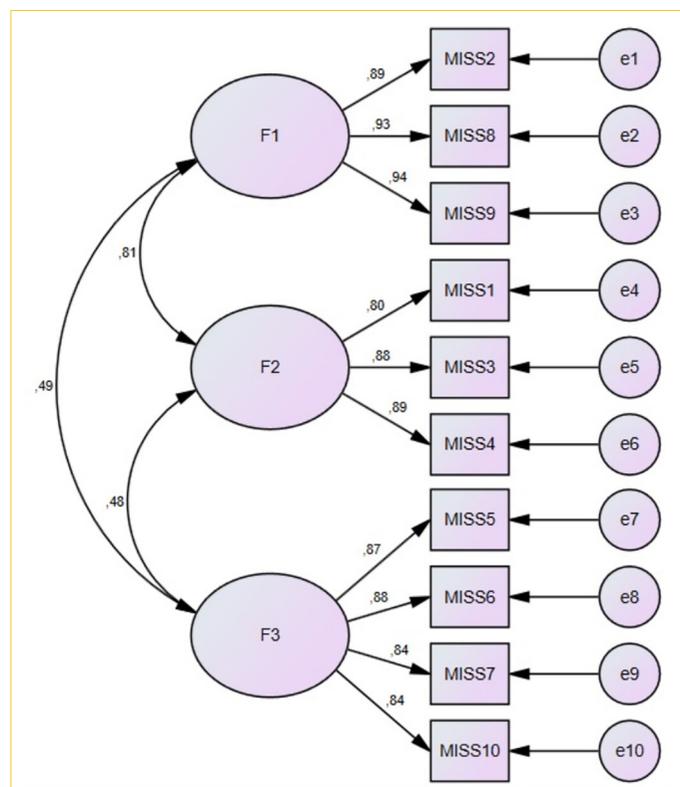
Figure 1. Model for multi-factor confirmatory factor analysis of Turkish version of the Moral Injury Symptom Scale-Health Professional.

Table 2. CR and AVE Values of MISS-HP

Factors	Factor I	Factor 2	Factor 3	CR	AVE	SQRT AVE
Factor 1	1			0.94	0.85	0.92
Factor 2	.746**	1		0.89	0.74	0.86
Factor 3	.454**	.439**	1	0.94	0.75	0.86

**Correlation is significant at 0.01. AVE: Average variance extracted value; CR: Composite reliability; MISS-HP: Moral Injury Symptom Scale-Healthcare Professional.

Table 3. Item-total correlations and Cronbach alpha coefficients of MISS-HP

Scale items	Item-total correlation	Cronbach alpha if item deleted
MISS1	0.694	0.911
MISS2	0.774	0.906
MISS3	0.739	0.908
MISS4	0.729	0.909
MISS5	0.579	0.917
MISS6	0.666	0.912
MISS7	0.664	0.912
MISS8	0.759	0.907
MISS9	0.794	0.905
MISS10	0.554	0.918

Cronbach alpha coefficient=0.919
Reliability coefficient for Factor 1 (Items 2, 8, 9)=0.941
Reliability coefficient for Factor 2 (Items 1, 3, 4)=0.892
Reliability coefficient for Factor 3 (Items 5, 6, 7, 10)=0.918

MISS-HP: Moral Injury Symptom Scale-Healthcare Professional.

Cronbach Alpha Reliability

Table 3 shows the item-total correlations and Cronbach alpha coefficients of the scale. The Cronbach alpha coefficient of the total proportion of observed variance was 0.91. The reliability coefficient was 0.94 for Factor 1 (items 2, 8, 9), 0.89 for Factor 2 (items 1, 3, 4), and 0.91 for Factor 3 (items 5, 6, 7, 10). Assessment of the item-total correlation values revealed that they were 0.55-0.79.

Split-Half Reliability

The scale items were divided into odd and even-numbered items. Spearman-Brown and Guttman split-half values were calculated and the results are displayed in Table 4. The internal consistency of the test scores was found to be 0.95.

Equivalent (Parallel) Form Reliability

Table 5 shows the results of correlation analysis to determine equivalent form reliability. The CF-SS scores were used as an equivalent, and a statistically significant, moderate, positive correlation was seen with those of the MISS-HP (r=.446, p<0.001).

Cutoff Score

A cutoff score for the scale was obtained using ROC curve analysis, displayed in the graph in Figure 2. The results indicated a 90% estimate, which was significant (area=0.906, standard error=0.028, p=0.000). It was observed that 85 of the 96 nurses correctly predicted that moral injury affected functionality with a 95% confidence interval (lower bound=0.852, up-

Table 4. Split-half reliability and Cronbach alpha coefficients of MISS-HP

Split-half reliability analysis	Cronbach alpha
Part 1*	0.834
Part 2**	0.838
Correlation between forms	0.912
Spearman-Brown coefficient	
Equal length	0.954
Unequal length	0.954
Guttman split-half coefficient	0.954

*Items 1, 3, 5, 7, 9
**Items 2, 4, 6, 8, 10

MISS-HP: Moral Injury Symptom Scale-Healthcare Professional.

Table 5. Correlation of MISS-HP and CF-SS

Correlation analysis	CF-SS	MISS-HP
CF-SS		
Pearson correlation (r)	1	.446**
p		0.000
N	125	125
MISS-HP		
Pearson correlation (r)	.446**	1
p	0.000	
N	125	125

**The correlation is significant at 0.01. CF-SS: Compassion Fatigue-Short Scale; MISS-HP: Moral Injury Symptom Scale-Healthcare Professional.
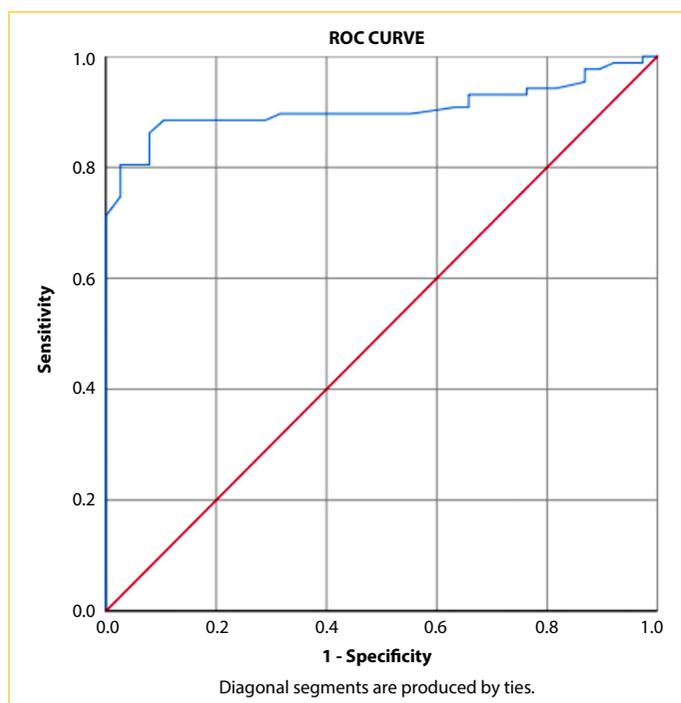
Figure 2. Receiver operating characteristic (ROC) curve graph of Turkish version of the Moral Injury Symptom Scale-Health Professional.

per bound=0.960). The cutoff score calculated using the likelihood ratio (sensitivity/1-sensitivity) was 46.

Discussion

The systematic preliminary work to adjust a scale for use in another culture or language is called scale adaptation.[21] This study describes the adaptation of the MISS-HP scale developed by Mantri et al.[5] for use with a Turkish population.

Validity of MISS-HP

The translation-back translation phase is the initial step in cross-cultural scale adaptation studies, and the participation of at least 2 independent translators is recommended.[22] The

language validity of this Turkish version of the MISS-HP was tested using the translation-back translation technique and the suitability was thoroughly evaluated according to accepted methods and standards. Expert opinions are used to identify and resolve inadequate or imprecise expressions and to identify inconsistencies between languages with advanced translation to ensure validity. The CVI is calculated based on the percentage of agreement among the opinions of 3-20 experts.[23] In this study, the CVI for each item was calculated based on the opinions of 7 experts. In this study, the Davis technique was used to evaluate content validity.[20] The revised instrument was found to be applicable and understandable, and the content validity was found to be good.

The final phase of the adaptation process is a pilot test.[23] A preliminary evaluation should be performed with a group of 30-40 individuals who have the characteristics of the target group and the respondents should be interviewed to make the questions clearer and get their opinion on understanding of the scale items.[24,25] The MISS-HP was pilot tested with a group of 20 nurses who were excluded from the study sample. The scale items were considered understandable and appropriate.

In addition to the content/scope validity study, convergent and divergent validity are used to strengthen structure validity, often based on EFA and CFA.[26,27]

To determine the adequacy of the sample for factor analysis and to assess whether the data are appropriate for factor analysis, the KMO coefficient is expected to be >0.50, and the Bartlett's test for sphericity result is expected to be significant.[28] In this study, the KMO value was >0.70, which indicates sufficient sampling adequacy.[29] The chi-squared value determined using Bartlett's sphericity test was found to be significant. It was accepted that the data demonstrated a multivariate normal distribution, and the suitability of the data for factor analysis was confirmed.

EFA is a multivariate statistical method used to determine a small number of identifiable significant variables from a large number of variables measuring the same structure, the factor structure.[30] Although EFA is the primary focus in scale development studies, it has been emphasized that it is important to perform EFA in adaptation studies, as well. However, in some cases CFA is performed without first conducting EFA.[31] In this study, EFA was performed for a 3-factor structure according to the original scale. The factor structure was the same as that of the split-half factor analysis of the original proportion.

The factor loading value is a coefficient that explains the relationship between the scale items and the factors. Items are expected to have a high loading value in the relevant factor.[30] A minimum factor loading value of 0.30 and a proportion of variance explained by all factors in the range of 40% to 60% is considered sufficient.[32] In this study, the factor loading values were >0.60 and the total variance explained by the scale was 84.48%, indicating high validity.

Differences in the factor loading have been reported,[5] including in a Chinese version of the scale.[16] This study found that

the factor structure of the Turkish MISS-HP was quite similar to that of the original scale. Small differences may be due to translation or cultural differences in the interpretation of the items.[5] It should also be kept in mind that the first application of the scale in the USA occurred before the COVID-19 pandemic and that the degree of psychological distress experienced by nurses may have changed in the interim due to the pandemic.

CFA evaluates the fit of the previously demonstrated structure in a new data set.[31] Our results indicated that the measurement model was sufficiently compatible: A CMIN/DF value of the CFA scale <3 indicates that the GFI is excellent; an RMSEA value >0.05 indicates that the GFI is acceptable; an SRMR value <0.05 indicates that the GFI is excellent; an AGFI value >0.80 indicates that the GFI is excellent; GFI, TLI, and RFI values ≥0.90 indicate that the GFI is acceptable; IFI, NFI, and CFI values ≥0.95 indicate that the GFI is acceptable.[33,34] The results of the multifactorial CFA showed that the factor loading of the MISS-HP ranged from 0.84 to 0.94, and were therefore acceptable.[30]

In their construction validity analysis of the MISS-HP with 181 healthcare professionals, Mantri et al.[5] randomly divided the sample into 2 groups. EFA was used to identify the number of factors in the group's first-half (n=90). To determine the extent to which the results could be verified, they performed CFA on the second half of the sample (n=91). The EFA results of the original scale with the first half of the group and the CFA results with the second half of the group were found to be compatible with the EFA and CFA results of the original version of the MISS-HP. The arrangement validity of the scale was confirmed with 10 items and 3 factors based on the results of EFA and CFA.

CR and AVE values were calculated to assess convergent and divergent validity. The correlation between the observed variables that make up the scale structure demonstrate convergent validity, which is expected to be high. The AVE values should be ≥0.50, and the CR value calculated for each structure should be greater than the AVE value. The CR value should be ≥0.70 for divergent validity, and the square root of AVE values should be greater than the relationship between the factors.[35] Our study outcomes showed convergent and divergent validity for the Turkish version of the MISS-HP.

Reliability of MISS-HP

Cronbach alpha measurement of internal consistency is an initial test of the reliability of a Likert-type scale.[36] In scale adaptation studies and evaluations of internal consistency reliability, split-half reliability and equivalent (parallel) form trustworthiness are used as measures of accuracy.[26,27]

It has been established that a Cronbach alpha value >0.70 is sufficient for reliability.[36] Mantri et al.[5] determined a Cronbach alpha coefficient for the MISS-HP of 0.75. The Cronbach alpha coefficient of the Chinese version of the scale was 0.71 for nurses and 0.70 for physicians.[16] The Cronbach alpha coefficient of the Turkish version of the MISS-HP was found to be 0.91. The Cronbach alpha coefficient of the factors were calcu-

lated to be 0.94, 0.89, and 0.91, for Factors 1, 2, and 3, respectively. The reliability of the adapted scale was evaluated to be high. Therefore, calibration items can be considered to be consistent with each other and used to determine related items.

Item analysis is used to identify the extent to which the scale items are related to the overall measurement instrument and how much they contribute to the overall score of the measurement instrument. The high correlation of the individual items with the overall result of the range shows the consistency of the instrument. For the item-total correlation to be sufficient, it must be ≥0.30.[37] The values of the item-total correlation of the scale vary between 0.55 and 0.79. Based on the results of the item-total correlation, all of the items appear to demonstrate good internal consistency.

Split-half reliability, a reliability assessment method based on a single application to 1 sample, is structured by randomly dividing the scale into 2 equal parts and calculating the correlation between the halves.[38] The commonly used splitting method divides the odd-numbered questions into one group and the even-numbered questions into a second group.[27] In this study, the scale items were divided by separating the odd- and even-numbered questions. The scale's split-half reliability result was 0.95, indicating a high level of reliability.

Equivalent forms reliability testing also provides data for concurrent validity.[27] The CF-SS adapted by Dinç and Ekinci,[18] which includes secondary trauma and fatigue subdimensions, was used as an equivalent form in this study. Moral injury in healthcare professionals is often associated with secondary traumatic stress and fatigue, especially in the presence of a pandemic.[12,13] Other studies of health professionals have also reported that moral injury is associated with fatigue.[39,40] A contemporaneous study examining the extent to which doctors, nurses, and other healthcare professionals suffered moral injury during the pandemic determined that secondary traumatic stress was significantly associated with moral injury.[41] Therefore, the CF-SS, which measures both of these concepts, was used in the study as an equivalent form of reliability. An acceptable level of correlation was seen in the scores of the 2 instruments.

Cutoff Score

The scale includes a question about functionality that is scored using a 5-point, Likert-type scale. The degree of moral injury was not assessed as a clinically significant problem for responses of "none" and "mild," while responses of "moderate," "very," and "extreme" were judged clinically significant. The original scale correctly predicted 77%. The estimated number was significant and the calculated cutoff score was 36.[5] In the Chinese version of the scale, the correct prediction rate was 71% and the cutoff value was 50.[16] ROC curve analysis demonstrated that the Turkish MISS-HP had a predictive accuracy of 90%, and a cutoff value of 46. Cultural diversities may influence the effect of the concept of moral injury on functionality. Different cutoff scores may be appropriate. The

cutoff score determined in this study, which is not significantly different from that of the original scale, can be accepted as a cutoff average for a determination of the level of moral injury among health professionals in Turkey.

Limitations

The sample of healthcare professionals used in this study comprised only nurses. In additon, because the study was conducted online during the COVID-19 pandemic, the researcher could not contact participants directly and provide additional face-to-face information.

Conclusion

This study designed to adapt the MISS-HP for use with a Turkish population found that a scale with 10 items and 3 subdimensions was highly valid and reliable. This scale can be used to assess moral injury in healthcare professionals in Turkey. While this study was conducted with a sample of nurses, it may prove beneficial in studies with other healthcare professionals. Additional studies performed with larger sample groups that include other health professionals may provide useful additional data and insight.

Conflict of interest: There are no relevant conflicts of interest to disclose.

Peer-review: Externally peer-reviewed.

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