ORIGINAL ARTICLE

Translation of the Medical Fear Survey to Serbian: psychometric properties

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Abstract

Background: Medical Fear Survey (MFS) is an instrument designed for measuring fear of medical and related treatments.

Objective: Aim of the present study was MFS translation into Serbian, measurement of its psychometric properties and MFS validation using other Blood-injury-injections and related stimuli instruments that have been translated from English into Serbian.

Method: After obtaining permission from the author of the original MFS, double forward translation from English to Serbian and backward translation to English were conducted in ten steps, according to International Society for Pharmacoeconomics and Outcomes Research (ISPOR) guidelines. Reliability, factorial analysis and concurrent validation of Serbian version of MFS were conducted on a sample of 485 medical or pharmacy students at University of Kragujevac, Serbia.

Results: Serbian version of MFS showed high internal consistency with a Cronbach's alpha 0.968 and good temporal stability after testing-and-retesting (Spearman's correlation coefficient 0.838, and intraclass correlation coefficient 0.877). Factorial analysis confirmed the same five factors demonstrated in the original English version: fear of mutilated bodies (10 items), fear of blood (11 items), fear of injections and blood draws (9 items), fear of sharp objects (10 items), and fear of medical examinations and physical symptoms (10 items). The total score of MFS correlated significantly with the total scores of Injection Phobia Scale-Anxiety (Spearman's correlation coefficient 0.391, $p < 0.001$), Blood/Injection Fear Scale (Spearman's correlation coefficient 0.502, $p < 0.001$) and Medical Avoidance Survey (Spearman's correlation coefficient 0.396, $p < 0.001$).

Conclusions: Serbian version of the 50-item MFS showed similar psychometric properties as the original English version of this scale, with the same factorial structure. It could be used for measurement of fear of medical and related treatments in Serbian socio-cultural milieu, preferably self-administered. Hippokratia 2016, 20(1): 44-49

Keywords: Medical Fear Survey, translation, transcultural validation, Serbian

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Introduction

Medical Fear Survey (MFS) is an instrument designed for measuring fear of medical and related treatments. It was developed in English language and validated in the USA in 1997 by Kleinknecht et al[1,2]. The final form of the instrument contains five, ten-item subscales: fear of mutilated bodies, fear of blood, fear of sharp objects, fear of medical examinations, and physical symptoms and fear of injections and blood draws. It was used successfully to diagnose Blood-injury-injections and related stimuli (BIIRS) phobia and to predict which patients with BIIRS phobia will faint after exposure to these stimuli[3,4]. Since BIIRS phobia is highly prevalent (3-4% in general population)[5,6], and the patients suffering from this disorder may avoid diagnostic procedures, hospitalization and/or vital medication (with grave consequences) or faint when treated in a health facility[7-9]. MFS is an important practical instrument to detect the disorder and administer certain preventive measures when treating such patients.

Up to date, none of the instruments measuring fear of medical and related treatments or BIIRS have been translated into Serbian and tested for its psychometric properties. This leaves physicians in Serbia without a reliable

Table 1: Extracted five factors obtained by orthogonal rotation and the varimax method. Eigen values for each factor and amount of variance of MFS score explained by each factor.

Factor	Eigen value	Amount of variance explained (%)
Fear of mutilated bodies	8.399	16.799
Fear of blood	6.822	13.644
Fear of injections and blood draws	6.642	13.285
Fear of sharp objects	5.381	10.761
Fear of medical examinations and physical symptoms	5.055	10.110

Table 2: Inter-correlations between the five obtained factors. The names of the factors according to the clustered questions correspond completely to the names of five factors in the original scale.

Factor	Fear of mutilated bodies	Fear of blood	Fear of injections and	Fear of sharp objects blood draws	Fear of medical examinations and physical symptoms
Fear of mutilated bodies	1.000	0.532*	0.623*	0.417*	0.704*
Fear of blood	0.532*	1.000	0.599*	0.573*	0.486*
Fear of injections and blood draws	0.623*	0.599	1.000	0.595	0.712*
Fear of sharp objects	0.417*	0.573*	0.595*	1.000	0.548*
Fear of medical examinations and physical symptoms	0.704*	0.486*	0.712*	0.548*	1.000

*: $p < 0.001$.

tool to measure fear of medical and related treatments and diagnose BIIRS, precluding estimation of risks of treatment avoidance and fainting after treatment. Aim of the present study was MFS translation into Serbian, measurement of its psychometric properties and MFS validation using other BIIRS instruments that have been translated from English into Serbian.

Methodology

The instrument

Medical Fear Survey is a 50-item questionnaire, with each answer rated on a 5-point Likert scale, ranging from 0 to 4, reflecting minimum to maximum symptoms severity, respectively. There are no items with reversed scoring within the scale, and the total score is calculated by simple summation of scores on individual items, ranging from 0 to 200.

MFS translation

MFS translation was made according to the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) guidelines[10,11]. Permission for translation of MFS (version with 5, 10-item subscales) from English into Serbian was granted by the author of the original scale Professor Emeritus Ronald A. Kleinknecht. The original scale was first translated into Serbian by two independent translators, who were not members of the study team. One of the translators was Mrs. Dusica Lazic, lecturer of English language at Faculty of Medical Sciences, University of Kragujevac, and the other Mrs. Maja Stojanovic, court interpreter. The final Serbian version derived from the combination of the two independent translations at the meeting of the study investigators and the translators. The Serbian version was then translated back into English by Dr. Zan Friscic, native English speaker, a citizen of Australia, who had not read the original English version of MFS. Back-translation in English was then compared with the original English version by the study investigators, and the final Serbian version of MFS was agreed at a new meeting of the investigators. The final MFS translation was then tested on ten pharmacy students (at Faculty of Medical Sciences, University of Kragujevac, Serbia) for clarity and comprehension. A few minor changes were made after this preliminary administration, and the final Serbian version of MFS was ready for reliability testing.

Sample

Final Serbian version of MFS was tested for reliability on medical and pharmacy students at Faculty of Medical Sciences, University of Kragujevac, on two occasions, on the 14th of March and the 14th of May 2014. The same sample was surveyed on both occasions, in order to check for temporal stability of the Serbian version of MFS. The sample consisted of 485 students (386 females, 99 males; 376 pharmacy students, 109 medical students). The distribution of the sample according to the year of the study was as following: 2nd year: 86, 3rd year: 173, 4th year: 176 and 5th year: 50. MFS was administered to all students present at premises of the Faculty of Medical Sciences on the first survey day (from the total of 1,145 students there were 526 present), and 485 students (92%) agreed to fill in the questionnaire. The same 485 students were then surveyed again on the second date (14th May 2014). On both occasions, the same students completed another three scales for MFS validation: Injection Phobia Scale-Anxiety (IPSA)[12], Blood/Injection Fear Scale (BIFS)[13] and Medical Avoidance Survey (MAS)[3]. On the first occasion the study participants were interviewed by the investigators who then filled the questionnaires, and on the second occasion the study participants completed the questionnaires

Table 3: The distribution characteristics of the five obtained factors (ie of the MFS's subscales): mean score with standard deviation (SD), Kurtosis, Skewness and Cronbach's alpha coefficient.

Subscale	Mean score (SD)	Kurtosis	Skewness	Cronbach's alpha
Fear of mutilated bodies	11.04 (9.87)	- 0.129	0.901	0.938
Fear of blood	2.84 (5.91)	11.321	3.129	0.926
Fear of injections and blood draws	5.05 (6.30)	3.681	1.894	0.909
Fear of sharp objects	4.38 (6.34)	6.592	2.320	0.927
Fear of medical examinations and physical symptoms	5.97 (5.67)	1.783	1.316	0.892

by themselves. The study was approved by the Ethics Committee of Faculty of Medical Sciences, University of Kragujevac (No of decision 01/4796, 12-3-2014). All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional and the national research committee and with the 1964 Helsinki declaration. Informed consent was obtained from all individual participants included in the study.

Reliability testing

Reliability of the Serbian version of MFS was tested by three methods. Firstly, internal consistency was determined through calculation of Cronbach's alpha for the questionnaire as a whole. Secondly, the questionnaire was divided by the split-half method into two parts with the same number of questions (25 each), and Cronbach's alpha for each of the parts was calculated. The Spearman-Brown coefficient for the questionnaire as a whole was calculated by the Spearman-Brown "prediction" formula using the alphas for both parts, the number of questions in each part and average correlation between questions in both parts of the original questionnaire[11]. Thirdly, the correlation between results of the Serbian version of MFS obtained from the two study periods on the same sample was calculated (Spearman's correlation coefficient and intraclass correlation coefficient) in order to test the translation for temporal stability (test-retest method).

Factorial analysis

Confirmatory factorial analysis of the Serbian version of MFS was made by the principal components method[7]. Firstly, we have used the Kaiser-Meyer-Olkin test of sampling adequacy and the Bartlett's test of sphericity to examine the suitability of the questionnaire. The factors were extracted without rotation using following criteria: the Eigenvalues ≥1 and Scree-plot (the extracted factors were above the "elbow" of the graph). Secondly, referent axes were rotated orthogonally, by the varimax method, and another extraction of the factors was made, using the same criteria as for the unrotated solution. Extracted factors were then compared with the factors of the original MFS, and named accordingly.

Validity

Content validity of Serbian version of MFS was tested by the three-member panel of psychiatrists from Clinic for psychiatry, Clinical Center Kragujevac. In order to make construct validation of the Serbian version of MFS, its total score was compared and correlated with total scores of the same study participants on IPSA, BIFS and MAS. The scores were correlated by the Spearman's method since they did not follow a normal distribution. One-trait-bi-method matrix was constructed based on the results of repeated administration of the MFS, IPSA, BIFS and MAS.

Results

Reliability

At the first test, the Serbian version of MFS showed high levels of internal consistency, with a Cronbach's alpha of 0.949. After dividing MFS scale into two parts using the split-half method, Cronbach's alphas were 0.892 and 0.916; the value of Spearman-Brown coefficient for the MFS as a whole calculated from the split-half method by the Spearman-Brown "prediction" formula was 0.941. After re-testing, Cronbach's alpha was 0.968. The correlation between total scores of the study participants on the first and repeated testing was highly significant: Spearman's correlation coefficient was 0.838, $p < 0.001$, intraclass correlation coefficient for absolute agreement was 0.877 (95% confidence interval 0.555-0.946), and the mean scores (± standard deviation) on the first and repeated testing were 40.70 ± 26.13 and 28.91 ± 27.95, respectively (Wilcoxon's signed rank test: $z = -13.19$, $p < 0.001$).

Factorial analysis

Kaiser-Meyer-Olkin test confirmed sampling adequacy with its value of 0.949, and the Bartlett's test of sphericity was highly significant ($x^2 = 18{,}227.519$; $df = 1225$; $p < 0.001$). After orthogonal rotation, there were five factors with similar loadings (Table 1 and Table 2), three of them consisted of 10 items, one of 9 items and one of 11 items. The names of the factors according to the clustered questions correspond completely to the names of five factors (i.e. subscales) in the original scale: fear of mutilated bodies (10 items), fear of blood (11 items), fear of injections and blood draws (9 items), fear of sharp objects (10 items) and fear of medical examinations and physical symptoms (10 items). There were only two differences between the factors of the original and the translated version. In the Serbian version, the item "seeing a preserved brain in a jar" belonged to the subscale "fear of blood" (instead of "fear of mutilated bodies" in the original scale), while the item "observing someone getting their finger stitched" belonged to the subscale "fear of mu-

Table 4: The one-trait-bi-method matrix with Spearman's correlation coefficients.

	MFS-T2	IPSA-T2	BIFS-T2	MAS-T2	MFS-T1	IPSA-T1	BIFS-T1	MAS-T1
MFS-T2	1							
IPSA-T2	0.391*	1						
BIFS-T2	0.502*	0.332*	1					
MAS-T2	0.396*	0.794*	0.339*	1				
MFS-T1	0.838*	0.320*	0.445*	0.326*	1			
IPSA-T1	0.357*	0.786*	0.281*	0.668*	0.343*	1		
BIFS-T1	0.673*	0.382*	0.583*	0.397*	0.622*	0.401*	1	
MAS-T1	0.310*	0.660*	0.267*	0.718*	0.294*	0.718*	0.357*	1

*: significant correlation, p<0.001. MFS-T2: Medical Fear Survey, filled in by the study participants themselves; IPSA-T2: Injection Phobia Scale-Anxiety, filled in by the study participants themselves; BIFS-T2: Blood/Injection Fear Scale, filled in by the study participants themselves; MAS-T2: Medical Avoidance Survey,filled in by the study participants themselves; MFS-T1: Medical Fear Survey, filled in by the study investigators; IPSA-T1: Injection Phobia Scale-Anxiety, filled in by the study investigators; BIFS-T1: Blood/Injection Fear Scale, filled in by the study investigators; MAS-T1: Medical Avoidance Survey, filled in by the study investigators.

tilated bodies" (instead of "fear of injections and blood draws" in the original scale). The distribution characteristics of the MFS's subscales are shown in Table 3.

Validity

Content validity of the Serbian version of MFS was analyzed and confirmed by a three-member panel of psychiatrists at the Clinic for Psychiatry, Clinical Center Kragujevac. As of the construct validity, the total score of MFS correlated significantly with the total scores of IPSA (Spearman's correlation coefficient 0.391, p <0.001), BIFS (Spearman's correlation coefficient 0.502, p <0.001) and MAS (Spearman's correlation coefficient 0.396, p <0.001). The one-trait-bi-method matrix is shown in Table 4.

Characteristics of the students and total score

Total score of the MFS was higher among female in comparison to male students on both tests (43.26 ± 30.15 vs. 30.15 ± 23.64, t = -4.463, p <0.001 at the 1st test, and 31.55 ± 28.39 vs. 19.32 ±2 4.08, t = -4.120, p <0.001at the 2nd). Older students also scored higher on both tests (Spearman's rho was 0.111, p =0.021, and 0.125, p =0.010, respectively). Pharmacy students showed higher MFS score than medical students on both tests (45.41 ± 26.65 vs. 22.88 ± 13.43, t =7.762, p <0.001 at the 1st test, and 33.45 ± 29.12 vs. 12.38 ± 13.90, t =6.691, p <0.001 at the 2nd).

Discussion

The Serbian version of the MFS showed high internal consistency (which is even higher when examinees fill in the questionnaire by themselves), but temporal stability cannot be taken for granted (the method of MFS administration was different between the two assessments, which led to difference in mean scores, leaving the issue of test-retest stability unresolved). Factorial analysis confirmed the same five domains (subscales) which were defined by developers of the original English scale[1,3]. The five subscales of the Serbian version showed almost the same alpha values as the subscales of the English version, as well as similar mean scores, although the distributions of the Serbian version were somewhat more positively skewed[1,3]. All items belonged clearly to only one factor except the item 4 ("Addressing a nurse for help"), whose loads were equally distributed between 4th and 5th factors. However, the logic of these factors allowed the item 4 to be regarded as belonging to factor 4. Unusually high inter-correlation between factor 5 (fear of medical examinations and physical symptoms) and 1 (fear of mutilated bodies) and 3 (fear of injections and blood draws), respectively, was observed, as shown in Table 2. This could be explained with conceptual similarity since in clinical practice medical examination is associated with injections, blood draws and seeing other injured patients in a waiting room. Although the score of the Serbian version of MFS correlated satisfactorily with scores of both IPSA and MAS, the highest correlation was observed with the BIFS, a recently developed instrument for measurement of BIIRS phobia[14,15]. The IPSA instrument showed excellent psychometric properties. Thus it could be used for the detection of BIIRS phobia[16], while MAS was proven a useful addition to the original MFS instrument[3]. Positive and significant correlations between MFS, IPSA, BIFS and MAS scores, regardless of the method of filling in the questionnaires (see the matrix in Table 2)[17], suggest that the Serbian version of MFS is a reliable instrument for measuring fear of medical and related treatments.

It was also shown that scores of self-administered MFS were significantly lower than MFS scores obtained by investigators. Taking into account that the study population consisted of relative young university students that have less experience with healthcare services than older people, together with the fact that scores obtained by self-administered questionnaires resembled scores obtained by university students that self-completed the original English version, it is suggested that MFS should be self-administered in studies of the Serbian socio-cultural milieu. Although the type of administration (self-administered vs. physician-assisted) does not usually influence questionnaires' psychometric properties[18,19], it might profoundly influence the results under certain circumstances as was shown in this study, obscuring the findings regarding the longitudinal stability of the instrument or posing a risk for underestimation of symptoms severity[20].

Adherence to injection treatment is low and rarely overrides 75% in patients with chronic therapy[21]. BIIRS phobia has a prevalence of around 3.5 %, and is an important factor associated with decreased adherence to injection therapy[22]; if present and not diagnosed by the physician, BIIRS phobia may preclude treatment success, with serious consequences. The MFS scale was successfully used for diagnosing BIIRS phobia, while the recently developed short (25-item) version showed excellent psychometric properties[4]. However, up to now, there was no diagnostic instrument for BIIRS phobia available in Serbian, something that could have possibly enhanced injection treatment adherence. Translation of MFS to Serbian would hopefully improve this unfavorable situation.

The main limitation of our study was the lack of clinical evaluation of the study participants by a psychiatrist regarding the existence of fear of medical and related treatments or BIIRS phobia. Thus, criterion validity, sensitivity and specificity of MFS could not be assessed in this study. The reason for this issue was that the students who participated in the study were not willing to spend additional time for the study purposes, and limited their participation to completing questionnaires on two different time points. Second, although convergent validity was assessed by means of investigation for correlations with relevant validated scales, divergent validity (e.g. comparison with a scale measuring other phobias – not medically oriented) was not. Another limitation of our study was that the method of MFS administration was different between the two assessments (physician-administered vs. self-administered), representing an important confounding factor. Thus, test-retest reliability was not tested appropriately in this study, since the external factors were altered. On the other hand, the observed difference in mean scores with two methods of MFS administration reveals that there is a risk for potentially significant underestimation of symptoms severity when the questionnaire is self-administered.

Another limitation of our study is the unresolved issue of generalizability, i.e. applicability of the instrument in other samples. This sample was relatively young (medical students), and males were underrepresented (20.4 %). Although such a sample recruitment might be a relatively common practice - also applied in the original validation study - it raises some concern regarding the generalizability of the findings and the applicability of the instrument in other samples. Future studies in samples from different populations should verify the psychometric properties of the instrument in certain settings. Finally, the responsiveness of the instrument (sensitivity to change) also remains to be confirmed in future clinical studies.

In conclusion, the Serbian version of the 50-item MFS showed similar psychometric properties as the original English version, with the same factorial structure. It could be used for measurement of fear of medical and related treatments in Serbian socio-cultural milieu, preferably self-administered. Its diagnostic value for BIIRS phobia detection remains to be elucidated by future studies of patients with clinical diagnosis of BIIRS phobia.

Conflict of Interest

Authors declare no conflict of interest.

Acknowledgements

The authors are grateful to Professor Ronald A. Kleinknecht, Department of Psychology, Western Washington University, Bellingham, USA, for his unconditional permission to translate the MFS to Serbian and use the translation for research and teaching purposes. This study was partially supported by grant No 175007 from Ministry of Education, Republic of Serbia, and by grant No 404 from Ministry of Science, Montenegro.

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