



Translation to Serbian, cultural adaptation, reliability testing and validation of the questionnaire estimating the fear of injections

Prevođenje na srpski jezik, transkulturalna adaptacija, ispitivanje pouzdanosti i validacija upitnika za procenu straha od injekcija

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Abstract

Background/Aim. The two-part questionnaire called Injection Phobia Scale (IPS)-Anxiety and IPS-Avoidance represents one of the most commonly used questionnaires for assessing the fear of injections. The aim of the present study was to translate and culturally adapt this questionnaire from English into Serbian as well as to assess reliability and validity of the translation. **Methods.** The translation and cultural adaptation of the IPS-Anxiety and IPS-Avoidance was performed in accordance with the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) guidelines. Reliability testing, factor analysis and validation of Serbian translation of IPS-Anxiety and IPS-Avoidance were carried out on a sample of 485 students of pharmacy, or medicine at the University of Kragujevac, Serbia. **Results.** Serbian translation of IPS-Anxiety and IPS-Avoidance demonstrated high internal consistency with Cronbach's alpha of 0.934 for IPS-Anxiety and 0.911 for

IPS-Avoidance. Factor analysis of IPS-Anxiety showed that there are two domains, which we have called as Direct Experience (9 items) and Indirect Experience (9 items); factor analysis of IPS-Avoidance also pointed out on two domains referring to direct and indirect fear of injections. Female students scored higher on the scale showing more extensive injection phobia than male students. It is also interesting that students of pharmacy have higher level of injection phobia than students of medicine, and those students of the fifth year of study feel more fear of injections than students from the first four years. **Conclusion.** Serbian translation of IPS-Anxiety and IPS-Avoidance showed good psychometric properties on population consisted of students medicine and pharmacy.

Key words:
fear; injections; surveys and questionnaires;
translating; serbia.

Apstrakt

Uvod/Cilj. Upitnik sastavljen iz dva dela pod nazivom *Injection Phobia Scale (IPS)-Anxiety* i *IPS-Avoidance* predstavlja jedan od najčešće korišćenih upitnika za procenu straha od injekcija. Cilj ove studije bio je da se ovaj upitnik prevede i transkulturalno prilagodi sa engleskog na srpski jezik, kao i da se proceni pouzdanost i validnost prevoda. **Metode.** Prevođenje i transkulturalno prilagođavanje upitnika *IPS-Anxiety* i *IPS-Avoidance* izvršeno je u skladu sa smernicama koje je dalo Međunarodno udruženje za farmakoekonomiju i praćenje ishoda lečenja (ISPOR). Ispitivanje pouzdanosti, faktorska analiza i validacija srpskog prevoda upitnika *IPS-Anxiety* i *IPS-Avoidance* je sprovedeno na uzorku od 485 stu-

denata farmacije i medicine na Univerzitetu u Kragujevcu, Srbija. **Rezultati.** Srpski prevod upitnika *IPS-Anxiety* i *IPS-Avoidance* je pokazao visoku unutrašnju konzistenciju sa vrednostima Kronbahove alfe od 0,934 za *IPS-Anxiety*, odnosno 0,911 za *IPS-Avoidance*. Faktorska analiza *IPS-Anxiety* pokazala je da u okviru ove skale postoje dva faktora, koje smo nazvali Direktno iskustvo (9 pitanja) i Indirektno iskustvo (9 pitanja); faktorska analiza skale *IPS-Avoidance* takođe je ukazala na dva faktora koji se odnose na direktni i indirektni strah od injekcija. Studenti ženskog pola su imali veće vrednosti skora pokazujući i izraženiju fobiju od injekcija nego studenti muškog pola. Takođe, interesantno je da studenti farmacije ispoljavaju viši nivo fobije od injekcija nego studenti medicine, pri čemu je strah od injekcija više izražen

kod studenata pete godine u odnosu na studente prve četiri godine studija. **Zaključak.** Srpski prevod upitnika IPS-*Anxiety* i IPS-*Avoidance* je pokazao dobre psihometrijske karakteristike na populaciji koju su činili studenti medicine i

farmacije.

Ključne reči:
strah; injekcije; ankete i upitnici; prevođenje; srbija.

Introduction

The fear of injections is a type of anxiety disorder whose prevalence in the general population ranges from 3 to 5 percent¹. Persons suffering from this kind of phobia feel excessive, irrational fear of needles, hospitals, surgery, wounds, pain, doctors or dentists². The prevalence is highest in the youngest age, especially among girls³⁻⁴, and is significantly higher among sick where by some estimates can reach up to 10%⁵. Patients with this type of anxiety experience serious mental and physical symptoms during invasive medical procedures, so they often avoid visiting a doctor and reject provision of medical services^{2,6}. This kind of behavior significantly reduces chances of cure⁷ and has a negative impact on important social aspects of life, such as family planning, or choosing a profession⁸.

There are several standardized and validated scales for assessment of this type of anxiety disorder⁹. Because of its simplicity and high reliability, the Injection Phobia Scale (IPS)-Anxiety and IPS-Avoidance are the most commonly used questionnaires⁸. It is the two-part questionnaire which consists of two separate scales, IPS-Anxiety and IPS-Avoidance. The first scale, IPS-Anxiety, has 18 questions, which are aimed to assess an intensity of fear among the respondents. The questions are actually the situations that can provoke fear among people with irrational fear of injections. A respondent assesses his/her fear in such situations by circling one of the answers on the Likert scale ranging from 0 to 4, where 0 indicates complete absence of fear and 4 indicates the highest intensity of fear. The second scale in this questionnaire, IPS-Avoidance, also has 18 questions, and in this part of the questionnaire the situations from the first part are used to assess how often respondents avoided medical procedures that are associated with fear of injections. There are three possible answers to each question on a scale from 0 to 2, where 0 means that respondent never avoids a specific medical procedure, while 2 means that he/she always avoids such a procedure. The result is shown as a total score, which is obtained by simply adding the values of answers on each individual issue, and it ranges from 0 to 72 for the first part of the questionnaire, and from 0 to 36 for the second part, with higher values indicating a higher intensity of fear¹⁰.

A high reliability of this two-part questionnaire was demonstrated in the study¹⁰, using a sample of 59 patients diagnosed with phobia of injections in 1992. The results of this validation study showed a high value of Cronbach's alpha for both subscales: 0.86 for IPS-Anxiety scale and 0.8 for IPS-Avoidance. In addition, there was a significant positive correlation between the two parts of the questionnaire ($r = 0.44$; $p < 0.05$). Content validity, criteria validity and structure validity of the questionnaire were confirmed in later

methodologically well-placed research¹¹⁻¹³. However, in order to use routinely this questionnaire in different speaking areas it is necessary to adapt the translation of the original version of the questionnaire to the cultural specificities and validate such adapted version.

The aim of this study was translating from English language to Serbian and cultural adaptation of the questionnaire IPS-Anxiety and IPS-Avoidance, with the assessment of reliability and validity of the translation.

Methods

Translation and cultural adaptation

Translation and cultural adaptation of the IPS-Anxiety and IPS-Avoidance to Serbian language was made according to the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) guidelines¹⁴. According to these recommendations, we first got permission from the author of the original scale, Professor Lars-Göran Öst, an expert in the field of cognitive behavioral therapy¹⁵. Then, the questionnaire was translated from English to Serbian by two independent translators, who were not part of the research team. The first translator was Mrs Jelena Jarčević, a graduated philologist in English language and literature and a member of the Association of Court and Technical Translators of Serbia. The second translator was Mrs. Dušica Lazić, a lecturer of English language at the Faculty of Medical Sciences, University of Kragujevac. At the meeting of the study investigators and the translators, two translations of the questionnaire were harmonized to one Serbian version. The harmonized Serbian version was back translated to English by Dr Zan Friščić, a native English speaker, citizen of Australia, who also participated in our study. Finally, at the second meeting of the investigators and the translators the final Serbian version of IPS-Anxiety and IPS-Avoidance questionnaire was agreed upon.

Clarity and comprehension of the final Serbian version of the questionnaire was tested in a pilot study. Ten students of pharmacy (at the Faculty of Medical Sciences, University of Kragujevac, Serbia) completed the questionnaire and we used feedback from them to made a few minor changes. The final Serbian version of IPS-Anxiety and IPS-Avoidance questionnaire was then prepared in the required number of copies and the reliability testing was conducted.

Study population and the sample size calculation

Our study population consisted of students of medicine and pharmacy at the Faculty of Medical Sciences, University of Kragujevac. The sample size was determined on the basis of the minimal power of the study 80%, on the maximal val-

ue of the first type error of 0.05 and by using the Pearson's correlation test. Since the correlations of responses to individual questions of the questionnaire and the total score of the original questionnaire were greater than 0.8⁸, we assumed the desired level of correlation in our study was 84%. Based on these parameters, minimal size of the study sample was 174 respondents. The reliability of the final Serbian version of the IPS-Anxiety and IPS-Avoidance questionnaire was tested on two occasions, on March the 14th, and on May the 14th, 2014. In total, 485 students voluntarily agreed to participate in the survey (375 of them were students of pharmacy and 110 were students of medicine) and the female : male ratio was 385 : 100. According to the year of the study, there were 86 students of the 2nd year, 174 students of the 3rd year, 175 students of the 4th year and 50 students of the 5th year of the study. The same study participants responded to the questionnaire on both occasions, although at the first time the investigators filled the questionnaires based on the interview with the participants, and after that the participants completed them by themselves.

The study was approved by the Ethics Committee of the Faculty of Medical Sciences, University of Kragujevac.

Reliability testing

Internal consistency of the Serbian version of the questionnaire was determined by calculating Cronbach's alpha for the whole questionnaire by the Spearman-Brown "prediction" formula¹⁶.

After division of the IPS-Anxiety and IPS-Avoidance questionnaire into two separate scales, IPS-Anxiety and IPS-Avoidance, we calculated Cronbach's alpha for each subscale as well as the correlation matrices. Cronbach's alpha for the whole questionnaire was then calculated backward from the alphas of the subscales¹⁷. The temporal stability of the questionnaire was tested by comparison of the internal consistency measures obtained by testing the same participants on two occasions, two months apart.

Validity

Content and construct validity of the Serbian translation of the IPS-Anxiety and IPS-Avoidance questionnaire were tested by the three-members panel of psychiatrists from the Clinic for psychiatry, Clinical Center Kragujevac. Criterion validity of the Serbian translation of the IPS-Anxiety and IPS-Avoidance questionnaire was tested by comparison and correlation of its total score with the scores of the same study participants on the Injection Phobia Scale-Anxiety, Blood/Injection Fear Scale¹⁸ and Medical Avoidance Survey¹⁹.

Before factor analysis, we conducted the Barlett's test and the Kaiser-Meyer-Olkin (KMO) test. For the IPS-Anxiety, we used oblimin rotation with the Kaiser normalization and generalized least squares as a method of extraction. For the IPS-Avoidance, we used oblimin rotation with the Kaiser normalization and Principal component analysis as a method of extraction.

Results

Injection Phobia Scale (IPS)-Anxiety

The results are presented for 426 (87.83%) students due to the incomplete data. In the second round, the entire survey was completed by the same 425 students (87.01%). In both testing rounds, the female students scored higher on the scale showing more extensive injection phobia than the male students (Table 1). It is also interesting that the students of pharmacy had a higher level of injection phobia than the students of medicine, and those students of the fifth year of study felt more fear of injections than the students from the first four years. The mean results (with standard deviations) on the IPS-Anxiety according to the demographic parameters are shown in Table 1.

Table 1
Mean results \pm SD on the Injection Phobia Scale (IPS)-Anxiety according to the demographic parameters in the first and in the second round

Demographic parameters	I round	II round
Gender (n)		
female		
I round: 343/426	10.24 \pm 10.707	7.95 \pm 10.198
II round: 338/425		
male		
I round: 83/426	7.02 \pm 8.814	5.03 \pm 10.568
II round: 87/425		
Medical sciences		
medicine	3.71 \pm 4.294	1.73 \pm 2.712
pharmacy	11.21 \pm 11.009	8.91 \pm 11.090
The year of the study		
the second	12.29 \pm 12.970	8.92 \pm 11.271
the third	7.00 \pm 7.947	5.11 \pm 7.805
the fourth	9.67 \pm 10.689	7.90 \pm 10.877
the fifth	13.00 \pm 10.026	11.79 \pm 13.599

SD – standard deviation.

The first round of tests

The first test showed high levels of internal consistency, with the Cronbach's alpha of 0.920 of the Serbian version of the IPS-Anxiety.

After dividing the IPS-Anxiety into two parts using the split-half method, the Cronbach's alphas were 0.863 and 0.832. The Spearman-Brown coefficient was 0.940 and the Guttman split-half coefficient was 0.920.

The second round of tests

The Cronbach's alpha of 0.934 indicated high levels of internal consistency of the Serbian version of the IPS-Anxiety.

After dividing the IPS-Anxiety into two parts using the split-half method, the Cronbach's alphas were 0.877 and 0.875. The Spearman-Brown coefficient was 0.940 and the Guttman split-half coefficient was 0.930.

There were no differences in the interclass correlation coefficient before and after division (Table 2).

Table 2
Inter-item correlation before and after dividing and interclass correlation coefficient before dividing for the Injection Phobia Scale (IPS)-Anxiety for the first and for the second round of tests

Time of testing	The first round of tests			The second round of tests		
	Inter-item correlation	0.403 (0.792)		Inter-item correlation	0.459 (0,784)	
Before dividing	Interclass correlation coefficient	Single measures	0.390 (0.356–0.427) $p = 0.000$	Interclass correlation coefficient	Single measures	0.438 (0.403–0.476) $p = 0.000$
		Average measures	0.920 (0.909–0.931) $p = 0.000$		Average measures	0.934 (0.924–0.942) $p = 0.000$
After dividing	Inter-item correlation	I	0.434 (0.497)	Inter-item correlation	I	0.464 (0.535)
		II	0.364 (0.699)		II	0.460 (0.668)

Factor analysis

The first round of tests

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was 0.919, and the Bartlett's test of sphericity: 4,840.893, $p < 0.05$.

The method of extraction: Generalized least squares; The total explained variance of two-factor solution was 55.01%. The factor correlation matrix was 1–2: + 0.591; 1–3: -0.426; 2–3: -0.409.

Two extracted factors obtained by oblimin rotation with Kaiser normalization and generalized least squares as a method of extraction and eigenvalues for each factor and the amount of variance of the IPS-Anxiety explained by each factor are shown in Table 3. The matrix of weights of items

and factors obtained with oblimin rotation with the Kaiser normalization of the two-factor solution for the IPS-Anxiety items are shown in Table 4.

Table 3
Extracted two factors obtained by oblimin rotation with the Kaiser normalization and generalized least squares as a method of extraction. Eigen values for each factor and amount of variance of (IPS)-Anxiety explained by each factor

Factor	Eigen value	Amount of variance explained (%)
Direct experience	7.817	43.428
Indirect experience	1.156	6.420

Table 4

Matrix of weights of the items and factors obtained with oblimin rotation with the Kaiser normalization of the two-factor solution for the Injection Phobia Scale (IPS)-Anxiety items

Items	Factor weights	
	DE	IE
When giving blood for analysis by taking a sample from your finger	0.158	0.471
When receiving an injection into the shoulder	0.101	0.789
When looking at a picture of a syringe and hypodermic needle	0.585	0.117
When feeling the smell of a hospital	0.267	0.167
When receiving an anesthetic injection at the dentists	0.173	0.437
When giving blood for analysis by obtaining a sample from your vein (venipuncture)	-0.143	0.617
When watching blood being drawn from another person's vein	0.280	0.048
When receiving an injection into the gluteus muscle	0.172	0.651
When watching a picture of a person receiving an injection	0.922	- 0.040
When listening to a conversation about injections	0.651	0.068
When looking at and touching the veins on the inside of the elbow	0.228	0.037
When watching a movie in which a person is receiving an injection	0.676	- 0.031
When watching a person getting an injection	0.637	0.053
When seeing a nurse in uniform	0.198	0.153
When getting your ears pierced	- 0.026	0.547
When receiving a vaccine injection	0.043	0.828
When having an intravenous injection	- 0.118	0.683
When watching a person have a blood sample drawn from his/her vein	0.327	0.032

IE – indirect experience; DE – direct experience.

Injection Phobia Scale (IPS) – Avoidance

The results are presented for 426 (87.42%) students due to the incomplete data. In the second round the entire survey was completed by 426 (87.83%). students The mean results (with standard deviations) on the IPS-Avoidance according to the demographic parameters are shown in Table 5.

Table 5
Mean results \pm SD on the Injection Phobia Scale (IPS)-Avoidance according to the demographic parameters in the first and in the second round

Demographic parameters	I round	II round
Gender (n)		
female		
I round: 341/424	3.83 \pm 4.813	4.60 \pm 5.991
II round: 336/426		
male		
I round: 83/424	5.03 \pm 5.469	3.04 \pm 4.700
II round: 90/426		
Medical sciences		
medicine	1.94 \pm 2.712	1.21 \pm 1.887
pharmacy	5.56 \pm 5.637	5.10 \pm 6.175
The year of the study		
the second	6.05 \pm 6.013	5.81 \pm 7.163
the third	3.57 \pm 4.453	3.11 \pm 4.337
the fourth	4.90 \pm 5.445	4.39 \pm 5.848
the fifth	6.61 \pm 5.935	5.44 \pm 6.579

SD – standard deviation.

The first round of tests

The translated scale showed high levels of internal consistency, with the Cronbach's alpha of 0.920.

After dividing the IPS-Avoidance into two parts using the split-half method, the Cronbach's alphas were 0.765 and 0.778. The Spearman-Brown coefficient was 0.890 and the Guttman split-half coefficient was 0.885.

The second round of tests

The Cronbach's alpha of 0.911 indicated high levels of internal consistency of the Serbian version the IPS-Avoidance.

After dividing the IPS-Avoidance into two parts using the split-half method, the Cronbach's alphas were 0.847 and 0.834. The Spearman-Brown coefficient was 0.903 and the Guttman split-half coefficient was 0.894.

The Inter-item correlation before and after dividing the IPS-Avoidance scale for the first and for the second round of the tests are shown in Table 6.

Factor analysis

The first round of tests

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO): 0.879; the Bartlett's test of sphericity: 3282.275, $p < 0.05$.

The method of extraction: The principal component analysis; The total explained variance of the two-factor solution was 46.06%. The component correlation matrix: 1-2: + 0.413.

The extracted two factors obtained by oblimin rotation with the Kaiser normalization and eigenvalues for each factor and the amount of variance of the IPS-Avoidance explained by each factor are shown in Table 7.

The matrix of the factor weights of the items and factors with oblimin rotation with the Kaiser normalization of the two-factor solution for the IPS-Avoidance items are shown in Table 8.

Validity

Construct validity of the Serbian version of the IPS-Anxiety and IPS-Avoidance was analyzed and confirmed by the three-member panel of psychiatrists at the Clinic for Psychiatry, Clinical Center Kragujevac. As of the criterion validity, the total score of the IPS-Anxiety correlated significantly with the total scores of MAS (Spearman's correlation coefficient 0.315, $p < 0.001$) and BIFS (Spearman's correlation coefficient -0.332, $p < 0.001$). The total score of the IPS-Avoidance correlated significantly with the total scores of MAS (Spearman's correlation coefficient 0.364, $p < 0.001$) and BIFS (Spearman's correlation coefficient -0.332, $p < 0.001$). The one-trait-bi-method matrix is shown in the Table 9.

Table 6
Inter-item correlation before and after dividing the (IPS)-Avoidance scale for the first and for the second round of the tests

Time of testing	The first round of tests		The second round of tests		
Before dividing	Inter-item correlation	0.283 (0.819)	Inter-item correlation	0.370 (0.716)	
After dividing	Inter-item correlation	I	0.267 (0.567)	I	0.385 (0.472)
		II	0.295 (0.646)	II	0.373 (0.677)

Table 7

Extracted two factors obtained by oblimin rotation with the Kaiser normalization. Eigenvalues for each factor and amount of variance of the Injection Phobia Scale (IPS)-Avoidance explained by each factor

Factor	Eigenvalue	Amount of variance explained (%)
Indirect experience	6.100	33.887
Direct experience	2.192	12.178

Table 8

Matrix of factor weights of the items and factors with oblimin rotation with the Kaiser normalization of the two-factor solution for Injection Phobia Scale (IPS)-Avoidance items

Items	Factor weights	
	IE	DE
When watching a picture of a person receiving an injection	0.832	-0.129
When watching a movie in which a person is receiving an injection	0.777	-0.106
When watching a person have a blood sample drawn from his/her vein	0.765	0.109
When watching a person getting an injection	0.758	0.143
When watching blood being drawn from another person's vein	0.758	0.143
When listening to a conversation about injections	0.736	-0.069
When looking at a picture of a syringe and hypodermic needle	0.586	-0.009
When looking at and touching the veins on the inside of the elbow	0.404	0.052
When seeing a nurse in uniform	0.314	0.131
When receiving an injection into the shoulder	-0.105	0.827
When receiving a vaccine injection	-0.004	0.783
When having an intravenous injection	0.112	0.764
When giving blood for analysis by obtaining a sample from your vein (venipuncture)	0.151	0.721
When receiving an injection into the gluteus muscle	0.058	0.669
When giving blood for analysis by taking a sample from your finger	0.040	0.605
When receiving an anesthetic injection at the dentists	-0.150	0.544
When getting your ears pierced	0.128	0.332
When feeling the smell of a hospital	0.151	0.263

IE – indirect experience; DE – direct experience.

Table 9

Spearman's correlation coefficients

	IPSA2	IPSAV2	BIFS2	MAS2	IPSA1	IPSAV1	BIFS1	MAS1
IPSA2	1							
IPSAV2	0.794*	1						
BIFS2	-0.332*	-0.339*	1					
MAS2	0.315*	0.364*	-0.425*	1				
IPSA1	0.786*	0.718*	-0.282*	0.281*	1			
IPSAV1	0.660*	0.718*	-0.268*	0.289*	0.718*	1		
BIFS1	-0.392*	-0.399*	0.597*	-0.518*	-0.407*	-0.363*	1	
MAS1	0.181*	0.258*	-0.345*	0.662*	0.228*	0.282*	-0.477*	1

* $p < 0.001$. IPSA2 – Injection Phobia Scale-Anxiety, filled in by the study participants themselves; IPSAV2 – Injection phobia scale (IPS) – Avoidance Scale, filled in by the study participants themselves; BIFS2 – Blood/Injection Fear Scale, filled in by the study participants themselves; MAS2 – Medical Avoidance Survey, filled in by the study participants themselves; IPSA1 – Injection Phobia Scale-Anxiety, filled in by the study investigators; IPSAV1 – Injection phobia scale (IPS)-Avoidance Scale, filled in by the study investigators; BIFS1 – Blood/Injection Fear Scale, filled in by the study investigators; MAS1 – Medical Avoidance Survey, filled in by the study investigators.

Discussion

Both scales of the Professor Lars-Göran Öst's questionnaire¹⁰ – IPS-Anxiety and IPS-Avoidance have excellent psychometric properties¹¹⁻¹³. Reliability, content validity, criterion

validity and structure validity, as the most important psychometric properties were examined for the original version of the questionnaire in English. In accordance with the ISPOR guidelines we conducted the process of translating and cultural adapting of this questionnaire to Serbian language.

The psychometric properties of the Serbian version of the IPS-Anxiety and IPS-Avoidance scale are very similar with the original psychometric properties of these scales in English. The Serbian translation of these two scales showed high internal consistency, whereby the IPS-Anxiety scale showed slightly higher internal consistency than the IPS-Avoidance which is in accordance with the original scale¹⁰. Internal consistency of the translated questionnaire was higher when the participants answered to the questions by themselves, without interference of the investigator. Also, the Serbian version of the scale showed a satisfactory temporal stability.

Concerning the factor analysis, there were no significant differences about these two scales. Factor analysis of the first scale of this questionnaire – IPS-Anxiety suggests that there are two factors and this is in accordance with the results of other studies. We called these two factors as the Indirect Experience (refers to a type of fear which Olatunji et al.¹² called the Distal Fear) and the Direct Experience (refers to a type of fear which Olatunji et al. called the Contact Fear). The first factor analysis of the IPS-Anxiety scale was made in the study of Olatunji et al.¹² and these authors found 12 complex items and two lower order factors labeled as the Distal Fear and Contact Fear. However, the correlation between these two factors was high, so they considered that one-factor model would be quite good. The correlation between our two factors was also good and since the factors we extracted had no theoretical background, our conclusion about factor analysis of the IPS-Anxiety is in some way similar, i.e., the scale should not be divided into domains. On the other hand, the factor analysis of the IPS-Avoidance scale in English was not made previously, so we could not compare our results. Our factor analysis also suggested that there were two factors with a good correlation between them. These factors were similar to those in factor analysis for the IPS-Anxiety: nine questions referred to the indirect fear of injections (Indirect Experience), which people experience when they talk about injections or when they watch other people who receive injections, while the other nine questions referred to the direct fear of injections (Direct Experience), which people experience in the moments of receiving injections.

In both scales, the questions that had the highest average score were those that considered intravenous injection and injection of an anesthetic by dentist. Results from other studies also indicated high level of fear from these two kinds

of injections^{20–22}. Adherence to injections is important for a success of therapy and one of the most important factors which contribute to a low level of injection adherence is certainly phenomenon of injection phobia²³. Considering these facts, it is very important to develop the instruments which could be used for the assessment of injection phobia. Not long ago, in Serbia, physicians have got the opportunity to use the Serbian version of the Medical Fear Survey (MFS), as an instrument for assessing Blood, Injury, Injections and Related Stimuli (BIIRS) phobia²⁴. However, more precise assessment of injection anxiety and injection-related could be made by the Serbian translation of the IPS-Anxiety and IPS-Avoidance.

Conclusion

The Serbian version of the IPS-Anxiety and IPS-Avoidance showed similar psychometric properties and similar factorial structure with the original English version. However, we must confess that our study has potentially important limitations in terms of differences in sociodemographic characteristics of the study population compared to the general population in Serbia. Considering this fact, we believe it is necessary to test these translated Serbian versions of the IPS-Anxiety and IPS-Avoidance on more representative sample of the Serbian population before we can give a firm conclusion and recommendation about possibility of using these scales for measuring anxiety and avoidance of injections in Serbian socio-cultural milieu.

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R E F E R E N C E S

1. Kose S, Mandiracioglu A. Fear of blood/injection in healthy and unhealthy adults admitted to a teaching hospital. *Int J Clin Pract* 2007; 61(3): 453–7.
2. Nir Y, Paç A, Sabo E, Potasman I. Fear of injections in young adults: Prevalence and associations. *Am J Trop Med Hyg* 2003; 68(3): 341–4.
3. Taddio A, Ipp M, Thivakaran S, Jamal A, Parikh C, Smart S, et al. Survey of the prevalence of immunization non-compliance due to needle fears in children and adults. *Vaccine* 2012; 30(32): 4807–12.
4. Sokolowski CJ, Giovannitti JA, Boynes SG. Needle phobia: Etiology, adverse consequences, and patient management. *Dent Clin North Am* 2010; 54(4): 731–44.
5. Deacon B, Abramowitz J. Fear of needles and vasovagal reactions among phlebotomy patients. *J Anxiety Disord* 2006; 20(7): 946–60.
6. Armstrong T, Hemminger A, Olatunji BO. Attentional bias in injection phobia: Overt components, time course, and relation to behavior. *Behav Res Ther* 2013; 51(6): 266–73.
7. Mollema ED, Snoek FJ, Adèr HJ, Heine RJ, van der Ploeg HM. Insulin-treated diabetes patients with fear of self-injecting or fear

- of self-testing: Psychological comorbidity and general well-being. *J Psychosom Res* 2001; 51(5): 665–72.
8. *Lilliecreutz C, Josefsson A, Sydsjö G*. An open trial with cognitive behavioral therapy for blood- and injection phobia in pregnant women—a group intervention program. *Arch Womens Ment Health* 2010; 13(3): 259–65.
 9. *Olatunji BO, Sawchuk CN, Moretz MW, David B, Armstrong T, Ciesielski BG*. Factor structure and psychometric properties of the Injection Phobia Scale-Anxiety. *Psychol Assess* 2010; 22(1): 167–79.
 10. *Ost LG, Brandberg M, Alm T*. One versus five sessions of exposure in the treatment of flying phobia. *Behav Res Ther* 1997; 35(11): 987–96.
 11. *Lilliecreutz C, Josefsson A*. Prevalence of blood and injection phobia among pregnant women. *Acta Obstet Gynecol Scand* 2008; 87(12): 1276–9.
 12. *Olatunji BO, Smits JAJ, Connolly K, Willems J, Lohr JM*. Examination of the decline in fear and disgust during exposure to threat-relevant stimuli in blood-injection-injury phobia. *J Anxiety Disord* 2007; 21(3): 445–55.
 13. *Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, et al*. Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value Health* 2005; 8(2): 94–104.
 14. *Andersson G, Holmes EA, Carlbring P, Lars-Göran Öst*. *Cogn Behav Ther* 2013; 42(4): 260–4.
 15. *Streiner DL, Norman GR*. *Health Measurement Scales: A practical guide to their development and use*. 4th ed. Oxford: Oxford University Press; 2008.
 16. *Janković SM*. Structure of design (plan) of research. In: *Janković SM*, editor. *Research design*. 1st ed. Kragujevac: Medical Society for Rational Therapy of the Republic of Serbia (Medrat) 2016. p. 3–25. (Serbian)
 17. *Page AC, Bennett KS, Carter O, Smith J, Woodmore K*. The Blood-Injection Symptom Scale (BISS): Assessing a structure of phobic symptoms elicited by blood and injections. *Behav Res Ther* 1997; 35(5): 457–64.
 18. *Kleinknecht RA, Thorndike RM, Walls MM*. Factorial dimensions and correlates of blood, injury, injection and related medical fears: cross validation of the medical fear survey. *Behav Res Ther* 1996; 34(4): 323–31.
 19. *Hsieh YC, Liu HT, Cho YH*. Reducing fear in preschool children receiving intravenous injections. *Hu Li Za Zhi* 2012; 59(3): 79–86. (Chinese)
 20. *Agdal ML, Raadal M, Skaret E, Kvale G*. Oral health and its influence on cognitive behavioral therapy in patients fulfilling the Diagnostic and Statistical Manual of Mental Disorders-IV criteria for intra-oral injection phobia. *Acta Odontol Scand* 2010; 68(2): 98–105.
 21. *Vika M, Skaret E, Raadal M, Ost LG, Kvale G*. One- vs. five-session treatment of intra-oral injection phobia: A randomized clinical study. *Eur J Oral Sci* 2009; 117(3): 279–85.
 22. *Kalincik T, Spelman T, Trojano M, Duquette P, Izquierdo G, Grammond P, et al*. MSBase Study Group. Persistence on therapy and propensity matched outcome comparison of two subcutaneous interferon beta 1a dosages for multiple sclerosis. *PLoS One* 2013; 8(5): e63480.
 23. *Chapman KL, Delapp RC*. Nine Session Treatment of a Blood-Injection-Injury Phobia With Manualized Cognitive Behavioral Therapy: An Adult Case Example. *Clin Case Studies* 2014; 13(4): 299–312.
 24. *Djoković J, Milovanović B, Milovanović JR, Milovanović O, Stojić I, Mrvić S, et al*. Translation of the Medical Fear Survey to Serbian: Psychometric properties. *Hippokratia* 2016; 20(1): 44–9.

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