Int Urogynecol J (2017) 28:1217–1222
DOI 10.1007/s00192-016-3251-x

ORIGINAL ARTICLE

Turkish adaptation of the Pelvic Organ Prolapse Symptom Score and its validity and reliability

Nuriye Özengin[1] · Serap Kaya[2] · Ceren Orhan[2] · Yeşim Bakar[1] · Bülent Duran[3] · Handan Ankaralı[4] · Türkan Akbayrak[2]

Received: 17 October 2016 / Accepted: 20 December 2016 / Published online: 6 January 2017

Abstract
Introduction and hypothesis The purpose of this study was to adapt the Pelvic Organ Prolapse Symptom Score (POP-SS) into Turkish and evaluate its reliability and validity.
Methods The POP-SS was adapted into Turkish by following the steps of the intercultural adaptation process. One hundred and three women with symptomatic or asymptomatic pelvic organ prolapse (POP) completed the Turkish POP-SS and other valid and reliable Turkish tools for POP: Pelvic Organ Prolapse Distress Inventory 6 (POPDI-6), Colorectal–Anal Distress Inventory 8 (CRADI-8), Urinary Distress Inventory 6 (UDI-6), Pelvic Floor Distress Inventory 20 (PFDI-20), and Pelvic Organ Prolapse Impact Questionnaire 7 (POPIQ-7). Pelvic Organ Prolapse Quantification (POP-Q) system was also used to assess pelvic support, and patients were divided into three groups based on POP-Q scores. Cronbach's alpha was used to determine internal consistency, and intraclass correlation coefficient (ICC) was estimated for test–retest reliability. POP-SS validity was assessed by using the Spearman rank correlation and Kruskal–Wallis analyses. The underlying scale structure was determined by exploratory factor analysis.
Results The POP-SS scale had high internal consistency (Cronbach's alpha = 0.705) and test–retest reliability (ICC = 0.981; $p < 0.001$). Among groups, there was statistically significant differences in POP-SS scores. POP-SS scores were also significantly correlated with POPDI-6 ($r = 0.830$), CRADI-8 ($r = 0.525$), UDI-6 ($r = 0.385$), PFDI-20 ($r = 0.752$), and POPIQ-7 ($r = 0.690$) ($p < 0.001$). Two factors were identified by exploratory factor analysis.
Conclusions The Turkish version of POP-SS is a valid and reliable tool for Turkish women with POP.

Keywords Pelvic organ prolapse · Pelvic Organ Prolapse Symptom Score · Reliability · Validity

✉ Yeşim Bakar
ptyesim@yahoo.de

[1] School of Physical Therapy and Rehabilitation, Abant İzzet Baysal University, 14280 Bolu, Turkey

[2] Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Hacettepe University, Ankara, Turkey

[3] Adatıp Hospital, Sakarya, Turkey

[4] Faculty of Medicine, Department of Biostatistics and Medical Informatics, Düzce University, Düzce, Turkey

Introduction

Pelvic organ prolapse (POP) is defined by the International Urogynecological Association (IUGA) and International Continence Society (ICS) as falling, slipping, or downward displacement of the uterus and/or various vaginal compartments and their neighboring organs, including bladder, rectum, or bowel [1]. It is one of the most common pelvic floor disorders and is generally found in women with moderate to severe stages of POP. Since prolapse symptoms can severely affect a woman's quality of life (QoL), symptom score should be included as an outcome measure in clinical trials [2]. However, prior to using a tool in a different language, it should always be cross-culturally adapted and its psychometric characteristics tested in the new language [3]. Thus, outcome measures obtained by different national and international studies can be comparable by using linguistic and cross-cultural adaptation [4].

Hagen et al. developed the English-language Pelvic Organ Prolapse Symptom Score (POP-SS) in 2009 and found it valid and reliable. The POP-SS consists of questions that focus on symptoms caused or aggravated by prolapse. It can be used as

the major outcome measure in randomized controlled trials of different interventions for POP [5–8]. To the best of our knowledge, only the validated English version of the POP-SS has been published [5]. Since repeatability and reproducibility of the POP-SS has not been assessed for the Turkish population, and because there is a limited number of scales assessing POP symptoms in the Turkish language, this study was planned to adapt the POP-SS into Turkish and evaluate its validity and reliability.

Materials and methods

Translation

Authorization and permission for validation was received from Hagen, the owner of the POP-SS copyright. The POP-SS was culturally adapted according to Beaton et al.'s protocol. The original scoring was translated into Turkish by a committee of Turkish- and English-speaking professionals: two physiotherapists and one urogynecologist. Two native English speakers who also spoke Turkish but had no knowledge about the subject translated the scoring back into English. An expert committee then compared the original version with the translated version regarding scoring. Before finalizing the scoring, a pilot study was conducted with 30 women with POP. The final version of the survey was formed after all cultural adaptation procedures were completed [9].

Participants

During the study period (from May 2015 to September 2015), 103 women with a diagnosis of POP were referred to either the Physical Therapy and Rehabilitation School of Abant Izzet Baysal University or the Physiotherapy and Rehabilitation Department of Hacettepe University. Women who had a mental problem that prevented cooperation, had a neurologic disorder, did not wish to enroll in the research voluntarily, were <18 years of age and pregnant, or could not speak and understand Turkish were not included in the study. The Ethics Committee of Human Studies in Social Sciences of Abant Izzet Baysal University approved the study (no: 2015/64). Written consent forms were received from all participating women.

Measurement

Sociodemographic and physical characteristics of all women were recorded. POP presence and stage were determined by the Pelvic Organ Prolapse Quantification (POP-Q) test. The women were asked to take a lithotomy position for the POP-Q test. In order to make the measurement, a speculum and measuring set were used. Nine points (Aa, Ba, Ap, Bp, C, D, genital hiatus, perineal body, and total vaginal length) were used for the POP-Q assessment. The hymen point was regarded as zero, and the position of points in the anterior (Aa, Ba), superior (C, D), and posterior (Ap, Bp) vagina were measured as hymenium proximal (negative number) or hymenium distal (positive number) in centimeters. All measurements except total vaginal length were taken at maximum Valsalva and the prolapse in each segment assessed. POP-Q

Table 1 Patient physical characteristics (n = 103)

Variables	Mean ± SD	Median	Minimum	Maximum
Age (year)	53.97 ± 10.43	5400	28.00	81.00
Body height (m)	1.59 ± .07	1.58	1.40	1.76
Body weight (kg)	73.10 ± 13.86	72.00	40.00	117.00
BMI (kg/m^2)	29.11 ± 5.68	28.23	16.65	48.00
Obstetric anamnesis				
Total parity		2.00	.00	12.00
Vaginal parity		2.00	.00	12.00
Gravida		3.00	.00	12.00
Para		2.00	.00	12.00
Abortus		.00	.00	3.00
D/C		1.00	.00	5.00
Live children		2.00	.00	9.00

BMI body mass index, *D/C* dilation and curettage, *SD* standard deviation

Table 2 Patient sociodemographic characteristics

Variables	Results	n	%
Educational status	Illiterate	12	11.7
	Literate	5	4.9
	Elementary school	51	49.5
	High school	16	15.5
	University	19	18.4
Profession	Housewife	70	68.0
	Civil servant	8	7.8
	Retired	8	7.8
	Employee	10	9.7
	Freelancer	7	6.8
Menstrual states	Normal	19	18.4
	Irregular	7	6.8
	Perimenopause	1	1.0
	Menopause	76	73.8
Stages of prolapses	Stage 1	29	28.2
	Stage 2	45	43.7
	Stage 3 and 4	29	28.2
Compartments of prolapses	Anterior	50	48.5
	Posterior	16	15.5
	Superior	12	11.7
	Anterior posterior	20	19.4
	Anterior superior	5	4.9

Table 3 Internal consistency of the Pelvic Organ Prolapse Symptom Score (POP-SS)

Questions	Corrected item-total correlation	Cronbach's alpha if item deleted	Internal consistency between A1 and A7 questions; Cronbach's alpha
A1	.459	.661	.705
A2	.504	.650	
A3	.465	.660	
A4	.325	.693	
A5	.511	.647	
A6	.498	.649	
A7	.182	.732	

staging was made by placing measures in a 3-×-3 table [10]. Subsequently, women were asked to complete the Pelvic Organ Prolapse Symptom Score (POP-SS), Pelvic Floor Distress Inventory 20 (PFDI-20), and Pelvic Organ Prolapse Impact Questionnaire 7 (POPIQ-7). The POP-SS was repeated for test–retest reliability analysis 1 week later.

The POP-SS has seven items, each with a five-point Likert response set: never (0), somewhat (1), sometimes (2), most of the time (3), and always (4). The seven symptoms were as follows: a feeling of something coming down from the vagina; pain or discomfort in the vagina that worsened when standing; dragging sensation in the lower abdomen; feeling of heaviness or dragging sensation in the lower back; straining need to empty the bladder; sensation of incomplete bladder evacuation; sensation of incomplete bowel evacuation. A total score that ranged from 0 to 28 was calculated by summing scores of individual symptom responses [5].

The PFDI-20 assesses the presence of POP, urinary and colorectal–anal problems, and discomfort levels related to these problems. The Turkish version was valid and reliable according to Toprak et al. in 2012. The scale consists of 20 items that contain three subscales: Pelvic Organ Prolapses Distress Inventory 6 (POPDI-6), Urinary Distress Inventory 6 (UDI-6), and Colorectal–Anal Distress Inventory 8 (CRADI-8). Women selected a response of either no (0) or yes (1) depending on presence or absence of a complaint. If they answered yes, they ranked the discomfort level as unimportant (1), little (2), moderate (3), or a lot (4). The average score of each subscale was computed and multiplied by 25 to convert each subscale score between 0 and 100. Each of three subscales was scored from 0: least distress to 100: greatest distress. Total scale score ranges from 0 (best possible) to 300 (worst possible). [11].

Clinicians and researchers have been using the POPIQ-7 to assess the effect of POP on the QoL. Its adaptation into Turkish, validity, and reliability was tested by Kaplan et al. Women graded their discomfort level in the 7-item survey as not at all (0), somewhat (1), moderately (2), and quite a bit (3). The total score possible was between 0 (best) and 100 (worst) [12].

Table 4 Test–retest reliability of the Pelvic Organ Prolapse Symptom Score (POP-SS)

Variables	ICC
First and second POP-SS	.981
First and second A1	.970
First and second A2	.855
First and second A3	.903
First and second A4	.967
First and second A5	.967
First and second A6	.955
First and second A7	.953

ICC intraclass correlation

Statistical analysis

Descriptive statistics and floor and ceiling effects (women obtaining minimum and maximum scores, respectively) were computed. Cronbach's alpha was calculated for internal consistency of the scale, and intraclass correlation coefficient (ICC) determined the test–retest reliability. The underlying scale structure was evaluated by exploratory factor analysis. Spearman rank correlation and Kruskal–Wallis analyses were used to determine the correlation between POP-SS and other measures, including POP-Q, POPDI-6, CRADI-8, UDI-6, PFDI-20, and POPIQ-7, which were used for criterion validity. A p value of 0.05 was accepted as a statistically significant level, and the PASW program (ver. 18) was used for all analyses.

Results

One hundred and twelve women were screened for the study. Two women who did not volunteer and five who did not cooperate were excluded. An additional two women did not complete the second assessment. In total, 103 women were assessed in the final analyses. Based on the POP-Q system, there were 29 women in POP stage 1 (group 1), 45 in stage 2 (group 2), and 29 in stages 3 and 4 (group 3). Sociodemographic, obstetric and menstrual characteristics,

Table 5 Pelvic Organ Prolapse Symptom Score (POP-SS) totals according to prolapses stages

Group/stage	n	Mean	SD	Minimum	Maximum	*P* value
Group 1 = stage 1	29	2.89	3.384	0	130	<0.001*
Group 2 = stage 2	45	7.24	5.148	0	200	
Group 3 = stage 3 and 4	29	11.68	4.520	40	230	

SD standard deviation

*$P < 0.001$

and POP-Q stages and compartments of 103 women are shown in Tables 1 and 2.

The internal consistency of the seven POP-SS scale items was 0.705 (statistically significant; $p < 0.001$). Table 3 shows the total correlations between each item and total scale score for measurements and how internal consistency (Cronbach's alpha) changes when each item is removed one by one from the scale.

The test–retest reliability between the first and second measurements of each item and total POP-SS scale score was between 0.855 and 0.981 and statistically significant ($p < 0.001$) (Table 4).

There was a statistically significant difference among three groups of stages in POP-SS score. The highest POP-SS average was in the stage 3 and 4 group, followed by stage 2 and then stage 1 ($p < 0.001$ for each one) (Table 5). Correlations of the POP-SS score with other tool scores were calculated to assess the POP-SS criterion validity. As seen in Table 6, POP-SS scores had a statistically significant correlation with all other total and subscale scores ($p < 0.001$), the highest level of relationship with the POPDI-6 ($r = 0.830$), and the lowest level of relationship with the UDI-6 ($r = 0.385$).

Table 6 Pelvic Organ Prolapse System Score criterion validity testing

Other scoring tools	POP-SS
POPDI-6	*r* .830
	P <0.001*
CRADI-8	*r*.525
	P<0.001*
UDI-6	*r*.385
	P<0.001*
PFDI-20	*r*.752
	P<0.001*
POPIQ-7	*r*.690
	P<0.001*

POPDI-6 Pelvic Organ Prolapse Distress Inventory 6, *CRADI-8* Colorectal–Anal Distress Inventory 8, *UDI-6* Urinary Distress Inventory 6, *PFDI-20* Pelvic Floor Distress Inventory 20, *POPIQ-7* Pelvic Organ Prolapse Impact Questionnaire 7

*$P < 0.001$

The Kaiser–Meyer–Olkin (KMO) test assessed suitability of the Turkish version of the POP-SS to factor analysis. Factor analysis should be made for the scale items, since the KMO value was 0.731 (if the KMO value is ≥0.50, then factor analysis should be made for scale items). Moreover, Bartlett's test of sphericity revealed that the correlation structure between items was not spherical and that there was a correlation between items and factor analysis (Ki-square value = 139.7 and $p < 0.001$). Considering the correlations included in the anti-image matrix, the correlation of the seven items with each other was ≥0.70. This outcome showed that the relationship of referred items to each other was sufficient (if the correlation value is ≥0.50, the item is kept in the scale; otherwise, it is removed because in will have no contribution to the scale); therefore, it was included in the scale structure. The scale had two subfactors as a result of POP-SS scale exploratory factor analysis using the seven subitems. The A1, A2, A3, and A4 questions entered into the first subfactor; the A5, A6 and A7 questions entered into the second subfactor. The Eigenvalue of the first subfactor was 2.637 and the total variance 37.7%; the Eigenvalue of the second subfactor was 1.271 and explained 18.2% of total variance, meaning that both subfactors explained 55.9% of total variance. This ratio adequately explained total variance. The factors were rotated by Varimax rotation to interpret factor loads more accurately and to better see items placed within subfactors, since there was a correlation between scale items (Table 7).

Floor and ceiling effects of each scale item are shown in Table 8. An answer of zero (0) was given most frequently to

Table 7 Pelvic Organ Prolapse Symptom Score (POP-SS) exploratory factor analysis

Rotated component matrix		
Questions	First subfactor	Second subfactor
A1	**.679**	.225
A2	**.754**	.177
A3	**.689**	.164
A4	**.721**	−.133
A5	.245	**.803**
A6	.266	**.771**
A7	−.091	**.615**

Factor loads indicated by bold emphasis were accepted as subfactors

Table 8 Pelvic Organ Prolapse Symptom Score floor and ceiling effects

Questions	Floor (0)		Ceiling (4)	
	n	%	*n*	%
A1	56	54.4	**17**	**16.5**
A2	66	64.1	4	3.9
A3	67	65.0	4	3.9
A4	**79**	**76.7**	3	2.9
A5	58	56.3	7	6.8
A6	40	38.8	15	14.6
A7	42	40.8	12	11.7

Bold emphasis indicate most given answers

question A4, and an answer of four (4) was given most frequently to question A1.

Discussion

POP, similar to other pelvic floor disorders, rarely results in severe morbidity or mortality. However, it causes symptoms that can affect a woman's daily activities and negatively affect her QoL [13]. The POP-SS is a brief symptom index that covers the presence and extent of major prolapse symptoms [5, 14]. This study demonstrated that the Turkish version of the POP-SS is a valid and reliable questionnaire for assessing prolapse symptoms in women with POP. International comparative studies, surveys of multilingual communities, and international multicenter clinical trials need more multiple-language versions of the same psychometric instrument [15]. However, cross-cultural adaptations of these surveys must be made first. In this study, we followed Beaton et al.'s translation process for adaptation [9]. The fourth stage of this process was the expert committee meeting. Health professionals met at this stage to ensure cultural equality and minimize differences between target and source languages. Problems about synonymous words and grammar, difficulties in spoken language and experiences, and usage of words appropriate to the lifestyle of the target culture were discussed. Although the word vagina is a global term, our experiences with women's health in Turekey indicates that some participants are unfamiliar with the word. Thus, the Turkish translation—reservoir (*hazne*)—was added in parentheses next to the word vagina for clarification.

A scale should have the two characteristics of reliability and validity in order to become standardized and subsequently have the ability to produce applicable information [16]. Internal consistency is a reliability criterion that shows the relationship between questions and is assessed using Cronbach's alpha coefficient. A Cronbach's alpha value between 0.7 and 0.9 signifies good internal consistency. Hagen et al. reported that Cronbach's alpha values ranged between 0.723 and 0.828 by using data obtained in three studies conducted to examine internal consistency of the POP-SS [5]. Values of the Turkish POP-SS was 0.705 in our study, displaying good internal consistency.

Hagen et al. estimated test–retest reliability by comparing scores from the two occasions using the percentage agreement and mean difference and standard deviation (SD) method. Agreement between scores on the two occasions was moderately high (69% agreed within 2 points), and the difference in scores between occasions was small (mean difference 0.4; SD 2.8) [14]. Considering the test–retest reliability of Turkish version of the POP-SS, it was found that the ICC was 0.981, showing a high correlation.

The relationship between POP-Q, POPDI-6, PFDI-20, POPIQ-7, and POP-SS was studied for POP-SS criterion validity. POP-SS values changed according to prolapse stage, with the highest stage having the highest POP-SS value. The Turkish version of the POP-SS was strongly correlated with POPDI-6, PFDI-20, and POPIQ-7. The highest relationship was with the POPDI-6. These results confirm the Turkish-POP-SS criterion validity. Hagen et al. used trait validity analysis to confirm that the POP-SS is a valid measure of prolapse symptoms, since the scores accurately differed between groups of women who were known to differ in prolapse symptoms [5].

Factor analysis is an assessment to determine whether scale items can be collected under different factors [17]. Exploratory factor analysis of the Turkish POP-SS revealed two subfactors of the scale. The first consisted of A1, A2, A3, and A4 questions, while the second consisted of A5, A6, and A7 questions. Therefore, the first four questions can be called physical symptoms and the last three evacuation symptoms. Factor analysis was not made for the original version of the POP-SS.

Considering the percentage distribution of responses to the questions, women with POP answered 4 at the highest rate to the question A1: feeling of something coming down from or in your vagina; they answered 0 at the highest rate to the question A4: a heaviness or dragging feeling in your lower back. Our study agrees with previous literature that shows the symptom most frequently stated by women is vaginal bulging and the least frequent is heaviness [13, 18, 19].

A strong aspect of this study is its conduction at two centers, which we believe allowed for a diverse profile of participating women.

Conclusion

The Turkish version of the POP-SS is a consistent, valid, and reliable scale for the Turkish population with which to assess key prolapse symptoms. Hence, it can be used in research and clinical environments. Further studies are needed to

investigate the sensitivity of this scale to different treatment approaches for POP.

Acknowledgements The original Pelvic Organ Prolapse Symptom Score (POP-SS) was authored by Hagen et al. (2008) and is copyrighted.

Compliance with ethical standards

Conflicts of interest None.

References

1. Ismail S, Duckett J, Rizk D, Sorinola O, Kammerer-Doak D, Contreras-Ortiz O, et al. Recurrent pelvic organ prolapse: international urogynecological association research and development committee opinion. Int Urogynecol J. 2016;27(11):1619–32.
2. Reid F. Assessment of pelvic organ prolapse: a practical guide to the pelvic organ prolapse quantification. Obstet Gynaecol Reprod Med. 2014;24(6):170–6.
3. Uysal-Bozkir Ö, Parlevliet JL, de Rooij SE. Insufficient cross-cultural adaptations and psychometric properties for many translated health assessment scales: a systematic review. J Clin Epidemiol. 2013;66(6):608–18.
4. Gjersing L, Caplehorn JR, Clausen T. Cross-cultural adaptation of research instruments: language, setting, time and statistical considerations. BMC Med Res Methodol. 2010;10(1):1.
5. Hagen S, Glazener C, Sinclair L, Stark D, Bugge C. Psychometric properties of the pelvic organ prolapse symptom score. BJOG Int J Obstet Gynaecol. 2009;116(1):25–31.
6. Kashyap R, Jain V, Singh A. Comparative effect of 2 packages of pelvic floor muscle training on the clinical course of stage I–III pelvic organ prolapse. Int J Gynecol Obstet. 2013;121(1):69–73.
7. Glazener C, Elders A, Macarthur C, Lancashire R, Herbison P, Hagen S, et al. Childbirth and prolapse: long-term associations with the symptoms and objective measurement of pelvic organ prolapse. BJOG Int J Obstet Gynaecol. 2013;120(2):161–8.
8. Hagen S, Stark D, Glazener C, Dickson S, Barry S, Elders A, et al. Individualised pelvic floor muscle training in women with pelvic organ prolapse (POPPY): a multicentre randomised controlled trial. Lancet. 2014;383(9919):796–806.
9. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine. 2000;25(24):3186–91.
10. Bump RC, Mattiasson A, Bø K, Brubaker LP, DeLancey JO, Klarskov P, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. Am J Obstet Gynecol. 1996;175(1):10–7.
11. Celenay ST, Akbayrak T, Kaya S, Ekici G, Beksac S. Validity and reliability of the Turkish version of the Pelvic Floor Distress Inventory-20. Int Urogynecol J. 2012;23(8):1123–7.
12. Kaplan PB, Sut N, Sut HK. Validation, cultural adaptation and responsiveness of two pelvic-floor-specific quality-of-life questionnaires, PFDI-20 and PFIQ-7, in a Turkish population. Eur J Obstet Gynecol Reprod Biol. 2012;162(2):229–33.
13. Barber MD. Symptoms and outcome measures of pelvic organ prolapse. Clin Obstet Gynecol. 2005;48(3):648–61.
14. Hagen S, Glazener C, Cook J, Herbison P, Toozs-Hobson P. Further properties of the pelvic organ prolapse symptom score: minimally important change and test–retest reliability. Neurourol Urodyn. 2010;29(6):1055–6.
15. Perneger TV, Leplège A, Etter J-F. Cross-cultural adaptation of a psychometric instrument: two methods compared. J Clin Epidemiol. 1999;52(11):1037–46.
16. Ercan İ, Kan İ. Ölçeklerde güvenirlik ve geçerlik. Uludağ Üniversitesi Tıp Fakültesi Dergisi. 2004;30(3):211–6.
17. Aksayan S, Gözüm S. Kültürlerarası Ölçek Uyarlaması İçin Rehber II: Psikometrik özellikler ve kültürlerarası karşılaştırma. Hemşirelikte Arastırma Gelistirme Dergisi. 2003;5:3–14.
18. Gutman RE, Ford DE, Quiroz LH, Shippey SH, Handa VL. Is there a pelvic organ prolapse threshold that predicts pelvic floor symptoms? Am J Obstet Gynecol. 2008;199(6):683.e1–e7.
19. Ghetti C, Gregory WT, Edwards SR, Otto LN, Clark AL. Pelvic organ descent and symptoms of pelvic floor disorders. Am J Obstet Gynecol. 2005;193(1):53–7.