HEALTH SERVICES RESEARCH

Reliability and Validity of the Turkish Version of the Body Image Disturbance Questionnaire-Scoliosis

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Study Design. It is cross-cultural adaptation and validation of the Body Image Disturbances Questionnaire.

Objective. The purpose of the study was to adopt the English version of the Body Image Disturbance Questionnaire-Scoliosis (BIDQ-S) into Turkish language.

Summary of Background Data. BIDQ-S is originally adopted from BIDQ scale which is designed to be used for healthy subjects in order to assess concerns and distress about physical appearance, and impairment on daily functioning. However, there is no culturally adopted and validated BIDQ-S for the Turkish population.

Method. Translation and back translation method was used to guide the translation process of the BIDQ-S from English to Turkish. In order to determine and confirm the factor structure of the Turkish BIDQ-S exploratory and confirmatory factor analysis were performed. Convergent validity of the Turkish BIDQ-S- was determined by calculating the correlations of BIDQ-S, and the factors emerged, with the indicators of subjective well-being which consists of three components: positive affect (PA), negative affect (NA), and satisfaction with life (SWL) and of health related quality of life measured by Scoliosis Research Society Questionnaire (SRS-22).

Results. The data from the present study demonstrated that different from the original, German and Chinese versions two factor solutions were found. The Turkish BIDQ-S also showed satisfactory internal consistency value with Cronbach α equals to 0.88 construct validity.

Conclusion. In conclusion, current study shows that Turkish BIDQ-S is a valid and reliable questionnaire for assessing the body image concerns in patients with scoliosis in Turkish population.

Key words: body image, body image disturbance questionnaire-scoliosis, health related quality of life, idiopathic scoliosis, life satisfaction.

Level of Evidence: 4
Spine 2020;45:E1033–E1038

I diopathic scoliosis is a three-dimensional pathology of the spine which changes from mild to severe curve. It leads to physical deformity with the other psychological problems and also has effects on adolescents' self-esteem and self-image.[1] Regardless of the treatment choice, both male and female patients have some body image concerns in a negative way.[2] These negative body image concerns are also affected by Cobb degree. Curvatures that are over 40° are found to be a risk factor for negative body image.[3]

In the literature several studies tried to measure body image concerns such as Scoliosis Research Society-22 (SRS-22), the most widely used instrument to determine self-perceived body image behind quality of life in idiopathic scoliosis.[4] Trunk Appearance Perception Scale (TAPS) is also validated in order to evaluate patients' perception about their trunk deformity.[5] Walter Reed Visual Assessment Scale (WRVAS) is another scale designed to measure the subjective perception of scoliosis patient's deformity.[6] Brace Questionnaire (BRQ) is also another scale that measures quality of life in adolescents with scoliosis and measure eight areas including self-esteem and physical appearance.[7] However, none of those instruments are designed to assess concerns about how physical appearance related to scoliosis affect daily functioning and psychological well-being.

The Body Image Disturbance Questionnaire-Scoliosis (BIDQ-S) is validated by Cash et al,[8] in order to assess scoliosis patients' worries about the shape of their back and whether they have impairment in their social, school, family, or work life. BIDQ-S is originally adopted from BIDQ scale which is developed with healthy subjects in order to assess

concerns and distress about physical appearance, and impairment on daily functioning.[8] Auerbach's et al[9] study showed BIDQ-S is a reliable scale which can be applied to scoliosis patients. Modified and validated version of BIDQ-S is previously adopted into German[10] and Chinese[11] languages but not into Turkish. The aim of this study is to adopt the English version of the BIDQ-S into Turkish language. It also aims to identify other possible factor solutions with confirmatory factor analysis.

MATERIALS AND METHOD

Participants and Procedure
The data were collected from different hospitals' orthopedic and physical therapy and rehabilitation clinics. Scales were administered to patients without any intervention of researcher. The inclusion criteria were being over 14 years old, and having over $10°$ Cobb angle of idiopathic scoliosis. Exclusion criteria was having other types of scoliosis (e.g., adult degenerative type) and having less than $10°$ curative. Patients received either surgical or nonsurgical (observation or bracing) treatment. With respect to these criteria, 83 idiopathic scoliosis patients were recruited from orthopedic and rehabilitation clinics; 68 females and 16 males. Their ages between 14 and 69 ($M = 26.5$), being diagnosed with idiopathic scoliosis minimum 2 years ($M = 10.89$) prior to the study. Their mean Cobb degree was 27 (range: 10–75). Data were collected from voluntary patients who gave written informed consent before participating in the study. The study was approved by Istanbul Arel University ethics committee.

Variables and Measures
In addition to a sociodemographic form, the following measures were administered.

Body Image

The Original Version of the BIDQ-S
Original BIDQ-S is a seven item scale which is scored on a five point Likert scale. The average of items indicates body image disturbance level. Higher scores show body image disturbance severity. In addition to seven items there are qualitative items about the responder's concerns of body parts (1B, 2B, and 5B) which are not factored in the total score. Revealing a one factor solution, the BDIQ-S has been found to be a reliable measure with 0.82 Cronbach α value and corrected item total correlations of 0.47 to 0.67. Reliability of German adopted study was reported to be $r = 0.87$ while in the Chinese version this value was $r = 0.87$.

The Adaptation of the Turkish Version of BIDQ-S (TR-BIDQ-S)
Before starting translation process the permission was taken from the original scale owners. The original BIDQ-S questionnaire translated by using Chapman and Carter[12]

methodology into Turkish by three psychologists who were both competent in English and Turkish languages (one is bilingual). In the second step, all three translations were compared in case there is any discrepancy or not. The translators reached consensus about translation of words. The minor corrections were done with the consensus of researchers. After these corrections the scale was sent to two academicians from the department of Turkish Language and Literature. They rated every single item whether it was appropriate to Turkish language or not. The final form of the Turkish version of the questionnaire was translated back to English by two other translators native in English. The two English versions (original and the re-translated one) were matched and compared with each other. With the consensus among translators and psychologists some mistakes were corrected and final version was created. At the final stage latest version of English scale was sent to the owner of the original scale and was confirmed about the similarity between the original English scale and re-translated one. Thus face validity stages were completed.

Quality of Life

Scoliosis Research Society-22 Patient Questionnaire
SRS-22, is a 22 item scale developed for scoliosis patients in order to measure their pain, function, self-image, mental health, and satisfaction management. Original study is done in English by Watanabe et al,[4] adaptation to Turkish language of the scale was done by Alanay et al[13] and found to be a reliable and valid questionnaire to use in Turkish language. The scale was used in order to test for the concurrent validity of TR-BIDQ-S. The alpha reliability coefficient for the current study is $r = 0.88$.

Subjective Well-Being
The levels of subjective well-being were determined by three independent scores of positive affect (PA), negative affect (NA), and life satisfaction (LS), obtained from the Positive and Negative Affect Schedule (PANAS) and Satisfaction with Life Scale (SWLS).[14]

PANAS
The Positive and Negative Affect Schedule (PANAS).[15] PANAS is a 20 items scale that measures negative and positive affect. While 10 items is for positive affect the rest are for negative items and each of them is rated on a 5-point scale, 1 (very slightly) to 5 (extremely). The coefficient alpha for positive affect was 0.87, for negative affect was 0.91 in the original study. Thus PANAS is a useful and valid tool for measuring mood states. The adaptation of the scale to Turkish was done by Gençöz et al.[16] Consistent with the original study factor analysis showed two factors accounting for 44% of the total variance and internal consistency value was 0.83. The scale was used in order to test for the concurrent validity of TR-BIDQ-S. The alpha reliability coefficient for the current study is $r = 0.72$.

SWLS

The Satisfaction with Life Scale (SWLS; Diener *et al*[14]) is used in order to measure global life satisfaction. It composes of five items and a Likert scale ranging from 1 to 7. General score of life satisfaction is formed by summing items. The adaptation of the scale into Turkish was conducted by Dağli and Baysal[17] where it was reported to have a one-factor structure. For the current study the scale was used in order to test for the concurrent validity of TR-BIDQ-S. The alpha reliability coefficient for the current study is $r = 0.85$.

Strategy of Analysis

Exploratory and confirmatory factor analyses were used in order to determine and confirm the factor structure of the TR-BIDQ-S. Since the basic aim of the present study is to understand whether the factor structure of the scale was valid for the Turkish sample, we compared the measurement models provided by the exploratory factor analysis and the original factor structure. In the evaluation of measurement models, several goodness-of-fit statistics was taken into consideration. As noted extensively in the literature, chi-square statistics tend to be affected by sample sizes and are almost always significant despite reasonable fit to the data.[18,19] Therefore, as suggested by Byrne,[19] several alternative indexes of fit as adjuncts to the chi-square statistic were used, including the chi-square to degrees of freedom ratio (χ^2/df), the comparative fit index (CFI), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), and root-mean-square error of approximation (RMSEA). Since a competing models strategy was used, some other indices of fit were also taken into account, such as Akaike's[20] information criterion (AIC; Akaike[20]), and expected cross-validation index (ECVI; Browne and Cudeck,[21]). Lower values for these statistics indicate a better model fit.[22]

RESULTS

Preliminary Descriptives

Means, standard deviations, and intercorrelations of the seven items of the TR-BIDQ-S are calculated before the factor analyses (Table 1). As can be seen from Table 1, most of the correlations among the items of the TR-BIDQ-S were strong, mostly higher than 0.40. Skewness and kurtosis values were found to be lower than 2, ranged from 0.10

to 1.50 for skewness and from −0.88 to 0.78 for kurtosis, showing no crucial problem with normality.

Exploratory Factor Analysis

A principal-axis factor analysis was implemented with oblique rotation method since it is considered one of the best methods by which the nature of the underlying structure behind the items can be understood.[23] Since the correlations among the items were strong, Direct Oblimin rotation with Kaiser Normalization method was used in case of the emergence of more than one factor. The sample size was found to be adequate for factor analysis with the following statistics: The Kaiser–Mayer–Olkin measure of sampling adequacy was 0.86 and Bartlett test of sphericity was 308.30 ($P < 0.001$). In contrast to a one factor expectation with respect to the structure of the original form, the results of the principal-axis factor analysis yielded two factors with eigenvalues of greater than 1. An examination of the factor structure (Table 2) indicated that the factors refer to meaningful patterns of relationships among the items. The first factor contained four items referring to the disturbance because of social actors around the individual such as family member or friends (*e.g.*, Has your back shape caused problems with your friends, family members, or dating? How much?), and this factor accounted for 59.41% of the variance. The second factor consisted of three items, reflecting the disturbance as a result of personal considerations (*e.g.*, are you worried about the appearance of your back shape?), accounting for 15.86% of the variance. These factors accounted for the 75.27% of the total variance. Cronbach α coefficients also indicated strong internal consistencies for the first and second factors, $\alpha = 0.89$ and $\alpha = 0.86$, respectively.

Confirmatory Factor Analyses

Confirmatory factor analyses were conducted using maximum likelihood estimation method on the items of the TR-BIDQ-S. The test of the original one-dimensional measurement model of the BIDQ-S resulted in poor fit to the data as indicated by the following goodness of fit statistics: $\chi^2(14, N = 83) = 82.28$, $P < 0.05$; GFI = 0.75; CFI = 0.86; SRMR = 0.090; RMSEA = 0.26 (90% confidence interval for RMSEA = 0.21–0.32). The two-factor measurement model yielded from the exploratory factor analysis resulted

TABLE 1. Means, Standard Deviations, and Intercorrelations of the Items of TR-BIDQ-S.

Item	Mean	SD	1	2	3	4	5	6	7
1	2.93	1.26	–						
2	2.40	1.07	0.76	–					
3	2.11	1.12	0.73	0.70	–				
4	1.70	0.99	0.49	0.40	0.49	–			
5	1.52	0.97	0.47	0.39	0.45	0.66	–		
6	1.81	1.09	0.38	0.38	0.42	0.65	0.54	–	
7	1.81	1.01	0.42	0.43	0.51	0.58	0.55	0.57	–

Notes: N = 83; All correlations are significant at P = 0.01. TR-BIDQ-S indicates Turkish version of BIDQ-S.

TABLE 2. Factor Loadings and Corrected Item-Total Correlations of the TR-BIDQ-S Items			
Item	Social	Personal	CITC
4.	**0.89**		0.72
6.	**0.77**		0.61
5.	**0.76**		0.65
7.	**0.65**		0.65
2.		**0.90**	0.67
1.		**0.88**	0.71
3.	0.12	**0.75**	0.73

Notes: N = 83; Factor loadings less than 0.10 are not represented. TR-BIDQ-S indicates Turkish version of BIDQ-S.

TABLE 3. Correlations of the TR-BIDQ-S With the Study Variables			
Variable	BDQ Sum	Social	Personal
SRS-22	**0.69****	**0.62****	**0.60****
Pain	0.31**	0.28*	0.27*
Image	0.74**	0.65**	0.67**
Activity	0.41**	0.36**	0.37**
Mental	0.05	0.05	0.04
SWB	−0.49**	−0.49**	−0.38**
PA	−0.26*	−0.25*	−0.22
NA	0.40**	0.41**	0.29**
LS	−0.46**	−0.47**	−0.33**

Notes: N = 83. LS indicates life satisfaction; NA, negative affect; PA, positive affect; SRS-22, Scoliosis Research Society Questionnaire; SWB, Subjective Well-Being; TR-BIDQ-S, Turkish version of BIDQ-S.
*P < 0.05.

in a much better fit as indicated by the following goodness of fits statistics: $\chi^2(13, N = 83) = 17.38$, $P > 0.05$; GFI = 0.94; CFI = 0.99; SRMR = 0.044; RMSEA = 0.064 (90% confidence interval for RMSEA = 0.00–0.13). A chi-square difference test (64.9, 1: $P < 0.001$) clearly indicated the superiority of the two-factor measurement model, also supported by the lower values of AIC (47.38) and ECVI (0.58) when compared with the original model's AIC (110.28) and ECVI (1.58) values.

Standardized parameter estimates of this two-factor model are presented in Figure 1. It is clear from the figure that the factor loadings are all large and statistically significant.

Convergent Validity

Convergent validity of the TR-BIDQ-S was determined by calculating the correlations of BIDQ-S, and the factors emerged, with the indicators of subjective well-being (SWB) and health related quality of life measured by SRS-22 (Table 3). The correlations of TR-BIDQ-S and of the two factors emerged in the present study with SRS factors were
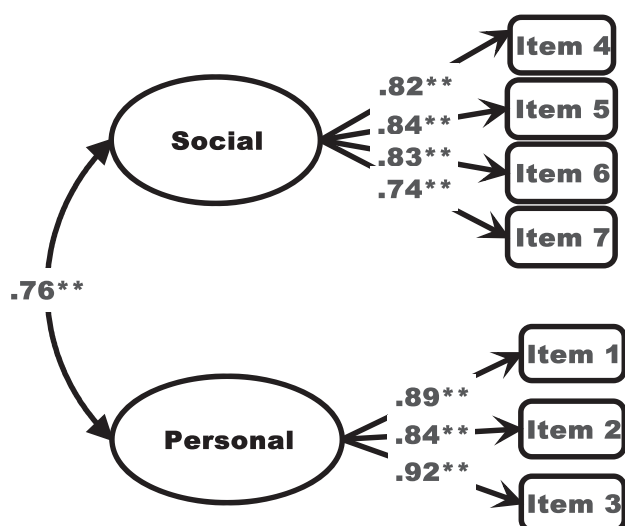

Figure 1. Standardized parameter estimates of the two-factor model. **P < 0.01.

high or moderate and statistically significant, except for the mental factor. The TR-BIDQ-S and the factors also correlated moderately with SWB, except for the weakest correlation of BIDQ-S's personal factor with PA.

DISCUSSION

The purpose of this study was to adopt the Turkish version of BIDQ-S scale for both research and clinical purposes. The data from the present study indicated that different from the original, German[10] and Chinese[11] versions two factor solutions were found. The first factor contained four items which refer to disturbance due to social environmental influences such as family members, friends, or partners. The second factor included three items which are about personal concerns such as worries about appearance of the back shape. Therefore, body image in scoliosis may infer a two-dimensional structure denoting a personal and environmental/social aspects. Besides personal concerns, social environment seems to be a crucial determinant of body image denoting a possibility that people may have a tendency to compare their body shape with their social environment especially in adolescence.[24] For this reason, two factor solution may serve to better identify the aspects affecting body image disturbance from a clinical health psychology perspective. The reason why factor solutions between Turkish and German/Chinese studies are different might be attributed to cultural differences. In Turkish culture because of collectivistic structure, individuals tend to express themselves in relation to others. Thus their body image evaluations cannot be considered independent from others perspective. For this reason, in factor analysis social/environmental aspects of body image emerged as a different factor.

The Turkish BIDQ-S showed more satisfactory internal consistency value with Cronbach $\alpha = 0.88$ than the original study by Auerbach[9] with the value of Cronbach $\alpha = 0.82$. The BIDQ-S scale is also translated into German and Chinese languages. Both German and Chinese studies provided good internal consistency value with Cronbach $\alpha = 0.87$[10]

and 0.87[11] respectively. Similar internal consistency values demonstrate that cultural translation and adaptation process are reliable. The mean score of TR-BIDQ-S is found to be $M = 2.03$ which is similar to German study ($M = 2.03$).[9] However higher than study done by Auerbach *et al*[9] ($M = 1.50$), and lower than study by Chinese ($M = 2.39$).[11] The difference between the scores obtained from the Chinese version and those from the original study was attributed to cultural differences by the authors of the Chinese version study.[11] Indeed, Western cultures which are individualistic countries are more likely to express their emotions than Eastern culture. People in individualistic societies are more prone to express their feelings and inner states.[25] However, the mean scores of the Turkish version which is identical with the German study can rather be attributed to sample characteristics. For instance, the mean age of participants is similar ($M = 26.5$ for Turkish sample and $M = 30.2$ for German sample). And also sample is composed of both male and female participants while Chinese study is composed of female participants and mean age of 14.74. This might be the reason for this similarity.

Scores from both of two factors are also highly correlated with PA and Life Satisfaction while negative correlated with NA. This indicates that their subjective well-being might be affected from their body shape concerns, which indeed is in line with the expectations of this validation study and which furthermore may be a critical information for clinical interventions. These findings are also supported with several researches.[26,27] They indicate that body image satisfaction is one of the most important predictors of positive and negative affect levels. The association between body image and positive or negative affect would suggest that there may be a need to clinical intervention for body image changing strategies in order to increase positive affect and decrease negative affect of scoliosis patients. The findings of this study which indicates that body image disturbance has personal and social/environmental aspects is what this study may add to the knowledge present in the current literature. Further studies are needed to investigate these two-fold effects of body image on the experience of scoliosis. Furthermore, as body image is culture sensitive, more cross-cultural adaptation studies are needed in order to discover cultural aspect of scoliosis related to body image disturbances.

There are several limitations that should be acknowledged in this study. The small sample size is another limitation that could reduce the generalizability of the results. Future studies with larger samples would be more representative for the population. Even though current results suggest that the Turkish BIDQ-S is a valid and reliable questionnaire for use in Turkish population, additional tests of validity such as test-retest and divergent validity are required. Future researchers with more participants should perform those tests.

In conclusion current study shows that TR-BIDQ-S is a valid and reliable questionnaire for assessing the body image concerns in patients with scoliosis in Turkish population. Through this questionnaire both personal and social/

environmental concerns about body shape related to scoliosis might be detected earlier. Thus those concerns can be handled with clinical health psychologists in order to increase treatment efficiency in a multidisciplinary approach.

➤ Key Points

☐ TR-BIDQ-S is a valid and reliable questionnaire for assessing the body image concerns in patients with scoliosis in Turkish population.

☐ Body image satisfaction is one of the most important predictors of positive and negative affect.

☐ Subjective well-being might be affected from their body shape concerns, which indeed is in line with the expectations of this validation study and which furthermore may be a critical information for clinical interventions.

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