OUTCOMES ASSESSMENT

Development and Validation of Turkish Version of The Female Sexual Distress Scale-Revised

Serdar Aydın, MD,[1] Öykü Izel Onaran, BS,[2] Kıvanç Topalan, BS,[2] Çağrı Arıoğlu Aydın, MD,[3] and Ramazan Dansuk, MD[1]

ABSTRACT

Introduction: The sexually related personal distress becomes an obligation for the diagnosis of female sexual dysfunction (FSD). The Female Sexual Distress Scale-Revised (FSDS-R) was developed, extensively validated, and is among the most widely used tools to measure distress associated with impaired sexual function.

Aim: This study aims to develop a Turkish version of the FSDS-R, to evaluate its psychometric reliability and validity, and to estimate the optimal cutoff score that corresponds best to the clinical diagnosis of sexual dysfunction.

Methods: Ninety-five participants were diagnosed with female sexual interest and arousal disorder (FSIAD), 25 participants were diagnosed with another FSD, and 128 participants were healthy. Alpha coefficients (α) were used as an indicator of internal consistency. Test–retest reliability over a 2-week period was estimated using intraclass correlation coefficients (ICCs). Correlation analysis conducted between the FSDS-R total score, the Female Sexual Function Index subscale, and total score was examined for convergent validity. Discriminant validity was assessed by comparing mean scores of the FSD and control groups in a between-groups analysis of variance. Receiver operating characteristic analysis was performed to determine optimal cutoff values of the Turkish version of Female Sexual Distress Scale-Revised (Tr-FSDS-R).

Main Outcomes Measures: Sexuality-related distress measured by the Turkish version of the FSDS-R.

Results: Internal consistencies of the FSDS-R across the two assessments point for the three groups of women ranged from $\alpha = 0.87$ to $\alpha = 0.99$. ICCs ranged from 0.92 to 0.94 for baseline and day 15 for FSIAD, other FSD, and no FSD groups. One-factor unidimensional model explained 85.7% of the total variance of the Tr-FSDS-R items. The optimal cutoff score was found to be >11.5 to provide optimal sensitivity (97.9%) and specificity (83.2%). Significant differences in the FSDS-R scores were found between healthy women, women with hypoactive sexual desire disorder, and women with other types of FSD.

Conclusion: The Turkish version of FSDS-R is a valid, reliable tool with well discriminative and psychometric validity for use in the Turkish female population and can be used as a screening questionnaire for females with sexual interest/arousal disorder. The score of ≥11.5 was proposed as a cutoff to detect the presence of sexually related personal distress in Turkish women with FSD.

Key Words: Female Sexual Distress Scale-Revised; Turkish Version; Female Sexual Dysfunction; Validation; Development

INTRODUCTION

Female sexual dysfunction (FSD) is a term used to describe any problem that may be encountered in the interruption of normal sexual functioning, such as low desire or interest, diminished arousal, orgasmic difficulties, and dyspareunia. FSD is a complex and multidimensional problem resulting from physical, social, and psychological factors such as culture, religion, age, mental health, and interpersonal relations. Its incidence increases with age, and up to 75% prevalence has been

Received July 26, 2015. Accepted September 3, 2015.

[1]Department of Obstetric and Gynecology, Bezmialem Vakif University, Istanbul, Turkey;

[2]Faculty of Medicine, Bezmialem Vakif University, Istanbul, Turkey;

[3]Department of Obstetric and Gynecology, Liv Hospital, Istanbul, Turkey

http://dx.doi.org/10.1016/j.esxm.2015.12.003

reported, with estimates differing across populations and cultures.[1−5] The few studies in Turkey have reported that FSD may affect up to 46.9% of women.[6] The FSD prevalence by age groups were 22% for those 20−29 years, 39.7% for those 30−39 years, 50.2% for those 40−49 years, 71.3% for those 50−59 years, 82.9% for those 60−64 years.[7] Some form of sexual dysfunction is experienced by as many as 45% of women in their lifetime.[1] Also, prevalence of this condition may vary depending on the adopted criteria.

Hypoactive sexual desire disorder (HSDD) is considered a sexual dysfunction and is characterized as a lack or absence of sexual fantasies and a desire for sexual activity, as judged by a clinician. Personal distress or interpersonal difficulties is an essential condition for diagnosis of sexual dysfunction according to the criteria of *Diagnostic and Statistical Manual of Mental Disorders* (DSM)-IV-TR and America Foundation of Urologic Disease (AFUD).[8,9] The DSM-V, published in May of 2013, seeks to overcome the validity problems of a linear model of sexual response.[10] Female hypoactive desire dysfunction and female arousal dysfunction were merged into a single syndrome called sexual interest/arousal disorder in DSM-V.[11] Female sexual interest/arousal disorder (FSIAD) is defined as a "lack of, or significantly reduced, sexual interest/arousal," manifesting as at least three of the following symptoms: no or little interest in sexual activity, no or few sexual thoughts, no or few attempts to initiate sexual activity or respond to partner's initiation, no or little sexual pleasure/excitement in 75−100% of sexual experiences, no or little sexual interest in internal or external erotic stimuli, and no or few genital/nongenital sensations in 75−100% of sexual experiences.[12]

Expert committee of the Third International Consultation on Sexual Medicine had emphasized the importance of measuring distress in FSD and HSDD. They recommended using a validated measure for sexual distress in clinical trials in FSD as a primary end point. This created the need for a validated measure of FSD. Validated patient reported outcome measures for the assessment of distress in FSD include the Sexual Satisfaction Scale for Women, the Sexual Desire and Relationship Distress Scale, the Female Sexual Distress Scale (FSDS), and the Female Sexual Distress Scale-Revised (FSDS-R). As the result of the efforts of AFUD to create a validated measure, the FSDS was developed.[13] FSDS become the most extensively validated and widely used scale for assessing sexuality-related distress in women. In 2008, a revised version of the FSDS—the FSDS-R—was developed with the addition of a 13th item, offering an increased sensitivity−specificity profile of the tool. FSDS-R demonstrated good discriminant validity, high test−retest reliability, and a high degree of internal consistency in measuring sexually related personal distress in women with HSDD.[14,15] Also the original FSDS and revised FSDS are widely accepted and translated into different languages and validated in various cultures and populations.[14−19] Also, the translated forms are demonstrating strong internal consistency, reliability, and validity.[17−20] There is a lack of and a need for a validated instrument for measuring sexuality-related distress in women in Turkey.

AIMS

The purposes of the study were to develop a Turkish version of the FSDS-R, to evaluate its psychometric reliability and validity, and to estimate the optimal cutoff score that corresponds best to the clinical diagnosis of sexual dysfunction. The secondary objective was to analyze correlation with commonly assessed domains of female sexual functioning.

METHODS

Study Population and Design

This 2-week prospective methodological study was carried out at the urogynecology unit of the Bezmialem Vakif University, Istanbul, Turkey, between January 2015 and May 2015. The study was approved by the institutional ethics committee. All subjects were invited to the clinic through direct face-to-face interview and telephone survey by medical students. They were asked to come to clinic and interview with a clinician for this study.

Eligibility criteria for inclusion into the study were to be 18 years or older, married, sexually active, and able to read, speak, and understand Turkish. Exclusion criteria were pregnancy or within 3 months postpartum, history of depression or other mental disorders, severe chronic diseases (diabetes mellitus, cardiovascular diseases, and liver and renal failure), psychoactive substance addiction, alcohol abuse, obesity (body mass index >30 kg/m^2), history of major gynecological operations (hysterectomy, oophorectomy, or mastectomy), and use of medications affecting sexual function (antipsychotics, antihypertensives, antidepressants, antihistamines, benzodiazepines, or oral contraceptives). Of the 362 women invited to participate in the study, 66 women refused to participate, with refusal rates of 18.7%. Of the remaining 296, 48 (16.2%) women were excluded from the study according to exclusion criteria, resulting in a final sample of 248 women.

Study protocol was briefly explained to all women who agreed to participate. After the study protocol was explained and written informed consent was obtained, all eligible volunteers were asked to complete self-administered questionnaires in a private room. One of the authors was available when participants needed further explanation about the questions. After completion of the questionnaires, a standard medical evaluation form was used to assess participants, and the DSM-V criteria were used for diagnosing FSD by two gynecologist. Based on the evaluation of participants according to DSM-V criteria, women were assigned to either FSIAD, other FSD, or the healthy control group. A second survey was conducted with face-to-face interview after 2 weeks for test−retest reliability.

Linguistic Validation

The process to develop a Turkish version of the tool that was equivalent to the one used for the original English version was successfully completed. Linguistic validation was executed according to linguistic validation process guidelines of MAPI Institute.[21] Validation process consisted of four steps including forward translation, backward translation, pilot testing, and cognitive debriefing field testing. One bilingual translator and the first author of the study independently translated the English FSDS into Turkish. Then, the two translated drafts were compared, and a first version of the FSDS-R was developed in a meeting with persons familiar with this issue. An independent native English-speaking translator who was blind to the original version of the scale translated the Turkish version back into English. Finally, a translation committee, which consisted of the first author of the study, two independent translators and other related authors, compared the backward-translated version with the original English version. In this way, a second Turkish version of the FSDS-R was created. The second version of the Turkish FSDS-R was administered to n = 20 nurses and to n = 10 women with known sexual distress to test the appropriateness, acceptability, clarity, comprehensibility, and cultural relevancy. No major problems were noted after pilot testing and face-to-face interview. In the end, the final version of the Turkish version of Female Sexual Distress Scale-Revised (Tr-FSDS-R) was administered to all 248 women agreeing to participate in the field testing to ensure consistency of the translation and to enhance cross-cultural comparability.

FSDS-R

The FSDS-R is a patient-reported outcomes measure consisting of 13 items assessing different aspects of sexual activity-related distress in women.[14] Items are scored on a five-point Likert-type scale as never (0), rarely (1), occasionally (2), frequently (3), or always (4). A total score, ranging from 0 to 52, can be computed by adding all 13 item scores. Higher scores indicate higher levels of sexual distress. The original version of the FSDS-R demonstrated acceptable scale reliability with Cronbach's alpha values ranging from $\alpha = 0.87$ to $\alpha = 0.93$ and high test–retest reliability (intraclass correlation coefficient [ICC] ranging from $r = 0.74$ to $r = 0.86$).[14] It was successfully cross-validated, and a diagnostic cutoff score of >11 was shown to be highly effective in discriminating between women with HSDD and other FSD and those without FSD.[14,15] Unidimensional structure of the FSDS-R was confirmed by confirmatory factor analysis.

FSFI

The second questionnaire was the Female Sexual Function Index (FSFI), which enables the evaluation of the key dimensions of female sexual function through its six domain structures: desire, subjective arousal, lubrication, orgasm, satisfaction, and pain.[22] Higher scores indicate better sexual function. A total FSFI score under 26.55 indicates low sexual function, with domain scores below 3.6 signifying abnormal function in the respective areas.[23,24] Furthermore, it has been shown to be a reliable and validated measure of female sexual function when used among the Turkish population.[25]

Statistical Analysis

Reliability of the Tr-FSDS-R was assessed by internal consistency and test–retest reliability. Alpha coefficients (α) were used as an indicator of internal consistency. A Cronbach alpha coefficient of ≥0.70 was considered to indicate acceptable reliability.[15] Test–retest reliability over a 2-week period was estimated using ICCs. ICC values of 0.21–0.40 representing poor to fair agreement, 0.41–0.60 moderate agreement, 0.61–0.80 good agreement, and >0.80 excellent agreement between the two assessments.

Single unrotated principal component factor analysis was conducted for all 13 questionnaire items to evaluate the factor structure and construct validity of the Tr-FSDS-R. To determine the optimal cutoff values of the Tr-FSDS-R to discriminate between participants without sexual distress and with sexual distress due to low sexual interest/arousal or other sexual dysfunction, and healthy women without sexual distress, a receiver operating characteristic (ROC) curve was used. An area under curve (AUC) of 0.5 indicates the inability of the measure to discriminate between sub-groups of the participants, whereas an AUC of 1.0 represents perfect discriminant validity.[26] Discriminant validity was assessed by comparing mean scores of the FSD and control groups in a between-groups analysis of variance (ANOVA). It was supposed that women with lower sexual functioning suffered from more sexual distress.[4,27] Therefore, correlation analysis conducted between the FSDS-R total score, the FSFI subscale, and total score was examined for convergent validity.

All the statistical analyses in this study were performed by SPSS version 21.0 (IBM Corp, Armonk, NY, USA) statistical software. Distribution of data was assessed with histogram analysis and Kruskal–Wallis test. One-way ANOVA was used for comparisons of continuous variables. Chi-square test was used to compare the proportion of categorical variables. A P value of <.05 was considered significant for all tests.

RESULTS

Of the 248 participants, 95 women were included in the FSIAD group and 25 were included in the other FSD group. The final healthy control group comprised of 128 women. The mean age for women with FSIAD, women with other types of FSD, and healthy women was 35.8, 37.4, and 32.3 years, respectively. Women with FSD were significantly older than healthy controls. Also, the mean age of women with other FSD was significantly higher than women with low sexual interest or arousal. Sample characteristics, demographic data, and FSFI scores are presented in Table 1. Consistently, ages of women, marital length, and age

Table 1. Baseline Characteristics, Female Sexual Function Index (FSFI) Total and Subdomain Scores of Sample with Sexual Dysfunction or with Normal Sexual Function

	FSIAD	Other FSD	No FSD	
	N = 95	N = 25	N = 128	*P*
Age, years (mean ± SD)	35.8 ± 6.6	37.4 ± 6.5	32.3 ± 4.5	**<.0001**
Age of partner, years (mean ± SD)	37.5 ± 6.9	39.4 ± 6.4	34 ± 5.8	**<.0001**
Marital length, years (mean ± SD)	10.8 ± 6.4	12.4 + 6.3	7.4 ± 4.9	**<.0001**
BMI (mean ± SD)	26.6 ± 4.5	26.3 + 5.1	27.6 ± 4.4	.4
Family income monthly, N (%)				
< $200	7 (7.4)	3 (12)	5 (3.9)	.8
$200–$1,000	10 (10.5)	7 (28)	18 (14.1)	
>$1,000	78 (82.1)	15 (60)	105 (82)	
Educational level, N (%)				
Primary	46 (48.4)	21 (84)	21 (16.4)	.001
High school	12 (12.6)	-	19 (14.8)	
Graduate	37 (38.9)	4 (16)	88 (68.8)	
Infertility, N (%)	9 (9.5)	3 (12)	12 (9.4)	.9
Nulliparity, N (%)	14 (14.7)	3 (12)	40 (31.3)	.006
Occupational status				
Housewife	48 (50.5)	20 (80)	28 (21.9)	**<.0001**
Employee	47 (49.5)	5 (20)	100 (78.1)	
FSFI score (mean ± SD)	17.9 ± 3.4	22.7 ± 2.7	24.4 ± 6.0	**<.0001**
Desire	2.2 ± 0.7	3.3 ± 0.8	3.5 ± 1.5	**<.0001**
Arousal	2.4 + 0.6	3.9 ± 0.5	3.9 ± 1.3	**<.0001**
Lubrication	3.2 + 0.6	4.0 ± 0.7	3.9 ± 0.8	**<.0001**
Orgasm	3.0 + 0.7	3.7 ± 0.6	4.3 ± 1.0	**<.0001**
Satisfaction	2.6 + 0.7	4.0 ± 0.9	4.1 ± 1.4	**<.0001**
Pain	3.6 + 1.2	4.3 ± 0.9	4.5 ± 1.1	**.001**

Bolding indicates statistical significance.
BMI = body mass index; FSD = female sexual dysfunction; FSIAD = female sexual interest/arousal disorder; SD = standard deviation.

of partners were significantly different between groups. Most of the patients in FSIAD and other FSD had primary school education. In comparison, most of the women (68.8%) with no sexual dysfunction had a graduate degree of education. In our study, population women without FSD had higher educational levels, higher employee, and low parity compared with women with FSD.

Mean total scores for Tr-FSDS-R at days 0 and 15 for FSIAD, FSD, and normal sexual function groups are presented in Table 2. Tr-FSDS-R discriminated FSIAD and FSD subjects from healthy women irrespective of the recall time, which was confirmed by one-way ANOVA between groups. Subjects with FSIAD had the highest scores compared with the women with and without FSD. Otherwise, covariant analysis did not show any significant effects for age, duration of marriage, partner's age, occupational status, and educational level across all three assessments.

Tr-FSDS-R demonstrated excellent internal consistencies, with Cronbach alpha of 0.98. Internal consistencies of the FSDS-R across the two assessments points for the three groups of women ranged from $\alpha = 0.87$ to $\alpha = 0.99$ (Table 3). For the assessment of test–retest reliability, the FSDS was administrated at baseline and 15 days after baseline. The ICC of stability over a 2-week period was 0.97. ICCs ranged from 0.92 to 0.94 for baseline and day 15 for FSIAD, other FSD and no FSD groups (Table 4).

Table 2. Discriminant Capability of the Turkish Version of the Female Sexual Distress Scale-Revised (Tr-FSDS-R) at Cutoff Score 11.5 in Women with FSIAD Compared with Normal Sexual Function

	FSIAD (mean ± SD)	Other FSD (mean ± SD)	No FSD (mean ± SD)	*P*
	N = 95	N = 25	N = 138	value*
Day 0	31.3 ± 10.9	26.2 ± 6.9	7.5 ± 6.3	<.0001*
Day 15	32.1 ± 11.8	28.2 ± 7.6	8.7 ± 7.5	<.0001*

ANOVA test with post hoc test; same superscript (*) means $P < .05$ for each other within the same row.
FSDS-R = Female Sexual Distress Scale-Revised; FSD = female sexual dysfunction; FSIAD = female sexual interest/arousal disorder; SD = standard deviation.

Table 3. Internal Consistency (Cronbach alpha) of the Turkish Version of the Female Sexual Distress Scale-Revised (Tr-FSDS-R)

	FSIAD	Other FSD	No FSD
	N = 95	N = 25	N = 138
Day 0	0.96	0.97	0.87
Day 15	0.98	0.97	0.99

FSD = female sexual dysfunction; FSIAD = female sexual interest/arousal disorder.

To evaluate the factor structure of the Turkish version of FSDS-R, single unrotated principal component analysis was conducted. Based on this analysis, a one-factor unidimensional model was established, which explained 85.7% of the total variance of the Tr-FSDS-R items (Table 5). All items clustered in a predicted fashion had relatively high factor loadings, supporting the factor validity of the Tr-FSDS-R.

Correlation analysis for convergent validity showed negative and statistically significant correlations between the FSDS-R and the arousal, orgasm, and satisfaction FSFI domains ($r = -0.21$, $r = -0.41$ and $r = -0.32$, respectively). Correlation with orgasm dimension of FSFI and FSDS-R was moderate ($P < .01$). In addition, correlation analysis of all 13 items of FSDS-R with total FSDS-R score demonstrated significantly good correlation, and Pearson correlation score ranges from 0.41 to 0.69 ($P < .01$) (Table 6).

Discriminant ROC analysis Tr-FSDS-R total score demonstrated that AUC for the total FSDS-R score was 0.92 (range 0.87–0.96) at baseline, confirming the good discriminant validity of the scale (Figure 1). The optimal cutoff score was found to be >11.5 to provide optimal sensitivity (97.9%) and specificity (83.2%). Sensitivity, specificity, false positive, and false negative values for the determination of FSIAD with the cutoff score >11.5 at day 0 and day 15 are presented in Table 7.

DISCUSSION

The prevalence of FSIAD was 38.3% in our study population (collected by call), and prevalence of other FSD was 10.1%. Our prevalence was compatible with previous studies that reported the prevalence of FSD and was 47% in our Turkish female population.[6] When we use a cutoff score of 11.5 according to the FSDS-R, the prevalence of female sexual distress were 12.5% (n = 16) for the healthy women (women with no FSD) in our study population. However, the prevalence of sexual distress in healthy women was reported as 22–24% in two U.S. national probability samples.[4,28] Self-reported sexual problems, mainly HSDD, were identified in about 40% of the U.S. population.[4] Sexual problems associated with personal distress were much less common, although reported by approximately 12% of women in the same study population. The differences in prevalence can be explained with cultural, educational, and social differences. Socioeconomic and demographic variables such as age, race, marital status, partner status, employment, and level of education were independently and significantly associated with FSD. Sexual functional problems increased with age, but female sexual distress problems were more common in middle-aged women than in younger or older women.[4] Our high prevalence of FSIAD can be due to our middle-aged study population. Female sexual functions diminished with age; however, distressing sexual problems were more common in middle-aged women than in younger or older women.[1] Other possible explanations are still high rates of arranged marriages instead of love marriages in Turkish family structure, low knowledge about sexuality, and being ashamed of talking and discussing sexuality.[29] Stephenson and Meston showed that low desire was associated with increased distress only in low-intimacy relationships.[30]

In the original validation study, the authors suggested a cutoff score of 11 for the discrimination between HSDD patients and healthy individuals.[14,17] In the Farsi version, the research population characteristics were similar to our population due to cultural proximity, reported the cutoff score of 10.5, whereas a Polish version proposed a cutoff score of 13.[17,19] Results of the ROC analysis further revealed an optimal sensitivity/specificity profile of the questionnaire with a cutoff score of 11.5. Our results are comparable with the original study and Farsi version.

The Tr-FSDS-R was also highly reproducible across the 2-week interval, with higher ICC values in FSD and healthy women. Reproducibility of this tool after a week and even after a 4-week interval had been reported in the original validation study and other linguistic validation studies. The highest ICC being found between day 7 to day 28 in original validation studies and linguistic validation studies of the FSDS-R (Polish and Farsi).[17,19] The time interval between the two administrations of measurements generally affect the ICC. It is generally accepted that a very short time interval makes the carryover effects due to

Table 4. Test–Retest Reliability of the Turkish Version of FSDS-R

	FSIAD	Other FSD	No FSD
	ICC (95% CI)	ICC (95% CI)	ICC (95% CI)
Day 0–15	0.94 (0.91–0.96)	0.92 (0.84–0.96)	0.92 (0.89–0.94)

CI = confidence interval; ICC = intraclass correlation coefficient; FSDS-R = Female Sexual Distress Scale-Revised; FSD = female sexual dysfunction; FSIAD = female sexual interest/arousal disorder.

Table 5. Single Unrotated Principal Component Analysis of the Turkish Version of the Female Sexual Distress Scale-Revised (Tr-FSDS-R)

Item	Factor 1
Distressed about your sex life	0.91
Unhappy about your sexual relationship	0.91
Guilty about sexual difficulties	0.94
Frustrated by your sexual problems	0.92
Stressed about sex	0.93
Inferior because of sexual problems	0.93
Worried about sex	0.94
Sexually inadequate	0.92
Regrets about your sexuality	0.94
Embarrassed about sexual problems	0.91
Dissatisfied with your sex life	0.92
Angry about your sex life	0.93
Bothered by low sexual desire	0.90
Eigenvalue	11.1
% of explained variance	85.7%

memory, practice, or mood more likely, whereas a longer interval increases the chances that a change in status could occur.[31] According to this argument, we performed the test–retest reliability for the stability of the FSDS-R in a 2-week interval.

In our study population, women with female sexual interest/arousal disorder reported the highest levels of sexual distress compared with the other FSD types and healthy controls. Discriminant validity analysis of our results showed that Tr-FSDS-R was able to differentiate between female sexual interest/arousal disorder and other types of sexual dysfunction with normal sexual functions successfully. Also consistent with previous reports and linguistic validation studies, sexually healthy women reported significantly lower FSDS-R scores compared with women suffering from low sexual interest/arousal or from any other type of FSD.[14,16,17]

Analysis of construct validity was carried out to test whether the Derogatis's original one-factor model could be replicated in our present sample.[14] Factor analysis stated the previously suggested one-factor model solution also produced a perfect fit in our Turkish sample.[14,17] Similar results were presented in the Polish and Farsi validation study and showed one-factor solution to provide best fit to data.[17,19] The 13 items of the scale loaded consistently on the same underlying factor with stable one-dimensional structure.

LIMITATIONS

Finally, this study had the following limitations. First, study sample was small and not fully representative of all Turkish women, although it was large enough to draw reasonable conclusions. Second, study sample was homogenous: mostly middle-aged, mostly premenopausal women who were not taking oral contraceptives or hormonal replacement and monogamic. The lack of use of the depression survey was another weak point of this study, but we excluded the women with known depression and anxiety or who use antidepressants. Data about sexual activity such as caressing, foreplay, vaginal intercourse, masturbation, vaginal, anal or oral intercourse, and frequency of sexual activity would contribute to the results. Recruitment of participants outside the hospital, not from admission to hospital, is the major strength of the study. After all these limitations, the

Table 6. Pearson Correlation Coefficients Between FSDS-R Items and FSDS-R Total Scores, FSFI Total Scores, and FSFI Domain Scores

			FSFI domains					
	Total FSDS-R	Total FSFI	Desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain
Item 1	0.58**	0.26**	0.30**	0.40**	0.22*	0.19*	0.23**	−0.07
Item 2	0.50**	0.42**	0.42**	0.50**	0.38**	0.36**	0.30**	0.0
Item 3	0.55**	0.31**	0.28**	0.40**	0.23**	0.24**	0.21*	−0.04
Item 4	0.53**	0.30**	0.31**	0.42**	0.29**	0.22*	0.21*	−0.03
Item 5	0.60**	0.30**	0.29**	0.40**	0.26**	0.20*	0.26**	−0.06
Item 6	0.48**	0.30**	0.29**	0.38**	0.26**	0.26**	0.20*	−0.03
Item 7	0.50**	0.35**	0.30**	0.46**	0.30**	0.26**	0.22*	0.02
Item 8	0.51**	0.20*	0.22*	0.29**	0.14	0.16	0.08	0.02
Item 9	0.44**	0.22*	0.23**	0.32**	0.20*	0.20*	0.11	−0.02
Item 10	0.60**	0.31**	0.34**	0.35**	0.31**	0.21*	0.29**	−0.03
Item 11	0.69**	0.19*	0.23**	0.28**	0.15	0.02	0.16	0.02
Item 12	0.65**	0.25**	0.25**	0.30**	0.23**	0.15	0.21*	−0.04
Item 13	0.41**	0.28**	0.30**	0.37**	0.24**	0.21*	0.13**	0.02
Total FSDS-R	1	−0.19*	0.02	−0.21*	−0.09	−0.41**	−0.32**	−0.13

*$P < .05$; **$P < .01$.
FSDS-R = Female Sexual Distress Scale-Revised; FSFI = Female Sexual Function Index.

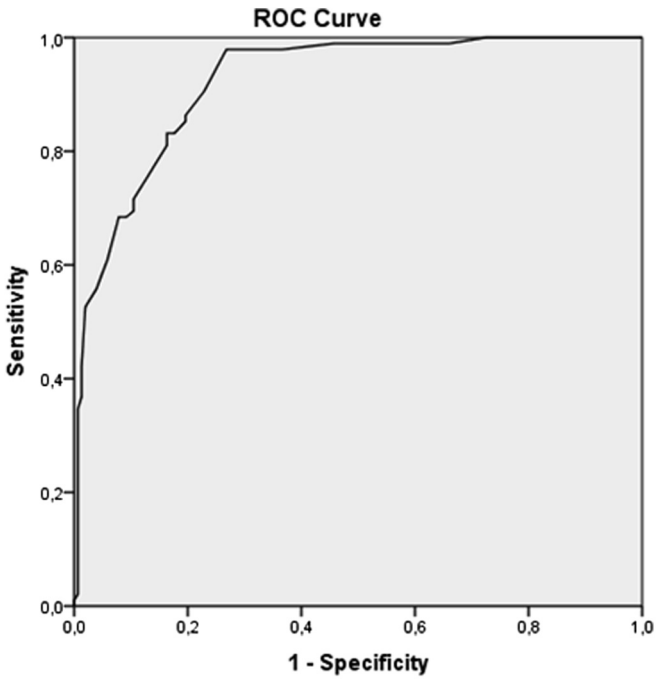

Figure 1. Receiver operating characteristic (ROC) curve for total score of the Turkish version of the Female Sexual Distress Scale-Revised at day 0.

findings are in agreement with the validation study of the original FSDS-R.

CONCLUSIONS

The results of this study are that the Turkish version of FSDS-R is a valid, reliable tool with well-discriminative and psychometric validity for the use in Turkish female population and can be used as a screening questionnaire for females with sexual interest/arousal disorder. The score of $\geq$11.5 was proposed as a cutoff to detect the presence of sexually related personal distress in Turkish women with FSD. The development of the Turkish version of FSDS-R will allow us to measure sexual function related to sexual distress and affect on women's quality of life in the Turkish speaking population. This will enhance our knowledge of how and to what extent cultural, social differences, family structure, and religious beliefs affect sexual distress that is considered as an obligation for the definition of sexual dysfunction.

Table 7. Discriminant Capability of the Turkish Version of the Female Sexual Distress Scale-Revised (Tr-FSDS-R) at Cutoff Score 11.5 in Women with FSIAD Compared with Normal Sexual Function

	Sensitivity (%)	Specificity (%)	False positives (%)	False negatives (%)
Day 0	98.3	87.5	0.8	6.5
Day 15	97.5	77.3	1.2	11.7

FSIAD = female sexual interest/arousal disorder.

ACKNOWLEDGMENT

The authors would like to thank the participants of the study.

Corresponding Author: Serdar Aydın, MD, Obstetric and Gynecology Department, Bezmialem Vakif University, Adnan Menderes Bulvarı, Fatih, Istanbul 34093, Turkey. Tel: +90 5327097179; Fax: +902124531780; E-mail: serdariks@yahoo.com

Conflict of Interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

Funding: None.

STATEMENT OF AUTHORSHIP

Category 1

(a) **Conception and Design**
Serdar Aydın; Çağrı Arıoğlu Aydın; Ramazan Dansuk
(b) **Acquisition of Data**
Serdar Aydın; Öykü Izel Onaran; Kıvanç Topalan
(c) **Analysis and Interpretation of Data**
Serdar Aydın; Öykü Izel Onaran; Kıvanç Topalan

Category 2

(a) **Drafting the Article**
Serdar Aydın; Çağrı Arıoğlu Aydın; Öykü Izel Onaran
(b) **Revising It for Intellectual Content**
Serdar Aydın; Ramazan Dansuk

Category 3

(a) **Final Approval of the Completed Article**
Serdar Aydın; Çağrı Arıoğlu Aydın

REFERENCES

1. Laumann EO, Paik A, Rosen RC. Sexual dysfunction in the United States: Prevalence and predictors. **JAMA 1999; 281:537-544**.
2. Laumann EO, Nicolosi A, Glasser DB, Paik A, Gingell C, Moreira E, Wang T, GSSAB Investigators' Group. Sexual problems among women and men aged 40–80 y: Prevalence and correlates identified in the Global Study of Sexual Attitudes and Behaviors. **Int J Impot Res 2005; 17:39-57**.
3. Avis N, Zhao X, Johannes CB, Ory M, Brockwell S, Greendale GA. Correlates of sexual function among multi-ethnic middle-aged women: Results from the Study of Women's Health Across the Nation (SWAN). **Menopause 2005; 12:385-398**.
4. Shifren JL, Monz BU, Russo PA, Segreti A, Johannes CB. Sexual problems and distress in United States women: Prevalence and correlates. **Obstet Gynecol 2008; 112:970-978**.
5. Derogatis LR, Burnett AL. The epidemiology of sexual dysfunctions. **J Sex Med 2008; 5:289-300**.
6. Cayan S, Akbay E, Bozlu M, Canpolat B, Acar D, Ulusoy E. The prevalence of female sexual dysfunction and potential risk factors that may impair sexual function in Turkish woman. **Urol Int 2004; 72:52-57**.

7. Aslan E, Beji NK, Gungor I, Kadioglu A, Dikencik BK. Prevalence and risk factors for low sexual function in women: A study of 1,009 women in an outpatient clinic of a university hospital in Istanbul. **J Sex Med 2008; 5:2044-2052.**
8. Basson R, Wierman ME, van Lankveld J, Brotto L. Summary of the recommendations on sexual dysfunctions in women. **J Sex Med 2010; 7:314-326.**
9. Brotto LA. The DSM diagnostic criteria for hypoactive sexual desire disorder in women. **Arch Sex Behav 2010; 39:221-239.**
10. Basson R. Human sex-response cycles. **J Sex Marital Ther 2001; 27:33-43.**
11. IsHak WW, Tobia G. DSM-5 changes in diagnostic criteria of sexual dysfunctions. **Reprod Syst Sex Disord 2013; 2:122. http://dx.doi.org/10.4172/2161-038X.1000122.**
12. American Psychiatric Association, ed. Female sexual interest/arousal disorder, 302.72 (F52.22). In: Diagnostic and statistical manual of mental disorders. 5th edition. Washington, DC: American Psychiatric Publishing; 2013:433–7.
13. DeRogatis LR, Rosen R, Leiblum S, Burnett A, Heiman J. The Female Sexual Distress Scale (FSDS): Initial validation of a standardized scale for assessment of sexually related personal distress in women. **J Sex Marital Ther 2002; 28:317-330.**
14. DeRogatis L, Clayton A, Lewis-D'Agostino D, Wunderlich G, Fu Y. Validation of the Female Sexual Distress Scale-Revised for assessing distress in women with hypoactive sexual desire disorder. **J Sex Med 2008; 5:357-364.**
15. DeRogatis L, Pyke R, McCormack J, Hunter A, Harding G. Does the Female Sexual Distress Scale-Revised (FSDS-R) cover the feelings of women with HSDD? **J Sex Med 2011; 8:2810-2815.**
16. Derogatis LR, Clayton AH, Goldstein A, Lewis-D'Agostino D, Wunderlich G, Cotton D. eDiary and Female Sexual Distress Scale(©) in evaluating distress in hypoactive sexual desire disorder (HSDD). **J Sex Res 2011; 48:565-572.**
17. Nowosielski K, Wrobel B, Sioma-Markowska U, Poreba R. Sexual dysfunction and distress—Development of a Polish version of the female sexual distress scale-revised. **J Sex Med 2013; 10:1304-1312.**
18. Bae JH, Han CS, Kang SH, Shim KS, Kim JJ, Moon du G. Development of a Korean version of the Female Sexual Distress Scale. **J Sex Med 2006; 3:1013-1017.**
19. Azimi Nekoo E, Burri A, Ashrafti F, Fridlund B, Koenig HG, Derogatis LR, Pakpour AH. Psychometric properties of the Iranian version of the female sexual distress scale-revised in women. **J Sex Med 2014; 11:995-1004. http://dx.doi.org/10.1111/jsm.12449.**
20. Ghassami M, Asghari A, Shaeeri MR, Soltaninejad Z, Safarinejad MR. Psychometric properties of the Female Sexual Distress Scale-Revised among a sample of non clinical Iranian women. **Int J Psychiatry Clin Pract 2014; 18:293-299. http://dx.doi.org/10.3109/13651501.2014.940048.**
21. Chassany O, Sagnier P, Marquis P, Fullerton S, Aaronson N, for the European Regulatory Issues on Quality of Life Assessment (ERIQA) Group. Patient-reported outcomes: The example of health-related quality of life—A European guidance document for the improved integration of Health-Related Quality of Life assessment in the drug approval process. **Drug Inf J 2001; 36:209-238.**
22. Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, Ferguson D, D'agostino R. The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. **J Sex Marital Ther 2000; 26:191-208.**
23. Wiegel M, Meston C, Rosen R. The female sexual function index (FSFI): Crossvalidation and development of clinical cutoff scores. **J Sex Marital Ther 2005; 32:1-20.**
24. Silva WA, Pauls RN, Segal JL, Rooney CM, Kleeman SD, Karram MM. Uterosacral ligament vault suspension: Five year outcomes. **Obstet Gynecol 2006; 108:255-263.**
25. Aygin D, Aslan FE. The Turkish adaptation of the Female Sexual Function Index. **J Med Sci 2005; 25:393-399.**
26. Hanley JA, McNeil BJ. The meaning and use of the area under a receiver operating characteristic (ROC) curve. **Radiology 1982; 14:29-36.**
27. Burri A, Rahman Q, Spector T. Genetic and environmental risk factors for sexual distress and its association with female sexual dysfunction. **Psychol Med 2011; 41:2435-2445.**
28. Bancroft J, Loftus J, Long JS. Distress about sex: A national survey of women in heterosexual relationships. **Arch Sex Behav 2003; 32:193-208.**
29. Tasci Y, Demir B, Kocak M, Ercan F, Karadag B, Göktolga U. Influence of family structure on sexual behavior of Turkish female adolescents. **Int J Adolesc Med Health 2011; 23:263-267.**
30. Stephenson KR, Meston CM. When are sexual difficulties distressing for women? The selective protective value of intimate relationships. **J Sex Med 2010; 7:3683-3694.**
31. Marxa RG, Menezesb A, Horovitza L, Jonesb EC, Warrena RF. A comparison of two time intervals for test-retest reliability of health status instruments. **J Clin Epidemiol 2003; 56:730-735.**