

Validation of Psychometric Properties of the Persian Version of the Female Sexual Function Index

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Purpose: To examine the psychometric properties of a Persian language version of the Female Sexual Function Index (P-FSFI) amongst a sample of healthy Iranian women.

Materials and Methods: All participants (562) completed a battery of questionnaires, including the P-FSFI, Depression Anxiety Stress Scales (DASS), Positive and Negative Affect Scales (PANAS) and Locke-Wallace Marital Adjustment Test (LWMAT). The dimensions of the P-FSFI and its convergent and divergent validity were examined, using principal component analysis and Pearson correlations, respectively. To examine the predictive validity of the P-FSFI, data collected from 562 healthy participants were compared with 108 women with sexual problems who completed the P-FSFI measure. The P-FSFI reliability was determined in two ways: calculating Cronbach alpha and measuring test-retest coefficients (with a 4-week interval).

Results: The results indicated that the P-FSFI is conceptualized within a four factor model. These factors were named as: Sexual Response, Sexual Desire, Sexual-related Pain, and Sexual Satisfaction. Results also indicated that the P-FSFI and its 4 subscales had good internal consistency and test-retest reliability. Significant correlations in the predicted directions between the scores of the P-FSFI and its 4 subscales with the scores of DASS, PANAS and LWMAT supported both the convergent and divergent validity for the P-FSFI. The results also indicated that the scores of the P-FSFI and its 4 subscales significantly differentiated woman with and without sexual problems.

Conclusion: In general, these findings support the reliability and the validity of the P-FSFI amongst Iranian healthy females.

Keywords: psychometrics, sexual dysfunctions, stress, psychology

INTRODUCTION

Female sexual dysfunction (FSD) is an important primary care issue and associates with biological, psychological, interpersonal, social, and cultural factors.^(1,2) The FSD is defined as persistent or recurrent disorders of sexual desire, genital arousal, orgasm, and genital pain associated with sexual intercourse.⁽¹⁻³⁾ Epidemiological surveys report a variable prevalence of FSD ranging from 19% to 45%.⁽⁴⁻⁷⁾ In spite of high prevalence of FSD, women's sexual-related dysfunction had been neglected for many years. As a result, compared to male sexual dysfunction (MSD), the FSD has been underestimated.^(1,8) However, in recent years, the FSD has received more research interest.^(9,10)

Having access to valid and reliable assessments tools for FSD is important from both research and treatment perspectives.^(8,9,11) Over the past decade, a number of psychometrically sound measures have been developed to assess the FSD.^(11,12) Of these, Female Sexual Function Index (FSFI) has received much research and clinical attention.

The FSFI is a 19-item multidimensional self-report instrument for assessing six key domains of sexual function in women, including sexual desire, arousal, lubrication, orgasm, satisfaction, and pain. The FSFI has two response formats; while items 1, 2, 15, and 16 are answered on a 1 to 5 Likert scale, the rest of the items are answered using a 0 to 5 Likert scale. The FSFI provides six separate scores for sexual desire, arousal, lubrication, orgasm, satisfaction, and pain as well as an overall score for sexual functioning (total FSFI). Higher scores (on the total FSFI or on the six individual subscales), compared to lower scores, indicate a better sexual functioning.⁽⁸⁾

The psychometric properties of the FSFI have been supported by several studies.^(9,10,13,14) The FSFI has been used extensively in epidemiological studies⁽¹⁵⁻¹⁸⁾ as well as in the treatment studies.⁽¹⁹⁻²²⁾ In sum, growing body of literature supports the practicability of the FSFI^(9,10,13) and until now, it has been translated into more than 20 languages.^(10,13,23)

The aim of the present study was to examine the psychometric properties of a Persian language version of the Female Sexual Function Index (P-FSFI) amongst sample of Iranian females without sexual problems.

MATERIALS AND METHODS

Study Subjects

The sample size on which factor structure, divergent and convergent validity, and internal consistency of the P-FSFI were tested consisted of 650 healthy participants who were living in Tehran, Iran. These participants were selected using a convenience sampling method. The sample size calculation was based on Tabachnick and Fidell recommendations that the sample size of 500 and over has been classified as a good sample size.⁽²⁴⁾

The participants had to meet the following inclusion criteria: (i) willing to participate in the study; (ii) being married and having a stable sexual relationship with their spouse for at least the past 6 months, and (iii) having at least 12 years of formal education. The exclusion criteria in this study were: (i) suffering from chronic and severe medical illnesses; (ii) seeing a psychiatrist, a psychologist, or a gynecologist due to sexual-related problems over the past 6 months, and (iii) unwilling to participate in the study. After consenting to the study protocol, a battery of questionnaires was given to each participant by the first author (M.G.), who explained the purpose of the study and how to complete the measures.

Of the 650 collected questionnaires, 88 were excluded from the analysis due to incomplete data. The remaining 562 subjects were included in this study. The test-retest reliability of the P-FSFI was tested, using data collected from a sub sample of these healthy participants (n = 40). The participants completed the P-FSFI in a 4-week interval.

Measures

Several measures were used in this study:

P-FSFI

Current guidelines for cross-cultural adaptation of measures generally recommend a multi-step process to certify the equivalence of the original and the back translated versions. In our translation of the FSFI, we incorporated some of these recommendations as follows: (1) Two bilingual mental health practitioners independently translated the original version of the FSFI⁽⁸⁾ from English into Persian; differences were solved by agreement; (2) Other two mental health practitioners who were fluent in Persian and English (bilingual) and had no knowledge regarding the questionnaire carried out

back translations; and (3) Pilot testing was performed on a sample of 50 participants. These participants were asked to report any problems that they had in understanding the P-FSFI items. On the basis of the results of this pilot study, some additional changes were made to the P-FSFI. Furthermore, as Persian (Farsi) language is a right-to-left language (while English is a left-to-right language), in the P-FSFI, each statement is written from right to left. Apart from the above, the P-FSFI was very similar to the original version without compromising its comprehension and being adequate in Persian (Farsi) language (a copy of the P-FSFI, and its scoring system is available from the first author). As in the original version of the FSFI, the P-FSFI consists of 19 items. Items refer to the past 4 weeks.

The short form of Depression Anxiety Stress Scales (DASS-21)

The DASS-21 is a short form of the DASS-42 that was originally developed by Lovibond and Lovibond to assess depression, anxiety, and stress.⁽²⁵⁾ Seven items are allocated to each measure of depression, anxiety, and stress. All the items are rated on a 0 to 3 scale; higher scores are associated with more severe levels.

Positive and Negative Affect Scales (PANAS)

The PANAS is a 20-item self-report measure that measures two mood dimensions, including positive affect (PA; 10 items) and negative affect (NA; 10 items). All items are rated on a 5 Likert scale, while 1 equals very slightly or not at all and 5 equals extremely. It has been demonstrated that the PANAS has excellent validity and reliability.⁽²⁶⁾

Locke-Wallace Marital Adjustment Test (LWMAT)

The MAT is one of the measures widely used to assess marital quality. This 15-item test can be answered in 5 to 10 minutes. The MAT yields a score ranging from 2 to 158, with higher scores indicating better marital functioning.⁽²⁷⁾

In addition to the above measures, the following characteristics were also recorded: age, education, occupation, duration of marriage, number of children, and menopausal status.

Data Analysis

All the data were collected, scored, and entered into a secure database by the first author (M.G.). Before the analyses, data were checked through the SPSS program for precision of data entry, missing values, normal distributions, and possible outliers.⁽²⁴⁾

In this study, data were analyzed in a number of ways:

A principal component analysis (PCA) was used to identify dimensions of the P-FSFI.⁽²⁸⁾ Eigenvalues and scree plot were used to determine the number of components underlying the P-FSFI. Reliability of the P-FSFI and its subscales was determined by examining both the internal consistency and test-retest stability of the P-FSFI and its subscales.⁽²⁹⁾ The convergent and the divergent validity of the P-FSFI were tested using Pearson product-moment correlations between the P-FSFI scores and a series of interested variables. The predictive validity of the P-FSFI and its subscales was established by having compared two groups of healthy participants ($n = 562$) and a sample ($n = 108$) of females referred to sexual clinics due to FSD.

Before conducting statistical analyses, the data were screened for normality of distribution. No outliers were detected. All statistical analyses were performed with the use of SPSS software (the Statistical Package for the Social Sciences, Version 17.0, SPSS Inc, Chicago, Illinois, USA).

RESULTS

Sample Characteristics

The mean \pm standard deviation age of the participants was 31.9 ± 8.16 years (range, 19 to 57 years). All the participants had at least a high school certificate (35% had at least 12 years of formal education and 65% had at least 16 years of formal education), and 61% were working in public section. They were married on average for 100 ± 85 months (range, 6 to 372 months).

Principal Component Analysis

Principal component analysis (PCA) was used to identify dimensions of the P-FSFI. The original pool of 19 items was submitted for initial analysis. A matrix that is factorable should consist of several considerable correlations. Tabachnick and Fidell believe that if none of the correlation surpasses 0.30, the use of factor analysis is debatable.⁽²⁴⁾ In this

Table 1. Principal component analysis of the Persian language version of the Female Sexual Function Index factor loading and communalities (h2) for the four-component solution.

Item number and description	C1	C2	C3	C4	h2
Sexual response (arousal, lubrication, and orgasm)					
7. How often did you become lubricated during sexual activity?	0.86	0.46	0.43	0.45	0.75
9. How often did you maintain your lubrication until completion of sexual activity?	0.85	0.52	0.37	0.41	0.74
10. How difficult was it to maintain your lubrication until completion of sexual activity?	0.84	0.59	0.25	0.46	0.75
6. How often have you been satisfied with your arousal during sexual activity?	0.83	0.45	0.45	0.66	0.76
8. How difficult was it to become lubricated during sexual activity?	0.82	0.56	0.26	0.44	0.71
12. When you had sexual stimuli or intercourse, how difficult was it for you to reach orgasm?	0.82	0.52	0.23	0.56	0.71
5. How confident were you about becoming sexually aroused during sexual activity?	0.82	0.41	0.57	0.58	.076
11. When you had sexual stimuli or sexual intercourse, how often did you reach orgasm?	0.81	0.36	0.37	0.60	0.70
4. How would you rate your level of sexual arousal during sexual activity?	0.79	0.41	0.62	0.54	0.74
3. How often did you feel sexually aroused during sexual activity?	0.78	0.33	0.57	0.54	0.71
13. How satisfied have you been with your ability to reach orgasm during sexual activity?	<i>0.78</i>	0.52	0.29	<i>0.70</i>	0.71
Sexual-related Pain					
17. How often did you experience discomfort or pain during vaginal penetration?	0.53	0.94	0.21	0.36	0.89
18. How often did you experience discomfort or pain following vaginal penetration?	0.51	0.93	0.27	0.39	0.87
19. How would you rate the level of discomfort or pain during or following vaginal penetration?	0.58	0.91	0.25	0.43	0.84
Sexual Desire					
2. How would you rate your level of sexual desire or interest?	0.47	0.32	0.88	0.39	0.81
1. How often did you feel sexual interest or desire?	0.41	0.24	0.88	0.26	0.78
Sexual Satisfaction					
16. How satisfied have you been with your overall sex life?	0.55	0.40	0.31	0.93	0.87
15. How satisfied have you been with your sexual relationship with your partner?	0.58	0.40	0.34	0.93	0.87
14. How satisfied have you been with the amount of emotional closeness during sexual activity?	<i>0.72</i>	0.49	0.26	<i>0.78</i>	0.73
Eigenvalue	10.8	1.57	1.22	1.1	
Percentage variance	56.90	8.27	6.42	5.6	

Primary loadings are indicated in **bold**. Items with cross-loadings are indicated in *italic*.

study, there were several correlations greater than 0.30. Bartlett's test of sphericity was significant ($\chi^2 = 9696.88$, $df = 171$, $P = .0001$) and Kaiser–Meyer–Olkin measure of sample adequacy was 0.95. Values of 0.60 and above are required for a good factor analysis.⁽²⁴⁾ The decision between orthogonal and oblique rotation was made by examining the correlations among factors.⁽²⁴⁾ Since one of the correlations was greater than 0.32 (the correlation between Factor 1 and Factor 4 was equal to 0.57), the resulting factors were subjected to oblique (Oblimin) rotation.⁽²⁴⁾

Using PCA with oblique rotation, 4 components were extracted. The eigenvalue of these components was greater than 1.0. The examination of the scree plot suggested that four

or five dimensions underlie the FSFI. This model accounted for 78.28% of the variance in P-FSFI item scores. Table 1 shows the factor loadings, communalities (h2), eigenvalues, and percentage of variance for the four-dimension solution. As has been recommended by Meir and Gati,⁽²⁸⁾ for each item, the difference between the two highest factor loadings must be greater than 0.10, otherwise, that item should be reported as a cross-loaded item. As can be seen in Table 1, problematic cross loading across components were observed for two items: item 13 from the Sexual Response component (with factor loading = 0.78) cross-loaded on sexual satisfaction factor (with factor loading = 0.70). Considering the content of this item, it was decided to accept it as one of the items

for Sexual Response component. Similarly, item 14 from the Sexual Satisfaction component (with factor loading = 0.78) cross-loaded on Sexual Response component (with factor loading = 0.72). Consistent with Rosen and colleagues study in which item 14 was loaded on Satisfaction component,⁽⁸⁾ in the present study, this item was accepted as one of the items of Sexual Satisfaction component.

The first extracted component contained 11 items, and addressed problems related to arousal, lubrication, and orgasm; we called this component as Sexual Response. The second component had 3 items and assessed pain experience during or following vaginal penetration; we called this component as Sexual-related Pain. The third component with 2 items addressed desire and was called Sexual Desire. The fourth component with 3 items addressed problems related to sexual satisfaction; we called this component as Sexual Satisfaction.

Reliability

Reliability was determined by examining both the internal consistency (Cronbach's alpha) and test-retest stability of the full scale of the P-FSFI and its four above-mentioned subscales.

Internal Consistency

The internal consistency of the total scale of the P-FSFI and its 4 subscales were examined, using Cronbach's alpha. The Cronbach's alphas for the full scale and its four subscales of Sexual Response, Pain, Sexual Desire, and Satisfaction were 0.93, 0.95, 0.93, 0.82, and 0.89, respectively. These findings indicate that the P-FSFI and its 4 subscales have satisfactory internal consistency (>0.70).⁽²⁹⁾

Test-Retest Reliability

Forty participants from the original sample (562) were randomly selected to complete the P-FSFI again 4 weeks after the initial assessment. Pearson correlations were calculated between the Time 1 and Time 2 assessments for the full scale of the P-FSFI and its 4 subscales. Pearson correlation for the Time 1 and the Time 2 of assessment for the total FSFI was 0.82 ($P < .001$) and for subscales 1, 2, 3, and 4 was 0.81, 0.78, 0.66, and 0.72, respectively. All correlations were statistically significant ($P < .001$). These findings indicate that

the P-FSFI and its 4 subscales are reliable over time.

Predictive Validity

As has been mentioned, in order to establish the predictive validity of the FSFI, the healthy participants ($n = 562$) were compared to the sample of 108 people with FSD on the total scale of the P-FSFI and its 4 subscales, using a series of independent sample t tests. The assumption of equal variance between these two groups was examined by Levene's test for equality of variance. In order to prevent type I errors, a Bonferroni correction was used ($0.05/5 = 0.01$). Therefore, only t values at or below the 0.01 alpha level were considered significant.

Over a period of 5 months (March to July 2010), 108 females were referred to the Family and Sexual Health Clinic at the University of Shahed and a private urology clinic in Tehran, Iran. These patients were interviewed by a clinical psychologist or a urologist, using Diagnostic and Statistical Manual of Mental Disorders (4th edition) (DSM-IV)⁽³⁾ criteria for sexual dysfunctions. The mean age of these 108 clinical samples was 32.37 ± 4.25 years (range, 23 to 42 years). All participants had at least a high school certificate (37% had at least 12 years of formal education and 63% had at least 16 years of formal education), and 60% were homemakers. They got married on average for 94.52 ± 52 months (range, 6 to 370 months).

Table 2 summarizes the results of t tests comparing the healthy participants and clinic samples. Before conducting t test, the pre-assumptions of t tests (ie, normality of distribution and equality of variance) were examined. As expected, the healthy participants reported better sexual functioning than the clinic (patients) sample. These results support the predictive validity of the FSFI and its subscale.

Convergent and Divergent Validity of the P-FSFI Scale and Its Four Subscales

In order to examine the convergent validity of the P-FSFI, it was hypothesized that there were significant and positive correlations between the P-FSFI and its 4 subscales scores and scores on measures of depression, anxiety, stress, and negative affect. In order to establish the divergent validity of the P-FSFI, it was hypothesized that there were signifi-

Table 2. Comparison between patients and healthy participants.

Variable	Healthy participants (n = 562), Mean ± SD	Clinic sample (n = 108), Mean ± SD	t	p
Sexual response	13.1 ± 3.90	10 ± 1.76	12.82	.0001
Pain	4.20 ± 1.61	3.53 ± 1.31	4.66	.0001
Sexual desire	3.30 ± 0.93	2.97 ± 0.76	3.57	.001
Satisfaction	4.81 ± 1.23	3.41 ± 0.69	16.45	.0001
Total FSFI scale	25.41 ± 6.58	19.96 ± 2.65	14.42	.0001

SD indicates standard deviation; and FSFI, Female Sexual Function Index.

cant and positive correlations between the P-FSFI and its 4 subscales scores and scores on measures of positive affect and marital adjustment. The results of these analyses are presented in Table 3. Our results confirm that the P-FSFI and its 4 subscales have convergent and the divergent validity.

DISCUSSION

In the present study, the psychometric properties of the P-FSFI amongst a sample of healthy Iranian females were tested. The results of this study demonstrate that in a healthy sample, the P-FSFI is best conceptualized as a multidimensional measure tapping 4 dimensions: Sexual Response, Sexual Desire, Pain, and Satisfaction. Furthermore, the reliability indexes (internal consistency and test-retest stability) of the P-FSFI have been shown in this study. Finally, the predictive validity as well as the divergent and the convergent validity of the P-FSFI have been confirmed in the present study.

In the original FSFI validation study,⁽⁸⁾ five-factor solution was identified, in which the desire and arousal loaded into

one factor. However, the mixed factor of desire/arousal was separated into two measurable dimensions based on a clinical decision. The results of the present study do not agree with the previous findings that the P-FSFI can be conceptualized as 6 dimensions. As has been mentioned, while three of the Rosen and associates' original subscales (ie, Sexual desire, Pain, and Satisfaction) remained intact when their items were subjected to PCA, the items of the three subscales of arousal, lubrication, and orgasm items collapsed into a single factor, which was called Sexual Response.

This study is not without limitations. First, the participants in the present study were not selected randomly from the population. Thus, the sample may not be representative of Iranian females, and the generalizability of the results to all Iranian females cannot be assumed. Second, the above findings are based on a healthy sample; therefore, they cannot be applied to patients. Examining the factorial structure of the P-FSFI with a clinical sample is clearly warranted. Third, participants in this study included only married women with sexually functioning partners. Those who were not married (single, divorced, or widowed) were excluded from this study. Therefore, we should be cautious about applying the P-FSFI to unmarried women or those without a partner.

Despite the above-mentioned limitations, the present study's strengths mean that the findings obtained should be of value to those interested in using the P-FSFI in clinical and research settings in Iran. These strengths include the use of widely recognized methods for translating the measure from English into Farsi, the adequate size of the sample studied for the analyses conducted, as well as the employment of other well-validated and established scales for comparison. Our

Table 3. Correlation between dimensions of P-FSFI with MAT and subscales of DASS and PANAS (n = 562).

Dimensions	Depression	Anxiety	Stress	Negative affect	Positive affect	Marital Adjustment
Sexual response	- 0.44*	- 0.29*	- 0.37*	- 0.23*	0.36*	0.48*
Pain	- 0.31*	- 0.25*	- 0.29*	- 0.23*	0.28*	0.35*
Desire	- 0.27*	- 0.12*	- 0.21*	- 0.13*	0.29*	0.37*
Satisfaction	- 0.52*	- 0.30*	- 0.47*	- 0.24*	0.37*	0.60*
Full scale	- 0.48*	- 0.31*	- 0.41*	- 0.26*	0.39*	0.53*

P-FSFI indicates Persian version of Female Sexual Function Index; MAT, Marital Adjustment Test; DASS, Depression Anxiety Stress Scales; and PANAS, Positive and Negative Affect Scales.

*P < .001

findings demonstrate that for Iranian females, the domains of arousal, orgasm, and lubrication were not clearly distinguishable. This may be due to different culture and medical conditions between the two populations.

CONCLUSION

The P-FSFI is a valid and reliable instrument to measure multidimensional aspects of sexual function in healthy Iranian women. This measure can be used both in clinical and research settings to measure sexual function in Iranian women.

CONFLICT OF INTEREST

None declared.

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