Psychometric properties of women's sexual performance index on their cardiovascular health in Asian countries: A systematic review

Propiedades psicométricas del índice de desempeño sexual de las mujeres sobre su salud cardiovascular en países asiáticos: una revisión sistemática

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Abstract

Introduction & Background: Sexual dysfunction is a common disease in Asian countries. These countries are facing women's sexual issues that can affect their cardiovascular health. This study aims to assess the reliability and validity of all the Female Sexual Function Index (FSFI) versions on their cardiovascular health in Asian Countries**.**

Methods: The Main Outcome Measure is the evidence of a measurement property, and the quality of evidence based on the COSMIN guidelines.

Results: 10 studies were included. FSFI has excellent internal consistency, appreciable test-retest reliability, and high discriminate, concurrent, and converge validity. Most studies supported six, five, and three-factor models. The six-factor model was confirmed by confirmatory factor analysis in a sample of menopausal women (P<0.001).

Conclusion: The FSFI, as a reliable scale, could evaluate the female sexual function among the general population and specific medical conditions (such as diabetes mellitus, cardiovascular and cervical cancer).

Keywords: Validity, Reliability, Female Sexual Function Index, FSFI, Asian Countries.

Resumen

Introducción y antecedentes. La disfunción sexual es una enfermedad común en los países asiáticos. Estos países se enfrentan a problemas sexuales de las mujeres que pueden afectar su salud cardiovascular. Este estudio tiene como objetivo evaluar la confiabilidad y validez de todas las versiones del Índice de función sexual femenina (FSFI) sobre su salud cardiovascular en países asiáticos.

Métodos. La principal medida de resultado es la evidencia de una propiedad de medición y la calidad de la evidencia basada en las directrices COSMIN.

Resultados. Se incluyeron 10 estudios. FSFI tiene una excelente consistencia interna, una confiabilidad test-retest apreciable y una alta validez discriminante, concurrente y convergente. La mayoría de los estudios apoyaron modelos de seis, cinco y tres factores. El modelo de seis factores se confirmó mediante análisis factorial confirmatorio en una muestra de mujeres menopáusicas (P<0,001).

Conclusión. La FSFI, como escala confiable, podría evaluar la función sexual femenina entre la población general y condiciones médicas específicas (como diabetes mellitus, cáncer cardiovascular y cervical).

Palabras clave: Validez, Confiabilidad, Índice de Función Sexual Femenina, FSFI, Países Asiáticos.

Introduction

Sexuality is a factor embedded in the personality of every human being, whose full development comprehensively affects all aspects of the individual, social and interpersonal well-being[1]. Female sexual dysfunction (FSD) is identified as sexual pain, disorders in arousal, libido, and orgasm that contribute to interpersonal difficulties or personal distress[2]. Various self-report assessment tools can act as relatively general scales to examine all or part of female sexuality[3]. Rosen et al.[4] developed the Female Sexual Function Index (FSFI) scale to assess the conditions that affect sexual functioning in women. FSFI consists of 19 items to examine six domains of sexual function (including libido, arousal, lubrication, pain, satisfaction, and orgasm)[4]. The total score on the scale ranged between 2 and 36, so a higher score means the lowest severity of sexual dysfunction[4]. The FSFI gained early psychology for non-pregnant women because pregnancy affects sexual perception and activity, following emotional and physical alterations, probably due to differences in cultural values and background values[4]. Sexual dysfunction as a prevalent condition is common in Asian countries[5-8]. There is a need for a valid self-administered scale, particularly in East Asia, that can help physicians and researchers identify sexual problems[9]. This systematic review aimed to comprehensively assess the psychometric characteristic of the FSFI to lead researchers to further research in these regions of the world.

Materials and methods

The current systematic review was performed based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement[10]. Electrical databases, including Scopus, Medline [via PubMed], Cochran Library, and Web of Science were searched via (FSFI or sexuality OR sexual function) AND ([Psychometrics OR Factor Analysis OR Exploratory Factor Analysis OR Reliability OR Validity OR Confirmatory Factor Analysis]) until November 2022. In addition, list references of related articles were searched manually.

Data extraction

Data on each of the measurement properties defined by the COSMIN taxonomy was extracted by 2 independent researchers (MG and MRS). Relevant data included the type of measurement property, its results, and information on missing values who independently assessed the articles and reviewed the abstracts and limitations of the articles as follows:

1. Define the review question and develop criteria for including studies.

2. Search for studies addressing the review question.

3. Select studies that meet the criteria for inclusion in the review.

4. Extract data from included studies.

Non-English language articles, letters to the editor, articles without abstracts, and unpublished studies were excluded. Also, data extraction was performed using an author-designed form adapted from the Cochrane Collaboration.

Quality Assessments

The quality of included studies was measured using the COSMIN. It assessed nine measurement properties, including reliability, structural validity, content validity, internal consistency, measurement error, hypothesis testing, cross-cultural validity, criterion validity, and responsiveness, and the final quality was determined as 'excellent', 'good', 'fair', and 'poor'[11].

In this review, after removing duplicates and considering inclusion and exclusion criteria, ten studies were included[3,12-20]. The details of included studies are presented in Table1.

Table 1. Characteristics of included articles

Authors	Sample	Version	Exploratory factor analysis		Reliability	
			EFA	CFA	Cronbach	Test-retest
Anis et al.[3]	General population	Arabic	Six factors	-	- Orgasm= 0.85 -Pain= 0.94	- NS -Pearson correlation coefficient above 0.9
Takahashi et al.[9]	Menopause and reproductive-age	Japanese	Five factors		-Total= 0.84 to 0.97 -Regular menstruation=0.87 to 0.96 -Menopause= 0.76 to 0.97	From 0.73 to 1
Sun et al. [12]	General population	Chinese	Six factors	-	From 0.69 to 0.94	NS
Babakhanian et al.[13]	Menopausal women	Persian	Six factors	CMIN =470.542; p<0.001; CMIN/df =3.51; CFI=0.95; RMSEA=0.079; GFI=0.89]	>0.8	NS
Fakhri et al.[14]	General population	Persian	Five factors	CMIN: 304.07 -GFI: 0.89 -CFI: 0.95 -SRMR: 0.08	0.96	From 0.73 to 0.76
Liu et al.[15]	Women with cervical cancer	Chinese	Five factors	-CMIN/DF: 3.08 -GFI: 0.83 -CFI: 91 -RMSEA: 0.099	0.94	NS
Chang et al.[16]	Pregnant women	Taiwan	Three factors	-	0.96	-
Ismail et al.[17]	Women with or without DM	Malaysia	Three factors	-	-	-
Sidi et al.[19]	General population	Malay	Three factors	-	0.96	NS
Rehman et al.[21]	General population	Urdu	-	-	From 0.84 to 0.97	NS

CMIN/DF: Chi-square fit statistics/degree of freedom; **GFI**: Goodness-of-fit index; **AGFI**: Adjusted goodness of fit index; **NFI**: Normed fix index; **RFI**: Relative fit index; **CFI**: Comparative fix index; **RMSEA**: Root mean square error of approximation; **SRMR**: Standardized Root Mean Squared Residual; **NS**: No significant differences

Factor analysis

Six-factor structures are similar to the original version identified in the two studies. Exploratory factor analysis (EFA) using principal component analysis with varimax rotation identified six factors satisfaction, pain, desire, orgasm, lubrication, and arousal in Arabic[3] and Chinese version[12]. Also, the six factors' structures are similar to the original version confirmed in confirmatory factor analysis (CFA). Babakhanian et al.[13] conducted CFA in a sample of menopause women and showed that an acceptable fit was obtained after three correlated error terms were added to the six-factor model Table 1; however, five-factor structures were identified in three studies[9,14,15]. In Liu et al.[15], EFA with oblique rotation was conducted on Chinese women with cervical cancer and showed a five-factor structure explaining 77.57% of the total variance, arousal group into one factor, and the rest factors were lubrication, orgasm, pain, and satisfaction. In the Takahashi et al.[9] study, five domains (desire/ arousal, lubrication, orgasm, satisfaction, and pain) of female sexual function were explored. CFA was used in one study and confirmed five factors structure in women with cervical cancer Table 2[15], and the general population[14].

Three-factor structures were identified in three studies[16-18]. In Ismail et al.[17] the study, women with or without diabetes mellitus (DM) were selected, and similar factor structures were assessed among women with or without DM. Sexual desire and arousal are grouped into one factor, and satisfaction was the second factor in both groups. However, there were slight differences in the third factor[17]. In women with DM, lubrication, orgasm, and pain were grouped into the third factor, while in women without DM, the pain was considered as the third factor, and lubrication and orgasm domains were loaded considerably on all three factors[17]. In the Chang et al.[16] study, in a sample of 121 Taiwanese pregnant women, three factors were identified. The first, second, and third factors were coitus, satisfaction, and desire, accounting for 72.32%, 9.37%, and 5.42%, respectively[16]. Also, in a general sample of 230 married Malay women, sexual arousal, lubrication, and pain formed the first construct[18]. The second construct comprised orgasm and sexual satisfaction. Also, desire made the third construct[18].

Discriminant validity

The validity, total score, and domain score showed significantly (P<0.0001) higher in the regular menstruation group than in the menopause group[9]. Sun et al.[12] and Sidi et al.[19] showed a significant difference between the FSD group with those in the control group.

Concurrent validity

The optimal cutoff score for the FSFI total score was reported as 23.45 (sensitivity = 66.9%; specificity = 72.7) for the Chinese version[20], and 28.1 (sensitivity 96.7%, specificity 93.2%, and area under curve 0.985) in the Arabic version[12].

Convergent validity

The total and each domain score of the FSFI showed statistically significant correlations with both overall satisfaction of sex life as measured by the Visual Analog Scale and with premenopausal subjective symptom inventory scores[9].

Intercorrelations

Slightly high significant correlations were reported among the different dimensions of the FSFI, ranging from 0.409 to 0.938[9,13].

Reliability

Cronbach's alpha coefficients ranged from moderate to excellent for domains and total scores of FSFI[3,9,12-16,19,21].

Test-retest reliability

Test-retest reliability was measured in ten studies. No significant difference was observed between the test and retest for both the total FSFI scale and all the six domains[3,12,19,21] in the general population and also in pregnant[16], menopause[13], and women with cervical cancer[14].

The test-retest was assessed by the intraclass correlation coefficient in two studies. It ranged from 0.73 to 1 in the Chinese version[20] and from 0.73 to 0.76 In the Persian version[14]. Test-retest reliability was assessed using the Pearson correlation coefficient, and all value was significant[3].

Table 2. Quality of included studies based on COSMIN

Authors	Internal consistency	Reliability	Measurement error	Content validity	Structural validity	Hypothesis testing	Cross-cultural	Criterion	Responsiveness	Interpretability	Generalizability
Anis et al.[3]	2	2	1	3	2	2	2	2	NA	1	4
Takahashi et al.[9]	2	2	NA	NA	NA	NA	3	NA	NA	1	3
Sun et al.[12]	2	2	NA	3	3	NA	3	NA	NA	NA	NA
Babakhanian et al.[13]	2	2	NA	NA	2	NA	2	NA	NA	NA	NA
Fakhri et al.[14]	2	2	NA	NA	3	3	3	2	NA	1	4
Liu et al.[15]	2	2	NA	NA	2	4	NA	NA	NA	NA	3
Chang et al.[16]	2	2	NA	NA	3	NA	3	NA	NA	NA	NA
Ismail et al. [17]	NA	NA	NA	NA	3	NA	3	NA	NA	NA	NA
Sidi et al.[19]	2	2	NA	3	NA	NA	NA	NA	NA	2	3
Rehman et al.[21]	2	2	NA	NA	3	NA	NA	NA	NA	1	2

1=poor, 2= fair, 3= good, 4= excellent

Discussion

Asian countries are faced with many challenges and problems with studies on female sexuality. A comprehensive review of the psychometric characteristic of the FSFI questionnaire may lead to further research in these regions of the world. Bartula *et al.*[22] revealed that the FSFI questionnaires have good acceptability, and participants reported a comfortable feel to completing a question, easy to complete, relevant to their experience, and the right length. However, acceptability was not reported in any Asian version.

Test-retest reliabilities and internal consistency in the Asian version were similar to the Western version. Asian versions of FSFI showed good internal consistency for various domains ranging from 0.72 to 90. In the Western version, such as the Austria version, test-retest reliability ranged from 0.76 to 0.82[22].

Test-retest reliabilities in the Turkish version indicated that among women with chronic pelvic pain, the correlation ranged from 0.79 to 0.89 for the six FSFI domains, and 0.9 for the total scale[23]. Also, for the women without chronic pelvic pain, correlations ranged from 0.81 to 0.89 regarding six domains and 0.92 for the total scale[23]. In the Italy version[24], FSFI questionnaires were administered within a 2-week interval, and the test-retest correlation coefficient showed a high degree for total score total. Also, the test-retest correlation for all domains was reported more than 0.92[24]. In the Austria version, the internal consistency was between 0.89 and 0.96, and test-retest reliability was reported as 0.75 and 0.86 for pain and desire, respectively[22]. In the Italian version, Cronbach's alpha coefficient was excellent for the total FSFI scale and its six domains, which ranged from 0.92 to 0.97[24]. Chang et al.[16] showed two possible reasons for the inconsistency between their model (three-factor Taiwanian version) and the original model. First, differences may be attributed to pregnancy status, as it affects sexual activity and perception due to emotional and physical changes. The second can be due to cultural and contextual value differences in people [16].

The FSFI could evaluate female sexual function during different phases of life, like menopause and pregnancy and its effect on cardiovascular disease. However, any of Asia's versions assessed characteristic psychometric postpartum periods.

The results of this systematic review revealed that the six subscales might be invalid in all groups of patients. A population may influence the factor structures; based on a large-scale cross-cultural study design, the factor structures of FSFI-19 may differ in women[25,26]. Utilizing the COSMIN checklist was one of the strengths of this study, as it introduces a systematic way to evaluate the quality of other studies on measurement profiles[27]. Multiple limitations were evident in this research. First, the data of a simple sample were the basis for assessing the validity and reliability of almost all studies enrolled in this review. Second, multiple risky illnesses probably influence sexual function as endometriosis[28] and rheumatic disorders[29], coronary artery disease[30], and inflammatory bowel disease[31]. Also, Takahashi et al. showed that most respondents live in the metropolitan regions of Tokyo, and many of them are relatively well-educated healthcare providers. Respondents in the present work may have a more open view of sexuality compared to the average Japanese female[9]. Anis et al[3] reported that it is possible a degree of some selection bias occurred during recruitment in theirs, rural origin women and less educated women participated less in their study. Only 28% had a rural origin, while 71.3% of participants were of urban origin. Also, 47% had an academic educational level, and 20.6% had an educational level in high school.

Conclusions

The efficiency of the Asian version of FSFI is comparable to the original English version. The FSFI, as a reliable scale, can elucidate the FSD among the general population and specific medical conditions such as DM, cardiovascular disease and cervical cancer. FSFI has excellent internal consistency, appreciable test-retest reliability, and high discriminate, concurrent, and converge validity.

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