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Assessment of sexual function of mid-aged Ecuadorian women with the 6-item Female Sexual Function Index

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ABSTRACT

Background: Assessing sexuality is a difficult task, hence used tools should be straight forward and easy to use.

Objective: To assess sexual function in mid-aged Ecuadorian women.

Method: In this cross sectional study, 904 otherwise healthy women 40–59 years completed the short 6-item Female Sexual Function Index (FSFI-6) and a general socio-demographic questionnaire containing personal/partner data. Internal consistency of the tool was also assessed.

Results: Median age of the whole sample was 49 years, 51.1% were postmenopausal, 43.8% lived at high altitude, 12.6% used hormone therapy (HT), 58.5% presented hot flushes, 43.5% were abdominally obese and 80.8% had a partner. Overall, 72.4% of surveyed women reported sexual activity ($n = 655/904$) with 65% of these presenting total FSFI-6 scores equal or below 20 the calculated median (lower sexual function). A 10.2% of those having a partner were sexually inactive. Internal consistency of tool was high (Cronbach's alpha = 0.91). Total FSFI-6 scores positively correlated with coital frequency and female and partner educational level and inversely with female age, waist circumference, hot flush intensity and partner age (bivariate analysis). Multiple linear regression analysis determined that lower scores (lower sexual function) were related to high altitude, history of sexual abuse, sedentarism, hot flush intensity, partner age and sexual dysfunction whereas partner educational level, coital frequency and female parity were significantly related to higher scores (better sexual function).

Conclusion: As assessed with a consistent, short, and easy to use tool lower sexual function of this mid-aged series was related to several female and partner factors. More research with this tool is warranted.

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1. Introduction

Sexuality is a key aspect within the context of female quality of life reflecting their bio-psycho and social well being [1,2]. Several reports seem to point out to the fact that during the climacteric there is a link between general quality of life, menopausal symptoms, depressive status and sexual function. Female sexual function

during mid-life is directly related to their hormonal, emotional and health status, and to various partner aspects [2–8].

In recent years a great deal of information has been gathered in relation to female sexual function by means of the originally designed 19 item Female Sexual Function Index (FSFI-19) [9–13]. However a short version of this tool, including 6-items, has recently been proposed (FSFI-6) which seems to parallel with the results obtained with the long version yet with optimized screening time [14]. In this study heterosexually active women, 18 years or more, were prospectively recruited from three Italian outpatient clinics devoted to sexuality and reproductive medicine. The FSFI-6 showed that women with scores 19 or less displayed female sexual dysfunction (FSD). The FSFI-6 displayed a sensitivity and specificity of 0.93 and 0.94, respectively. Important to mention is the fact that only 4% of women recruited in this study were menopausal [14]. Since FSD is highly prevalent during the menopausal transition and studies

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using this short version of the FSFI are still lacking the aim of the present research was to assess sexual function and related factors in mid-aged Ecuadorian women using the FSFI-6.

2. Methods

2.1. Participants

A cross-sectional study was carried out from August 2010 to February 2011 under the sponsorship of the Ecuadorian Climacteric & Menopause and Climacteric Society aiming to assess sexual function among mid-aged women. For this, otherwise healthy women (40–59 years) who were accompanying or visiting patients being attended for at gynecological and obstetrical healthcare centers of main Ecuadorian cities with more than 100,000 inhabitants were requested to fill out the FSFI-6 and an itemized questionnaire containing female/partner socio-demographic data. Women unable to understand the survey, not consenting participation or with psychological or physical incapacity imposing difficulties during the interview were excluded. In addition, lesbian women were not included in this survey because this population requires the use of modified questionnaires to study their sexuality [15]. The research protocol of the study was reviewed and approved by the Bioethics Committee of the Facultad de Medicina de la Universidad Católica de Santiago de Guayaquil, Ecuador. All women were informed about the research (purposes and used tools) and written consent obtained.

2.2. General questionnaire

2.2.1. Female data

Female data included: age (years), parity, menopausal status (pre-, peri- or postmenopausal), partner status (yes/no), marital status, educational level (total years), sexual status in the past 4 weeks (active or inactive), coital frequency (per month), high altitude residency (2000 or more meters above sea level) and accessed healthcare system (free–minimal cost or paid). Lifestyle and other personal factors included: smoking habit, church attendance, and history of sexual abuse. Medical care and drug use included: current psychiatric consultation (yes/no) and the use of psychotropic drugs, oral contraceptives and hormone therapy (HT) or phytoestrogens for the menopause. Menopausal status was defined using criteria of the Stages of Reproductive Aging Workshop: premenopausal (women having regular menses), perimenopausal (irregularities > 7 days from their normal cycle) and postmenopausal (no more menses in the last 12 months) [16]. Those with bilateral oophorectomy were considered as postmenopausal. Women performing less than 15 min of physical activity (i.e. walking) two times per week were defined as sedentary [17]. Waist or abdominal circumference was measured in centimeters (cm) with an anthropometric tape placed directly on the narrowest point between the lower rib margin and the iliac crest on a plane perpendicular to the long axis of the body, while the subject stood balanced on both feet, approximately 20 cm apart, and with both arms hanging freely. A waist circumference greater than 88 cm was used to define abdominal obesity [18]. The presence and severity of hot flushes was assessed with the first item of the Menopause Rating Scale (MRS). Severity was graded from 1 to 4 and defined as mild = 1; moderate = 2; severe = 3; and very severe = 4 points.

2.2.2. Partner data

Women provided data related to their partner including: age, educational level, healthiness, faithfulness, alcoholism, or sexual dysfunction presence (erectile dysfunction and/or premature ejaculation). Definitions for alcoholism, erectile dysfunction and premature ejaculation have previously been described [11].

Women or men capable of performing daily routine activities were defined as healthy.

2.3. The 6-item Female Sexual Function Index (FSFI-6)

This instrument is composed of 6 questions derived from the original FSFI-19, each covering one of the original domains: desire (original item #2), arousal (original item #4), lubrication (original item #7), orgasm (original item #11), satisfaction (original item #16) and pain (original item #17) [14]. Each question can provide a score varying from 0 to 5. Scores obtained for each question are then summed up to provide a total FSFI-6 score. Isidori et al. [14] have proposed a cut-off value of 19 or less to identify women at risk of FSD. Instead the present research used the calculated median for the sample to identify women with lower sexual function. Individual scores obtained for each item were also computed separately and displayed as medians [interquartile ranges and percentiles]. The Spanish version of the FSFI-19 [11,13] was used to extract the 6 items of the FSFI-6. The assembled FSFI-6 was tested among 50 women prior to its use in this research.

2.4. Statistical analysis

Statistical analysis was performed using SPSS software package (Version 19.0 for Windows, SPSS Inc., Chicago, IL, USA). Data are presented as medians, interquartile ranges, percentiles (p25 and p75), percentages, coefficients, and 95% confidence intervals. The Kolmogorov–Smirnov test was used to determine the normality of data distribution. According to this, non parametric data were compared with the Mann–Whitney (two independent samples) or the Kruskal–Wallis test (various independent samples). Rho Spearman coefficients were calculated to determine correlations between FSFI-6 total scores and various numeric variables.

Multiple linear regression analysis was performed to obtain a best model predicting total FSFI-6 scores (sexual function, dependent variable) among those sexually active. For this, independent variables (female and partner), found to be significant during bivariate analysis, were entered into the model using a backward stepwise procedure with a significance level of p set at <0.05. For all calculations a p value of <0.05 was considered as statistically significant.

Sample size calculation was performed using the EPI-INFO 6.04 statistical package. A minimal sample size of 94 women per center was determined considering that each center covers an approximate population of 5000 women between 40 and 59 years and assuming that 50% would present lower sexual function [11] with a 10% desired precision and a 95% confidence level.

3. Results

During the studied period a total of 952 heterosexual women were invited to participate, 4.2% denied participation and 0.9% provided incomplete data, leaving 904 complete surveys for statistical analysis. Median [interquartile range] age of the whole sample was 49 [8.0] years. A 51.1% were postmenopausal, 43.8% lived at high altitude, 12.6% used HT, 58.5% presented hot flushes, 43.5% were abdominally obese and 80.8% had a partner (Table 1).

Overall, 72.4% of surveyed women reported sexual activity ($n = 655/904$) displaying a coital frequency ranging from 1 to 48 per month. A 10.2% of those having a partner were sexually inactive. Computed FSFI-6 scores (total and domains), expressed as medians, are depicted in Table 2. A 65% displayed total FSFI-6 scores equal or below 20 the calculated median (lower sexual function). FSFI-6 scores were significantly higher among younger and premenopausal women yet similar between HT users and non users.

Table 1

Basal characteristics of all surveyed women and their partners.

Female data	n = 904
Age (years)	49 [8; 45–53]
40–44	198 (21.9)
45–49	289 (32.0)
50–54	234 (25.9)
55–59	183 (20.2)
Educational level (years)	12 [9; 6–15]
0–6	257 (28.4)
7–12	370 (40.9)
≥13	277 (30.6)
Marital status	
Married	498 (55.1)
Single	44 (4.9)
Widowed	55 (6.1)
Divorced	119 (13.1)
Cohabiting	188 (20.8)
Parity	3 [2; 2–4]
0	49 (5.4)
1–5	773 (85.5)
>5	82 (9.1)
Lives at high altitude	396 (43.8)
Access to free healthcare	568 (62.8)
Menopausal status	
Premenopausal	240 (26.5)
Perimenopausal	202 (22.3)
Postmenopausal	462 (51.1)
Natural menopause	254 (28.1)
Surgical menopause	86 (9.5)
Hysterectomy after natural menopause	46 (5.1)
Bilateral oophorectomy	76 (8.4)
Time since menopause onset (years)	4 [2]
Drug use	
HT use	114 (12.6)
Phytoestrogens	90 (10.0)
Psychotropics	24 (2.7)
Oral contraceptive	82 (9.1)
Current smoking	67 (7.4)
Hot flushes present	529 (58.5)
Moderate to severe	51 (529/9.7)
Abdominal circumference (cm)	86.5 [15; 80–95]
Abdominal obesity (waist > 88 cm)	393 (43.5)
Sedentary	485 (53.7)
Healthiness	810 (89.6)
Church attendance	515 (57.0)
Psychiatric consultation	68 (7.5)
History of sexual abuse	42 (4.6)
Currently has partner	730 (80.8)
Sexually active	655/730 (89.8)
Coital frequency (month)	4 [4; 4–8]
0	75 (10.3)
1–14	606 (83.0)
15–29	47 (6.4)
30–48	2 (0.3)
Partner	n = 730
Age (years)	50 [10; 46–56]
Educational level partner	12 [8; 6–14]
Alcohol abuse	135 (18.5)
Healthiness	587 (80.4)
Faithfulness	349 (47.8)
Erectile dysfunction	159 (21.8)
Premature ejaculation	169 (23.2)

Data are presented as medians [interquartile ranges; p25–p75] or percentages n (%); HT: hormone therapy

Internal consistency of the tool was high for this sample (Cronbach's alpha = 0.91).

Bivariate analysis found that total FSFI-6 scores positively correlated with coital frequency and female and partner educational level and inversely with female age, waist circumference, hot flush intensity and partner age (Rho Spearman coefficients) (Table 3). Multiple linear regression analysis was used to obtain the best model predicting total FSFI scores, explaining an 80% of the total variance (Table 4). In this model lower total FSFI-6

Table 2

The FSFI-6: total and per domain scores among sexually active women (n = 655).

Domain	n = 655
FSFI 1 desire	3 [1; 2–3]
FSFI 2 arousal	3 [2; 2–4]
FSFI 3 lubrication	3 [2; 2–4]
FSFI 4 orgasm	3 [2; 2–4]
FSFI 5 satisfaction	4 [1; 3–4]
FSFI 6 pain	4 [2; 3–5]
Total FSFI-6 score	20 [8; 15–23]
FSFI total scores 20 or less (lower sexual function)	588 (65.0)
Cronbach's alpha	0.91
Age groups	Total FSFI-6
40–44 years	22 [5; 19–24]
45–49 years	19 [10; 14–24]
50–54 years	17 [10; 11–22]
55–59 years	18 [8; 15–23]*
Menopausal status	Total FSFI-6
Premenopausal (n = 198)	21 [6; 18–24]
Perimenopausal (n = 160)	19 [9; 14–23]
Postmenopausal (n = 297)	19 [9; 14–23]*

Data are presented as medians [interquartile ranges; p25–p75] or percentages n (%).

* p < 0.05 for the trend as calculated with the Kruskal Wallis test.

scores, hence lower sexual function, were related to high altitude, history of sexual abuse, sedentarism, hot flush intensity, partner age and sexual dysfunction (erectile dysfunction and premature ejaculation) whereas partner educational level, coital frequency and female parity were significantly related to higher scores (better sexual function).

4. Discussion

The menopausal transition is a time in women's life when bio, psycho, social and emotional factors interact and may impair quality of life [2,19,20]. Different approaches have been used to delineate the factors and the degree in which they may influence mid-aged female sexuality [1,6,7,9–11,13,21,22]. The FSFI-19 has been used to assess sexual function in various female populations in relation to menopausal status, anxiety, depression, urinary symptoms, eating disorders, hormone levels and partner factors [6,11–13,23,24]. The present study aimed at assessing sexual function and related factors in mid-aged women using the FSFI-6. This tool has recently been reported as an accurate and quick FSD screening instrument, useful for non-specialized clinical settings [14]. The 6 items included in the tool were selected as the most representative ones of the 6 domains of the original FSFI-19. A cut off value of 19 demonstrated a high sensitivity, specificity and positive and negative predictive values for the identification of women with FSD [14]. As our population differs from the originally explored by Isidori et al. [14], in terms of age range and other cultural aspects, we did not use this cut off value nor did we focus on identifying FSD rather those with scores equal or below the calculated median

Table 3

Rho Spearman coefficients between total FSFI-6 scores and various numeric variables in sexually active studied women (bivariate analysis).

Parameters	Coefficient	p value
Coital frequency (month)	0.26	<0.001
Female educational level	0.13	0.001
Partner educational level	0.21	<0.001
Female age	−0.26	<0.001
Waist circumference	−0.24	<0.001
Hot flush severity	−0.10	0.04
Partner age	−0.22	<0.001
Parity	0.03	0.44

Table 4
Factors relating to total FSFI-6 scores in sexually active studied women: final multivariate regression model.

Factors	Beta coefficient	Standard error	95% CI	t	p value
Living at high altitude	-3.65	0.49	-4.62 to -2.67	-7.36	<0.001
History of sexual abuse	-2.36	1.04	-4.42 to -0.30	-2.25	0.02
Sedentarism	-1.72	0.48	-2.67 to -0.78	-3.58	<0.001
Hot flush intensity	-1.29	0.35	-1.99 to -0.60	-3.68	<0.001
Parity	0.38	0.14	0.09–0.68	2.62	0.009
Coital frequency (month)	0.09	0.04	0.01–0.18	2.13	0.03
Partner age	-0.07	0.03	-0.13 to -0.01	-2.52	0.01
Partner educational level	0.20	0.05	0.10–0.30	4.08	<0.001
Partner erectile dysfunction	-2.51	0.62	-3.74 to -1.28	-4.02	<0.001
Partner premature ejaculation	-1.46	0.53	-2.51 to -0.41	-2.73	0.007

$r^2 = 0.821$; adjusted $r^2 = 0.801$, $p < 0.0001$; CI: confidence intervals.

who indeed may potentially have FSD. In this sense, the present research found that 65% of surveyed women displayed scores 20 or less, the calculated median, suggesting lower sexual function. This is in correlation with what we have previously reported using the complete 19 item tool [13]. In the present research the FSFI-6 displayed a high Cronbach alpha value indicating an adequate internal consistency, which is similar to that reported for the original FSFI-19 [10]. General characteristics of surveyed women and their partners were similar to those previously reported for Latin American [25] and Ecuadorian populations [6]. Indeed women had lower education, multiparity, non HT use and free health care access in high rates, a profile characteristic of developing countries. Rate of abdominal obesity, hot flush presence and sedentarism was also similar to that found in a previous Ecuadorian report [25].

Overall 72.4% of participants of the present series were sexually active, who were significantly younger than those inactive. This is consistent with the rate found in a previous Latin American mid-aged female report (74.4%) [13]. Sexual inactivity in our series was mainly due to the fact that women had no partner and among those who did have a partner, sexual inactivity was most frequently related to female age and partner issues. This is in correlation with a Danish survey including men and women aged 16–97 years in which sexual inactivity was related to health and lifestyle factors in both partners [22].

Life and sexual satisfaction depend on organic, emotional, couple communication and lifestyle factors [2,19,20,22,26]. In addition, the diagnosis and prevalence of FSD may also depend on the used methodological approach. Important to bear in mind is that the FSFI-19 or the FSFI-6 are mainly screening tools and not diagnostic ones. More thorough examinations are required to diagnose FSD. We have previously reported attempts at simplifying sexual function assessment in mid-aged women. In one study by using only item 8 of the MRS [27]; however accuracy was moderate for diagnosing sexual dysfunction, and in another [6] by correlating scores obtained with the FSFI-19 and the sub-scales of the MRS. In the latter it was found that the urogenital scores of the MRS significantly predicted total FSFI scores and hence female sexual function. A tool using one question of the original FSFI-19 has recently been proposed. However, sensitivity and specificity was found to be low [28]. The FSFI-6 tool incorporates one item of each of the 6 domains of the original FSFI, thus allowing rapid screening of these domains [14]. This is an important feature, as when it comes to evaluating mid-aged women tools need to be quick and easy to use, moreover when this population needs to be assessed with various instruments in order to obtain a global overview of their problems.

In the present study, bivariate analysis found significant correlations between total FSFI-6 scores and several numeric variables. For instance coital frequency and educational level (female and partner) displayed a positive correlation whereas age (female and partner), waist circumference and hot flush severity displayed

an inverse significant correlation. Younger and premenopausal women displayed higher FSFI-6 total scores, hence better sexual function (Table 2). Some of these correlations and differences, however, were not found during multivariate linear regression analysis, which obtained a best fit model containing significant factors predicting FSFI-6 total scores and explaining 80% of the total variance. It was found that lower total FSFI-6 scores, hence lower sexual function, were related to high altitude, history of sexual abuse, sedentarism, hot flush intensity and partner age and sexual dysfunction (erectile dysfunction and premature ejaculation) whereas partner educational level, coital frequency and female parity were significantly related to higher scores (better sexual function). Results of the present research highlight the importance of personal social and partner factors over age and hormonal ones in the prediction of female sexual function, situation which confirms our previous observations using the FSFI-19 tool [6,11,13] and contrasts with the results of Nappi et al. [29] that highlight the profile of Italian women assisting gynecological consultations, in which age, menopausal status and HT use seem to be more relevant sexual function predictors. One should bear in mind, however, that standards of the FSFI-19 (total and domain scores) cannot be compared with the scores obtained in the present research using the FSFI-6 and that population differences make comparison of results difficult.

As we have previously described partner aspects exert an impact over mid-aged female quality of life and sexuality [11,30]. Male sexual dysfunction was found to be high in the present series yet similar to that of our previous observations [11] and most possibly related to a high rate of alcohol abuse. Partner age and health status may affect female sexual life and satisfaction [23]. Aged males have more erectile and ejaculatory disorders, life frustration and work stress that may deteriorate both sexual desire and performance [20,31–33]. Decreased sexual intercourse (quality and frequency) may reduce urovaginal status creating a vicious circle with negative sexual feelings and impaired vaginal trophism [3,6,20]. The present study found that higher parity related to better sexual function. Contrary to this, higher parity relating to worse sexuality has previously been reported by our group [6] and others [20,29,34,35]. Explanation to these discrepancies may rely on the characteristics of the studied population which were not explored in the present study (i.e. pelvic floor disorders). Increased parity relating to worse sexual function may be supported by the fact that increased parity may alter vulvovaginal anatomy and sensitivity [33,36]. Indeed, reports have highlighted the role of pudendal nerve integrity and genital-sensory alterations in relation to female sexual dysfunction [37,38]. History of sexual abuse and the role of obesity, sedentarism, and coital frequency as predictors of sexual function have been previously reported [6,13,26,29]; however, not by means of the FSFI-6.

Previously we have described that women living at higher altitude present impaired quality of life in relation to more severe

menopausal symptoms [25,39]. Sexual function has previously been explored in Ecuadorian and Latin American women by means of the FSFI-19, yet altitude of residency not analyzed as a covariate [11,13]. Contrarily the present study is the first to describe, by means of the FSFI-6, a significant correlation between living at high altitude and lower sexual function.

Finally regarding the limitations of the present study one can mention the cross sectional design. Also as this was not a clinical sample, women were not fully explored for other potential organic causes which may influence sexual function (i.e. pelvic floor disorders: genital prolapse and bladder problems) [40–42]. Despite this, to the best of our knowledge the present study may be the largest and first to use the FSFI-6 among mid-aged women. Limitations applicable to the FSFI-19 also apply to this shorter 6 item version. Indeed one must bear in mind that these tools have been designed to assess sexual function and identify women with lower sexual function and not provide a definitive diagnosis of FSD. For practical purposes any proposed screening tool should be easy to use and quick. The FSFI-6 seems to fit this profile aiding the assessment of female sexual function, menopausal or not.

In conclusion, as assessed with a consistent, short, and easy to use tool lower sexual function in this mid-aged Ecuadorian sample was related to several female and partner factors. More research with this instrument is warranted.

Contributors

Faustino R. Pérez-López and Peter Chedraui were involved in study conception and design. Hugo Sánchez, Wellington Aguirre, Nalo Martínez, Octavio Miranda, María S. Plaza, Gino Schwager, Jorge Narváez, Juan C. Quintero and Branly Zambrano conducted the clinical surveys. Peter Chedraui performed the statistical analysis. Faustino R. Pérez-López and Peter Chedraui performed drafting of the manuscript. All authors were involved in critically revising the manuscript for its intellectual content; and the final approval of the manuscript was done by all authors.

Competing interest

None.

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