Sexual dysfunction in middle-aged women: a multicenter Latin American study using the Female Sexual Function Index

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Abstract

Objective: The purpose of this study was to assess the prevalence of sexual dysfunction (SD) and associated risk factors among middle-aged Latin American women using one validated instrument.

Methods: The Female Sexual Function Index (FSFI) was applied to 7,243 healthy women aged 40 to 59 years who were users of 19 healthcare systems from 11 Latin American countries. An itemized questionnaire containing personal and partner sociodemographic data was also filled out.

Results: Mean ± SD age of surveyed women was 49.0 ± 5.7 years, with 11.6 years of schooling on average. There were 55.1% of women who were married, 46.8% who were postmenopausal, 14.1% who used hormonal therapy (HT), and 25.6% who were sexually inactive. Among those who were active (n = 5,391), the mean ± SD total FSFI score was 25.2 ± 5.9 and 56.8% of them presented SD (FSFI total score ≤26.55), with a prevalence varying from 21.0% to 98.5% depending on the center. Centers were grouped in terciles (according to mean ± SD prevalence). The tercile with higher SD prevalence (86.4%) compared with that with lower SD prevalence (32.2%) had significantly older women (49.5 ± 5.3 vs 48.0 ± 5.6 y) with a higher rate of vaginal dryness (60.4% vs 40.8%) and older partners (53.0 ± 6.9 vs 50.2 ± 7.5 y). Similarly, there was a significantly higher rate of married (68.5% vs 63.1%), postmenopausal (49.7% vs 39.3%), and HT-using women (23% vs 9.2%). There were no differences in regard to their health perception, history of oophorectomy, rape, and partner SD rate (27% vs 26.2%). The total FSFI score was significantly lower in the tercile with higher SD prevalence (22.0 ± 5.0 vs 27.5 ± 5.4). Logistic regression analysis was used to determine the odds ratios (95% CIs) for the main risk factors associated with SD among those who were sexually active: bad lubrication, 3.86 (3.37-4.43); use of alternative menopausal therapies, 2.13 (1.60-2.84); partner SD, 1.89 (1.63-2.20); older women (>48 y), 1.84 (1.61-2.09); bladder problems, 1.47 (1.28-1.69); HT use, 1.39 (1.15-1.68); negative perception of female health status, 1.31 (1.05-1.64); and being married, 1.22 (1.07-1.40). Protective factors were higher educational level (women), partner faithfulness, and access to private healthcare.

Conclusions: The prevalence of SD in this middle-aged Latin American series was found to be high, varying widely in different populations. A decrease in vaginal lubrication was the most important associated risk factor. Differences in the prevalence of risk factors among the studied groups, several of which are modifiable, could explain the variation of SD prevalence observed in this study.

Key Words: Sexual dysfunction – Female Sexual Function Index – Menopause – Latin America.

S exuality is essentially a group of anatomical, physio-logical, and psychoaffective animal conditions that characterize each gender. However, among human beings, sexuality is an aspect that addresses sex, identity and gender roles, erotism, pleasure, intimacy, reproduction, and orientation. Sexuality is influenced by the interaction of biological, psychological, social, economical, political, ethnical, legal, historical, religious, and spiritual factors.[1]

Latin America is a mosaic of countries with different socioeconomic levels, ethnicities, and political systems.[2] However, equal culture, religion (Catholic), and origin (mestizo: Spaniard/indigenous) is the framework that unites this population. The diversity of biological and sociocultural factors

could have different effects on female sexuality in several Latin American countries.

Human sexuality is a complex phenomenon that involves psychological and organic processes. Moreover, one must bear in mind that sexuality may also be affected by sociocultural changes, which are permanent occurrences within societies. Hence, the systematic study of sexuality data is very complex. A major improvement was an international consensus conference (*The International Consensus Development Conference on Female Sexual Dysfunctions*) and the development through this conference of the Female Sexual Function Index (FSFI), a test with psychometric properties, capable of assessing sexual function within various domains: desire, arousal, orgasm, pain, lubrication, and satisfaction.[3,4] The Spanish version of this tool has been validated among Latin American women aged 20 to 59 years.[5]

Recently, a network of Latin American researchers who are studying the climacteric has been established, allowing the performance of various multicenter studies and the generation of several important publications.[6-10] Within this scenario of a research network and current validated tools for assessing female sexuality, we carried out this cross-sectional study aimed to assess the prevalence of sexual dysfunction (SD) and associated risk factors among middle-aged Latin American women using one validated instrument, the FSFI.

METHODS

Participants

From November 2006 to February 2007, a cross-sectional study was carried out in 19 healthcare centers of cities with a population of more than 500,000 inhabitants in 11 Latin American countries (see list of participating countries and investigators in Appendix 1). Using statistical software (EPI-INFO 6.04; Centers for Disease Control and Prevention, Atlanta, GA), a minimal sample size of 380 participants per center was calculated, considering that each center covered an estimated population of 50,000 women[11] and assuming that 50% of the surveyed population would present SD[12,13] with an estimated 5% error and a 95% CI. To record all data, an itemized questionnaire was previously constructed and validated in 50 women before implementation at the centers affiliated with the Collaborative Group for Research of the Climacteric in Latin America (REDLINC) participating in this study known as the REDLINC III, aiming to assess sexuality and determine SD prevalence and related risk factors in middle-aged women. Healthy women of Hispanic ethnicity aged 40 to 59 years who were accompanying patients attending health centers were included. Pregnant women, women of indigenous populations, and those refusing to fill out the survey or incapable of understanding the items contained in it were excluded. Similarly, lesbian women were not included in this survey because this population requires the use of modified questionnaires to study their sexuality.[14]

Women fulfilling the inclusion criteria were requested to fill out the FSFI[4] and a general data questionnaire after being informed about the research, its purpose, the FSFI, and its content. Participants were also asked to complete the Menopause Rating Scale (MRS). Consent was obtained from all participants. The research protocol for this study was reviewed and approved by the Bioethics Committee of the Protección para la Salud de la Mujer Foundation, Santiago de Chile, Chile.

Variables included in the general questionnaire
General data

General data were age (years), parity, REDLINC center number (city and country), menopause status (premenopause, perimenopause, or postmenopause), marital status, sexual status for the last 4 weeks (active or inactive), educational level (expressed in years of schooling), and accessed healthcare system (free-minimal cost [<25% of private consultation fee] or paid [paying more than the minimal cost]). Insufficient educational level (women or partner) was considered as 12 years or less of study.[15]

Lifestyle and other personal factors

Lifestyle and other personal factors included were smoking habit (current smoker, sometime smoker, or nonsmoker), church attendance, history of sexual abuse (rape), and current relationship (one partner). Women were asked about how they perceived their health status (and that of their partner). Those capable of performing daily routine activities were defined as healthy.[16]

Medical care and drug use

The rate of women seeking psychiatric attention was assessed as well as the use of psychotropic drugs and hormonal therapy (HT)/alternative therapies for menopausal symptoms.

Data related to partner

Partner age (years), years of schooling (total years), healthiness, presence of alcoholism, or SD (erectile or premature ejaculation) were assessed. Women were asked about male faithfulness. Alcoholism was defined as a chronic conduct disorder manifested by repeated and excessive alcohol consumption, which interferes with health, economic, or social relationships. Erectile dysfunction was defined as the persistent or recurrent incapacity to achieve or maintain an erection to allow satisfactory sexual intercourse,[17] whereas premature ejaculation was defined as the persistent or recurrent ejaculation after minimal sexual stimulation before, during, or shortly after penetration or before the individual's desire to do so.[18]

Menopause status definitions

For menopause status, the following definitions were used: premenopausal, women having regular menses; perimenopausal, irregularities more than 7 days from their normal cycle; and postmenopausal, no menses in the last 12 months.[19] Those with bilateral oophorectomy were considered as postmenopausal.

The FSFI

This instrument used to assess sexual function in the past 4 weeks is composed of 19 questions grouped in six domains

or dimensions: desire (items 1 and 2), arousal (items 3-6), lubrication (items 7-10), orgasm (items 11-13), satisfaction (items 14-16), and pain (items 17-19). Each question has a Likert scale score varying from 0 to 5. Scores obtained in a particular domain are added and multiplied by a respective factor that homogenizes the influence of each dimension. The total FSFI score is the sum of all scores obtained in each domain.[4] A higher score indicates better sexuality. Participants obtaining a total FSFI score of 26.55 or less were defined as having SD.[20] For the purpose of this research, the validated FSFI Spanish version was used (Cronbach $\alpha > 70\%$).[5]

The MRS

The MRS is composed of 11 items assessing menopausal symptoms divided into three subscales: (1) somatic: hot flushes, heart discomfort, sleeping problems, and muscle and joint problems (items 1-3 and 11, respectively); (2) psychological: depressive mood, irritability, anxiety, and physical and mental exhaustion (items 4-7, respectively); and (3) urogenital: sexual problems, bladder problems, and dryness of the vagina (items 8-10, respectively). Each item can be graded by the participant from 0 (not present) to 4 (1 = mild, 2 = moderate, 3 = severe, 4 = very severe). For a particular individual, the total score for each subscale is the sum of each graded item contained in that subscale. The total MRS score is the sum of the scores obtained for each subscale. The MRS scale has been translated into more than 27 languages. For the purpose of this research, the Spanish version of the MRS was used,[21] which has been validated in Ecuador and Chile.[22,23] Validity of the Spanish version of the MRS has been confirmed through analysis of internal (Cronbach $\alpha > 0.80$) and external reliability (significant retest correlation with Pearson's coefficient, $P < 0.01$).[23]

Statistical analysis

Statistical analysis was performed with EPI-INFO statistical software (versions 6.04 and 2000 [World Health Organization, Basel, Switzerland]). Results are expressed as mean ± SD or percentages. Group comparisons for means were assessed with Student's t test, analysis of variance, or the Mann-Whitney test, according to homogeneity of measured variance with the Bartlett test. Percentage differences were evaluated with the χ^2 test. Centers were grouped (only sexually active) according to their SD prevalence (mean) and comparison between lowest and highest terciles performed. Logistic regression analysis was performed (EPI-INFO 2000) for the simultaneous assessment of several variables influencing female sexual function in those sexually active (for the past 4 wk). For this, total FSFI score, as continuous variables, was transformed into a categorical score, now considered as cases of women exhibiting scores of 26.55 or less. Menopausal symptoms comprising the MRS were categorized as not present (symptom score was 0) and present (score of 1 or higher). Independent variables (women and men) to be entered in the regression model were as follows: (for women) access to free health care, older age (≥48 y, median), higher parity (>2, median), lower educational level (≤12 y), marital status (married or not), postmenopause status, smoking status, medication use (HT/alternatives for menopausal symptoms, psychiatric drugs), history of sexual abuse (rape), church attendance, psychiatrist attention, female health perception, and menopausal symptoms, and (for men) partner age, lower educational level, alcoholism, healthiness, faithfulness, premature ejaculation, and erectile dysfunction. Entry of variables into the model was considered, with a 20% significance level, and the stepwise procedure was performed. A P value less than 0.05 was considered as statistically significant.

RESULTS

A total of 7,243 healthy women aged 40 to 59 years who were users of 19 healthcare systems from 11 Latin American countries were surveyed, providing data for statistical analysis (refusal rate was 6.5%). Depicted in Table 1 are sociodemographic characteristics of surveyed women. Of the women surveyed, 74.4% (n = 5,391) were sexually active with their partners. Those sexually inactive (n = 1,852; 25.6%) were significantly older, less educated, less healthy, used less HT, were less likely to be married, and were more likely to be postmenopausal. Within this group, 16.4% of partners had male SD (erectile dysfunction and/or premature ejaculation). The sexual activity rate significantly decreased with age: 85.4%, 40-44 years; 78.2%, 45-49 years; 74.3%, 50-53 years; and 56.0%, 55-59 years. Mean ± SD age of sexually active women was 48.2 ± 5.5 years; they had 11.9 years of schooling on average, 64.8% were married, 41.3% were postmenopausal, and 15.0% used HT. The percentage of women with a history of sexual abuse (rape) was 4.6%, with no significant difference seen regarding sexual activity status.

Epidemiological characteristics of sexually active women according to REDLINC center are presented in Table 2. A wide

TABLE 1. *Characteristics of sexually and nonsexually active women (N = 7,243)*

	No. women (%)	Age, mean ± SD, y	Education, mean ± SD, y	% Married	% Postmenopausal[a]	% HT use	% Rape	% Healthy	% Partner with sexual dysfunction
All	7,243 (100.0)	49.0 ± 5.7	11.6 ± .4	55.1	46.8	14.1	4.6	90.4	24.4
Sexually inactive	1,852 (25.6)	51.3 ± 5.7	11.0 ± 4.7	26.7	62.7	11.6	4.5	88.3	16.4
Sexually active	5,391 (74.4)	48.2 ± 5.5	11.9 ± 4.3	64.8	41.3	15.0	4.7	91.2	27.1
P values according to χ^2 or ANOVA	—	0.0001	0.0001	0.0001	0.0001	0.0002	NS	0.0003	0.0001

HT, hormone therapy; ANOVA, analysis of variance.
[a] Included natural and surgical.

TABLE 2. *Epidemiological characteristics of women with sexual activity according to participating REDLINC center (n = 5,391)*

Centers	% Women refusing to participate	% Women with sexual activity	Age, mean ± SD, y	Education, mean ± SD, y	% Married	% Postmenopausal	% HT	% Rape	% Healthy	% Partner with sexual dysfunction
Argentina										
Buenos Aires	12.4	81.3	50.1 ± 5.8	11.8 ± 4.6	60.4	52.9	8.8	2.6	97.4	23.4
Bolivia										
Cochabamba I	6.8	84.7	49.7 ± 4.9	13.9 ± 2.8	52.5	48.1	26.4	14.0	96.3	33.2
Cochabamba II	9.7	66.6	47.2 ± 5.8	14.5 ± 2.8	85.0	26.5	1.6	8.3	89.7	45.8
Santa Cruz	6.7	71.0	47.1 ± 5.5	13.2 ± 3.6	75.8	34.0	35.1	4.2	95.8	33.6
Colombia										
Bogota I	6.8	54.7	46.9 ± 5.3	9.2 ± 4.7	50.9	26.9	11.1	3.7	84.3	26.9
Bogota II	9.9	82.8	46.4 ± 4.7	7.4 ± 3.8	41.6	26.8	4.1	6.2	72.7	41.4
Cartagena	2.4	70.8	47.0 ± 5.8	7.9 ± 3.5	36.3	34.8	6.7	3.4	91.8	10.9
Chile										
Santiago de Chile	11.4	66.8	48.1 ± 5.6	10.9 ± 3.3	64.4	36.0	6.1	11.7	94.7	30.4
Cuba										
La Habana	1.9	76.9	47.8 ± 5.2	13.4 ± 3.0	54.7	43.3	4.5	0.3	87.5	21.1
Ecuador										
Quito	2.4	72.0	48.6 ± 5.4	12.8 ± 4.4	80.0	41.5	18.5	3.3	94.2	29.8
Guayaquil I	7.7	74.7	47.1 ± 5.3	13.2 ± 3.4	76.9	35.5	18.6	1.7	90.7	21.4
Guayaquil II	8.7	73.3	46.8 ± 5.1	14.9 ± 4.5	74.0	32.9	15.9	3.6	92.8	29.2
Panama										
Panama City	6.1	76.0	47.7 ± 5.3	13.0 ± 4.0	53.8	43.9	15.3	9.3	95.3	32.6
Peru										
Lima	4.2	73.7	48.5 ± 4.7	10.5 ± 3.3	68.6	43.6	10.4	6.1	91.4	18.9
Piura	5.0	80.0	49.5 ± 5.2	10.4 ± 3.5	80.3	46.6	16.6	0.0	98.5	20.0
Cuzco	7.0	74.6	47.2 ± 5.2	13.2 ± 3.4	77.1	35.4	18.8	1.7	90.6	21.2
Dominican Republic										
Santiago de los Caballeros	8.7	66.3	47.3 ± 5.1	11.2 ± 5.3	59.9	41.3	8.3	4.0	80.6	22.2
Uruguay										
Montevideo	3.4	81.1	52.2 ± 4.1	13.2 ± 3.8	76.6	74.4	39.0	2.6	99.7	23.1
Venezuela										
Caracas	2.4	53.4	48.7 ± 5.9	11.4 ± 4.5	63.1	55.2	15.8	2.5	96.6	30.0
P values[a] according to χ^2 or ANOVA	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

REDLINC, Collaborative Group for Research of the Climacteric in Latin America; HT, hormone therapy; ANOVA, analysis of variance.
[a]Comparison between different centers.

variation in these characteristics was seen. The refusal rate to participate varied from 12.4% in Buenos Aires (Argentina) to 1.9% in La Habana (Cuba). In addition, 53.4% of women in Caracas (Venezuela) were sexually active, whereas in Cochabamba I (Bolivia), 84.7% were active (*P* < 0.0001). Mean ± SD age in Bogota (Center II) was 46.4 ± 4.7 years, whereas in Montevideo, this was 52.2 ± 4.1 years (*P* < 0.0001). Similar differences were found regarding educational level and marital status, postmenopause status, HT use, healthiness, history of rape, and partners with SD.

FSFI scores (total and per domain) for sexually active women according to participating center are depicted in Table 3. Mean ± SD total FSFI score (whole sample) was 25.2 ± 5.9, varying from 29.9 ± 4.3 (Cartagena de Indias, Colombia) to 20.6 ± 3.0 (Quito, Ecuador). The desire domain had the lowest score (most affected), with a mean score of 3.6 ± 1.2 (maximum of 6), also widely varying among different centers: from 4.5 ± 1.0 in Cartagena de Indias, Colombia, to 3.1 ± 1.1 in Cochabamba, Bolivia (Center I). The Cartagena Colombian group was the center with less psychological compromise according to the MRS as compared with the Bolivian Cochabamba I center (score 2.9 ± 2.7 vs 4.8 ± 3.9; *P* < 0.0001).

Pain and arousal domains were also affected, with mean ± SD scores of 4.2 ± 1.5 and 4.2 ± 1.3, respectively. A wide variation in scores between groups was also observed, especially in the pain domain (ie, 5.0 ± 1.1 in Cartagena de Indias, Colombia, and Panama City, Panama, compared with 1.9 ± 1.0 in Montevideo, Uruguay). The satisfaction domain was the least affected, with a mean ± SD score of 4.5 ± 1.3, with the highest score seen in women of Cartagena de Indias, Colombia, and the lowest score (more impaired) in Cochabamba, Bolivia (Center I).

The total FSFI score allows for a definition of SD. In the whole Latin American cohort, 56.8% of women presented with SD (FSFI score ≤26.55), with a prevalence varying from 21.0% to 98.5% depending on the center studied (Table 3). It is interesting that in the same city of Cochabamba, Bolivia, SD prevalence differed widely (86.3% in Cochabamba I vs 42.3% in Cochabamba II). Significant differences in epidemiological characteristics were observed between these two Bolivian centers, as one can see in Table 2. Women from Cochabamba I were older (49.7 ± 4.9 vs 47.2 ± 5.8 y; Mann-Whitney, *P* < 0.0001), with a higher postmenopausal rate (48.1% vs 26.5%; χ^2, *P* < 0.0001), lower rate of married status (52.5% vs 85.0%; χ^2, *P* < 0.0001), and less education

TABLE 3. *FSFI scores (total and domain) and percentage of sexual dysfunction among sexually active women (n = 5,391) according to participating REDLINC Center*

Centers	Desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain	Total score	% sexual dysfunction
Argentina								
Buenos Aires	3.6 ± 1.2	4.0 ± 1.3	3.8 ± 1.4	3.7 ± 1.1	4.3 ± 1.3	3.4 ± 1.6	22.8 ± 5.1	79.5
Bolivia								
Cochabamba I	3.1 ± 1.1	3.0 ± 1.1	3.7 ± 1.0	3.5 ± 1.1	3.3 ± 1.2	4.1 ± 1.0	20.7 ± 5.2	86.3
Cochabamba II	3.6 ± 1.4	4.2 ± 1.4	4.6 ± 1.3	4.7 ± 1.2	4.9 ± 1.1	5.0 ± 1.1	27.2 ± 6.8	42.3
Santa Cruz	3.8 ± 1.0	4.1 ± 1.2	3.8 ± 1.0	3.8 ± 1.2	3.8 ± 1.4	3.3 ± 1.3	22.6 ± 4.5	87.9
Colombia								
Bogota I	3.8 ± 1.2	4.3 ± 1.2	4.3 ± 1.2	4.3 ± 1.2	4.5 ± 1.3	4.2 ± 1.5	25.4 ± 5.8	58.3
Bogota II	3.5 ± 1.0	4.0 ± 1.0	4.7 ± 1.1	4.5 ± 1.1	4.6 ± 1.2	4.7 ± 1.2	26.0 ± 4.6	50.3
Cartagena	4.5 ± 1.0	4.7 ± 0.9	5.3 ± 0.9	5.3 ± 0.9	5.1 ± 1.0	5.0 ± 1.1	29.9 ± 4.3	21.0
Chile								
Santiago de Chile	4.0 ± 1.2	4.6 ± 1.0	4.8 ± 1.2	4.8 ± 1.2	4.9 ± 1.1	4.8 ± 1.2	27.8 ± 5.1	36.0
Cuba								
La Habana	3.8 ± 1.3	4.4 ± 1.4	4.9 ± 1.3	4.7 ± 1.4	4.4 ± 1.6	4.9 ± 1.5	27.1 ± 6.7	33.2
Ecuador								
Quito	3.1 ± 0.8	3.6 ± 1.1	3.4 ± 0.6	3.6 ± 0.9	4.2 ± 1.4	2.7 ± 1.3	20.6 ± 3.0	98.5
Guayaquil I	3.5 ± 1.2	4.0 ± 1.4	4.6 ± 1.2	4.3 ± 1.2	4.3 ± 1.3	4.5 ± 1.2	25.1 ± 6.1	55.2
Guayaquil II	3.8 ± 1.1	4.3 ± 1.2	4.9 ± 1.1	4.6 ± 1.2	4.7 ± 1.2	4.7 ± 1.3	27.0 ± 5.6	43.3
Panama								
Panama City	3.8 ± 1.1	4.1 ± 1.1	4.9 ± 1.1	4.7 ± 1.3	4.8 ± 1.2	5.0 ± 1.1	27.2 ± 5.1	40.9
Peru								
Lima	3.6 ± 1.4	3.8 ± 1.4	4.1 ± 1.4	3.9 ± 1.3	4.1 ± 1.3	3.6 ± 1.5	23.1 ± 7.1	71.8
Piura	3.6 ± 0.8	4.7 ± 0.5	4.7 ± 0.9	3.8 ± 0.7	4.4 ± 0.7	5.0 ± 0.9	26.2 ± 3.5	32.1
Cuzco	3.5 ± 1.2	4.0 ± 1.4	4.6 ± 1.2	4.3 ± 1.2	4.3 ± 1.4	4.5 ± 1.2	25.2 ± 6.1	54.9
Dominican Republic								
Santiago de los Caballeros	3.7 ± 1.2	4.4 ± 1.3	4.7 ± 1.2	4.5 ± 1.3	4.7 ± 1.3	4.8 ± 1.2	26.9 ± 6.0	43.7
Uruguay								
Montevideo	3.7 ± 1.2	4.5 ± 1.2	3.5 ± 0.5	3.8 ± 0.7	4.8 ± 1.2	1.9 ± 1.0	22.2 ± 3.5	94.5
Venezuela								
Caracas	3.7 ± 1.3	4.3 ± 1.3	4.6 ± 1.3	4.6 ± 1.3	4.6 ± 1.3	4.7 ± 1.3	26.5 ± 6.2	44.3
P value[a] according to Student's test or ANOVA	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
All	3.6 ± 1.2	4.2 ± 1.3	4.4 ± 1.2	4.3 ± 1.2	4.5 ± 1.3	4.2 ± 1.5	25.2 ± 5.9	56.8

Values are expressed in mean ± SD, unless otherwise stated. FSFI, Female Sexual Function Index; REDLINC, Collaborative Group for Research of the Climacteric in Latin America; ANOVA, analysis of variance.
[a]Comparison between different centers.

$(13.9 ± 2.8$ $14.5 ± 8.8$ y; Student's *t* test, $P < 0.0005$). HT use was extremely different between these two centers (26.4% vs 1.6%; χ^2, $P < 0.0001$).

To assess factors that could explain differences in the prevalence of SD among different populations, centers were grouped into terciles (according to the mean ± SD prevalence; Table 4). The tercile with higher SD prevalence (86.4%, mean) compared with that with less SD (32.2%) had significantly older women (49.5 ± 5.3 vs 48.0 ± 5.6 y; Student's *t* test, $P < 0.0001$) and older partners (53.0 ± 6.9 vs 50.2 ± 7.5 y; Mann-Whitney, $P < 0.0001$). Similarly, there was a significantly higher rate of married (68.5% vs 63.1%; χ^2, $P < 0.0008$), postmenopausal (49.7% vs 39.3%; χ^2, $P < 0.0001$), and HT-using women (23.0% vs 9.2%; χ^2, $P < 0.0001$). It was observed that those centers with higher SD rates had women with lower lubrication according to the MRS (60.4% vs 40.8; $P < 0.0001$), with no differences regarding refusal rate to answer the survey, their health perception, history of oophorectomy, rape, and partner SD rate (27% vs 26.2%). Aiming to have some evidence that the aforementioned predicting variables are associated with participating cities with higher SD prevalence, we performed one logistic regression model in which indicator variables for just the cities

were entered, and subsequently, other predictors were added one by one and then all together. It was observed that when other variables were entered, odds ratio (OR) for SD dropped in cities with higher SD rates from 12.26 (95% CI, 10.36-14.51) to 3.41 (95% CI, 2.56-4.54), providing some evidence that the added predictors explain the associations with cities. As expected, the total FSFI score was significantly lower in the tercile with higher SD prevalence (22.0 ± 5.0 vs 27.5 ± 5.4).

After adjusting for confounding factors, logistic regression analysis (Table 5) determined that the main factors associated with SD were bad lubrication as assessed with the MRS (OR, 3.86; 95% CI, 3.37-4.43), use of alternative menopausal therapies (OR, 2.13; 95% CI, 1.60-2.84), partner sexual failure or dysfunction (erectile dysfunction and/or precocious ejaculation; OR, 1.89; 95% CI, 1.63-2.20), older women (age >48 y; OR, 1.84; 95% CI, 1.61-2.09), bladder problems (OR, 1.47; 95% CI; 1.28-1.69), HT use (OR, 1.39; 95% CI, 1.15-1.68), negative perception of female health status (OR, 1.31; 95% CI, 1.05-1.64), and being married (OR, 1.22; 95% CI, 1.07-1.40). Protective factors for SD were higher female educational level (OR, 0.75; 95% CI, 0.66-0.86), partner faithfulness (OR, 0.66; 95% CI, 0.59-0.73), and having access to a private healthcare system (OR, 0.56; 95% CI,

TABLE 4. *Comparison of centers with lowest and highest SD prevalence (sexually active, n = 5,391)*

Centres	% SD
Cartagena	21.0
Piura	32.1
La Habana	33.2
Santiago	36.0
Panama	40.9
Cochabamba II	42.3
Guayaquil II	43.3
Dominican Republic	43.7
Caracas	44.3
Bogota II	50.3
Cuzco	54.9
Guayaquil I	55.2
Bogota I	58.3
Lima	71.8
Buenos Aires	79.5
Cochabamba I	86.3
Santa Cruz	87.9
Montevideo	94.5
Quito	98.5
TOTAL	**56.8**

1st Tercile: (Lower SD prevalence)

3rd Tercile: (Higher SD prevalence)

Women of within group of higher SD prevalence were significantly (p<0.001):

- older (49.5±5.3 vs. 48.0±5.6 years)
- had an older partner (53.0±6.9 vs. 50.2±7.5 years)
- had higher rates of:
    married status (68.5% vs. 63.1%)
    postmenopausal status (49.7% vs. 39.3%)
    HT use (23% vs. 9.2%)
    Vaginal dryness (MRS, 60.4% vs. 40.8%)

SD, sexual dysfunction; HT, hormonal therapy; MRS, Menopause Rating Scale.

0.49-0.64). Other menopausal symptoms comprising the MRS (except bladder problems) as well as a history of sexual abuse, church attendance, older partner, or alcoholism were not associated with SD risk.

DISCUSSION

An important issue raised during the planning of the present cross-sectional study on middle-aged women was deciding whether analysis should be confined to all or only to those who were sexually active. Sexual inactivity rate among middle-aged women is high in various reports. Indeed, 34% of European women aged 40 to 80 years[24] and 38.4% of US women aged 57 to 64 years[25] reported being sexually inactive 1 year before the survey. As for Latin America, a Chilean study found that 20.8% of women aged 40 to 64 years were not sexually active.[26] Hence, a concern that arises with studies addressing sexuality is that exclusion of sexually inactive women from analysis would also exclude an important population segment, which could, in fact, present with SD, the latter being the cause of sexual inactivity. This possibility seems to be the case in a study that points out that 70% of middle-aged sexually inactive women have a partner and that the main reason for their not having sex is they present with female SD.[27] In light of this evidence and of the fact that the FSFI is a test designed for and validated on sexually active women, we therefore decided to focus our analysis on sexually active women. Nevertheless, epidemiological characteristics of non-sexually active women were described as well.

In the present series, compared with sexually active women, inactive women were older, were less educated, and had worse perception of their health status; also more were postmenopausal, fewer were married, and fewer used HT. All these variables constitute SD risk factors.[28-30] Therefore, a high prevalence of sexual disorders among them would not be rare.

The percentage of sexual activity in the present series varied widely among the centers studied: for instance, from 84.7% in Cochabamba I (Bolivia) to 53.4% in Caracas (Venezuela). Overall, 74.4% of the women in our series were sexually active. This rate is higher than the rate previously reported for Europe and the United States.[24,25] However, comparisons are difficult because the targeted age group and length of time used to define sexual inactivity may in fact vary from one study to another. One study that allows comparing sexual activity rates in different regions of the

TABLE 5. *Main factors associated with sexual dysfunction in sexually active women (n = 5,391): logistic regression analysis*

Factors	OR	95% CI	P
Female			
Bad lubrication	3.86	3.37-4.43	0.0001
Use of alternative therapies	2.13	1.60-2.84	0.0001
Older age (>48 y)	1.84	1.61-2.09	0.0001
Bladder problems	1.47	1.28-1.69	0.0001
Hormonal therapy use	1.39	1.15-1.68	0.0001
Negative perception of female health status	1.31	1.05-1.64	0.0017
Being married	1.22	1.07-1.40	0.0030
Education >12 y	0.75	0.66-0.86	0.0001
Access to private healthcare system	0.56	0.49-0.64	0.0001
Partner			
Sexual failure	1.89	1.63-2.20	0.0001
Faithfulness	0.66	0.59-0.73	0.0001

OR, odds ratio.

world is the Global Study of Sexual Attitudes and Behaviors, which analyzed 13,882 women aged 40 to 80 years in 29 countries and found that 65% of surveyed women had sexual intercourse in the previous year[31]; the higher rate of sexual inactivity compared with that in our series (35% vs 25.6%) could have been determined by the fact that older women were included and related to the epidemiological aging profile of each country. Our series only included women aged 40 to 59 years, displaying a sexual activity rate dropping from 85.4% in women aged 40 to 44 years to 56% in those aged 55 to 59 years. Including only middle-aged women decreases selection bias caused by older women, which eventually influences sexual activity rate.

In the present series, the mean total FSFI score (n = 5,391) was 25.2, immediately suggesting a high SD prevalence because this score is below 26.55, the FSFI cutoff value used for defining SD.[20] Mean total FSFI scores varied among centers from 20 to 30, suggesting significant population differences. Our average total FSFI score was slightly higher than that reported by others: 20.4 in Thailand (women's age range, 45-55 y),[32] 24.2 in Turkey (mean age, 38.6 y),[33] and 25 in Italy (women's age range, 45-65 y)[34]; however, it was lower than that reported by Rosen et al[4], which was 30.5, among women without SD. In Chile, we have previously reported scores ranging from 27.3 to 19.3 among women aged 45 to 49 and 60 to 64 years, respectively.[35] Although the FSFI has been widely used to study the impact of several diseases and therapies on sexuality, few epidemiological studies have been done on normal populations.

Assessment of sexuality and the diagnosis of SD have never been exempt from controversy. For instance, the Food and Drug Administration has assumed a more endpoint position, suggesting the quantification of orgasms or number of occurrences of sexual intercourse. Despite this, good sexuality is not determined by the number of events, but rather by women's perceptions and satisfaction. For this reason, self-administered questionnaires such as the FSFI have been suggested as being ideal for sexual assessment and diagnosing SD.[36] Nevertheless, sexual disorder prevalence will widely vary according to the tool used.[37] Using the FSFI, SD prevalence varied widely among the centers of the present study, with overall 56.8% of women being affected. Although our results cannot be extrapolated to all Latin America, the high participation rate (low refusal rate) within all cities gives strength to the findings of this cross-sectional study. Our SD prevalence rate (56.8%) is similar to that found by others using the FSFI tool in Colombia (37.8%),[13] Iran (39%; 50-60 y),[38] and Greece (48.8%; 43 y on average),[39] yet lower than that found in Thailand (82.3%) for women aged 45 to 55 years.[32] Using another SD diagnostic tool, a multicenter study (29 countries) including 13,882 women aged 40 to 80 years detected that 39% present with SD.[40] Applying different methodology, Laumann et al,[41] in a representative US population–based study, have also reported that 43% of women aged 18 to 59 years present with SD.

Desire was the most compromised sexual domain of our series, a situation that correlates with many other studies.[28,33,40,42-45] An interesting finding was that the group with better FSFI desire scores (Cartagena de Indias) was the same group presenting with lower psychological MRS scores, suggesting some type of relation between sexual desire and psychological symptoms. This correlation has been previously found in a representative North American population–based study pointing out that decreased sexual desire is associated with emotional psychological distress.[46] Our series found, according to the FSFI, that the arousal domain is also compromised. Anhedonia, the incapacity to experience pleasure from normally pleasurable life events such as eating, exercise, and social or sexual interaction, is recognized as a key symptom in mood disorder, a frequent problem in climacteric women.[47]

The least affected of all sexual domains in the present series was satisfaction (higher total score), with an average score of 4.5 for all studied centers. These results seem to confirm those of other studies, suggesting that the presence of sexual problems does not affect female sexuality as a whole and stressing the importance of individual perceptions when defining SD.[39] However, one concern that arises is the following question: can we diagnose SD based on the FSFI score, given the high rate of sexual satisfaction found in these women? One hypothesis could be that Latin American women deny accepting the fact that impaired sexuality is really a significant problem in their relationship. This interpretation seems to be supported by observations found in studies drawn from other similar Latin populations. A French study pointing out the fact that 83% of individuals, independently of their gender, are satisfied with their sexuality found that 70% of the men and 55% of the women would like some changes in their sexual lives, somehow reflecting a certain degree of dissatisfaction.[48] Probably with another type of survey, such as that performed in the French study, we could have revealed a higher rate of sexual dissatisfaction among our participants.

The wide variability of SD prevalence found in the present series immediately suggests that this could be the result of ethnical and cultural diversity and socioeconomical differences found in Latin America. Moreover, the marked difference in SD prevalence found in two different groups from the same city (ie, 86.3.% in Cochabamba I vs 42.3% in Cochabamba II) suggests the importance of individual risk factors for sexual disorders. The Cochabamba I group was composed of older women, with lower educational level and married status and higher rates of being menopausal and HT use. The same trend was found in a comparison of centers with higher SD rates: older age, higher rates of postmenopause status, and vaginal lubrication problems.

Our regression model found that the main risk factor for SD in middle-aged women was poor vaginal lubrication, implicating an organic cause and not a psychological one. Decreased lubrication is associated with unpleasant sensations and pain, which significantly affects female sexuality,

even in younger women.[49] That an organic cause was a strong risk factor could have prognostic and therapeutic implications because local or systemic estrogenic therapy improves vaginal lubrication significantly and hence influences sexual function.[50,51] Despite this, our regression model found HT as a risk factor, a fact that does not necessarily contradict the positive impact of HT on sexuality. Women who seek therapy are logically those with more symptoms, and although HT improves sexuality, complete achievement may not necessarily ensue, especially if compliance is not optimal. In the present series, women using HT presented a 1.39 OR increase for SD, which was lower than the two-fold increase found among those using alternate therapies.

Higher educational level and access to paid healthcare systems (indirect indicators of socioeconomical level) seemed to be SD protective factors. This observation has been a constant in several studies, independent of the place of origin. Safarinejad,[38] using the FSFI tool, found that in Iranian women aged 20 to 60 years, educational level is an SD protective factor. Age and educational level were also found to be factors for SD in a representative US study composed of women aged 18 to 59 years.[41] Similar results have been described in other countries such as Brazil[28] and Turkey.[33] Because educational level in Latin America is experiencing an overall increasing trend,[52] it can be expected that this will have a midterm positive impact on sexuality.

As expected, our series found that the partner also exerts an important influence over female sexuality. Indeed, masculine SD significantly increased the risk for female SD. In a worldwide series regarding SD, it was found that premature ejaculation and erectile dysfunction affected 10% and 14% of male partners aged 40 to 80 years, respectively,[40] a rate similar to that found in the present series (24.4%). Another publication from the same study determined that 63% of women were not very satisfied with the hardness of their partner's erection and that this issue influenced their sexual satisfaction.[53] This is a very important issue because male SD is a modifiable factor that, with appropriate therapy, may significantly improve female sexuality. A study showed that treating erectile dysfunction significantly improved arousal, lubrication, pain, orgasm indices, and women's satisfaction.[54] In addition, our series found that partner faithfulness significantly decreased SD; this may translate to a healthy relationship, a known factor related to good sexuality.[55,56] One would expect male SD to increase with age; however, partner older age was not found as a risk factor for SD in our series. It is possible that partner SD is not only related to age but also to other factors, which are not the focus of the present report. However, high sexual self-esteem, good health, and an active sexual history have been related to male sexual activity.[57]

In other series, sexual abuse has been found as a significant risk factor for SD in middle-aged women[27]; this was not the case in our series in which the rate of sexual abuse did not significantly differ among women with or without SD. Other studies also using the FSFI have not found higher rates of SD among sexually assaulted women.[58,59]

Regular church attendance was not found as a protective factor for SD, a fact that correlates with other series.[12,60]

Finally, one limitation of the present study is its cross-sectional nature. However, the large amount of data regarding this middle-aged female series and their sociodemographic background constitutes an important reference tool for other Hispanic populations, not to mention an important addition to the current scientific information. Not determining body mass index (overweight and obesity) in the present series may be seen as another important drawback, particularly if obesity had been found by others to be a determinant of female SD.[61,62]

CONCLUSIONS

In conclusion, in this Latin American middle-aged series, the prevalence of SD was found to be high, varying widely in different populations. Decrease in vaginal lubrication was the most important associated risk factor. Differences in the prevalence of risk factors among groups could explain the variation of SD prevalence observed in this study. Hence, because of the wide diversity of the population (educational level, marital status, geographical location, habits, etc), findings cannot be generalized to one Latin American country or population. Despite the outlined limitations, to the best of our knowledge this is the first and largest study assessing sexuality in a Latin American climacteric series in which SD risk factors, several of which are modifiable, are described.

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APPENDIX 1. *Participating REDLINC countries and investigators*

Country	City	Investigator(s)
Argentina	Buenos Aires	M. Royer
Bolivia	Cochabamba I	M.T. Espinoza
	Cochabamba II	E. Soto
	Santa Cruz	D. Mostajo
Colombia	Bogota I	G. Baron
	Bogota II	W. Onatra
	Cartagena	A. Monterrosa
Chile	Santiago de Chile	D. Flores
		J.E. Blümel
		S. Vallejo
Cuba	La Habana	D. Navarro
Ecuador	Quito	A. Calle
	Guayaquil I	P. Chedraui
	Guayaquil II	P. Leon-Leon
Panama	Panama City	K. Tserotas
Peru	Lima	H. Izaguirre
	Piura	E. Mezones-Holguin
	Cuzco	E. Ojeda
Dominican Republic	Santiago de los Caballeros	A. Bencosme
Uruguay	Montevideo	S. Lima
Venezuela	Caracas	E. Belzares