

# Sexual Dysfunction Risk and Associated Factors in Young Peruvian University Women

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## ABSTRACT

**Introduction.** Information regarding sexual dysfunction risk among young Latin American women is limited.

**Aim.** Assess female sexual dysfunction (FSD) risk and associated factors in young Peruvian university women.

**Methods.** This was a nested case-control study, using the Female Sexual Function Index (FSFI). Cases were defined as women with total FSFI scores at or below 26.55 (increased FSD risk). Demographic characteristics, gynecologic aspects, body mass index, mood disorders, substance abuse, and issues related to the couple, were also evaluated.

**Main Outcome Measures.** Primary end point was assessment of FSD risk and associated factors.

**Results.** A total of 625 women were surveyed of which 409 (65.4%) were sexually active. The average total FSFI score was  $27.2 \pm 4.3$ . Overall, 39.9% were at higher risk for FSD. Multivariate analysis using a binary logistic regression model found that male premature ejaculation (odds ratios [OR] = 2.47, 95% confidence interval [CI]: 1.27–4.77), oral emergency contraception use (OR = 1.87, 95% CI: 1.04–3.38), good partner relationship (OR = 0.24, 95% CI: 0.12–0.49), and length of relationship ( $\geq 3$  years; OR = 0.025, 95% CI: 0.013–0.05) were factors independently associated to a higher FSD risk (goodness of fit  $P = 0.39$ ).

**Conclusion.** In this young university female population, FSD risk was high and associated to male and female factors.

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**Key Words.** Sexual Behavior; Female Sexual Dysfunction; Postcoital Contraception; Peru; Female Sexual Function Index; Young Women

## 2 Introduction

Human sexuality is a complex multidimensional phenomenon involving bio-psycho and social/cultural aspects. Female sexual dysfunction (FSD) affects quality of life, is highly prevalent, and misdiagnosed in many cases [1–4]. Its prevalence may vary and rely on studied population, methodological issues, and used instruments. Prevalence in the general population is often overestimated when clinical samples are used; hence,

epidemiological studies have been proposed [2,5]. New sexuality assessing tools have been developed in recent years. In this sense, one can mention the Female Sexual Function Index (FSFI), a popular and multidimensional sexuality screening tool easy to use in routine clinical practice [6,7]. Moreover, its Spanish version has been widely validated in recent years [8–11].

Data related to FSD in young Latin American women are limited; some information can be found in relation to both young (18–40 years) [11]

1 and climacteric Latin American women [8–10].  
2 Differences in sexual function have been reported  
3 4 between Hispanic and non-Hispanic women [12].  
4 In many cases, young women suffer FSD despite  
5 having low rates of comorbid conditions [2,13].  
6 Few studies have assessed depressive problems  
7 among general university students, moreover if  
8 Hispanic populations are taken into account.

9  
10 **Aims**

11 Assess FSD risk and associated factors in young  
12 Peruvian university women using the FSFI.

13  
14 **Materials and Methods**

15 *Study Design and Population*

16 This was a nested case-control study within a  
17 cross-sectional research performed during March  
18 2009 at the Universidad Nacional de Piura, Perú.  
19 Otherwise, healthy women aged 18 or more, with  
20 a partner at least 1 month prior, registered for the  
21 first academic semester of 2009 were included in  
22 the survey. Women with any chronic illness or  
23 drug use were excluded.

24  
25 *Sample Size Calculation and Sampling Procedure*

26 The General Academic Registry Office of the  
27 Universidad Nacional de Piura provided the list of  
28 students registered for the first academic semester  
29 of 2009. A total of 4,056 women were identified  
30 distributed among 14 faculties. Sample size calcu-  
31 lation was performed with Nquery Advisor® sta-  
32 5 tistical package and sampling procedure carried  
33 out in three phases.

34  
35 *Phase One (Cross-Sectional Study)*

36 A minimal sample size of 385 women was calcu-  
37 lated in order to detect a 50% FSD risk prevalence  
38 among those sexually active, with a 5% estimated  
39 error and a confidence level of 95%. Assuming  
40 that 70% of women would be sexually active and  
41 considering a 10% refusal rate, a total of 605 par-  
42 ticipants would be required for survey. In accor-  
43 dance to this calculated sample size, a stratified  
44 random sampling procedure with proportional  
45 allocation was carried out within each faculty.

46  
47 *Second Phase (Nested Case-Control Study)*

48 Due to the nested case-control nature of the study,  
49 a sample size of 145 cases and 217 controls was  
50 calculated in order to detect a twofold increase in  
51 odds ratios (OR) among cases (increased FSD risk:

total FSFI  $\leq$  26.55) with an 80% power and 5%  
significance level. Control/case ratio was set at 1.5.

52  
53  
54  
55 *Third Phase: Statistical Power Confirmation and Use  
56 for Multivariate Analysis*

57 Once cross-sectional study was carried out, a total  
58 of 409 women fulfilling inclusion criteria were sur-  
59 veyed: 163 identified as cases and 246 as controls.  
60 A statistical power of 82% was confirmed using  
61 same parameters determined in phase two. In  
62 addition, an 85% statistical power was determined  
63 in order to use this sample (n = 409) for the logistic  
64 binary regression model with a 0.65  $\beta$  coefficient  
65 and 14 covariates (Figure 1).  
66

67 *Instruments, Variable Definitions, and Measurements*

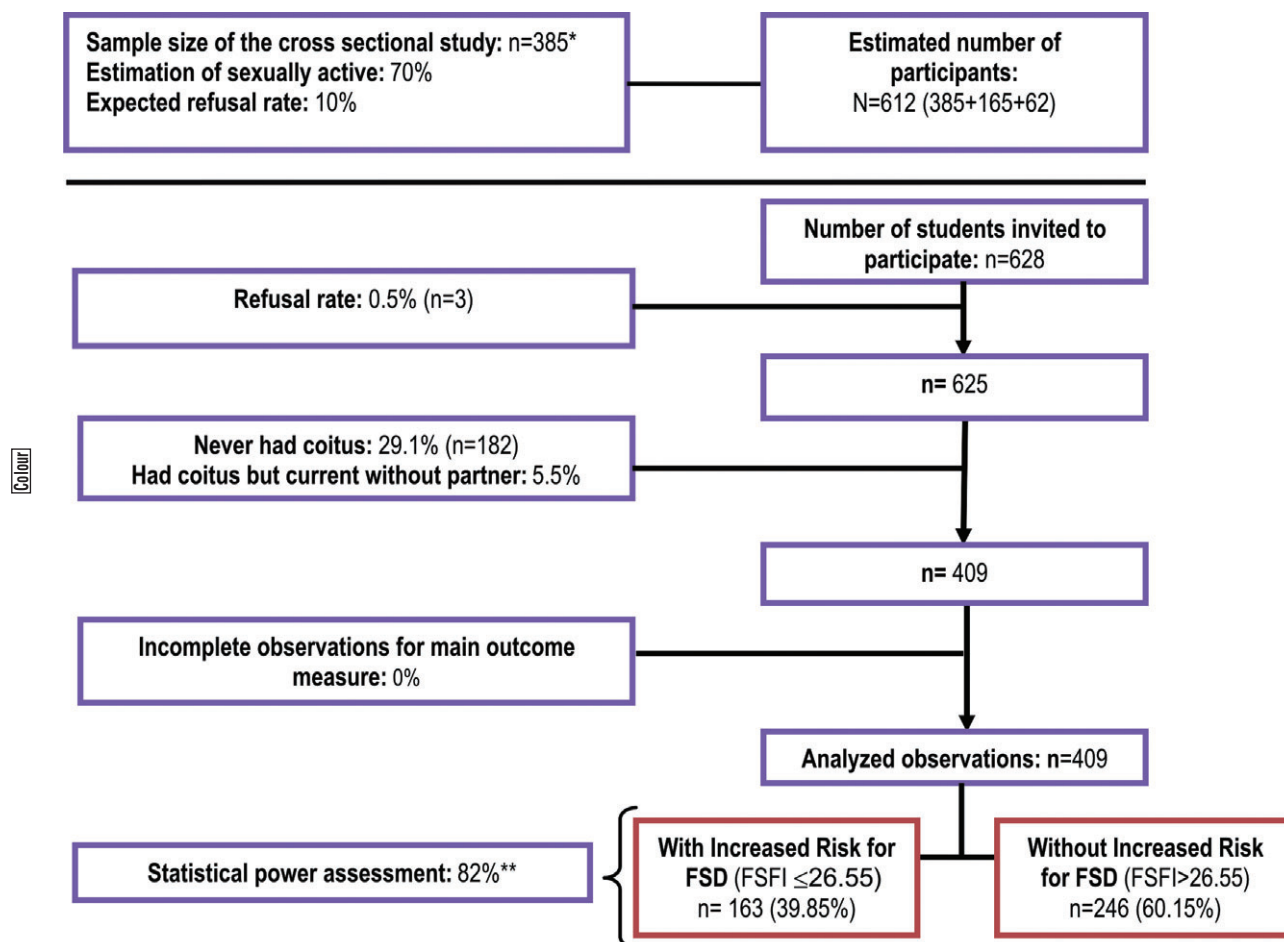
68 **General Questionnaire**

69 An anonymous, structured, codified, and self-  
70 administered tool was constructed containing  
71 female and partner data. Female data included age  
72 (years), marital status, religion, body mass index  
73 (BMI), alcohol, tobacco or drug use (past and  
74 current [frequency]); obstetrical and gynecological  
75 history data included menarche, age at sexual ini-  
76 tiation (years), time interval since sexual initiation,  
77 parity, sexual intercourse frequency (monthly esti-  
78 mation), contraceptive use, and history of sexual  
79 abuse. BMI was determined as weight (kg) divided  
80 by squared height (meter) and classified as low  
81 (<18.5), normal (18.5 to 24.99), overweight (25 to  
82 29.99), and obese (30 or more) [14].

83 Partner data were provided by women and  
84 included age (years), age difference with partner,  
85 partner relationship time interval, female percep-  
86 tion of relationship quality, and the presence of  
87 male sexual dysfunction (premature ejaculation or  
88 erectile dysfunction). Erectile dysfunction was  
89 defined as the persistent or recurrent incapacity to  
90 achieve or maintain an erection to allow satisfac-  
91 tory sexual intercourse, whereas premature ejacu-  
92 lation as the persistent or recurrent ejaculation  
93 after minimal sexual stimulation before, during, or  
94 shortly after penetration or before the individual's  
95 desire to do so [10]. Sexual partner changes were  
96 not assessed.

97  
98 **The Female Sexual Function Index (FSFI)**

99 Risk for FSD was assessed using the validated  
100 Spanish FSFI version [8–10]. The tool is com-  
101 posed of 19 questions grouped in six domains:  
102 desire, arousal, lubrication, orgasm, satisfaction,  
103 and pain [6]. Each question can provide a score  
104 varying from 0 to 5. Scores obtained for questions  
105 composing each domain are summed up and mul-



**Figure 1** Research flow: sample size calculation, sampling, and FSD prevalence. \*Calculated simple size for case (n = 145) and controls (n = 217), total n = 362. \*\*Considering parameters for cases and controls previously calculated.

4 multiplied by a constant factor to provide individual  
5 domain scores. Total FSFI score is the sum of  
6 scores obtained for each domain. As proposed by  
7 Wiegel et al. [7], women obtaining a total FSFI  
8 score of 26.55 or less were defined as being at  
9 higher risk for FSD.

10 **Brief Abnormal Drinking Scale (BADs)**

11 The Brief Abnormal Drinking Scale (BADs) vali-  
12 dated by Orpinas et al. [15] was used to explore  
13 participants' subjective perception regarding their  
14 way of drinking. This scale has a high sensitivity  
15 (97%) and high specificity (89%) and is composed  
16 of seven items (affirmative or negative responses)  
17 that aim at identifying problem drinkers. Problem  
18 drinkers are identified with three or more affirma-  
19 tive responses and defined as those who cause  
20 negative consequences to themselves or third  
21 persons.  
22

23 **Quality of Partner Relationship**

24 A 20-point analog visual scale (AVS) was used to  
25 measure female perception of the partner relation-  
26 ship quality, being 0 the worst and 20 for the best/  
27 optimal relationship [8].

28 **Hamilton Depressive Rating Scale (HDRS)**

29 The Hamilton Depressive Rating Scale (HDRS)  
30 was designed to measure depressive symptom  
31 intensity or severity [16]. The present study used  
32 the validated Spanish version of the short 17-item  
33 form [17]. It is scored by the observer and its  
34 contents basically center on somatic and behav-  
35 ioral aspects of depression. Vegetative, cognitive,  
36 and anxiety symptoms are the most prominent  
37 aspects influencing the final score. Each item can  
38 be scored from 0 to 2 in some cases, or from 0 to  
39 4 in others, depending on which best adjusts to  
40 patient symptoms occurring currently or in the  
41

1 past 7 days. Scored items are summed to provide a  
2 final total score, which can range from 0 to 52  
3 points. A total score of 14 or more was used to  
4 define women presenting moderate to very severe  
5 depressive symptoms. The scale has good internal  
6 consistency (Cronbach's alpha ranging from 0.76  
7 to 0.92), interobserver reliability (0.65–0.9), and  
8 validity (0.8–0.9) in relation to other global  
9 depression assessing tools, with an 85% sensitivity  
10 for diagnosing depressive symptoms in the general  
11 population and in the clinical field [16].

### 12 *Statistical Analysis*

13  
14 Statistical analysis was performed using Stata  
15 version 9.0 (Stata Corp., College Station, TX,  
16 USA). Data are presented as mean  $\pm$  standard  
17 deviations, minimum and maximum values, OR,  
18 95% confidence intervals (CI) and percentages.  
19 The Shapiro–Wilk test was used to determine data  
20 distribution normality and Levene's test for vari-  
21 ance homogeneity. Continuous data (cases vs. con-  
22 trols) were initially compared using crude bivariate  
23 analysis. Student's *t* test or Wilcoxon's rank sum  
24 test were used when appropriate. Percentages were  
25 compared with the chi-square test or the Fisher  
26 exact test (small expected values).

27 Binary logistic regression analysis was used to  
28 assess the relation of several independent factors  
29 over the increased risk for FSD (dependant  
30 outcome variable; FSFI  $\leq$  26.55). Regression  
31 model was constructed using significant variables  
32 found upon crude bivariate analysis. Dichotomic  
33 variables were directly entered into the regression  
34 model. Quantitative data were converted into  
35 binary variables using cut-off values obtained with  
36 receiver operator curves (ROC) best adjusted for  
37 FSD increased risk definition (total FSFI  
38 score  $\leq$  26.55). A primary regression model was  
39 generated using a stepwise procedure and included  
40 all potential interaction variables. Subsequently, a  
41 final reduced best fit model was generated without  
42 interaction variables. Both models were assessed  
43 with the likelihood ratio test; as no significant dif-  
44 ferences were found, reduced model was used.  
45 Adequacy of the regression model was estimated  
46 with the Hosmer–Lemeshow goodness-of-fit test.

### 47 *Ethical Aspects*

48 Participants were informed of the study, its objec-  
49 tives, and requested to voluntarily participate after  
50 written consent was obtained. Research protocol  
51 was reviewed and approved by the Thesis Com-  
52 mittee of the Medical Faculty of the Universidad  
53 Nacional de Piura, Piura, Perú.  
54

### 55 **Main Outcome Measures**

56 Primary end point was assessing FSD risk and  
57 associated factors.

### 58 **Results**

59  
60 The present study was well accepted by the target  
61 population as refusal rate was low at 0.5% (3/628  
62 invited participants). A total of 216 women were  
63 excluded: 29.1% ( $n = 182$ ) who never had vaginal  
64 sexual intercourse and 5.5% ( $n = 34$ ) who were  
65 not currently sexually active. Hence, data of 409  
66 sexually active participants (65.4%) were consid-  
67 ered for final analysis (Figure 1). Of the 182  
68 women who never engaged in sexual intercourse  
69 (coitus), 19 reported masturbation (10.4%), three  
70 had oral sex (1.7%), and one anal sex (0.6%).  
71 Among the 34 women who were currently not  
72 sexually active, 12 performed masturbation, eight  
73 oral, and three anal intercourse. Coital frequency  
74 among those sexually active was  $6.0 \pm 4.8$  per  
75 month. In this group ( $n = 409$ ), 27.4% ( $n = 112$ )  
76 masturbated, 64.0% had oral ( $n = 262$ ), and 23.0%  
77 ( $n = 94$ ) anal sex.

78 Socio-demographic characteristics of the  
79 studied sample is presented in Table 1 ( $n = 409$ ).  
80 Mean age was  $22.5 \pm 2.4$  years (range 18–33), the  
81 majority of women were single (82.7%), 14.9%  
82 already had children, and 5.4% had more than one  
83 partner. A tenth of studied women were smokers  
84 (six cigarettes per day average). Drug abuse among  
85 studied women was null; 20.5% of the surveyed  
86 women had HDRS total scores compatible with  
87 moderate to very severe depressive symptoms.

88 Mean total FSFI score was  $27.2 \pm 4.3$  (range 9  
89 and 35.1). In this series, 39.9% presented  
90 increased risk for FSD (FSFI total score 26.55 or  
91 less;  $n = 163$ ; CI 95%: 35.1%–44.8%). Mean FSFI  
92 domain scores were  $3.8 \pm 1.0$  (desire),  $4.3 \pm 0.9$   
93 (arousal),  $4.5 \pm 1.0$  (orgasm),  $5.0 \pm 0.8$  (lubrica-  
94 tion),  $4.9 \pm 1.0$  (satisfaction), and  $4.7 \pm 1.1$  (pain).

95 Upon bivariate analysis, increased risk for FSD  
96 was associated to female age, body mass index,  
97 time interval since sexual initiation, partner age,  
98 partner relationship interval, and worse relation-  
99 ship quality (lower AVS scores). Categorical vari-  
100 ables associated to higher FSD risk included male  
101 sexual dysfunction (erectile dysfunction and pre-  
102 mature ejaculation), oral emergency contraceptive  
103 use (last 3 months), moderate-very severe depres-  
104 sive symptoms (HDRS scores 14 or more), oral  
105 and anal sex (Table 2).

106 Significant variables found during bivariate  
107 analysis were included to logistic binary regression

**Table 1** Characteristics of women included in the study (n = 409)

	Mean ± SD	(Min/max value)	n (%)
<b>General characteristics</b>			
Age	22.5 ± 2.4	(18/33)	
Body mass index (kg/m <sup>2</sup> )	21.5 ± 2.3	(16.2/29.8)	
Low			56 (13.7)
Normal			324 (78.7)
Overweight			31 (7.6)
Single			338 (82.7)
Married or cohabiting			71 (17.3)
With children			61 (14.9)
Catholic religion			388 (94.9)
<b>Gynecological and obstetrical aspects</b>			
Menarche	12.5 ± 1.3	(9/17)	
Age at sexual initiation	18.9 ± 2.2	(12/27)	
Time interval since sexual initiation (years)	3.6 ± 2.5	(0/16)	
History of sexual abuse			58 (14.2)
Parental contraception use (monthly)			32 (7.8)
Parental contraception use (trimester)			17 (4.2)
Oral contraception use			43 (10.5)
Emergency oral contraception use			128 (31.3)
Intrauterine device (IUD) use			4 (0.9)
<b>Aspects related to current partner</b>			
Partner age (years)	25.5 ± 4.6	(19/58)	
Age difference with partner (years)	2.9 ± 4.0	(-9/33)	
Time since relation (months)	36.8 ± 21.9	(2/98)	
Relation with partner (analog visual scale: quality)	15.3 ± 2.8	(0/20)	
Partner premature ejaculation			108 (26.4)
Partner erectile dysfunction			30 (7.3)
<b>Habits and HDRS scores</b>			
Alcohol consumption <sup>†</sup>			
Nondrinker			258 (63.1)
Nonproblematic drinker			103 (25.2)
Problematic drinker			48 (11.7)
Smoking habit			41 (10.0)
Smoking frequency <sup>‡</sup> (n = 41)	6.4 ± 5.0	(1/21)	
Total HDRS score <sup>§</sup>	10.7 ± 6.8	(0/36)	
Moderate—very severe depressive symptoms (HDRS 14 or more)			84 (20.5)
<b>Other sexual practices</b>			
Oral sex			282 (63.8)
Anal sex			99 (24.2)
Masturbation			112 (27.4)

<sup>†</sup>As measured with the BADS.

<sup>‡</sup>Cigarette/week rate.

<sup>§</sup>HDRS scores presented as mean ± standard deviation.

SD = standard deviation; HDRS = Hamilton Depressive Rating Scale.

calculation. Final model presented a significant goodness of fit ( $P = 0.39$ ). A higher risk for FSD was independently associated to oral emergency contraception use (OR = 1.87, 95% CI: 1.04–3.38,  $P = 0.036$ ) and partner premature ejaculation (OR = 2.47, 95% CI: 1.27–4.77,  $P = 0.007$ ). On the other hand, a better partner relationship (AVS scores  $\geq 15$ ) (OR = 0.24, 95% CI: 0.12–0.49,  $P < 0.001$ ) and length partner relationship three or more years (OR = 0.025, 95% CI: 0.013–0.05,  $P < 0.001$ ) were protective factors against higher FSD risk (Table 3). Female age, BMI, depressed mood, sexual experience, partner age and presence of impotence, and type of sexual practice were excluded from the final multivariate regression model (Table 3).

## Discussion

Human sexual function is complex, multidimensional, and related to many female/partner and environmental factors. FSD is not uncommon (in fact many women experience sexual problems at some time in their lives) at sexual initiation, occurs or persists as a lifelong problem, or appears later in life after experiencing a period of satisfactory functioning. Traditional reports show that sexual dysfunction prevalence may vary from 19 to 50% in otherwise healthy women, increasing up to 75% if all sexual dissatisfactions are quantified [18,19]. Nevertheless, spontaneous consulting for FSD as a complaint is lower. The lack of uniform definitions, diagnostic methods, studied population may

**Table 2** Crude association analysis between variables and the presence or not of increased sexual dysfunction risk (FSFI  $\leq$  26.55) among studied women (n = 409)

	Increased risk <sup>†</sup> n = 163 Mean $\pm$ SD	No risk n = 246 Mean $\pm$ SD	P value
Age	22.0 $\pm$ 2.5	22.9 $\pm$ 2.3	0.002 <sup>§</sup>
Body mass index (kg/m <sup>2</sup> )	21.1 $\pm$ 2.4	21.9 $\pm$ 2.2	0.002 <sup>§</sup>
Age at menarche (years)	12.4 $\pm$ 1.5	12.5 $\pm$ 1.2	0.381 <sup>§</sup>
Age at sex initiation (years)	18.9 $\pm$ 2.0	18.9 $\pm$ 2.3	0.794 <sup>§</sup>
Time interval since sexual initiation (years)	3.1 $\pm$ 2.2	3.9 $\pm$ 2.6	0.001 <sup>§</sup>
Partner age (years)	24.9 $\pm$ 4.0	25.9 $\pm$ 4.9	0.032 <sup>§</sup>
Age difference with partner (years)	2.9 $\pm$ 3.6	3.0 $\pm$ 4.3	0.653 <sup>§</sup>
Partner relationship length (months)	21.2 $\pm$ 13.2	47.1 $\pm$ 20.4	0.001 <sup>§</sup>
Partner relation (analog visual scale)	14.4 $\pm$ 3.0	15.9 $\pm$ 2.5	0.001 <sup>§</sup>
HDRS total score	12.4 $\pm$ 6.9	9.7 $\pm$ 6.5	0.001 <sup>§</sup>
	n (%)	n (%)	P
Body mass index			0.234 <sup>¶</sup>
Low	19 (11.7)	37 (15.1)	
Normal	135 (82.8)	187 (76.0)	
Overweight	9 (5.5)	22 (8.9)	
Marital status			0.052 <sup>¶</sup>
Single	142 (87.1)	196 (79.7)	
Married or cohabiting	21 (12.9)	50 (20.3)	
Have a child	22 (13.5)	39 (15.9)	0.52 <sup>¶</sup>
Catholic religion	157 (96.3)	231 (93.9)	0.27 <sup>¶</sup>
History of sexual abuse	22 (13.5)	36 (14.7)	0.747 <sup>¶</sup>
Parental contraception use (monthly)	8 (4.9)	24 (9.8)	0.074 <sup>¶</sup>
Parental contraception use (trimester)	7 (4.3)	10 (4.07)	0.909 <sup>¶</sup>
Oral contraception use	14 (8.6)	29 (11.8)	0.302 <sup>¶</sup>
Emergency oral contraception use	66 (40.5)	62 (25.2)	0.001 <sup>¶</sup>
IUD use	0 (0.0)	4 (1.6)	0.152 <sup>††</sup>
Partner premature ejaculation	57 (35.0)	51 (20.8)	0.001 <sup>¶</sup>
Partner erectile dysfunction	20 (12.3)	10 (4.1)	0.002 <sup>¶</sup>
Alcohol consumption <sup>‡</sup>			0.383 <sup>¶</sup>
Nondrinker	98 (60.1)	160 (65.0)	
Nonproblematic drinker	47 (28.9)	56 (22.8)	
Problematic drinker	18 (11.0)	30 (12.2)	
Tobacco consumption	20 (12.3)	21 (8.5)	0.218 <sup>¶</sup>
HDRS scores 14 or more (moderate—very severe)	44 (27.0)	40 (16.3)	0.009 <sup>¶</sup>
Oral sex	91 (55.9)	171 (69.5)	<0.001 <sup>¶</sup>
Anal sex	30 (18.4)	69 (28.1)	0.02 <sup>¶</sup>
Masturbation	38 (23.3)	74 (30.1)	0.133 <sup>¶</sup>

<sup>†</sup>FSFI  $\leq$  26.55.

<sup>‡</sup>As measured with the BADS.

<sup>§</sup>t de student for nonhomogenous variances.

<sup>¶</sup>Chi-squared test.

<sup>††</sup>Fisher's exact test.

SD = standard deviation; HDRS = Hamilton Depressive Rating Scale; IUD = intrauterine device.

explain prevalence variation. Indeed, currently, there is no available gold standard to define “normal” sexuality. The present study used a well-standardized tool, the FSFI, with measures based on 65.4% of participants who were currently sexually active. A 29.1% of screened university students had never had sexual intercourse and 5.5% with past experience were currently inactive. Other types of sexual practices including masturbation, and less frequently, oral and anal sex were reported among these women. Masturbation may improve mood without the obligation and risks of partnered sex [20]. Contrary to this, cited sexual practices were highly frequent among sexually

active women of the present series: masturbation (27.4%), oral (64.0%), and anal intercourse (23.0%). In this group, these optional sexual practices seem to be complementary and not alternative to vaginal intercourse as is the case of their nonsexually active counterparts. Mean monthly coital rate was six among those sexually active. Rate of anal sex of the present series was similar to that observed in young Puerto Rican women [21]. Reports indicate the female masturbation rate in German and Finnish women increases in proportion to unsatisfactory vaginal intercourse [22,23]. Data regarding sexual behavior among Latin American women, and specifically university stu-

**Table 3** Factors associated to increased female sexual dysfunction risk: multivariate analysis (n = 409)

	Bivariate analysis		Multivariate analysis <sup>¶</sup>	
	OR (95% CI) <sup>‡</sup>	P value <sup>§</sup>	OR (95% CI) <sup>‡</sup>	P value
Male premature ejaculation	2.06 (1.28–3.29)	0.001	2.47 (1.27–4.77)	0.007
Emergency contraceptive use	2.02 (1.29–3.16)	0.001	1.87 (1.04–3.38)	0.036
Relationship with partner ≥ 3 years <sup>†</sup>	0.03 (0.016–0.06)	<0.001	0.025 (0.013–0.05)	<0.001
Good relation with partner <sup>†</sup> (AVS ≥ 15)	0.36 (0.21–0.59)	<0.001	0.24 (0.12–0.49)	<0.001
Body mass index < 20 kg/m <sup>2</sup> <sup>†</sup>	1.87 (1.18–2.97)	0.005	Not included in the final model	
Moderate—very severe depressive symptoms (HDRS scores ≥ 15)	1.90 (1.14–3.18)	0.009	Not included in the final model	
Female age < 23 years <sup>†</sup>	0.45 (0.29–0.69)	<0.001	Not included in the final model	
Sexual experience > 3 years <sup>†</sup>	9.50 (0.33–0.77)	<0.001	Not included in the final model	
Partner age < 25 years <sup>†</sup>	1.94 (1.27–2.96)	<0.001	Not included in the final model	
Oral sex	0.55 (0.36–0.85)	<0.001	Not included in the final model	
Anal sex	0.58 (0.34–0.96)	0.02	Not included in the final model	
Partner erectile dysfunction	1.30 (1.42–8.11)	<0.001	Not included in the final model	
			Goodness-of-fit test: Pearson chi-square (11) = 11.65. P = 0.3908.	

<sup>†</sup>Cut-off values were obtained using ROC curves considering FSFI scores ≤ 26.55.  
<sup>‡</sup>OR = odds ratios; CI = confidence intervals.  
<sup>§</sup>P value determined with chi-square.  
<sup>¶</sup>Final reduced model using logistic binary regression.  
 AVS = analog visual scale; HDRS = Hamilton Depressive Rating Scale.

dents, are scarce. Our results therefore provide interesting insights and serve as a reference for future studies.

Scientific information regarding the assessment of FSD risk in young Latin American women is also limited. Previous studies among Peruvian women have been focused on climacteric and diabetic women [8–10]. In these cohorts, increased risk for FSD ranged from 30 to 71.6%. A recent Colombian report drawn upon 391 women from Medellin aged 18 to 40, mostly (53.1%) having university education, revealed that 30% were at increased risk for FSD [11], similar to our series (39.9%), despite some study design differences and presumable small cultural differences. Moreover, our studied population was younger (mean age) than the Colombian. Sexual relationships are socially accepted although academic demands may have an important influence on their sexuality with important implication in their daily lives. Worthy to mention is the fact that the FSFI tool was used in all aforementioned studies (including the present). This tool is a popular instrument able to quantify sexual function and screen those at higher risk for FSD across different cultural and health circumstances. Indeed, Wiegel et al. [7] have supported the use of the FSFI as a screening tool and potential aid in diagnostic assessment, stressing out the fact that it should not be used as the sole basis for diagnostic classification.

In women, sexual dysfunction has many forms and causes, whether physical, psychological, or interpersonal [2,4,5]. The FSFI is a construct spe-

cifically designed to approach every component of the female sexual function. The present study added a specific questionnaire to assess social, emotional, and partner aspects. It is believed that education may influence the characteristics of sexual behavior and sexual dysfunction risk. However, this should be taken with precaution since Peruvian university students do not receive specific sexual education.

In a previous study, sexual dysfunction was concurrently associated with higher depression scores, negative feelings for the partner, and decline in sexual score [24]. Depressive symptoms in American medical students measured with the CES-D tool were common (46%) with psychosocial complex relationships observed [25,26]. Although moderate to severe depressive symptoms (HDRS measured) were found in 20.5% of our young females, final best fit regression did include this factor as significant. This rate seems to be lower than that observed in American students. Differences in social role, used tools, life conditions, and competitive program study conditions must mostly be presumed.

Prevalence of increased FSD risk in the present study is consistent with international figures. Our prevalence was high (39.9%) and similar to the 41% found by Oksuz et al. [27] in Turkish women aged 18 to 30 using the same assessment tool (FSFI). Total FSFI scores of our series was similar to those reported for young Chilean (20 to 24 years) [28] and Spanish women (18 to 23 years) [29]. These similarities point out to the fact that increased risk for

FSD is constant throughout transcultural factors and support the validity, consistency, and reliability of the FSFI as a sexual assessing tool. Indeed, the FSFI has also been useful to assess sexual function in mid-aged women [9,10].

It should be pointed out that the FSFI exclusively addresses female components without considering male conditions and sexual technique. Our best fit logistic regression model found that associated factors for increased FSD risk included oral emergency contraception use and male premature ejaculation. Reports show that combined oral contraceptive use in young women may increase FSD risk in relation to increased sexual hormone-binding globulin levels [30,31]. Oral emergency contraceptive use is unlikely to relate to an endocrine cause due to its short-term use yet could relate to increased anxiety due to the risk of having an undesired pregnancy [32]. It is worthy to mention that this associated factor for increased FSD risk has not been reported up to date. More research is required in this regard.

Increased FSD risk associated to male premature ejaculation (our second significant factor) is most likely to be due to insufficient female stimulation. Partner sexual dysfunction seems to be a constant issue relating FSD risk in Latin America. Indeed, a recent multicentric study found that bad vaginal lubrication, partner sexual dysfunction among others, were important factors predicting mid-aged increased FSD risk [9,10]. In our series, a better and longer partner relationship were protective factors against this increased risk. These aspects are linked to satisfaction with lifestyle and sexual rewards. Hispanic series have reported an inverse association between good marital communication and FSD risk [33,34].

As for the limitations of the present study, one can mention its cross-sectional design. Present results cannot be extrapolated to the general young female Peruvian or Latin American population. Despite these limitations, to the best of our knowledge, it adds to the few reports assessing FSD risk in young Latin America women, providing interesting insights on associated factors, which will serve as a referral tool for the designing of future studies.

### Conclusion

In this young Peruvian university female population, FSD risk was high and associated to specific male and female factors. More research is warranted in this regard.

J Sex Med \*\*,\*\*,\*\*\_\*\*

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