

Prevalence of sexual dysfunctions and correlated conditions in a sample of Brazilian women—results of the Brazilian study on sexual behavior (BSSB)

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The objective of this study was to assess the prevalence and risk factors of female sexual dysfunctions across a selection of social groups. In all, 1219 women in the community, aged 18 y or older, answered a 38-question self-applicable questionnaire. Statistical analysis was performed using multivariate logistic regression. The average age was 35.6 y (s.d. = 12.31) and the average number of sexual intercourses was 2.8 (s.d. = 1.94) a week. At least one sexual dysfunction was reported by 49% of the women; lack of sexual desire (LSD) by 26.7%; pain during sexual intercourse (PSI) by 23.1% and orgasmic dysfunction (OD) by 21%. Women aged over 40 y represented an LSD and OD risk factor, whereas women aged over 25 y showed less likelihood of presenting PSI. The educational level was inversely correlated with the risk of LSD, OD and PSI. Depression and cardiopathies increased PSI occurrences and women with *diabetes mellitus* showed a higher probability of developing LSD and OD. In conclusion, almost half the women had at least one sexual dysfunction, and prevalence increased with age and lower educational levels. Preventive medical care for the female population, mainly for patients with chronic and/or degenerative diseases, considerably reduced the chances of sexual dysfunction.

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Introduction

In spite of the growing current demand for treatment of female sexual dysfunctions and knowledge on the negative effects of these dysfunctions, not only for quality of life but also for sexual and interpersonal relationships,^{1,2} information with regard to their prevalence is still scarce in international literature.

In 1992, the National Health and Social Life Survey was conducted with a probabilistic sample of the US population, aged between 18 and 59 y. This study found that 43% of women had had significant sexual complaints in the preceding year.^{3,4} In Casablanca, Morocco, a study with a sample of women aged 20 y and older was carried out and found sexual dysfunctions in 26.6% of the women;⁵ in a survey conducted with a representative sample of Swedish women, sexual dysfunctions were also found in 48% of the subjects between 18 and 74 y.⁶

The increasing interest in dysfunctions in women has not been associated with an equal number of studies and the appreciation of epidemiological data, which, all in all, represents an invaluable tool for the development of strategies and the allocation of adequate resources necessary for providing assistance for populations.

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Simons and Carey⁷ performed a literature review and found prevalence rate estimates between 7 and 10% for female orgasmic dysfunctions (OD). Nathan⁸ found rates that ranged between 5 and 30%.

In a review conducted by Simons and Carey,⁷ the prevalence of lack of sexual desire (LSD) ranged from 5 to 46%. Nathan⁸ found rates ranging between 1 and 35% in women with LSD complaints.

A review article found rates between 3 and 27% for dyspareunia in women aged between 18 and 30 y and 1 to 10% for those above 65 y, in community samples.⁹ Simons and Carey⁷ found rates between 3 and 18% for dyspareunia.

Prevalence depends on case definitions, characteristics of the population studied and the timeframe of prevalence estimates. Therefore, the design, implementation and reporting of epidemiological studies requires standardization before systematic reviews and meta-analyses can be carried out.⁹

Female sexual dysfunctions are strongly associated with psychosocial problems and difficulties in marital relationships.¹⁰ A particularly prevalent risk results from poor educational background or low socioeconomic status.⁴

Cardiovascular problems and diabetes are common risk factors for sexual dysfunctions.^{11–13} In some studies, statistically relevant associations between LSD and aging have been found. Literature reviews have also shown the opposite for pain related to sexual intercourse (PSI).^{4,5,14,15}

This article analyzes data on sexual dysfunctions in women, obtained from the Brazilian Study of Sexual Behavior (BSSB), based on a questionnaire that assessed adult sexual behavior in seven Brazilian states.¹⁶

The objective of this study was to assess sexual dysfunction prevalence rates and respective odds ratios for sexual symptoms in 1219 women in seven Brazilian states vis-à-vis sociodemographic characteristics and specific common diseases.

Material and methods

The BSSB was conducted between February and April of 2000 and used a sample of 2835 subjects (53% women and 47% men) in 10 cities of seven Brazilian states. The age group was 18 y and older. The group studied comprised women with an educational level (high school and college degree) higher than that of the average Brazilian woman. The sample was comparable in terms of race and religion.¹⁷

Subjects were weekend visitors of beaches, parks and shopping malls, who were invited to answer a self-applicable anonymous questionnaire. Data on women who declined to answer the questionnaire were not recorded and hence comparisons with the answering sample were not taken into account. The original questionnaire was submitted to a pilot test

involving 30 subjects of both genders. The questionnaire was used after having been adjusted for adequacy (Attachment 1). In this survey, questions 1, 2, 3, 5, 6 and 11 were used for identification, question 12 for identifying the aforementioned diseases and questions 17 and 19 to assess sexual habits and tendencies.

In the questionnaire, the item with regard to sexual difficulties (question 29) requested subjects to check with an 'X' whatever did not occur very often and with 'XX' the facts that very frequently occurred in their sexual relations. The answers 'sometimes' and 'very frequently' were classified as 'yes' (presence of dysfunctions), whereas answers not checked were classified as 'no' (absence of dysfunctions). These answers were separated into 'yes/no', so as to be analyzed using univariate and multivariate logistic regression. Question 32 was used for assessing dyspareunia (pain during or after sexual intercourse).

This article analyzes information obtained in a group of 1219 women experiencing difficulties with sexual desire and orgasm, and pain related to sexual intercourse.

For statistical analysis, only women who had had sexual intercourse with at least one partner in the past 12-month period were selected.

We calculated case frequency and the percentage distribution of subjects presenting LSD, pain related to sexual intercourse and OD for each sociodemographic characteristic surveyed (age, marital status, educational level, race, religion and sexual orientation) and for each disease, such as depression, *diabetes mellitus*, systemic arterial hypertension, cardiopathies and hypercholesterolemia.

The odds ratios for sexually related symptoms in members of a given social condition (for instance, unmarried women) in relation to a reference group (for instance, married women) were calculated through univariate logistic regression. For each of the diseases (depression, diabetes mellitus, systemic arterial hypertension, cardiopathies and hypercholesterolemia), the chance of experiencing a particular concomitant sexual dysfunction was also calculated, always using women in the group without the above-mentioned diseases.

Subsequently, multivariate logistic regression models were designed. Final models for each of the sexual dysfunctions studied were obtained in the following manner: only variables with $P \leq 0.20$ in the *test of the verisimilitude reason* were included. Then, a strategy that went from the simplest model to the most complex (forward selection) allowed independent variables (age, marital status, hypertension, etc) to be included one at a time. Only statistically significant variables ($P \leq 0.05$) or those for which coefficients of independent variables (β) could be adjusted by at least 10% were considered in the study. Variables that did not meet these requirements were not taken into

consideration in the final models for each of the sexual dysfunctions surveyed.

Statistical analysis was performed using SPSS, in the Windows 10.0 version.

Results

The average age of the sample was 35.6 y (s.d. = 12.31). Table 1 shows that sexual intercourse decreases progressively as age increases. Of the 1219 women, 736 answered the question related to the frequency of sexual intercourse.

Of the 1212 women who provided information on age, 49% reported at least one sexual dysfunction; the older the women, the higher the prevalence (Table 2).

The main female sexual dysfunction observed was LSD (26.7%), followed by PSI (23.1%) and OD (21.0%).

Table 3 shows the distribution of frequencies and the results of the univariate logistic regression statistical analysis, for each of the dysfunctions with regard to the sociodemographic characteristics and diseases surveyed.

Table 4 shows the results of the multivariate logistic regression analysis obtained from the final model for each sexual dysfunction.

Age and educational levels proved to be variables highly associated with sexual dysfunctions, both in univariate and multivariate models.

The prevalence of LSD and OD increased with age, regardless of the educational level, race or the

presence of diabetes mellitus, or systemic arterial hypertension (Table 4).

On the other hand, with regard to PSI, age proved to be a protection factor for dysfunctions, regardless of the educational level, presence of cardiopathies or depression (Table 4).

The lower the educational level, the higher the chance of sexual dysfunctions, notwithstanding other variables studied.

In our study, the chance of LSD occurring for brown women was smaller—0.65 (95% CI: 0.43–0.98), when compared to white women, regardless of age, educational level, diabetes mellitus or systemic arterial hypertension. Race was not statistically associated with other dysfunctions and thus was not included in the final models of multivariate logistic regression.

Diabetic women presented a probability of having LSD and OD (Table 4).

Women with cardiopathies and depression were more likely to have PSI, irrespective of other variables studied (Table 4).

Depressive symptoms did not significantly increase the risk of LSD or OD. Marital status, religion, sexual orientation, systemic arterial hypertension and hypercholesterolemia were statistically insignificant variables with respect to sexual dysfunctions.

Discussion

The BSSB allowed for the identification of sexual dysfunctions in a specific sample of women aged 18 y and older.

The presence of at least one sexual dysfunction was very high in this population and held true for almost half the sample.

In medical literature, different prevalence rates of female sexual dysfunctions are found. The great variation is partly due to the characteristic of samples (community versus sexuality clinics) studied, type of trial performed (self-applicable questionnaires or interviews), the clinical definition used for each dysfunction and the representativeness of the sample.

Information collected through self-applicable questionnaires, such as the one used in the present

Table 1 Mean and s.d. of weekly sexual relations in the sample (n = 736)

Age (y)	Mean	Number of women (n)	Standard deviation (s.d.)
Up to 25	3.51	196	2.46
26–40	2.73	336	1.52
41–60	2.31	187	1.38
61 or older	2.00	17	0.87
Total	2.81	736	1.83

P < 0.001.

Table 2 Presence of at least one sexual dysfunction (lack of sexual desire, pain during sexual intercourse or orgasmic dysfunction), classification by age group

Age (y)	Some dysfunction n (%)	Without dysfunction n (%)	Total n (%)
Up to 25	142 (45.1)	173 (54.9)	315 (100.00)
26–40	221 (44.4)	277 (55.6)	498 (100.00)
41 or older	229 (57.4)	170 (42.6)	399 (100.00)
No Information	5 (71.4)	2 (28.6)	7 (100.00)
Total n (%)	597 (49.0)	622 (51.0)	1219 (100.00)

P < 0.001.

Table 3 Distribution of total frequency, frequency of cases and odds ratios of sexual dysfunctions in relation to sociodemographic characteristics and diseases surveyed^a

Variable	Lack of sexual desire			Pain during sexual relation			Orgasmic dysfunction		
	No. of sample	No. of cases (%)	Odds ratio (95% CI)	No. of sample	No. of cases (%)	Odds ratio (95% CI)	No. of sample	No. of cases (%)	Odds ratio (95% CI)
<i>Age (y)</i>									
≤25	315	47 (14.9)	Reference group	315	99 (31.4)	Reference group	315	47 (14.9)	Reference group
26 to 40	498	103 (20.7)	1.49 (1.02–2.17)*	498	116 (23.3)	0.66 (0.48–0.91)**	498	83 (16.7)	1.14 (0.77–1.68)
41 or older	399	171 (42.9)	4.28 (2.96–6.18)***	399	65 (16.3)	0.43 (0.30–0.61)***	399	122 (30.6)	2.51 (1.72–3.66)***
Total	1212	321 (26.5)		1212	280 (23.1)		1212	252 (20.8)	
<i>Marital status</i>									
Married/ concubinage	610	198 (32.5)	Reference group	610	127 (20.8)	Reference group	610	151 (24.8)	Reference group
Unmarried	463	84 (18.1)	0.46 (0.35–0.62)***	463	123 (26.6)	1.38 (1.04–1.83)*	463	75 (16.2)	0.59 (0.43–0.80)**
Separated/ divorced/ widowed	141	42 (29.8)	0.88 (0.59–1.32)	141	28 (19.9)	0.94 (0.60–1.49)	141	29 (20.6)	0.79 (0.50–1.23)
Total	1214	324 (26.7)		1214	278 (22.9)		1214	255 (21.0)	
<i>Educational level</i>									
College	509	105 (20.6)	Reference group	509	93 (18.3)	Reference group	509	73 (14.3)	Reference group
High school	504	131 (26.0)	1.35 (1.01–1.81)*	504	129 (25.6)	1.54 (1.14–2.08)**	504	100 (19.8)	1.48 (1.06–2.06)*
Elementary school	201	89 (44.3)	3.06 (2.15–4.35)***	201	58 (28.9)	1.81 (1.24–2.65)**	201	81 (40.3)	4.03 (2.77–5.86)***
Total	1214	325 (26.8)		1214	280 (23.1)		1214	254 (20.9)	
<i>Race</i>									
White	864	246 (28.5)	Reference group	864	184 (21.3)	Reference group	864	187 (21.6)	Reference group
Black	91	26 (28.6)	1.01 (0.62–1.62)	91	27 (29.7)	1.55 (0.97–2.52)	91	24 (26.4)	1.30 (0.79–2.12)
Brown	188	36 (19.1)	0.60 (0.40–0.88)**	188	52 (27.7)	1.41 (0.99–2.02)	188	34 (18.1)	0.80 (0.53–1.20)
Others	67	15 (22.4)	0.73 (0.40–1.31)	67	16 (23.9)	1.16 (0.65–2.08)	67	10 (14.9)	0.64 (0.32–1.27)
Total	1210	323 (26.7)		1210	279 (23.1)		1210	255 (21.1)	
<i>Religion</i>									
Without religion	20	6 (30.0)	Reference group	20	5 (25.0)	Reference group	20	5 (25.0)	Reference group
Some religion	1183	316 (26.7)	0.85 (0.32–2.23)	1183	271 (22.9)	0.89 (0.32–2.48)	1183	249 (21.0)	0.80 (0.29–2.22)
Total	1203	322 (26.8)		1203	276 (23.1)		1203	254 (21.1)	
<i>Sexual orientation</i>									
Heterosexual	1002	260 (25.9)	Reference group	1002	234 (23.4)	Reference group	1002	202 (20.2)	Reference group
Others	28	5 (17.9)	0.62 (0.23–1.65)	28	5 (17.9)	0.71 (0.27–1.90)	28	4 (14.3)	0.66 (0.23–1.92)
Total	1030	265 (25.7)		1030	239 (23.2)		1030	206 (20.0)	

Table 3 (Continued)

Variable	Lack of sexual desire			Pain during sexual relation			Orgasmic dysfunction		
	No. of sample	No. of cases (%)	Odds ratio (95% CI)	No. of sample	No. of cases (%)	Odds ratio (95% CI)	No. of sample	No. of cases (%)	Odds ratio (95% CI)
<i>Depression</i>									
No	856	218 (25.5)	Reference group	856	174 (20.3)	Reference group	856	169 (19.7)	Reference group
Yes	363	108 (29.8)	1.24 (0.94–1.63)	363	107 (29.5)	1.64 (1.24–2.17)**	363	87 (24.0)	1.28 (0.96–1.72)
Total	1219	326 (26.7)		1219	281 (23.1)		1219	256 (21.0)	
<i>Diabetes mellitus</i>									
No	1183	306 (25.9)	Reference group	1183	273 (23.1)	Reference group	1183	239 (20.2)	Reference group
Yes	36	20 (55.6)	3.58 (1.83–7.00)***	36	8 (22.2)	0.95 (0.43–2.11)	36	17 (47.2)	3.53 (1.81–6.90)***
Total	1219	326 (26.7)		1219	281 (23.1)		1219	256 (21.0)	
<i>Systemic arterial hypertension</i>									
No	1067	257 (24.1)	Reference group	1067	250 (23.4)	Reference group	1067	209 (19.6)	Reference group
Yes	152	69 (45.4)	2.62 (1.85–3.71)***	152	31 (20.4)	0.84 (0.55–1.27)	152	47 (30.9)	1.84 (1.26–2.68)**
Total	1219	326 (26.7)		1219	281 (23.1)		1219	256 (21.0)	
<i>Cardiopathies</i>									
No	1164	305 (26.2)	Reference group	1164	263 (22.6)	Reference group	1164	239 (20.5)	Reference group
Yes	55	21 (38.2)	1.74 (0.99–3.04)	55	18 (32.7)	1.67 (0.93–2.98)	55	17 (30.9)	1.73 (0.96–3.12)
Total	1219	326 (26.7)		1219	281 (23.1)		1219	256 (21.0)	
<i>Hypercholesterolemia</i>									
No	1076	266 (24.7)	Reference group	1076	247 (23.0)	Reference group	1076	217 (20.2)	Reference group
Yes	143	60 (42.0)	2.20 (1.54–3.16)***	143	34 (23.8)	1.05 (0.70–1.58)	143	39 (27.3)	1.48 (1.00–2.21)
Total	1219	326 (26.7)		1219	281 (23.1)		1219	256 (21.0)	

^aData obtained from the BSSB. Odds ratios for the presence of a given sexual symptom for members of a specific group in relation to a reference group. Results derived from *univariate logistic regression* performed on women with at least one sexual partner in the last 12-month period prior to this research. Percentages were derived from women who answered each of the categories, while the total number represents all women who answered the questions. CI = confidence interval.

* $P \leq 0.05$.

** $P \leq 0.01$.

*** $P < 0.001$.

Table 4 Distribution of odds ratios of sexual dysfunctions in relation to sociodemographic characteristics, depression and diseases surveyed^a

Variable	Lack of sexual desire	Pain during intercourse	Orgasmic dysfunction
	Odds ratio (95% CI)	Odds ratio (95% CI)	Odds ratio (95% CI)
Age (y)			
≤ 25	Reference group	Reference group	Reference group
26–40	1.42 (0.96–2.09)	0.62 (0.45–0.86)**	1.09 (0.73–1.62)
41 or older	3.84 (2.60–5.68)***	0.38 (0.26–0.54)***	2.34 (1.58–3.46)***
Educational level			
College	Reference group	Reference group	Reference group
High School	1.58 (1.16–2.16)**	1.39 (1.02–1.90)*	1.61 (1.15–2.26)**
Elementary School	3.09 (2.12–4.49)***	1.83 (1.24–2.70)**	4.03 (2.74–5.93)***
Race			
White	Reference group		
Black	1.12 (0.67–1.87)		
Brown	0.65 (0.43–0.98)*		
Others	0.73 (0.39–1.37)		
Diabetes			
No	Reference group		Reference group
Yes	2.25 (1.08–4.68)*		2.90 (1.43–5.87)**
Systemic arterial hypertension			
No	Reference group		
Yes	1.40 (0.95–2.07)		
Cardiopathies			
No		Reference group	
Yes		2.03 (1.11–3.72)*	
Depression			
No		Reference group	
Yes		1.77 (1.33–2.36)***	

^aData obtained from the BSSB. Odds ratios for the occurrence of a given sexual symptom for members of a specific group in relation to a reference group. Results of *final models* per each sexual dysfunction derived from *multivariate logistic regression model* performed on women with at least one sexual partner in the last 12-month period prior to this research. CI = confidence interval.

* $P \leq 0.05$.

** $P \leq 0.01$.

*** $P < 0.001$.

survey, lacks diagnostic precision. This may occur due to the difficulty of interviewees understanding the questions and also because signs and symptoms are directly related to the occurrence of dysfunctions, while not measuring the extent to which those sexual symptoms are a source of interpersonal and psychological stress for each of the subjects.

A validation of the BSSB questionnaire was not performed. This may have compromised the accuracy of the data obtained.

Simons and Carey⁷ suggest the use of stratified and representative samples of the population and of validated scales for assessing dysfunctions. The proper identification of a dysfunction and the correct collection of data on its incidence are also very important.

New studies in a population including women of all socioeconomic levels and from different regions of Brazilian cities, in addition to the use of validated psychometric scales, laboratory tests and the adoption of all diagnostic criteria contained in DSM-IV could provide more complete data.

The procedure of excluding women who had no sexual partners in the year prior to the study altered results in relation to the overall sample because women, who were excluded, might have been avoiding sexual intercourse especially due to some sexual dysfunction. When analyzing women who had had no sexual partners, 69% presented some dysfunction. Therefore, had those women been included, the prevalence of sexual dysfunctions would have been higher. However, those women had to be excluded from the sample to assure that answers on the three essential questions (sexual desire, orgasm and pain related to sexual intercourse), which only sexually active women could answer, would in fact be provided.

In general, race played a very small role in women presenting sexual dysfunctions. In Brazil, female children of white fathers with black mothers or *vice versa* are known as '*mulatas*' (brown women). Surprisingly, brown women (*mulatas*) were prone to showing less LSD, suggesting that further studies

should be performed. Another study showed that black women had an increased LSD; no other association with race was found.⁴ In spite of increasing chances for this disorder to occur in black women, this study was not able to achieve statistical significance.

Lower educational levels are positively linked to the presence of sexual dysfunctions, as also shown by similar findings by Laumann *et al.*⁴

Several studies indicate sexual difficulties in female patients diagnosed with diabetes mellitus, such as decreased sexual desire and difficulties in reaching an orgasm. These dysfunctions probably result from damage to the vascular system and the autonomous nervous system, as well as changes in the production and action of nitrous oxide, a condition related to vascular reactions from human sexual response.^{13,18–21}

Women with cardiopathies reported sexual difficulties in up to 57% of cases.²² Anxiety about the future of their sexual lives and decreasing sexual desire was reported in a study published in 2001.²³

Depression is frequently associated with different sexual dysfunctions; this study, however, only indicated a statistically significant association with depression and pain related to sexual intercourse.^{10,24}

Conclusions

This study was the first of its kind performed in Brazil. In spite of not having a relevant sample of the entire socioeconomic-cultural strata of the Brazilian population, it may give an idea of how prevalent sexual dysfunctions are, as it may serve as a starting point for future surveys with wider-ranging samples of people and may also indicate possible associations between sexual dysfunctions and other factors such as age, educational level, race and chronic-degenerative diseases.

The utilization of stratified and representative samples of the population, clear, accurate and consensual diagnostic criteria and laboratory tests, in addition to incidence rates, may refine the results and thus make it possible to more accurately derive generalizations from the collected data.

The directly proportional association between age and presence of at least one sexual dysfunction, the increased risk of certain concomitant sexual dysfunctions and chronic and/or degenerative diseases (diabetes mellitus, cardiopathies and depression) and the inversely proportional association between the education level and sexual dysfunctions, suggest that improved medical prevention and educational care may protect these specific woman groups from developing sexual dysfunctions.

Supplementary information accompanies the paper on International Journal of Impotence Research website (<http://www.nature.com/ijir>).

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