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Medication Use and Sexual Function: A Population-Based Study in Middle Aged Women

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ABSTRACT

Introduction: Medications used to treat chronic diseases have contributed to increasing longevity and improving quality of life. These medications are considered an indispensable resource in the management of most treatable diseases. However, they can affect sexual function through their effects on the central or the peripheral nervous system or due to hormonal effects.

Aim: To evaluate the association between the use of medication for chronic diseases and sexual dysfunction in Brazilian women 45−60 years of age.

Methods: A secondary analysis of household survey data from a previous cross-sectional, population-based study conducted with a sample of 749 women of a population of 257,434 female urban residents in the age bracket of interest. Sexual function was evaluated using the Short Personal Experiences Questionnaire (SPEQ). Associations between the use of medication and sexual function were evaluated, as were correlations with other variables.

Main Outcome Measure: We found associations of the individual SPEQ domains with the use of some medications.

Results: Mean age of participants was 52.5 ± 4.4 years. Mean age at menopause was 46.5 ± 5.8 years. The overall prevalence of medication use was 68.8%, with the drugs predominantly consisting of those used for cardiovascular diseases. In the Poisson regression analysis, sexual dysfunction, as based on the overall SPEQ score, was associated with sexual inactivity (prevalence ratio [PR] = 4.05; 95% CI 3.16−5.20; $P < .001$), a sedentary lifestyle (PR = 1.49; 95% CI 1.06−2.09; $P = .021$), and untreated anxiety (PR = 1.44; 95% CI 1.08−1.92; $P = .014$). Analysis of the individual SPEQ domains revealed that women who scored low in the desire domain were more likely to use antihypertensive agents ($P = .019$), whereas a lower score for the arousal domain was associated with the use of antidepressants, with treatment for osteoarticular diseases and with polypharmacy ($P = .003$). Women with lower scores in the satisfaction domain were more likely to use antidepressants, drugs for osteoarticular diseases, diabetes medication, and polypharmacy ($P = .019$). A lower score in the orgasm domain was associated with the use of antidepressants, the treatment of osteoarticular diseases, and diabetes ($P < .001$). Hormone therapy proved protective against loss of libido ($P = .036$).

Clinical Implications: Some medications can interfere with sexual function negatively and, clinicians have to be aware of it to choose the treatment with fewer collateral effects.

Strength & Limitations: The strength of our study is the large, population-based sample of middle-aged women evaluated for sexual dysfunction with the SPEQ. However, it was a self-reported cross sectional study.

Conclusion: This study found no association between the use of medication for chronic diseases and the overall SPEQ score, whereas untreated anxiety was 1 of the main factors associated with female sexual dysfunction. On the other hand, medical treatments were found to contribute to lower scores in the different sexual function domains. Common drug culprits included antihypertensives, antidepressants, treatment for osteoarticular disease, diabetes medications, and polypharmacy. Hormone therapy protected against loss of libido. **Gueldini de Moraes AV, Ribeiro Valadares AL, Lui Filho JF, et al. Medication Use and Sexual Function: A Population-Based Study in Middle Aged Women. J Sex Med 2019;XX:XXX−XXX.**

Key Words: Menopause; Use Of Medications; Female Sexual Dysfunction; Population-Based Study; SPEQ

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INTRODUCTION

Throughout life, and particularly during the menopausal transition, women experience biological and behavioral changes that can affect sexual function. Preserving sexuality during menopause is fundamental for a healthy life and involves a range of behaviors and actions. An active sexual life can contribute substantially to improving the overall well-being of women at this time in their lives, thus, providing a better quality of life.[1]

Female sexual dysfunction (FSD) is a broad term used to describe chronic sexual conditions that affect the domains of desire, arousal, orgasm, and pain. Women may experience difficulty in ≥1 aspects of sexual response, and the sexuality domains that are altered can overlap and vary over time. The cause of FSD is often multifactorial and includes biological, psychological, interpersonal, and sociocultural risk factors and contributors.[2]

Aging and menopause are 2 important overlapping factors that affect female sexual function, leading to decreased sexual responsiveness, sexual activity, and desire. Some chronic illnesses, such as cardiovascular disease, hypothyroidism, diabetes mellitus, respiratory disease, and psychiatric disease, can directly or indirectly affect sexual function as a result of physiological, psychological, emotional, and interpersonal events.[3,4] The most common type of sexual dysfunction in women, hypoactive sexual desire disorder, has been associated with negative emotional and psychological states, as well as with medical conditions that include depression.[5]

In menopausal Brazilian women, there have been wide variations in the reported prevalence of sexual dysfunction, depending on the study design, with rates ranging from 13.3−79.3%.[6] Similar rates (30−71%) have been reported in other international population-based studies,[7−11] with the highest rates being found in postmenopausal women.[12]

A significant decline in mortality and a substantial increase in life expectancy have been seen worldwide over recent decades. Medications used to treat chronic diseases have contributed to increasing longevity and improving quality of life. These medications are considered an indispensable resource in the management of most treatable diseases. However, medications can affect sexual function through their effects on the central or the peripheral nervous system[13] or because of hormonal effects. Sedatives that affect the central serotonin, dopamine, or prolactin signaling pathways, as well as certain antihypertensive drugs, can exert an effect on sexual function. On the other hand, such medications can improve women's sexual quality of life by treating diseases that were previously interfering with their sexuality.[14] Therefore, the purpose of this study was to establish the association between the use of certain medications and sexual function in middle-aged women from a metropolitan region of Brazil.

METHODS

Study Design

This study consists of a secondary analysis of household survey data from a previous cross-sectional population-based study conducted between September 2012−June 2013. The sample consisted of middle-aged, native, Brazilian women 45−60 years of age, residing in the metropolitan region of Campinas. Inability to complete the interview for any reason, including refusal to participate, cognitive deficits, and scheduling incompatibility, was considered an exclusion criterion. This study followed the recommendations defined in the Strengthening the Reporting of Observational Studies in Epidemiology statement.[15]

Sample Size

Sample size was calculated based on a prevalence of female sexual dysfunction of 35.9% in middle-aged Brazilian women.[16] The total population of the metropolitan region of Campinas in 2010 was 2,798,477 individuals. Of these, 1,423,748 were female, and 257,434 women were between 45−60 years of age.[17] For an α error of 5%, the initial sample size required was calculated at 820 women, considering a 20% loss (mainly due to refusal to be interviewed or inability to comply with the schedule).

Population Demography and Participant Selection

Until 2013, the metropolitan region of Campinas consisted of 19 municipalities.[17] The Brazilian Institute of Geography and Statistics provided numbered and clearly defined census tracts for this metropolitan region. 92 sectors were selected using a simple random sampling approach. When making the selection, rural, semirural, and industrial sectors were excluded. Urban census tracts with ≥10 women between the ages of 45−60 years were selected. Sectors with <10 women in this age group were grouped together with neighboring, sequentially numbered sectors. After a draw of the 92 sectors, 2 blocks per sector were randomly selected, and the number of women 45−60 years of age was determined. 10 women from each sector were randomly selected for the interviews. Well-trained interviewers, guided by maps, went to the homes of the previously selected women, and invited them to participate in the study. If the woman was unavailable at first contact, an appointment was made to facilitate her participation in the interview. Interviews were conducted on the spot. Refusals were mostly due to lack of availability.

The interviewers were trained over a total of 20 hours in a combination of theoretical and practical classes. A manual was created for this training course based on ethical aspects of research involving human beings, on the study objectives and methodology, interview techniques, and administrative issues. This guide enabled interviewers to become familiar with the conversation approach, with the content of the instruments used to select volunteers and with the collection of data for the study. A mix of techniques suitable for all stages of the survey was used

to train the interviewers, including a "demonstration," in which they watched a previously prepared interview. This procedure gave them the opportunity to observe an ongoing interview. The items included in the questionnaire were discussed in detail during training. The principal investigators in charge of the project at the Campinas Reproductive Health Research Center were responsible for training the research assistants. The purpose and importance of the study was explained, and each item, its importance, and technical significance were discussed. The assistants also participated in fieldwork exercises to gain experience in the selection process and in interviewing women with a background similar to that of the target population. After this training, a test was applied to assess their progress. Based on their performance in practice, as well as on the quality of the interviews in class and in homework assignments, a decision was made regarding who was sufficiently trained to perform data collection activities for the survey. The 6 interviewers who participated in the data collection had ≥11 years of formal education. Their fieldwork was supervised by the principal investigators and by researchers from the Campinas Reproductive Health Research Center acting in partnership with the University of Campinas. Supervisors are senior researchers who have already accumulated considerable experience in other population-based studies conducted in the past using similar methodology. The observation and supervision continued during the practical work and until the process was complete. The interviews lasted on average 30−40 minutes. Data collection began on October 9, 2012, and ended on June 6, 2013.

The internal review board of the Department of Obstetrics and Gynecology, School of Medical Sciences, University of Campinas approved the study under protocol number 030/2011. All participants signed an informed consent form before the interviews.

Self-Report Questionnaires and Data Collection

The questionnaire used to collect the data consisted of a structured instrument divided into 8 sections: sociodemographic evaluation, general aspects of health, gynecological and reproductive aspects, menopausal symptoms, knowledge regarding menopause, search for and use of treatments for menopausal symptoms, aspects concerning sexuality, and socioeconomic classification. This questionnaire was created from 3 other pre-existing questionnaires: the Economic Classification Criteria of Brazil,[18] the Menopause Rating Scale,[19] and the Short Personal Experiences Questionnaire (SPEQ).[20,21]

The Menopause Rating Scale consists of 11 questions covering 3 types of symptoms: psychological, somatic, and urogenital. There are 5 possible answers to each question, scored incrementally according to the severity of symptoms. The total score can range from 0 (asymptomatic) to 44 (highest degree of complaints).

The SPEQ is used to evaluate sexual function and consists of 9 questions. It addresses libido (1 question), sexual responsiveness (3 questions), the frequency of sexual activities (1 question), feelings for partner (2 questions), partner problems (1 question), and dyspareunia (1 question). The cutoff score for a diagnosis of sexual dysfunction is 7, with specificity and sensitivity of 79% for diagnosing women with sexual dysfunction. Investigators at the University of Melbourne, Australia, supplied the original version of this instrument. Having been translated and culturally adapted for use in Brazilian Portuguese, the version of the SPEQ proposed for this study was considered useful and appropriate for the collection of self-reported data on sexual function in menopausal Brazilian women.[19]

The dependent variable in this study was sexual dysfunction, evaluated using the version of the SPEQ validated for use in Brazilian Portuguese. The final score was calculated from the mean of the sum of the scores for sexual responsiveness (graded from 1−6, where 1 = an absence of pleasure and 6 = maximal pleasure), arousal,[1−6] orgasm,[1−6] frequency of sexual activities (1 = never, 2 = less than once a week, 3 = once or twice a week, 4 = several times a week, and 5 = once a day or more), and desire (1 = never, 2 = once a week, 3 = once or twice a week, 4 = several times a week, and 5 = once a day or more). A score ≤7 was considered indicative of sexual dysfunction, and a score >7 was considered indicative of an absence of sexual dysfunction.[21]

According to SPEQ domains, sexual desire was considered low when the answer to the corresponding question was never or less than once a week, and normal if more than once a week. Arousal was considered low when the score was ≤2. A score of 1 or 2 defined low sexual orgasmic function. Scores for the frequency of sexual activities were dichotomized into ≤2 or >2, with the former being considered low.[20]

The independent variables were categorized as follows: (i) sociodemographic characteristics: age (subdivided into 3 categories: 45−49, 50−54, and 55−60 years); schooling (years attending educational institutions, categorized as ≥4 and <4 years); marital status (with or without partner); menopausal status (premenopausal if regular menstrual cycles, perimenopausal if irregular menstrual cycles or amenorrhea for less than a year, postmenopausal when amenorrhea has been present for >12 months); body mass index, categorized as <25 and ≥25; (ii) habits: smoking (yes/no); alcohol consumption (yes/no); physical activity (≥3 times per week or <3 times per week); (iii) problems and health perception: systemic arterial hypertension (yes/no); diabetes mellitus (yes/no); dyslipidemia (yes/no); myocardial infarction (yes/no); stroke (yes/no); deep vein thrombosis or pulmonary embolism (yes/no); osteoporosis or osteopenia (yes/no); osteoarticular problems (yes/no); asthma or bronchitis (yes/no); tuberculosis (yes/no); depression (yes/no), anxiety (yes/no); cancer (yes/no). Chronic diseases were categorized as 0, 1−2, or ≥ 3. Having ≥3 chronic diseases was categorized as multimorbidity; (iv) gynecological and obstetric aspects: menarche, age at onset of menopause, time since menopause, number of live children; use of contraceptive methods (used, never used or currently using); number of pregnancies (0 or ≥ 1); abortions (yes/no); active sex life (yes/no); previous gynecological surgery

Table 1. Main clinical and demographic characteristics (N = 749) associated with sexual dysfunction—Bivariate analysis

Characteristic	SPEQ ≤7 (N = 337; 45.3%)	SPEQ >7 (N = 407; 54.7%)	P*
Age,y			
45-49	28.9	71.1	**<.001**
50-54	**47.1**	52.9	
55-60	**57.5**	42.5	
Status of menopause			
Peri / Post	**49.7**	50.3	**<.001**
Pre	23.3	76.7	
Time since menopause, y			
5-9	50.0	50.0	**<.001**
≥10	**58.5**	41.5	
Schooling, y			
>4	43.9	**56.1**	**.001**
≤4	**56.7**	43.3	
Marital status			
Without a partner	**76.1**	23.9	**<.001**
No Physical activity	**53.0**	47.0	**<.001**
No active sexual life	**86.3**	13.7	**<.001**
Contraception			
No previous or current use	**68.8**	31.2	**<.001**
Polipharmacy	**53.0**	47	**.018**

SPEQ = Short Personal Experiences Questionnaire.
Bolded values indicate statistical significance.
*χ^2 test.

(yes/no); bladder surgery (yes/no); breast surgery (yes/no); other surgeries (yes/no); urinary incontinence (yes/no); vaginal dryness (yes/no); vaginal itching (yes/no); and dyspareunia (yes/no).

The women's patterns of medication use were classified into 4 categories: (i) Not in use of any medication; (ii) In use of medication or remedies specifically intended to treat menopausal symptoms, including topical vaginal hormone replacement therapy (vaginal route of administration), hormone therapy (systemic route of administration, including estrogens, with progesterone added in the case of non-hysterectomized women; oral or transdermal route of administration); and alternative therapies (such as diets, black mulberry leaf tea, over the counter medications, acupuncture, relaxation techniques, yoga, soy derivatives, isoflavone, and others); (iii) Medication not specifically intended to treat menopausal symptoms (medication to control chronic conditions such as high blood pressure, diabetes mellitus, dyslipidemia, osteoporosis, arthritis and osteoarthritis [osteoarticular diseases], asthma, depression and anxiety), or (iv) Concomitant use of medications/remedies from both groups 2 and 3, such as those used for the treatment of menopausal symptoms and for chronic conditions, respectively. The interviewers verified which medications were in use; if there was any doubt, they were trained to ask to see the prescription or the drug packaging containing the drug name. The definition of polypharmacy can vary.[22] In view of the age range of the population evaluated here, polypharmacy was defined as the concomitant daily use of ≥3 different medications.

The instrument was previously tested in person or by telephone, with volunteer participants attending the menopause clinic at the University of Campinas Women's Hospital. Any questions that generated uncertainties were submitted to further adaptation and retested until the participants reported no more uncertainties or difficulties in answering the questions. A final version of the instrument was obtained through this feedback process of evaluation.

Statistical Analysis

The frequency distribution of the participants' characteristics was analyzed. Results were presented as means and standard deviations (SD) and medians, or as absolute frequencies and percentages. A bivariate analysis was performed using the χ^2 test to identify associations between the dependent variable (sexual dysfunction) and the use of medications for different diseases. Fisher's exact test was used as required. The Mann-Whitney and Kruskal-Wallis tests were used to establish the relationship between categorical and numerical variables. Simple and multiple Poisson regression analyses (with a forward stepwise selection of variables) were performed to evaluate the significance of the factors associated with sexual dysfunction (95% CI for the prevalence ratio). The level of statistical significance was set at 5%, and the sampling clusters (census tracts) were taken into consideration in the bivariate and multivariate analyses. All analyses were performed using the SAS (Statistical Analysis System; SAS Institute, Cary, NC, USA) software package for Windows, version 9.2.

Table 2. Association between treated chronic conditions and sexual dysfunction - (SPEQ Score ≤7) — bivariate analysis*

		Sexual dysfunction		
Chronic conditions	n	Yes (no./%)	No (no./%)	*P*
High blood pressure	258	127/49.2	131/50.8	.255
Diabetes	71	37/52.1	34/47.9	.274
Asthma	20	5/25.0	15/**75.0**	**.023**
Depression	110	65/**59.0**	45/40.9	**.005**
Untreated anxiety	112	65/**58.0**	47/41.9	**.006**
Osteoarticular diseases	196	50/**55.5**	40/44.4	**.024**
Chronic conditions	589	281/**47.7**	308/52.3	**.017**
Multimorbities	235	131/**55.7**	104/44.3	**<.001**

Bolded values indicate statistical significance.
*χ^2 test.

RESULTS

Because 71 of the 820 women invited to participate in the study refused to take part, the final sample consisted of 749 women. Of these, 744 women answered all the questions associated with sexual function. The mean age of the study population was 52.5 ± 4.4 years (± SD), whereas mean age at menopause was 46.5 ± 5.8 years and mean age at initiation of sexual life was 19.7 years. The overall prevalence of sexual dysfunction (overall SPEQ score ≤ 7) was 45.5%. Average sexual frequency was once or twice a week (n = 747); however, only one-third of the women were sexually active (n = 334). The principal clinical and demographic characteristics of the sample population are described according to sexual function in Table 1.

Overall, 68.8% of the study population used some form of medication. Most of the women interviewed (72.8%) reported that they had neither used nor were currently in use of any specific treatment for menopausal symptoms. The most commonly used drugs were those for the treatment of cardiovascular diseases (34.6%) followed by antidepressants (14.7%) and anxiolytics (12%) (data not shown in tables). Table 2 shows the associations between chronic conditions and sexual dysfunction. Non-use of medication was associated with an overall SPEQ score >7 ($P = .016$) (data not shown in tables). The multiple regression analysis showed that women who were sexually or physically inactive or who had untreated anxiety were at the highest risk of sexual dysfunction (Table 3).

According to the SPEQ domains, the frequency of sexual activity was not associated with any medication used. However, women with low scores for libido were more likely to be in use of antihypertensive agents ($P = .019$). Low scores for arousal were associated with the use of antidepressants, with the treatment of osteoarticular diseases and with polypharmacy ($P = .003$). Women whose satisfaction score was low were more likely to use antidepressants, drugs for osteoarticular disease or diabetes mellitus, or polypharmacy ($P = .019$). A lower score in the orgasm domain was associated with the use of antidepressants, the treatment of osteoarticular diseases and diabetes ($P < .001$). Using hormone therapy proved protective against loss of libido ($P = .036$) (Table 4).

DISCUSSION

This population-based cross-sectional survey is part of a broader women's health study initiated in 2012 and was

Table 3. Factors associated with sexual dysfunction in the population studied—Poisson multiple regression analysis*

Variable	Cathegories	PR*	95% CI*	*P*
Active sexual life	No	4.05	3.16–5.20	<.001
	Yes (ref.)	1.00	—	—
Physical activity	None	1.49	1.06–2.09	.021
	< 3times/week	1.09	0.71–1.67	.682
	>3 times/week (ref.)	1.00	—	—
Anxiety	Yes/untreated	1.44	1.08–1.92	0.014
	Yes/treated	1.16	0.83–1.63	0.386
	No (ref.)	1.00	—	—

PR = Prevalence ratio (n = 381 escore '>7' and n=298 escore '≤7').
*Variables considered: age, schooling, marital status, menopausal status, age at menopause, time since menopause, smoking, alcoholism, physical activity, body mass index, hypertension, diabetes, dyslipidemia, rheumatologic diseases, osteoporosis, asthma, depression, anxiety, number of diseases, systemic hormone therapy, topical hormone therapy, hormone therapy (systemic, topical, or both), alternative therapies, polypharmacy, type of medicine, no previous use of contraception, and no active sexual life.

conducted to evaluate the association between the use of medications for chronic conditions and FSD in middle-aged women.

Prevalence of Sexual Dysfunction and Medication Use in Middle-Aged Women

The prevalence of 45.3% found for FSD in this sample population was similar to that described in a Brazilian systematic review conducted in 2016, with rates that ranged from 13.3−66.7% in women from southeastern Brazil.[6] The overall prevalence of medication use in this study was 68.8%. This was higher than rates reported in other studies, such as that conducted by Bertoldi et al. Those authors reported differences in the prevalence of medication use in the different regions of Brazil, with values that ranged from 36.4−60.5% in women 40−60 years of age.[22]

Effects of Physical Activity on Sexual Well-Being During Menopause

Physical activity appears to exert a positive effect on the sexual functioning of middle-aged women.[23] Positive body image resulting from exercise also increases sexual well-being.[24] According to the present multiple regression analysis, women who did not practice physical activity were at a higher risk of sexual dysfunction. These findings are in agreement with the results of a recent survey that reported improvements in physiological sexual arousal after acute and chronic exercise. According to those authors, this advantage appears to result from increases in the activity of the sympathetic nervous system and endocrine factors. There is an indirect improvement in sexual satisfaction from the preservation of proprioception, with benefits for cardiovascular health and mood. The anxiolytic effect of physical activity, achieved through different endocrine and metabolic mechanisms, may contribute toward reducing the chronic stress that is so common in untreated anxious women.[25]

Sexual Dysfunction and Medication Use

Medication can influence sexual function through its effects on the central nervous system or the peripheral nervous system[13] or because of hormonal effects. In addition, a significant association has been found between polypharmacy, multimorbidity, and female sexual dysfunction. The medications most commonly used by the women in this study were drugs for cardiovascular disease. When the individual SPEQ domains were evaluated, women with low scores in the arousal domain were found to be more likely to be using antihypertensives ($P = .019$). Data in the literature have shown high rates of sexual dysfunction in hypertensive women in all the domains of the sexual function questionnaire.[26,27]

A correlation was found between anti-diabetic drugs and the domains of satisfaction and orgasm. It is possible that women using medication for diabetes are less likely to adopt healthy lifestyle habits, leading to sedentariness and, consequently, obesity and depression. These intersecting factors may ultimately worsen sexual health outcomes.

The present analysis revealed a correlation between antidepressant use and lower scores for the domains of arousal, satisfaction, and orgasm. This finding is in agreement with most previously conducted studies, showing that antidepressants lead to sexual dysfunction in female patients.[28] Studies also suggest that suppression of sexual desire is a common finding in antidepressant users, as is delayed orgasm or anorgasmia.[29]

Few studies have adequately investigated the correlation between FSD and anxiolytics. In a group of patients with bipolar disorder, the concomitant administration of benzodiazepines and lithium resulted in significantly higher rates of SD (49%) when compared with the use of either lithium alone (14%) or lithium in combination with other drugs (17%).[30] The use of alprazolam as a treatment for patients with panic disorder resulted in significant rates of decreased libido and increased erectile and orgasmic dysfunction.[31] Those studies were not specifically designed for the middle-aged female population, and the available evidence is too limited to allow any definitive conclusions to be drawn. On the other hand, our findings point to a potential effect associated with the use of psychotropic drugs on FSD. An association was also found between anxiolytics and FSD. This is an important issue that should always be discussed with the patient before a specific treatment is administered.

In the present study, drugs used to treat asthma were significantly associated with overall sexual dysfunction (score $\leq$ 7). Although the number of women was small, those who had asthma and were under treatment for it were less likely to have sexual dysfunction compared with those who were not receiving medication. Among treated asthmatic women, the domain with the highest score was the orgasm domain. Sexual activity itself can cause anxiety in patients who are already anxious and who fear that intercourse will cause severe dyspnea or suffocation.[30]

According to the present data, using hormone therapy was protective against loss of libido. This finding is in line with the latest position statement issued by the North American Menopause Society,[32] which recommends the use of transdermal hormone therapy if sexual function or libido are concerns in women with menopausal symptoms. The same position statement recommends the use of low-dose vaginal estrogen therapy to improve sexual function in postmenopausal women with the genitourinary syndrome of menopause, particularly in cases of symptomatic vulvovaginal atrophy.

The concomitant use of multiple medications, referred to as polypharmacy, is commonly associated with multimorbidity, because $\geq$1 drugs may be used to treat each condition. In the present analysis, polypharmacy was associated with lower scores for the domains of arousal and satisfaction. The risk of adverse effects and harm grows as the number of drugs increases due to overlapping factors that include drug-drug interactions and drug-disease interactions.[5,22] Therefore, the benefits of the final combination of medications should outweigh the risks and should take sexual function into consideration.

Table 4. Scores of Short Personal Experiences Questionnaire domains according to medication use — bivariate analysis*

	Types of medication, n (%)							
SPEQ domains scores	Hypertension (n = 258), n (%)	Antidepressants (n = 110), n (%)	Anxiolytics (n = 90), n (%)	Asthma (n = 20), n (%)	Osteoarticular diseases (n = 90), n (%)	Diabetes (n = 71), n (%)	Hypertension (n = 154), n (%)	Polipharmacy (n = 182), n (%)
Frequency								
Normal	165 (64.0)	69 (62.7)	61 (67.8)	16 (80.0)	59 (65.6)	44 (62.0)	108 (69.7)	125 (68.3)
Altered	93 (36.0)	41 (37.3)	29 (32.2)	4 (20.0)	31 (34.4)	27 (38.0)	47 (30.3)	58 (31.7)
P	.075	.358	.903	.401	.649	.067	.732	.937
Desire								
Normal	70 (27.1)	30 (27.3)	29 (32.2)	8 (40.0)	24 (26.7)	18 (25.4)	91 **(59.0)**	55 (30.2)
Altered	188 **(72.9)**	80 (72.7)	61 (67.8)	12 (60.0)	66 (73.3)	53 (74.6)	63 (41.0)	127 (69.8)
P	**.019**	.257	.927	.645	.264	.234	**.036**	.243
Arousal								
Normal	140 (54.3)	49 (44.5)	48 **(53.3)**	13 (65.0)	42 (46.7)	33 (46.5)	84 (54.5)	91 (50.0)
Altered	118 (45.7)	61 **(55.5)**	42 (46.7)	7 (35.0)	48 **(53.3)**	38 (53.5)	70 (45.5)	91 **(50.0)**
P	.134	**.005**	**.028**	.057	**.015**	.060	.404	**.019**
Satisfaction								
Normal	147 (57.0)	48 (43.6)	48 **(53.3)**	14 (70.0)	43 (47.8)	33 (46.5)	91 (59.1)	95 (52.2)
Altered	111 (43.0)	62 **(56.4)**	42 (46.7)	6 (30.0)	47 **(52.2)**	38 **(53.5)**	63 (40.9)	87 **(47.8)**
P	.324	**<.001**	**.011**	.074	**.040**	**.019**	.874	**.018**
Orgasm								
Normal	139 (54.0)	46 (41.8)	47 **(52.8)**	14 (70.0)	41 (45.6)	32 (45.1)	89 (57.8)	94 (51.7)
Altered	118 (46.0)	64 **(58.2)**	42 (47.2)	6 (30.0)	49 **(54.4)**	39 **(54.9)**	65 (42.2)	88 (48.3)
P	.104	**<.001**	**.035**	**.019**	**.013**	**.033**	.983	.057

Bold values indicates statistical significance.

*χ^2 test.

The present interviews also assessed a history of hormone-responsive cancer and the use of drugs that are commonly prescribed to cancer survivors, such as GnRH agonists and tamoxifen. This part of the investigation revealed that few women (n = 6) used these drugs. Such a small sample size led to the decision to exclude these cases from the statistical analysis, although these drugs could potentially exert a negative effect on female sexual function.

Sexual Dysfunction and Chronic Conditions

Cardiometabolic risk factors such as diabetes mellitus have recently been highlighted as an important etiological determinant of FSD.[33,34] In the present study, diabetes was analyzed as a chronic disease in the sample population, with no distinction being made regarding whether this was type 1 or type 2 diabetes mellitus. According to this analysis, there was no association between diabetes and the overall SPEQ score. In their review, Maseroli et al[33,34] found no conclusive evidence on predictors of FSD in women with diabetes mellitus. Notably, in many studies, psychological and relational factors were reported as the main contributors.[35] Those authors concluded that, although epidemiologic studies show that FSD is a common comorbidity in women with diabetes mellitus, a cause-effect relationship between these 2 clinical conditions cannot be assumed from current data.

Adverse effects on sexuality have been widely reported in studies of women with chronic conditions, such as rheumatic diseases, fibromyalgia, and chronic pain.[36] Physical and emotional problems and partnership difficulties resulting from disease-related stress may contribute to a less-active and less-enjoyable sex life. Diseases that lead to chronic pain and fatigue, as well as the use of medications for those conditions, reduce patients' self-esteem and could hamper sexual function. In this respect, the present study evaluated the effects of chronic diseases on female sexual function, with particular attention being paid to osteoarticular diseases. Women with osteoarticular diseases, either treated or untreated, were more likely to score poorly in the domains of arousal, satisfaction and orgasm.

Depressive symptoms are independently and bidirectionally associated with hypoactive sexual desire disorder. The presence of depression confers a 50−70% increased risk of sexual dysfunction, whereas sexual dysfunction is associated with a 130−210% increased risk of depression [5]. In this study, women with depression who were not under treatment were more likely to have lower scores in the libido, satisfaction, and orgasm domains.

Because of the poor rates of diagnosis of anxiety disorders and their overlap with symptoms of the menopausal transition, most patients remain untreated, particularly in primary care settings.[37] 1 of the main factors associated with sexual dysfunction in this study sample was untreated anxiety. Anxiety is a common complaint during the menopausal transition, mainly due to hormonal changes. The presence of estrogen receptors in the brain reinforces the hypothesis that estrogen exerts mediating effects on mood.[38] Decreased estrogen levels may lead to reduced bioavailability of neurotransmitters, increasing mood disorders in women during the menopausal transition. Severe somatic symptoms of the menopausal transition such as hot flashes, sleep disorders and muscle and joint complaints may also worsen anxiety. If untreated, anxiety disorders tend to become chronic in middle-aged women,[39] overlapping with the somatic symptoms of hypoestrogenism and potentiating these symptoms. A long delay between diagnosing anxiety and initiating treatment can have a devastating effect on the sexual life of affected women.[40] Anxiety in relation to sexual performance introduces a psychological impediment to sexual activity, and, in the absence of specific sexual problems, high levels of anxiety may trigger dysfunctions.[35] A diagnosis of sexual dysfunction in anxious women requires meticulous investigation into the woman's sexual history and anxiety symptoms.

Patients with asthma may be more likely to suffer a dysfunction in the sexual sphere compared with the healthy population. A recent study showed that lack of control of the disease could be 1 of the principal factors contributing to the existence of sexual dysfunction.[31] Those investigators also showed that one-third of their patients attributed their sexual problems to aspects such as the severity of their asthma, control and deterioration of lung function, and the duration of the disease. Patients with bronchospasm may benefit from the use of a bronchodilator before sex.

The aging process is commonly associated with an increased risk of a broad range of chronic health conditions. Valadares et al[41] found that sexual dysfunction was associated with multimorbidity, a condition in which the overlapping of multiple chronic diseases can impact women's interest and ability to enjoy sexual activity. Therefore, women with multiple chronic health conditions are at an increased risk of impaired sexual function.[42] Physicians must take the sexual needs and sexual dysfunction of their female patients into consideration, particularly in the case of women with chronic diseases, because these are the women who tend to use several different medications concomitantly.

Limitations and Strengths of the Present Study

Some limitations of this study must be considered, particularly bearing in mind that much of the data was self-reported, which may lead to biases. However, previous studies using self-reports suggest that data obtained from self-perception are valid.[43] Another limitation refers to the cross-sectional nature of the study that does not allow any causal relationships to be established between pharmacotherapy and factors associated with sexual dysfunction. On the other hand, this observational study provides an epidemiological contribution. The meticulous methodology and the representativeness of the population sample permit these conclusions to be extrapolated to the entire population of middle-aged women residing in the metropolitan region of Campinas, Brazil. The interviewers were trained to request the prescription or the packaging containing the drug name whenever this was necessary to ensure that the medication being used by the women was accurately recorded. Other

strongpoints of this study were the use of the Short Personal Experiences Questionnaire, which has been translated into Portuguese and adapted for use in Brazilian menopausal women, and the training given to the interviewers, all of whom had at least 11 years of formal education and were qualified to explain the questionnaire to those women with poorer education levels.

CONCLUSIONS

The results of the present study showed no association between the use of medications for chronic diseases and an overall SPEQ score indicative of sexual dysfunction. Behavioral factors and untreated anxiety may have overlain the effects of medications in the association with sexual dysfunction. Controlling anxiety symptoms with pharmacological treatment may result in a meaningful improvement in sexual-related quality of life. Nevertheless, many medical treatments contributed to decreasing scores in the sexual function domains evaluated in the present paper. Commonly implicated medications included in this analysis were antihypertensives, antidepressants, treatment for osteoarticular disease, medication for diabetes and polypharmacy. The use of hormone therapy served as protection against loss of libido.

Understanding the potential for drug-induced sexual problems will enable the clinician to tailor treatments for the patient and his/her partner. Encouraging a discussion with the patient about sexual function and providing strategies to manage this multifactorial problem are critical steps in good medical practice.

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