Relationship between loss of libido and signs and symptoms of depression in a sample of Puerto Rican middle-aged women

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Female sexual dysfunction is a multi-causal and multidimensional problem combining sexual, physiological, physical, psychological, and interpersonal determinants. Loss of libido or loss of sexual desire, as a symptom of one of the primary sexual dysfunctions described in females, is highly prevalent in the general female population. Research on the psychological aspect associated with loss of libido among Hispanic female populations is limited. The objective of this study was to determine how the loss of libido is affected by signs and symptoms of depression, once potential confounders are controlled. Nine-hundred and nineteen Puerto Rican women ages 40 to 59 years living in Puerto Rico participated in health-fairs conducted in twenty-two municipalities between May 2000 and November 2001. Contingency tables and chi-square statistics were used to evaluate the bivariate associations of loss of libido with demographic and lifestyle characteristics, symptom experience and obstetric and gynecologic histories. A logistic regression model was used to estimate the magnitude of the association between loss of libido and signs and symptoms of depression, after controlling for confounders. The overall prevalence of loss of libido in this population was 40.8%. Loss of libido was significantly associated with depressive symptoms ($p<0.05$) after adjusting for age, educational attainment, employment status, physical activity, menopausal status/ hormone therapy use and genitourinary symptoms. Women reporting 1-2 depressive symptoms were 67% (95% CI=1.08-2.60) more likely than women reporting no symptomatology to report loss of libido. The odds of loss of libido increased as the number of depressive symptoms increased [(3-4 symptoms: POR= 3.67, 95% CI=2.16-5.56); (5-6 symptoms: POR= 5.52, 95% CI=3.16-9.66)]. Consistent with previous studies, signs and symptoms of depression were significantly associated with loss of libido. Future longitudinal studies should further elucidate the temporal sequence between depression and sexual dysfunctions in this population.

Key words: Loss of libido, Puerto Rican women, Depressive symptoms.

Female sexual dysfunction is a multicausal and multidimensional problem combining sexual, physiological, physical, psychological, and interpersonal determinants (1). Studies have shown female sexual dysfunction to be highly prevalent. Data from the National Health and Social Life Survey found that sexual dysfunction is more prevalent in women (43%) than in men (31%) (2,3). Community-based studies indicate a prevalence of sexual dysfunction among all women between 25% and 63% (2,4), while the prevalence of sexual dysfunction in post menopausal women varies from 68% to 86.5% (2,5,6). Among the sexual dysfunctions described in females, loss of libido or low sexual desire has been highly prevalent in the general female population and has been the most common presenting problem in clinical institutions (7).

Libido is defined as sex drive or general level of sexual desire (8). According to the revision of the International Classification of Diseases (ICD-10) and the 10th revised edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-4), hypoactive sexual desire disorder is defined as "persistent or recurrent deficiency or absence of sexual fantasies and desire for sexual activity, causing marked distress or interpersonal difficulty" (1,9). The Report of the International Consensus Development Conference on Female Sexual Dysfunction evaluated and revised existing definitions and classifications of female sexual dysfunction. As part of this revision, the definition of hypoactive sexual desire disorder was broadened to include a lack of receptivity to sexual activity, emphasizing the persistent lack or deficiency of well accepted markers

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of desire, such as sexual thoughts or fantasies and desire or receptivity to initiation by a partner (1). In addition to revisions of sexual dysfunction definitions, new models of sexual response cycles for women proposed by Basson (10) differ from the traditional ones described by Masters and Johnson and by Kaplan (1,8). These new models emphasize the complexity of women's sexuality and indicate the need for additional descriptors such as former interpersonal relationships, current interpersonal difficulties, partner sexual dysfunction, unsatisfactory sexual and emotional contexts, medical conditions, menopausal status, psychiatric conditions, among others (11).

A number of factors have been consistently described in the literature to be associated with loss of libido among women, including increasing age, lower educational attainment, postmenopausal status and signs and symptoms of depression (11-20). Overall, mental well-being has shown to be a strong predictor of women's sexual desire in both cross-sectional and longitudinal studies (14). A recent national survey performed in the United States showed that 24% of women reported being markedly distressed about their sexual relationships and their own sexuality (14,21). Additional studies have shown that symptoms and signs of depression, such as mood instability, fragile self-esteem, a tendency to be more worried, anxious, and introverted feelings of guilt, are reported more frequently by women with low desire (7,12,18,22). Although the association between loss of libido and self-reported depression has not been consistent in all studies, (23) this association is consistent among multiple studies using various depression scales, such as the Short-Form 36-Item Mental Component Scale (SF-36 MCS) and the Center for Epidemiological Studies Depression Scale (CES-D) (2,15,17).

The study of female sexual dysfunction in Puerto Rico is lacking. To our knowledge, this is the first study conducted in this population that intends to describe factors associated with loss of sexual desire, as a symptom of sexual dysfunction, focusing on depressive symptomatology. The present cross-sectional study characterized loss of libido in a sample of middle-aged (40-59 years) Puerto Rican women and evaluated the relationship between reported loss of libido and signs and symptoms of depression.

Methods

Study participants and data collection

Between May 2000 and November 2001, the *Centro Mujer y Salud* of the School of Medicine of the University of Puerto Rico hosted 73 health fairs in 22 municipalities across Puerto Rico. Activities were held both during the week and weekends, and sites included shopping malls, work places, universities, health facilities, nursing homes and residential complexes. Women were offered a calcaneous ultrasound bone assessment (QUS) to determine risk of osteoporosis, given information on menopause and hormone therapy (HT), and asked to complete a self-administered health history questionnaire. The data collection instrument obtained information on demographic characteristics, lifestyle practices, obstetric and gynecologic history, including menstrual status, the use of oral contraceptives, HT use and symptom experience. A total of 3,258 women attended these fairs, although 777 did not fill out the questionnaire. Seventy women did not sign the informed consent, 711 women were outside the eligible age group of 40-59 years, and 39 were not from a Puerto Rican ethnic background. Among the 1,661 eligible women, 350 did not provide responses to demographic and reproductive sections of the questionnaire, 39 did not identify cessation of menses or provide sufficient information to determine current status of HT use, 352 women did not provide information about symptom experience and one did not provide information on loss of libido. Thus, among age-eligible study participants, 919 (55%) women were eligible for this analysis. Additional details about the study design and data collection have been previously described elsewhere (24,25). This study was approved by the Institutional Review Board (IRB) from the University of Puerto Rico, Medical Sciences Campus.

Measurement of study variables

Loss of libido was defined as self-reported loss of sexual desire experienced during the last two months previous to the interview. Information on additional symptoms experienced during the last two months included: lower concentration on daily labor (yes/no), lack of energy to do usual chores (yes/no), lack of interest (yes/no), feeling tired most of the day (yes/no), difficulty making decisions (yes/no), and reduced mood (yes/no). These symptoms were grouped to define the variable of depressive signs and symptoms (1-2 symptoms, 3-4 symptoms and 5-6 symptoms) using a scale previously created for this study population by principal factor analysis (Cronbach alpha=0.79) (23). Age was defined both as a categorical variable (40-49 and 50-59 years). Educational level attained was categorized into two levels (12 years of education or less/more than 12 years of education). Other demographic variables included: current employment status (employed/unemployed) and partnership (couple or no couple). Lifestyle characteristics considered: current cigarette smoking (yes/no), physical activity defined as exercising

at least twice a week (yes/no), and alcohol consumption (yes/no). Body mass index (BMI) was determined using self-reported height and weight and classified into three categories (<25 kg/m^2, 25-29.9 kg/m^2, ≥30 kg/m^2). Obstetric history included parity measured as number of live births and categorized as: 0, 1-2, and ≥3 children. Gynecologic history included menopausal status and use of HT, and defined as follows: pre-menopausal, post-menopausal without current use of HT and post-menopausal with current use of HT. Women were defined to be premenopause if their menses had occurred within the last 12 months. Post-menopause was defined as natural menopause, menses stopping for at least 12 months without surgery, pregnancy, or other obvious cause, and surgical menopause, menses stopping as a result of hysterectomy and/or bilateral oophorectomy. Lifetime use of oral contraception (OC) was also gathered (never/ever). The variable genitourinary symptoms (any/none) considered that women reported having experienced any of the following symptomatology also during the two months previous to the interview: pain during sexual intercourse (yes/no), vaginal itching (yes/no), vaginal dryness (yes/no), and incontinence (yes/no) (24,25).

Statistical analysis

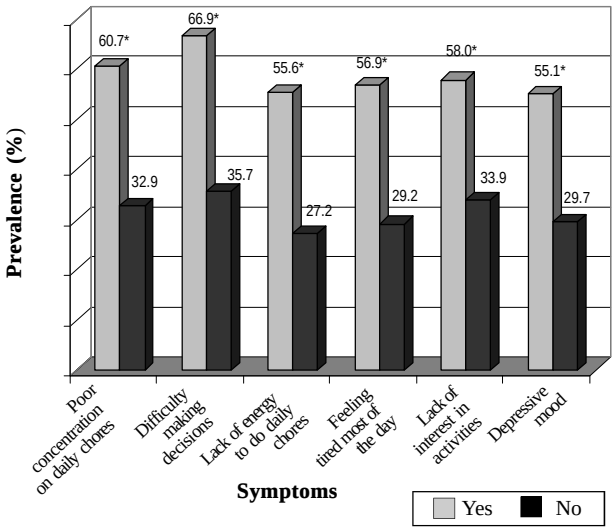
Contingency tables were used to assess the relationship between loss of libido and the following variables: symptoms experience, demographic, lifestyles, and obstetric and gynecologic history. Chi-square tests were used in each contingency table to explore how individual factors affected loss of libido.

To determine the magnitude of the association between loss of libido and signs and symptoms of depression, the prevalence odds ratio (POR) (crude and adjusted) were estimated with 95% confidence intervals using a logistic regression model (26). The potential confounder variables for the adjusted POR were selected from the bivariate analyisis. Interaction terms in the logistic regression model were analyzed using the Likelihood Ratio Test (LRT). Data were analyzed using SAS version 8 (SAS Institute Inc., Cary, NC).

Results

Of 919 women in the study sample, 375 (40.8%) reported loss of libido. All symptoms included in the depressive symptoms scale were independently associated (p<0.0001) to loss of libido. Specifically, the prevalence of loss of libido was higher (55%-66%) among women who reported any of the studied symptoms than in those not reporting these symptoms (27%-32%) (Figure 1). The prevalence of

Figure 1. Prevalence of loss of libido by signs and symptoms of depression, among women aged 40-59 (n=919).



*p<0.0001

loss of libido increased from 22% in women with no depressive symptomatology, to 35% among those who reported 1-2 symptoms, 54% among those with 3-4 symptoms and 72% among those with 5-6 symptoms. Loss of libido was lower among women aged 40-59 years (34%) than among those aged 50-59 years (49%) (p<.0001). Loss of libido was also associated to educational attainment and working status; being less reported among women with lower educational attainment and those currently working. Meanwhile, loss of libido was higher among women with a partner (50%) than among those without a couple (22%). Other factors associated to loss of libido included alcohol use, current smoking status, parity, menopausal/HT use status and genitourinary symptoms. Ever use of OC and BMI were not associated with loss of libido (p > 0.05) (Table 1).

Multivariate analysis. Signs and symptoms of depression were significantly (p<0.05) associated to loss of libido after adjusting for age, educational attainment, employment status, physical activity, menopausal status/HT use and genitourinary symptoms. Women reporting 1-2 depressive symptoms were 67% (95% CI=1.08-2.60) more likely than women reporting no symptomatology to report loss of libido. A trend was observed were the odds of loss of libido increased as the number of depressive symptoms increased [(3-4 symptoms: POR= 3.67, 95% CI=2.16-5.56); (5-6 symptoms: POR= 5.52, 95% CI=3.16-9.66)] (Table 2). Interaction terms between depressive symptoms and other relevant covariates were not significant (data not shown).

Table 1. Distribution of demographic, lifestyle and health characteristics of Puerto Rican females aged 40-59, by loss of libido status (n=919).

	Loss of Libido				p-value
	Yes		No		
	n	%	n	%	
Symptom experience					
Signs and symptoms of depression† (n= 919)					<.0001
No symptoms	64	22.15	225	77.85	
1-2 symptoms	99	34.62	187	65.38	
3-4 symptoms	107	54.04	91	45.96	
5-6 symptoms	105	71.92	41	28.08	
Genitourinary symptoms (n=919)					<.0001
None	84	21.32	310	78.68	
Any	291	55.43	234	44.57	
Demographic characteristics					
Age groups (n=919)					<.0001
40-49 years	172	34.26	330	65.74	
50-59 years	203	48.68	214	51.32	
Educational attainment† (n=918)					0.0002
d" 12 years	232	46.22	270	53.78	
> 12 years	142	34.13	274	65.87	
Employment Status‡ (n=896)					<.0001
Employed	172	34.26	330	65.74	
Unemployed	199	50.51	195	49.49	
Partnership (n=914)					<.0001
Couple	307	51.60	288	48.40	
No couple	68	21.32	251	78.68	
Lifestyle					
Current cigarette smoking (n=874)					0.0485
Yes	22	29.73	52	70.27	
No	332	41.50	468	58.50	
Body mass index (kg/m^2) (n=868)					0.6472
< 25	70	39.11	109	60.89	
25- 29.9	153	42.62	206	57.38	
≥ 30	131	39.70	199	60.30	
Physical activity (n=864)					0.0082
Yes	99	34.38	189	65.63	
No	252	43.75	324	56.25	
Alcohol use (n=865)					0.0406
Yes	72	34.62	136	65.38	
No	280	42.62	377	57.38	
Obstetric History					
Parity ‡ (n=892)					0.0103
0 children	24	31.58	52	68.42	
1-2 children	141	37.60	234	62.40	
≥ 3 children	203	46.03	238	53.97	
Gynecologic history					
Menopausal status and current HT use (n=800)††					<.0001
Pre-menopause	148	32.89	302	67.11	
Post-menopause not using HT	72	45.28	87	54.72	
Post-menopause using HT	102	53.40	89	46.60	
Use of oral contraceptives (n=876)					
Never	129	39.69	196	60.31	0.5512
Ever	230	41.74	321	58.26	

† Mantel-Haenszel Chi-square test for trend= 117.72, p<0.001
‡ Mantel-Haenszel Chi-Square test for trend= 9.05, p=0.0026
†† 52 women were excluded from this analysis as they reported current HT use and to be menstruating, thus, menopausal status could not be accessed.

Discussion

This cross-sectional study characterized loss of libido by signs and symptoms of depression in a sample of middle-aged (40-59 years) Puerto Rican women living in Puerto Rico. Nearly 41% of the study sample reported having experienced loss of libido during the two months previous to the interview. The prevalence of loss of libido was higher in our study sample than that reported in studies in the US (24%-31%) (3,17,22) and Brazil (27%) (23). Differences in age groups included for analysis, other population characteristics, the time frame used to define prevalence, and the use of validated scales to characterize signs and symptoms of depression, may account for some of these differences.

When demographic, lifestyle, and health characteristics were analyzed by loss of libido status in bivariate analysis, we found that age, educational attainment, employment status, partnership status, current smoking, parity, physical activity, menopausal status with HT use and genitourinary symptoms were associated with loss of libido. These associations are all consistent with previous studies (11-20) and highlight the importance of these variables in studies of female sexuality.

The observed associations between loss of libido and all signs and symptoms of depression studied, is consistent with previous studies of female sexual desire (2,7,12,15,17,18,22). Our results for the grouped variable of signs and symptoms of depression, showed that women reporting these symptoms were more likely to report loss of libido when compared to women without any depressive symptomatology, after adjusting for age, educational attainment, employment status, physical activity, menopausal status and HT use and genitourinary symptoms. The association between depressive symptomatology and loss of libido was supported by evidence of a dose-response trend, where women reporting 5-6 symptoms had more than 5-fold odds of reporting loss of libido as compared with

Table 2. Crude and adjusted prevalence odds ratios (and 95% confidence intervals) for the association between loss of libido and signs and symptoms of depression, Puerto Rican women aged 40-59.

	Crude model		Adjusted Model*†	
Characteristic	**POR**	**95% CI**	**POR**	**95% CI**
Signs and symptoms of depression				
No symptoms‡	1.00	—	1.00	—
1-2 symptoms	1.81	1.24-2.64	1.67	1.08-2.60
3-4 symptoms	4.14	2.76-6.22	3.67	2.16-5.56
5-6 symptoms	9.08	5.67-14.54	5.52	3.16-9.66

*Adjusted by age, educational attainment, employment status, physical activity, menopausal status and HT and genitourinary symptoms.
† Interaction terms for depressive symptoms and other relevant covariates were not significant (p>0.05)
‡ Referent category

women with no symptomatology.

The association between psychosocial factors, such as depressive symptomatology, and sexual dysfunction may be bidirectional in terms of causation. Several studies have shown that the presence of certain sexual symptoms and disorders, such as arousal and orgasm problems, inhibited enjoyment, vaginal dryness, and dyspareunia, are associated with depression (14,18). However, another study showed that sexual arousal, desire, and pain disorders have been demonstrated for conditions for which causation is unlikely, including poor overall health, emotional problems or stress, change in social status, and a history of sexual coercion (3,18). Bidirectionality is evidently dependent on individual patients and may be cyclic in nature for many of them, creating a marked difference in the sexual experience for each separate individual and making sexual dysfunction and loss of libido conceptualized as a global inhibition of sexual response, instead of discrete phase disorders (3,7,18). In addition, treatment with certain antidepressants has been shown to increase the risk of sexual dysfunction (18,27). Consistent with the bidirectionality of the associations between depressive symptoms and sexual dysfunction, if the treatment for a depressive symptom is the cause of the sexual dysfunction or the depressive symptom is the one causing the dysfunction, needs to be further explored.

Several study limitations need to be considered when interpreting our results. Our results may be affected by selection bias, as only women who attended the health fairs were recruited into the study. Since one of the main focuses of the health fairs was to provide information on menopause and HT, women recruited into the study might have been those most affected by symptoms, thus selection bias might account for the high prevalence of symptoms observed among our study sample. To assess the potential for selection bias, previous comparisons of our study sample with data from the Puerto Rico Public Use Microdata Sample (5%) from the Census 2000 and the 2000 Behavioral Risk Factor Surveillance Survey for women aged 40-59 have been made (24). Overall, our study sample was similar to the Census 2000 in the distribution of women who receive social aid from the government and marital status, although a larger proportion of women aged 45-49 (30%) and a smaller proportion of women aged 55-59 (17%) were included in the study as compared with the census (26% and 21% respectively). Study participants were also more likely to be employed (56%) than in the census (41%) and had higher educational attainment.

Our results may also be affected by information bias, as the definition of loss of libido and depressive symptoms was based on self-reports, and not based on official diagnostic definitions or a standardized depressive scale. According to the DSM-4, major depression is diagnosed if at least five of the following criteria are present during the previous two week period and the symptoms represent a change from previous level of functioning (significant distress or impairment in social, occupational, or other important areas of functioning): depressed mood, nearly every day during most of the day, marked diminished interest or pleasure in almost all activities, significant weight loss, weight gain, or a change in appetite, insomnia or hypersomnia, psychomotor agitation or psychomotor retardation, fatigue or loss of energy, feelings of worthlessness or inappropriate guilt, impaired ability to concentrate or indecisiveness, and/or recurrent thought of death, recurrent suicidal (9). Although the signs and symptoms of depression reported by the women in this study are mostly included in the definition of major depression, the length of time of symptom duration since its onset and the previous sexual functioning of study participants was not assessed in the questionnaire. In addition, information on medication use and history of sexual abuse/assault (28) were not accessed, both of which could have an impact on sexual desire and/or depressive mood.

This study constitutes the first attempt to characterize the psychological aspect of a broad spectrum of factors associated to loss of libido in a middle-aged sample of Puerto Rican women living in Puerto Rico. Our results offer valued matters of discussion into the context of psychological health in middle-aged Hispanic women, exposing the idea that comorbidity with other demographic, lifestyle, obstetric and gynecologic characteristics, and general well-being affect loss of libido. Female sexual dysfunction is a complex disorder including sexual well-being, physiological, and psychosocial factors poorly studied in our population. Nonetheless, our results agreed

with prior studies regarding the potential association between depressive symptomatology and loss of libido. Given the high complexity and the recent biopsychosocial approach given to the study of female sexual dysfunction, along with the high prevalence of self-reported loss of libido observed in our study population, additional studies of female sexual dysfunction and its association with depression are highly warranted, as well as studies focused on determining additional independent factors associated with other sexual symptoms and dysfunctions in Puerto Rico. Specifically, prospective studies should be developed, aimed at elucidating the temporal sequence of the association between depression and loss of libido. These studies should employ appropriate diagnostic tools, in order to correctly measure depression and sexual dysfunction status of study participants, and thus reduce the potential for misclassification bias. These studies should also include a thorough personal history on socio-demographic matters, along with a complete obstetric and gynecologic history detailing reproductive matters such as mode of delivery, breastfeeding, and reproductive history including surgical sterilization, factors not analyzed in our study but that could also be associated with sexual symptoms and dysfunctions in Puerto Rican women.

Sexual dysfunction, depression, and its implications in the quality of life of women are relevant areas of women's health, still not openly discussed in our population, that require further attention within our health care setting. Clinicians must consider the need to inquire and orient patients about the presence of sexual matters when at clinics. This will be essential for developing appropriate intervention strategies, including a broad-spectrum diagnosis and treatment approach, that promote and maintain the sexual and mental health of female populations.

Resumen

La disfunción sexual femenina es un problema causado por una combinación de factores sexuales, fisiológicos, físicos, psicológicos e interpersonales. La pérdida de libido o deseo sexual, síntoma de una de las principales disfunciones sexuales en la mujer, tiene una alta prevalencia en la población femenina. Estudios de investigación sobre el aspecto psicológico asociado a la pérdida de deseo sexual en poblaciones de mujeres hispanas son limitados. El objetivo principal de este estudio fue determinar como la pérdida de libido es afectada por signos y síntomas de depresión, ajustado por variables de confusión. Novecientas diecinueve mujeres puertorriqueñas entre las edades de 40 a 59 años viviendo en Puerto Rico participaron de ferias de salud llevadas a cabo en 22 municipios entre mayo de 2000 y noviembre de 2001. Se utilizaron análisis de tablas de contingencia y la prueba de ji-cuadrada para evaluar las asociaciones bivariadas entre la pérdida de líbido y las características demográficas, estilos de vida, síntomas médicos e historiales obstétricos y ginecológicos. Un modelo de regresión logística fue utilizado para estimar la magnitud de la asociación entre la pérdida de deseo sexual y los signos y síntomas de depresión, luego de controlar por variables de confusión. La prevalencia de pérdida de libido en esta población fue de un 40.8%. La prevalencia de pérdida de libido estuvo significativamente asociada con síntomas de depresión ($p<0.05$), luego de controlar por edad, nivel de educación, empleo, actividad física, estado de menopausia y uso de terapia hormonal y síntomas genitourinarios. Las mujeres que reportaron de 1-2 síntomas de depresión tuvieron 67% (95% CI=1.08-2.60) mayor posibilidad de pérdida de deseo cuando fueron comparadas con aquellas que no reportaron ningún síntoma. La posibilidad de pérdida de deseo sexual aumentó a medida que los signos y síntomas de depresión aumentaron [(3-4 síntomas: POR= 3.67, 95% CI=2.16-5.56); (5-6 síntomas: POR= 5.52, 95% CI=3.16-9.66)]. Consistente con estudios previos, los signos y síntomas de depresión estuvieron significativamente asociados a la pérdida de deseo sexual. Futuros estudios longitudinales deberán elucidar la secuencia temporal entre la depresión y la disfunción sexual en esta población.

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