

Sexual health in menopausal women with symptoms of pelvic floor disorders

Rocío Adriana Peinado Molina¹, Sergio Martínez Vázquez¹, Antonio Hernández Martínez², Juan Miguel Martínez Galiano^{1,3}

ABSTRACT

INTRODUCTION Sexual dysfunction in women is usually associated with the menopausal transition and menopause; however, there are factors that can also influence the sexual function of women in menopause. The aim of this study is to determine the association between pelvic floor disorders and sexual dysfunction in women in menopause.

METHODS A cross-sectional study was carried out in Spain with menopausal women recruited by convenience sampling. Data were collected on background and health status. To evaluate the presence of pelvic floor problems, the Pelvic Floor Distress Inventory (PFDI-20) was used. Regarding the evaluation of female sexual function, the validated Sexual Function of Women (FSM-2) tool was used. Crude (OR) and adjusted odds ratios (AOR) were obtained using the SPSS 28.0 statistical program.

RESULTS A total of 197 women participated. The mean age was 57.7 years (SD=8.4), 51.3% (101 women) reported experiencing some form of sexual dysfunction. Despite this, the majority (79.5%; 155 women) indicated that they were satisfied with their sexual health. However, 25.5% (50 women) mentioned they faced difficulties when trying to initiate sexual intercourse. Additionally, 22.9% (45 women) reported having moderate to severe issues achieving orgasm. Furthermore, 29% (57 women) stated that they had never or only occasionally felt arousal in the past month. Women who experienced urinary incontinence and pelvic pain had a higher frequency of sexual dysfunction. The main associated factor observed was the risk of pelvic floor dysfunction through the PFDI-20 scale. For each point of this instrument, there was a small but increased risk of sexual dysfunction (OR=1.01; $p<0.001$). Type of birth or maternal disorders, such as mental illness or gastrointestinal disorder, did not show any statistical association with sexual dysfunction.

CONCLUSIONS Pelvic floor dysfunctions symptoms in menopausal women are associated with their sexual health. Pelvic floor dysfunctions that influence sexual function are colorectal, urinary, and prolapse. Pelvic floor disorders such as urinary incontinence and pelvic pain are those that most influence sexual function.

AFFILIATION

1 Department of Nursing, University of Jaen, Jaen, Spain

2 Department of Nursing, Physiotherapy and Occupational Therapy, Faculty of Nursing, University of Castilla-La Mancha, Ciudad Real, Spain

3 Consortium for Biomedical Research in Epidemiology and Public Health (CIBERESP), Madrid, Spain

CORRESPONDENCE TO

Sergio Martínez Vázquez. Department of Nursing, University of Jaen, 23071, Jaen, Spain.

E-mail: svazquez@ujaen.es
ORCID iD: <https://orcid.org/0000-0002-8752-459X>

KEYWORDS

sexual health, menopause, pelvic floor disorders, sexual dysfunction

Received: 2 September 2024

Revised: 3 October 2024

Accepted: 6 October 2024

INTRODUCTION

Sexuality, according to the World Health Organization (WHO), can influence a woman's quality of life by having effects on her emotional, physical, and psychological well-being, one of its fundamental components¹. There is a widespread and mistaken belief that as people age, they lose both interest in and ability to have sexual relations². However, many women continue to maintain sexual interest; in fact, 76% of women aged 42–52 years consider sex to be important to them³. Thus, approximately 67% of American women aged 65–74 years express the importance they give to sex⁴. At the same time, it is widely recognized that sexual activity declines during the transition to menopause and beyond⁴⁻⁷. Despite the importance of sexual function in women at this stage of life, sexual dysfunction also tends to increase with age⁸. Sexual dysfunction in women is usually associated with the menopausal transition and menopause since they are times characterized by hormonal, physiological, and social changes⁸. Up to 85% of women experience symptoms linked to this transition that vary in intensity and can affect their quality of life⁹. From a physiological point of view, the variation in hormonal levels negatively affects the elasticity of the vaginal mucosa and vaginal lubrication, which leads to vaginal atrophy. Additionally, as we age, the

likelihood of weakening of the pelvic floor increases, leading to conditions such as dyspareunia, chronic pelvic pain, and pelvic organ prolapse⁸.

Pelvic floor problems encompass various problems that can affect this muscular structure. These disorders include situations such as urinary incontinence, pelvic organ prolapse in women, fecal incontinence, and pelvic-perineal regional pain syndrome, among others¹⁰. It is a public health problem with a high prevalence and can affect a quarter of adult women¹¹ negatively, influencing the sexual function of women with these symptoms^{8,12,13}.

Women with pelvic floor dysfunction may experience a decrease in their quality of life and compromised sexual function due to factors such as a negative perception of their body image, anxiety related to incontinence during sexual activity, feelings of shame, dyspareunia, and difficulties in achieving a satisfying orgasm¹⁴⁻¹⁶.

Since the relationship between pelvic floor disorders and sexual function in women during menopause has been investigated to a limited extent^{12,13}, and considering that there are contradictory findings, and further research on the topic is recommended^{17,18}. The aim of the present study was to investigate the association between pelvic floor disorders and sexual dysfunction in women during menopause.

METHODS

Study design, setting and participants

A cross-sectional study was carried out in Spain in 2022 with women who were in menopause. Women with difficulties in the Spanish language or with mental and cognitive problems that affected data collection for the study, were excluded. The women were recruited by convenience sampling.

To carry out this research, it was necessary to recruit at least 196 women based on the following criteria: a confidence level of 95%, an absolute margin of error of 7%, a prevalence in the population of menopausal women of 50% (this criterion is used because it is the most conservative since no recent prevalence data have been located and in addition, different dysfunctions with different prevalence are addressed) in relation to sexual dysfunction.

Data sources, measurement and variables

The recruitment of women was carried out in places frequented by them, such as health centers or GP surgeries, women's associations and information centers, and after their interest in participating in the research, informed consent was obtained, followed by interviews carried out by two trained observers using a questionnaire as a script. The selection of women was carried out consecutively.

Data on sociodemographic and work characteristics, background and health status, as well as habits and lifestyle, were collected through a specifically designed and previously pilot-tested questionnaire, which did not require any posterior modification to launch the data collection.

Additionally, to evaluate the presence of pelvic floor problems, the Pelvic Floor Distress Inventory (PFDI-20) was used, which consists of 20 items composed by 3 subscales. The UDI-6 subscale, composed of 6 items, evaluates urinary

symptoms, the CRADI-8 subscale evaluates colorectal symptoms, while the POPDI-6 subscale, with another 6 items, evaluates prolapse symptoms, all subscales have one score maximum of 100 points each. The PFDI-20 has a total score of 300 points, and a higher score indicates a greater symptom burden¹⁹. To determine the presence of prolapse, an affirmative response to question 3 ('Usually have a bulge or something falling out that you can see or feel in your vaginal area?') of the PFDI-20 Spanish version was considered. Fecal incontinence was assessed by PFDI-20 responses 9 ('Usually lose stool beyond your control if your stool is well formed?') or 10 ('Usually lose stool beyond your control if your stool is loose?'), urinary incontinence by PFDI-20 responses 16 ('Usually experience urine leakage associated with a feeling of urgency, that is, a strong sensation of needing to go to the bathroom?'), 17 ('Usually experience urine leakage related to coughing, sneezing, or laughing?'), or 18 ('Usually experience small amounts of urine leakage (that is, drops?'), and pelvic pain by PFDI-20 responses 20.

Regarding the evaluation of female sexual function, validated in Spanish women, the Women's Sexual Function tool (FSM-2) was used. This self-administered questionnaire consists of 14 questions. Responses were rated on a Likert scale from 1 to 5 and integrated into domains. The questions included in the sexual activity evaluation domains have a score from 1 to 5, while those in the descriptive domain do not have a quantitative value and serve to recognize important aspects, such as sexual frequency or the existence of a partner, as well as questions for the diagnosis of sexual dysfunctions in the patient or her sexual partner²⁰.

With these measurements, sexual dysfunction was studied with the exposure (pelvic floor disorders) considering predictors (e.g. pelvic floor disorders scores) as well as potential confounders (e.g. age, BMI, smoking, alcohol consumption, etc.) and effect modifiers (e.g. type of delivery, etc.).

Definitions

Menopause

The time of life when a woman's ovaries stop producing hormones and menstrual periods stop. Natural menopause usually occurs around the age of 50 years. A woman is said to be in menopause when she has not had a period for 12 months in a row^{8,9}.

Pelvic floor disorders (PFDs)

These include urinary/fecal incontinence, pelvic prolapse, and pelvic pain. A PFD occurs when the muscles or connective tissues of the pelvic area weaken or are injured. The most common PFDs are urinary incontinence, fecal incontinence, and pelvic organ prolapse. PFDs are more common among older women^{11,15,19}.

Sexual dysfunction

Sexual dysfunction includes hypoactive sexual desire dysfunction, female sexual arousal dysfunction, female orgasmic dysfunction, female genital-pelvic pain

dysfunction, persistent genital arousal disorder, postcoital syndrome, hypotonic orgasm, and painful orgasm²⁰⁻²⁷.

Ethical considerations

This study obtained approval from the Research Ethics Committee of the province of Jaén, with the reference number SPCV-0220/0302-N-20, on 26 March 2020. Prior to beginning the questionnaire, the participants received detailed information about the study and its objectives and expressed their informed consent before participating.

Statistical analysis

The information processing was carried out using the IBM SPSS v.28 statistical program. First, descriptive analyses were performed using absolute and relative frequencies for categorical variables, as well as means and standard deviation (SD) for quantitative variables. Subsequently, a bivariate analysis was performed using Pearson's chi-squared test for categorical variables and analysis of variance when the independent variables were categorical and the dependent variables were quantitative (after checking the application assumptions). In this analysis, *post hoc* tests were also performed using Dunnett's C test, which consists of a pairwise comparison based on the studentized range and is appropriate when the variances are unequal. In addition, this same analysis was performed using the non-parametric Kruskal-Wallis test due to the violation of normality. Finally, a multivariate analysis was performed using binary logistic regression to control confusion. Odds ratios (ORs) and adjusted odds ratios (AORs) were calculated with 95% confidence intervals.

RESULTS

A total of 197 women participated. The mean age was 57.7 years (SD=8.4), with a mean BMI of 26.6 (SD=4.3); 86.3% (170) of the participants were non-smokers and 53.8% (106) drank alcohol occasionally, 50.3% (99) of the women had University level in terms of education level.

Regarding personal history, 13.6% (7) of the women had a history of gynecological disease, and 4.6% (9) had gastrointestinal disease. Regarding obstetric history, 85.8% (169) of the women had been pregnant on more than one occasion and 33.5% (66) of the women had experienced a miscarriage. Regarding the type of delivery, 78.7% (155) of the women did not undergo a caesarean section, 71.6% (141) had an episiotomy, and 37.1% (73) who suffered an episiotomy had a tear at the same time (Table 1).

Table 2 shows the distribution of the different domains that evaluate women's sexual function (hypoactive sexual desire dysfunction, female sexual arousal dysfunction, female orgasmic dysfunction, female genital-pelvic pain dysfunction, persistent genital arousal disorder, postcoital syndrome, hypohedonic orgasm, and painful orgasm). It stands out that 51.3% (101) of the women reported having sexual dysfunction. In general terms, 79.5% (155) expressed satisfaction with their sexual health and 75.5% (148) indicated having communication with their partners in intimate relationships. However, 25.5% (50) experienced

Table 1. Sociodemographic and clinical characteristics of the study sample, a cross-sectional study, Spain 2022 (N=197)

Characteristics	n (%)
Age (years), mean (SD)	57.7 (8.4)
30–49.9	27 (13.7)
≥50	170 (86.3)
BMI (kg/m ²)	
Normal weight <25	80 (40.6)
Overweight 25–29.9	79 (40.1)
Obese ≥30	38 (19.3)
Civil status	
Single	6 (3.0)
Separated	1 (0.5)
Divorced	12 (6.1)
Widowed	4 (2.0)
Common-law couple	17 (8.6)
Married	157 (79.7)
Education level	
Primary level, uncompleted	19 (9.6)
Primary level, completed	22 (11.2)
Secondary level	32 (16.2)
High school	25 (12.7)
University level	99 (50.3)
Employment sector	
Administration	17 (8.6)
Agriculture/livestock	10 (5.1)
Commerce	4 (2.9)
Industry and construction	6 (3.0)
Retired	44 (22.3)
Self-employed	25 (12.7)
Public servant	91 (46.2)
Monthly income (€)	
<1000	25 (12.7)
1000–1999	61 (31.0)
2000–2999	61 (31.0)
>3000	50 (25.4)
Alcohol consumption	
Never	43 (21.8)
Occasionally (every 2–3 weeks)	106 (53.8)
Only weekends	18 (9.1)
Frequently (one day if another)	21 (10.7)
Daily	9 (4.6)
Smoking habit	
No	170 (86.3)
Yes	27 (13.7)

Continued

Table 1. Continued

Characteristics	n (%)
Pregnancy	
0	12 (6.1)
1	16 (8.1)
≥2	169 (85.8)
Miscarriage	
0	131 (66.5)
1	56 (28.4)
≥2	10 (5.1)
Vaginal birth	
0	34 (17.3)
1	30 (15.2)
≥2	133 (67.5)
Cesarean births	
0	155 (78.7)
1	26 (13.2)
≥2	16 (8.1)
Instrumental birth	
No	116 (58.9)
Yes	81 (41.1)
Episiotomy	
No	56 (28.4)
Yes	141 (71.6)

Continued

Table 1. Continued

Characteristics	n (%)
Tear	
No	124 (62.9)
Yes	73 (37.1)
Episiotomy and tear	
No	96 (48.7)
Yes	101 (51.3)
Macrosomia	
No	149 (75.6)
Yes	48 (24.4)
Mental health illness	
No	194 (98.5)
Yes	3 (1.5)
Respiratory disorder	
No	191 (97.0)
Yes	6 (3.0)
Gynecological disorder	
No	190 (96.4)
Yes	7 (3.6)
Gastrointestinal disorder	
No	188 (95.4)
Yes	9 (4.6)

Gynecological disease: e.g. cervical, endometrial or ovarian cancer among others.
Gastrointestinal disease: e.g. Crohn's disease, gastric ulcer or irritable bowel syndrome.

Table 2. Distribution of responses regarding women's sexual function by category (FSM-2), a cross-sectional study, Spain, 2022 (N=197)

Dimensions	Evaluation according to the Female Sexual Function (FSM-2) questionnaire		
	Severe disorder n (%)	Moderate disorder n (%)	No disorder n (%)
Sexual response and presence of sexual dysfunction			
Sexual desire	18 (9.1)	63 (32.0)	116 (58.9)
Excitation	10 (5.1)	47 (23.9)	140 (71.1)
Lubrication	19 (9.6)	47 (23.9)	131 (66.5)
Orgasm	23 (11.7)	22 (11.2)	152 (77.2)
Problems with vaginal penetration	16 (8.1)	-	181 (91.9)
Anticipatory anxiety	4 (2.0)	6 (3.0)	187 (94.9)
Relational aspects of sexual activity	Absence of initiation/ sex communication	Initiation/sex communication moderate	No problem with initiation/ sex communication
Sex initiation ^a	50 (25.5)	35 (17.9)	111 (56.6)
Level of sex communication ^a	26 (13.3)	22 (11.2)	148 (75.5)
Sexual satisfaction	Sexual dissatisfaction	Moderate	Satisfactory
Satisfaction of sexual activity ^a	11 (5.6)	19 (9.7)	166 (84.7)
General satisfaction ^b	10 (5.1)	30 (15.4)	155 (79.5)

Continued

Table 2. Continued

<i>Dimensions</i>	<i>Evaluation according to the Female Sexual Function (FSM-2) questionnaire</i>				
	<i>Severe disorder n (%)</i>		<i>Moderate disorder n (%)</i>		<i>No disorder n (%)</i>
Descriptive categories of sexual activity					
Reasons for sexual activity without vaginal penetration (VP)	Due to pain	Due to fear of VP	Due to lack of interest in VP	No sexual partner	Inability of partner for VP
	7 (43.8)	1 (6.3)	5 (31.3)	2 (12.5)	1 (6.3)
Frequency of sexual activity	Times per month				
	1–2	3–4	5–8	9–12	>12
	74 (38.1)	64 (33.0)	44 (22.7)	10 (5.2)	2 (1.0)
Sexual dysfunction					
No	96 (48.7)				
Yes*	101 (51.3)				

*Sexual dysfunction is considered present if one of the 6 first dimensions are affected. a Missing = 1. b Missing = 2.

Table 3. Bivariate and multivariate analysis of pelvic floor problems and sexual dysfunction, a cross-sectional study, Spain, 2022 (N=197)

<i>Pelvic floor problems</i>	<i>Sexual dysfunction</i>		<i>Bivariate analysis</i>	
	<i>No n (%)</i>	<i>Yes n (%)</i>	<i>OR (95% CI)</i>	<i>p</i>
Urinary incontinence				0.043
No @	47 (57.3)	35 (42.7)	1	
Yes	49 (42.6)	66 (57.4)	1.81 (1.02–3.21)	
Fecal incontinence				0.703
No @	88 (49.2)	91 (50.8)	1	
Yes	8 (44.4)	10 (55.6)	1.21 (0.46–3.20)	
Pelvic pain				<0.001
No @	84 (56.4)	65 (43.6)	1	
Yes	12 (25.0)	36 (75.0)	3.87 (1.87–8.04)	
Prolapse				0.090
No @	87 (51.2)	83 (48.8)	1	
Yes	9 (33.3)	18 (66.7)	2.10 (0.89–4.93)	
Score impact of pelvic floor problems	No (N=96) Mean (SD)	Yes (N=101) Mean (SD)	Mean difference (95% CI)	p
Prolapse symptoms (POPDI-6)	9.99 (11.82)	22.23 (23.31)	-12.25 (-17.49 – -7.02)	<0.001
Colorectal-Anal symptoms (CRADI-8)	14.84 (15.76)	22.43 (20.21)	-7.59 (-12.70 – -2.49)	0.002
Urinary symptoms (UDI-6)	18.71 (19.29)	32.38 (30.46)	-13.68 (-20.82 – -6.54)	<0.001
Pelvic function disorders Total (PFDI-20)	43.53 (40.48)	77.05 (68.41)	-33.52 (-49.24 – -17.80)	<0.001

@ Reference categories.

problems when initiating sexual interaction.

Regarding symptoms, 22.9% (45) stated that they had a severe or moderate problem reaching orgasm, and 29% (57) of women stated that they had never or occasionally felt excitement in the last month. Finally, of the 16 women

who had difficulties with vaginal penetration, 43.8% (7) of the women indicated that it was because they felt pain, and 31.3% (5) attributed it to a lack of interest.

Table 3 indicates the bivariate analysis between the different pelvic floor disorders and their association with

Table 4. ANOVA and significance of the comparison of samples and scores on the scales used, a cross-sectional study, Spain, 2022 (N=197)

Variable	Assessment of pelvic floor disorders scales												
	n	POPDI-6 Mean (SD)	Post hoc test Dunnett C	Sig.	CRADI-8 Mean (SD)	Post hoc test Dunnett C	Sig.	UDI-6 Mean (SD)	Post hoc test Dunnett C	Sig.	PFDI-20 Mean (SD)	Post hoc test Dunnett C	Sig.
Sexual response and presence of sexual dysfunction													
Sexual desire				<0.001 ^a <0.001 ^b			<0.001 ^a 0.003 ^b			<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b
Severe	18	44.44 (28.65)	Moderate* No*		34.03 (23.75)	Moderate No*		58.10 (35.22)	Moderate* No*		136.57 (84.56)	Moderate * No*	
Moderate	63	17.59 (19.89)	Severe* No		21.08 (19.36)	Severe No		26.39 (27.95)	Severe* No		65.06 (61.03)	Severe* No	
No	116	16.26 (12.88)	Severe* Moderate		15.08 (15.69)	Severe* Moderate		20.33 (19.90)	Severe* Moderate		46.59 (41.55)	Severe* Moderate	
Excitation				<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b
Severe	10	24.58 (28.29)	Moderate No		18.13 (22.57)	Moderate No		37.50 (37.68)	Moderate No		80.21 (85.79)	Moderate No	
Moderate	47	31.29 (25.62)	Severe No*		29.12 (22.30)	Severe No*		41.76 (33.36)	Severe No*		102.17 (75.64)	Severe No*	
No	140	10.63 (12.53)	Severe Moderate*		15.29 (15.42)	Severe Moderate*		19.49 (19.79)	Severe Moderate*		44.41 (40.87)	Severe Moderate*	
Lubrication				<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b
Severe	19	17.76 (22.82)	Moderate No		17.43 (18.87)	Moderate No		30.48 (30.05)	Moderate No		65.68 (67.02)	Moderate No	
Moderate	47	30.23 (25.81)	Severe No*		29.06 (21.61)	Severe No*		41.49 (33.85)	Severe No*		100.78 (76.11)	Severe No*	
No	131	11.04 (13.06)	Severe Moderate*		15.22 (15.86)	Severe Moderate*		19.37 (19.80)	Severe Moderate*		44.63 (41.69)	Severe Moderate*	
Orgasm				<0.001 ^a <0.001 ^b			<0.001 ^a 0.004 ^b			<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b
Severe	23	34.06 (29.80)	Moderate No*		27.99 (22.25)	Moderate No*		48.56 (34.17)	Moderate No*		110.59 (81.87)	Moderate No*	
Moderate	22	30.68 (25.15)	Severe No*		29.97 (24.96)	Severe No*		47.35 (37.01)	Severe No*		108.00 (83.22)	Severe No*	
No	152	11.49 (13.33)	Severe* Moderate*		15.70 (15.68)	Severe* Moderate*		19.13 (18.91)	Severe* Moderate*		45.33 (40.54)	Severe* Moderate*	

Continued

Table 4. Continued

Variable	Assessment of pelvic floor disorders scales												
	n	POPDI-6 Mean (SD)	Post hoc test Dunnett C	Sig.	CRADI-8 Mean (SD)	Post hoc test Dunnett C	Sig.	UDI-6 Mean (SD)	Post hoc test Dunnett C	Sig.	PFDI-20 Mean (SD)	Post hoc test Dunnett C	Sig.
Sexual response and presence of sexual dysfunction													
Problems with vaginal penetration				0.128 ^a 0.189 ^b			0.228 ^a 0.276 ^b			0.142 ^a 0.137 ^b			0.122 ^a 0.138 ^b
Severe	NE		NC			NC			NC			NC	
Moderate	11	25.00 (25.34)	NC		25.28 (22.98)	NC		37.12 (30.30)	NC		87.41 (71.90)	NC	
No	186	15.75 (19.13)	NC		18.35 (18.23)	NC		25.04 (26.16)	NC		58.14 (57.84)	NC	
Anticipatory anxiety				<0.001 ^a 0.005 ^b			0.016 ^a 0.034 ^b			<0.001 ^a 0.006 ^b			<0.001 ^a 0.004 ^b
Severe	4	38.54 (30.31)	Moderate No		30.47 (30.98)	Moderate No		61.46 (24.38)	Moderate No		130.47 (83.12)	Moderate No	
Moderate	6	43.06 (23.07)	Severe No		37.50 (16.87)	Severe No		50.00 (34.86)	Severe No		130.56 (65.06)	Severe No	
No	187	14.93 (18.40)	Severe Moderate		17.88 (17.98)	Severe Moderate		24.18 (25.44)	Severe Moderate		56.99 (56.12)	Severe Moderate	
Relational aspects of sexual activity													
Sex initiation				<0.001 ^a <0.001 ^b			<0.001 ^a 0.005 ^b			<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b
Absence	50	29.42 (27.26)	Moderate* No problem*		28.00 (23.11)	Moderate No problem*		43.25 (34.43)	Moderate* No problem*		100.67 (80.98)	Moderate* No problem*	
Moderate	35	14.40 (15.99)	Absence* No problem		17.14 (18.23)	Absence No problem		25.12 (26.34)	Absence* No problem		56.67 (52.28)	Absence* No problem	
No problem	111	10.85 (12.72)	Absence* Moderate		15.01 (14.72)	Absence* Moderate		18.13 (17.50)	Absence* Moderate		42.98 (37.32)	Absence* Moderate	
Level of sex communication				<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b			<0.001 ^a <0.001 ^b
Absence	26	42.63 (27.19)	Moderate* No problem*		41.23 (23.03)	Moderate* No problem*		62.98 (34.92)	Moderate* No problem*		146.83 (80.94)	Moderate* No problem*	

Continued

Table 4. Continued

Variable	Assessment of pelvic floor disorders scales												
	n	POPDI-6 Mean (SD)	Post hoc test Dunnett C	Sig.	CRADI-8 Mean (SD)	Post hoc test Dunnett C	Sig.	UDI-6 Mean (SD)	Post hoc test Dunnett C	Sig.	PFDI-20 Mean (SD)	Post hoc test Dunnett C	Sig.
Sexual response and presence of sexual dysfunction													
Moderate	22	15.34 (20.14)	Absence* No problem		13.49 (16.88)	Absence* No problem		23.48 (26.87)	Absence* No problem		52.32 (58.44)	Absence* No problem	
No problem	148	11.71 (13.49)	Absence* Moderate		15.52 (14.91)	Absence* Moderate		19.59 (18.39)	Absence* Moderate		46.83 (38.73)	Absence* Moderate	
Sexual satisfaction													
Satisfaction of sexual activity				<0.001^a <0.001^b			<0.001^a 0.005^b			<0.001^a <0.001^b			<0.001^a <0.001^b
Dissatisfaction	10	42.08 (37.45)	Moderate Satisfactory		31.25 (26.84)	Moderate Satisfactory		50.00 (37.01)	Moderate Satisfactory		123.33 (99.75)	Moderate Satisfactory	
Moderate	30	30.42 (25.19)	Dissatisfaction Satisfactory*		29.69 (24.11)	Dissatisfaction Satisfactory*		52.36 (35.54)	Dissatisfaction Satisfactory*		112.47 (80.96)	Dissatisfaction Satisfactory*	
Satisfactory	155	11.85 (13.52)	Dissatisfaction Moderate*		15.73 (15.56)	Dissatisfaction Moderate*		19.25 (18.70)	Dissatisfaction Moderate*		45.83 (40.22)	Dissatisfaction Moderate*	
General sexual satisfaction				0.003^a 0.030^b			0.514 ^a 0.485 ^b			0.003^a 0.010^b			0.011^a 0.052^b
Dissatisfaction	11	27.65 (26.89)	Moderate Satisfactory		24,15 (18.91)	Moderate Satisfactory		43.94 (26.83)	Moderate Satisfactory		95.74 (69.93)	Moderate Satisfactory	
Moderate	19	27.41 (27.33)	Dissatisfaction Satisfactory		20.72 (22.85)	Dissatisfaction Satisfactory		38.60 (35.43)	Dissatisfaction Satisfactory		86.73 (80.91)	Dissatisfaction Satisfactory	
Satisfactory	166	14.18 (17.36)	Dissatisfaction Moderate		18.70 (18.05)	Dissatisfaction Moderate		23.11 (24.55)	Dissatisfaction Moderate		55.41 (54.00)	Dissatisfaction Moderate	

*The mean difference is significant at the 0.005 level. a p-value ANOVA test. b p-value Kruskal-Wallis test. NC: not calculated.

Table 5. Bivariable and multivariate analysis of the factors associated with sexual dysfunction, a cross-sectional study, Spain, 2022 (N=197)

Variable	Sexual dysfunction		Bivariate analysis		Multivariate analysis (adjusted regression analysis)	
	No n (%)	Yes n (%)	AOR (95% CI)	p	AOR (95% CI)	p
Age (years)				0.239		0.815
30–49.9 [®]	16 (59.3)	11 (40.7)	1		1	
≥50	80 (47.1)	90 (52.9)	1.64 (0.72–3.73)		1.12 (0.44–3.22)	
BMI (kg/m²)				0.227	1.02 (0.95–1.10)	0.540
Smoking habit				0.111		0.732
No [®]	79 (46.5)	91 (53.5)	1		1	
Yes	17 (63.0)	10 (37.0)	0.51 (0.22–1.18)		0.50 (0.21–1.23)	
Pregnancy				0.916		0.380
0 [®]	6 (50.0)	6 (50.0)	1		1	
1	7 (43.8)	9 (56.3)	1.29 (0.29–5.77)		0.39 (0.05–3.22)	
≥2	83 (49.1)	86 (50.9)	1.04 (0.32–3.34)		0.24 (0.02–2.77)	
Vaginal birth				0.190		0.196
0 [®]	21 (61.8)	13 (38.2)	1		1	
1	12 (40.0)	18 (60.0)	2.42 (0.89–6.63)		5.48 (0.83–26.12)	
≥2	63 (47.4)	70 (52.6)	1.80 (0.83–3.88)		4.08 (0.47–35.48)	
Cesarean birth				0.497		0.878
0 [®]	73 (47.1)	82 (52.9)	1		1	
1	13 (50.0)	13 (50.0)	0.89 (0.39–2.04)		1.22 (0.38–3.92)	
≥2	96 (48.7)	101 (51.3)	0.53 (0.19–1.54)		1.78 (0.19–16.73)	
Instrumental birth				0.315		0.501
No [®]	60 (51.7)	56 (48.3)	1		1	
Yes	36 (44.4)	45 (55.6)	1.34 (0.76–2.37)		0.78 (0.39–1.59)	
Episiotomy				0.241		0.846
No [®]	31 (55.4)	25 (44.6)	1		1	
Yes	65 (46.1)	76 (53.9)	1.45 (0.78–2.70)		0.90 (0.32–2.53)	
Tear				0.642		0.634
No [®]	62 (50.0)	62 (50.0)	1		1	
Yes	34 (46.6)	39 (53.4)	1.15 (0.64–2.05)		0.84 (0.41–1.72)	
Mental health illness				0.089		0.999
No [®]	96 (49.5)	98 (50.5)	1		1	
Yes	0 (0)	3 (100)	NC		NC	
Respiratory disorder				0.443		0.765
No [®]	94 (49.2)	97 (50.8)	1		1	
Yes	2 (33.3)	4 (66.7)	1.94 (0.35–10.83)		0.71 (0.11–4.58)	
Gynecological disorder				0.650		0.845
No [®]	92 (48.4)	98 (51.6)	1		1	
Yes	4 (57.1)	3 (42.9)	0.70 (0.15–3.23)		0.84 (0.14–4.99)	
Gastrointestinal disorder						0.279
No [®]	91 (48.4)	97 (51.6)	1	0.675	1	
Yes	5 (55.6)	4 (44.4)	0.75 (0.20–2.88)		0.43 (0.10–1.90)	
PFDI-20 questionnaire score, Median (SD)	43.53 (40.48)	77.01 (68.41)	1.01 (1.01–1.02)	<0.001	1.01 (1.01–1.02)	<0.001

AOR: adjusted odds ratio. BMI: body mass index. PFDI-20: Pelvic Floor Distress Inventory. Values in bold are statistically significant. [®] Reference categories.

sexual dysfunctions. It was observed that women who experienced urinary incontinence [49 (42.6%) vs 66 (57.4%), $p=0.043$] and pelvic pain [12 (25.0) vs 36 (75.0), $p<0.001$] were more likely to report sexual dysfunction.

The impact of pelvic floor problems was evaluated using the PFDI-20 questionnaire and its association with sexual dysfunctions. Women with sexual dysfunctions were found to have significantly higher mean scores on the POPDI-6 [9.99 (11.82) vs 22.23 (23.31), $p<0.001$], CRADI-8 [14.84 (15.76) vs 22.43 (20.21), $p=0.002$], and UDI-6 [18.71 (SD=19.29) vs 32.38 (30.46), $p<0.001$] subscales compared to those women without sexual dysfunction.

Table 4 below shows the results of the analysis of variance (ANOVA) and Kruskal-Wallis tests, which indicate that the mean scores on the impact of prolapse, colorectal-anal, and urinary symptoms showed statistically significant associations in most of the studied domains of sexual function. However, none of the subscales showed a statistical association with problems related to vaginal penetration. Furthermore, no statistical significance was observed between general sexual satisfaction and colorectal-anal symptoms. In addition, the mean scores, standard deviations, and different p values in the ANOVA and Kruskal-Wallis are shown, as well as the *post hoc* contrasts with the Dunnett C test.

Finally, a multivariate analysis (Table 5) was carried out to control for confounding and determine which factors were associated with sexual dysfunction. Specifically, pelvic floor dysfunction evaluated through the PFDI-20 scale was identified as the main risk factor, observing that women who had a higher score on this scale were more likely to present sexual dysfunction (AOR=1.01; 95% CI: 1.01–1.02).

DISCUSSION

The women who experienced urinary incontinence and pelvic pain, had a higher frequency of sexual dysfunction. Specifically, pelvic floor dysfunction evaluated through the PFDI-20 scale was identified as the main risk factor, observing that menopausal women who had a higher score on this scale were more likely to present sexual dysfunction.

Sexual health in women is affected during menopause, and there are studies that, among other factors, relate it to the presence of pelvic floor dysfunctions^{14,21}. Incidence reported by Verbeek and Hayward¹⁶ on sexual dysfunction in women with pelvic floor disorders amounts to 50–83%, with our prevalence being 51.3% of women who suffered from sexual dysfunction.

In relation to sexual function, in a study in which 93 women with urinary incontinence participated, altered items of disorders in sexual desire, orgasmic dysfunction, and sexual satisfaction were observed²². It is important to note that, in our results, no statistically significant alterations were observed with vaginal penetration.

Regarding fecal incontinence, Pauls et al.²³, in a study carried out with women with this dysfunction, identified that women presented a decrease in sexual desire, sexual satisfaction, arousal, lubrication, and orgasmic capacity, but was only significant in the desired domain, whereas Visscher

et al.²⁴ observed statistical significance in all domains. In the case of pelvic pain, a study with 200 women, of which 100 had this dysfunction, and in line with our results, showed that the dimensions affected were the domains of sexual desire, arousal, lubrication, orgasm, and pain²⁵. Furthermore, in the study by Verit and Verit with 200 women, including 100 with pelvic pain, it was observed that women who suffered from it reported worse sexual function with respect to desire, arousal, lubrication, orgasm, satisfaction, and greater frequency and severity of pain on vaginal penetration²⁶.

Pelvic pain has been described as an important risk factor in sexual dysfunction, which, combined with other symptoms, can be responsible for up to 50% of sexual dysfunctions²⁷. Faubion et al.²⁸ determined that the impact of these symptoms on women's sexuality can be very important. Finally, in our study, we identified that pelvic organ prolapse affects all sexual dimensions except penetration; in contrast, Tola et al.²⁹ did not find that prolapse, or any other pelvic floor dysfunction, affects female sexual function.

Strengths and limitations

The strengths of the study include the use of validated instruments previously used in the population to determine both the sexual function of women FSM-2 and the presence of pelvic floor dysfunction in the population, PFDI-20^{19,20}. On the other hand, certain limitations are recognized, such as the possible influence of selection and memory biases. However, we proceed by framing questions to minimize recall errors or focusing on recent experiences. Selection bias was addressed by defining inclusion criteria, although it may not be exempt from self-selection or under-representation of certain subgroups. The questionnaire was previously piloted with language adapted to facilitate reading and understanding at all educational levels; no further changes were required after this stage. However, we acknowledge that may be present, since the sampling method was convenient. Additionally, confounding bias was avoided by including all the variables that could impact the results obtained in the multivariate analysis. With the results obtained from this study, the basis could be established to develop appropriate therapeutic and preventive strategies, considering the high prevalence of this problem and its significant impact on the sexual health of a stratum of society that is especially vulnerable and ignored in this regard, menopausal women.

CONCLUSIONS

Pelvic floor dysfunctions in menopausal women are associated with their sexual health. Pelvic floor dysfunctions symptoms that influence sexual function are colo-rectal, urinary and prolapse. Pelvic floor disorders such as urinary incontinence and pelvic pain are those that most influence sexual function.

REFERENCES

1. Blümel JE, Binfa L, Cataldo P, Carrasco A, Izaguirre H, Sarrá S. Índice de función sexual femenina: un test para evaluar la sexualidad de la mujer. Rev Chil Obstet

- Ginecol. 2004;69(2):118-125. doi:[10.4067/S0717-75262004000200006](https://doi.org/10.4067/S0717-75262004000200006)
2. Freak-Poli R, Kirkman M, De Castro Lima G, Direk N, Franco OH, Tiemeier H. Sexual Activity and Physical Tenderness in Older Adults: Cross-Sectional Prevalence and Associated Characteristics. *J Sex Med.* 2017;14(7):918-927. doi:[10.1016/j.jsxm.2017.05.010](https://doi.org/10.1016/j.jsxm.2017.05.010)
 3. Cain VS, Johannes CB, Avis NE, et al. Sexual functioning and practices in a multi-ethnic study of midlife women: baseline results from SWAN. *J Sex Res.* 2003;40(3):266-276. doi:[10.1080/00224490309552191](https://doi.org/10.1080/00224490309552191)
 4. Waite LJ, Laumann EO, Das A, Schumm LP. Sexuality: measures of partnerships, practices, attitudes, and problems in the National Social Life, Health, and Aging Study. *J Gerontol B Psychol Sci Soc Sci.* 2009;64B(Suppl 1):i56-i66. doi:[10.1093/geronb/gbp038](https://doi.org/10.1093/geronb/gbp038)
 5. Gass ML, Cochrane BB, Larson JC, et al. Patterns and predictors of sexual activity among women in the Hormone Therapy trials of the Women's Health Initiative. *Menopause.* 2011;18(11):1160-1171. doi:[10.1097/gme.0b013e3182227ebd](https://doi.org/10.1097/gme.0b013e3182227ebd)
 6. Howard JR, O'Neill S, Travers C. Factors affecting sexuality in older Australian women: sexual interest, sexual arousal, relationships and sexual distress in older Australian women. *Climacteric.* 2006;9(5):355-367. doi:[10.1080/13697130600961870](https://doi.org/10.1080/13697130600961870)
 7. Trompeter SE, Bettencourt R, Barrett-Connor E. Sexual activity and satisfaction in healthy community-dwelling older women. *Am J Med.* 2012;125(1):37-43.e1. doi:[10.1016/j.amjmed.2011.07.036](https://doi.org/10.1016/j.amjmed.2011.07.036)
 8. Thornton K, Chervenak J, Neal-Perry G. Menopause and Sexuality. *Endocrinol Metab Clin North Am.* 2015;44(3):649-661. doi:[10.1016/j.ecl.2015.05.009](https://doi.org/10.1016/j.ecl.2015.05.009)
 9. O'Neill S, Eden J. The pathophysiology of menopausal symptoms. *Obstet Gynaecol Reprod Med.* 2012;22(3):63-69. doi:[10.1016/j.ogrm.2011.12.006](https://doi.org/10.1016/j.ogrm.2011.12.006)
 10. Hong MK, Ding DC. Current Treatments for Female Pelvic Floor Dysfunctions. *Gynecol Minim Invasive Ther.* 2019;8(4):143-148. doi:[10.4103/GMIT.GMIT_7_19](https://doi.org/10.4103/GMIT.GMIT_7_19)
 11. Wu JM, Vaughan CP, Goode PS, et al. Prevalence and trends of symptomatic pelvic floor disorders in U.S. women. *Obstet Gynecol.* 2014;123(1):141-148. doi:[10.1097/AOG.0000000000000057](https://doi.org/10.1097/AOG.0000000000000057)
 12. Handa VL, Harvey L, Cundiff GW, Siddique SA, Kjerulf KH. Sexual function among women with urinary incontinence and pelvic organ prolapse. *Am J Obstet Gynecol.* 2004;191(3):751-756. doi:[10.1016/j.ajog.2003.11.017](https://doi.org/10.1016/j.ajog.2003.11.017)
 13. Barber MD, Visco AG, Wyman JF, Fantl JA, Bump RC; Continence Program for Women Research Group. Sexual function in women with urinary incontinence and pelvic organ prolapse. *Obstet Gynecol.* 2002;99(2):281-289. doi:[10.1016/s0029-7844\(01\)01727-6](https://doi.org/10.1016/s0029-7844(01)01727-6)
 14. Macêdo SR, Vasconcelos Neto JA, Tamanini JTN, Bezerra L, Castro RA. Factors Associated with Sexual Activity for Women with Pelvic Floor Dysfunction - A Cross-Sectional Study. *Rev Bras Ginecol Obstet.* 2020;42(8):493-500. doi:[10.1055/s-0040-1713805](https://doi.org/10.1055/s-0040-1713805)
 15. Omodei MS, Marques Gomes Delmanto LR, Carvalho-Pessoa E, Schmitt EB, Nahas GP, Petri Nahas EA. Association Between Pelvic Floor Muscle Strength and Sexual Function in Postmenopausal Women. *J Sex Med.* 2019;16(12):1938-1946. doi:[10.1016/j.jsxm.2019.09.014](https://doi.org/10.1016/j.jsxm.2019.09.014)
 16. Verbeek M, Hayward L. Pelvic Floor Dysfunction And Its Effect On Quality Of Sexual Life. *Sex Med Rev.* 2019;7(4):559-564. doi:[10.1016/j.sxmr.2019.05.007](https://doi.org/10.1016/j.sxmr.2019.05.007)
 17. Lukacz ES, Whitcomb EL, Lawrence JM, Nager CW, Contreras R, Luber KM. Are sexual activity and satisfaction affected by pelvic floor disorders? Analysis of a community-based survey. *Am J Obstet Gynecol.* 2007;197(1):88.e1-88.e886. doi:[10.1016/j.ajog.2007.02.053](https://doi.org/10.1016/j.ajog.2007.02.053)
 18. Dennerstein L, Smith AM, Morse CA, Burger HG. Sexuality and the menopause. *J Psychosom Obstet Gynaecol.* 1994;15(1):59-66. doi:[10.3109/01674829409025630](https://doi.org/10.3109/01674829409025630)
 19. Sánchez-Sánchez B, Torres-Lacomba M, Yuste-Sánchez MJ, et al. Cultural adaptation and validation of the Pelvic Floor Distress Inventory short form (PFDI-20) and Pelvic Floor Impact Questionnaire short form (PFIQ-7) Spanish versions. *Eur J Obstet Gynecol Reprod Biol.* 2013;170(1):281-285. doi:[10.1016/j.ejogrb.2013.07.006](https://doi.org/10.1016/j.ejogrb.2013.07.006)
 20. Sánchez-Sánchez F, Ferrer-Casanova C, Ponce-Buj B, et al. Diseño y validación de la segunda edición del Cuestionario de Función Sexual de la Mujer, FSM-2. *Semergen.* 2020;46(5):324-330. doi:[10.1016/j.semarg.2020.01.004](https://doi.org/10.1016/j.semarg.2020.01.004)
 21. Nappi RE, Cucinella L. Sexuality, pelvic floor/vaginal health and contraception at menopause. *Best Pract Res Clin Obstet Gynaecol.* 2022;81:85-97. doi:[10.1016/j.bpobgyn.2021.11.006](https://doi.org/10.1016/j.bpobgyn.2021.11.006)
 22. Caruso S, Brescia R, Matarazzo MG, Giunta G, Rapisarda AMC, Cianci A. Effects of Urinary Incontinence Subtypes on Women's Sexual Function and Quality of Life. *Urology.* 2017;108:59-64. doi:[10.1016/j.urology.2017.06.025](https://doi.org/10.1016/j.urology.2017.06.025)
 23. Pauls RN, Rogers RG, Parekh M, Pitkin J, Kammerer-Doak D, Sand P. Sexual function in women with anal incontinence using a new instrument: the PISQ-IR. *Int Urogynecol J.* 2015;26(5):657-663. doi:[10.1007/s00192-014-2563-y](https://doi.org/10.1007/s00192-014-2563-y)
 24. Visscher AP, Lam TJ, Hart N, Felt-Bersma RJ. Fecal incontinence, sexual complaints, and anorectal function after third-degree obstetric anal sphincter injury (OASI): 5-year follow-up. *Int Urogynecol J.* 2014;25(5):607-613. doi:[10.1007/s00192-013-2238-0](https://doi.org/10.1007/s00192-013-2238-0)
 25. Da Luz RA, de Deus JM, Valadares AL, Conde DM. Evaluation of sexual function in Brazilian women with and without chronic pelvic pain. *J Pain Res.* 2018;11:2761-2767. doi:[10.2147/JPR.S176851](https://doi.org/10.2147/JPR.S176851)
 26. Verit FF, Verit A. Validation of the female sexual function index in women with chronic pelvic pain. *J Sex Med.* 2007;4(6):1635-1641. doi:[10.1111/j.1743-6109.2007.00604.x](https://doi.org/10.1111/j.1743-6109.2007.00604.x)
 27. Knoop LR, Shippey SH, Chen CC, Cundiff GW, Derogatis LR, Handa VL. Sexual complaints, pelvic floor

- symptoms, and sexual distress in women over forty. *J Sex Med.* 2010;7(11):3675-3682. doi:[10.1111/j.1743-6109.2010.01955.x](https://doi.org/10.1111/j.1743-6109.2010.01955.x)
28. Faubion SS, Shuster LT, Bharucha AE. Recognition and management of nonrelaxing pelvic floor dysfunction. *Mayo Clin Proc.* 2012;87(2):187-193. doi:[10.1016/j.mayocp.2011.09.004](https://doi.org/10.1016/j.mayocp.2011.09.004)
29. Fashokun TB, Harvie HS, Schimpf MO, et al. Sexual activity and function in women with and without pelvic floor disorders. *Int Urogynecol J.* 2013;24(1):91-97. doi:[10.1007/s00192-012-1848-2](https://doi.org/10.1007/s00192-012-1848-2)

ACKNOWLEDGEMENTS

The authors thank all the participants in this study.

CONFLICTS OF INTEREST

The authors have completed and submitted the ICMJE Form for disclosure of Potential Conflicts of Interest and none was reported.

FUNDING

This project was co-funded by the Operative Program FEDER 2014-2020, and the Ministry of Economics and Knowledge of the Government of Andalusia (Code 1380358). The first author received a Grant from the Program University Teacher Training, financed by the Ministry of Universities Government of Spain (ref. FPU20/01567).

ETHICAL APPROVAL AND INFORMED CONSENT

Ethical approval was obtained from the Research Ethics Committee of the province of Jaén (Approval number: SPCV-0220/0302-N-20; Date: 26 March 2020). Participants provided informed consent.

DATA AVAILABILITY

The data supporting this research are available from the authors on reasonable request.

AUTHORS' CONTRIBUTIONS

RAP-M: equal contribution on – conceptualization, data curation, funding acquisition, investigation, resources, validation, visualization, writing of original draft, reviewing and editing of the manuscript. JMM-G: equal contribution on – conceptualization, investigation, methodology, resources, writing of original draft, reviewing and editing of the manuscript; lead on – funding acquisition, project administration, supervision, validation, visualization. AH-M: equal contribution on – conceptualization, resources, investigation, supervision, validation, visualization, writing, reviewing and editing of the manuscript; lead on – data curation, formal analysis, methodology, software. SM-V: support on – conceptualization, investigation, validation, visualization, writing, reviewing and editing of the manuscript. All authors read and approved the final version of the manuscript.

PROVENANCE AND PEER REVIEW

Not commissioned; externally peer reviewed.