Factors Associated with Sexual Activity for Women with Pelvic Floor Dysfunction - A Cross-Sectional Study

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Abstract

Objective To examine women with pelvic floor dysfunction (PFDs) and identify factors associated with sexual activity (SA) status that impacts quality of life (QoL).

Methods We conducted a cross-sectional study that included women > 18 years old who presented with at least one PFD symptom (urinary incontinence [UI] and/or pelvic organ prolapse [POP]), in outpatient clinics specializing in urogynecology and PFD in Fortaleza, state of Ceará, Brazil, using a service evaluation form and QoL questionnaires.

Results The analysis of 659 women with PFD included 286 SA (43.4%) women and 373 non-sexually active (NSA) (56.6%) women, with a mean age of 54.7 (±12) years old. The results revealed that age (odds ratio [OR] = 1.07, 95% confidence interval [CI] 1.03–1.12) and post-menopausal status (OR = 2.28, 95% CI 1.08–4.8) were negatively associated with SA. Being married (OR = 0.43, 95% CI 0.21–0.88) was associated with SA. Pelvic organ prolapse (OR = 1.16, 95% CI 0.81–1.68) and UI (OR = 0.17, 95% CI 0.08–0.36) did not prevent SA. SF-36 Health Survey results indicated that only the domain functional capacity was significantly worse in NSA women (p = 0.012). Two King’s Health Questionnaire domains in NSA women, impact of UI (p = 0.005) and personal relationships (p < 0.001), were significantly associated factors. Data from the Prolapse Quality-of-life Questionnaire indicated that NSA women exhibited compromised QoL.

Conclusion Postmenopausal status and age negatively affected SA. Being married facilitated SA. Presence of POP and UI did not affect SA. However, NSA women with POP exhibited compromised QoL.

Keywords
► sexual activity
► pelvic floor dysfunction
► urinary incontinence
► pelvic organ prolapsed

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Introduction

In the context of clinical practice, women who are sexually active (SA) and those who are non-sexually active (NSA) with satisfactory self-perception of their sexual function (SF) may also experience sexual problems related to pelvic floor dysfunction (PFD).1

The reported prevalence of sexual activity in middle-aged and older women ranges from 53 to 79%, depending on the population studied.2 Panman et al3 reported that, among older women with PFD, increased age and lower levels of education were predictors of sexual inactivity.

Sexual activity and SF rates have not been found to exhibit any differences between women with and without PFD, and women with PFD are as likely to be SA as those without PFD.4,5 However, women with pelvic organ prolapse (POP) are reported to be more likely to avoid sexual activity compared with women with urinary incontinence (UI).4,5 Previous studies have reported that PFD strongly affects perimenopausal and postmenopausal women. The demand for evaluation and treatment of these conditions has steadily increased in recent years, with increased life expectancy and efforts to promote quality of life (QoL).4,5 Sexuality is a fundamental part of human life, and is an important parameter for health and QoL.6 Thus, the current study sought to identify factors that affect sexual activity in women with PFD, and the impacts of QoL, according to sexual activity status.

Methods

Study Design and Inclusion/Exclusion Criteria

We conducted a cross-sectional observational study, which was designed for outpatient clinics specializing in urogynecology and PFD in Fortaleza, state of Ceará, Brazil. The present study was approved by the Ethics and Research Committee of the Universidade Federal de São Paulo (UNIFESP, in the Portuguese acronym), of the Hospital Geral Cesar Cals and of the Hospital Geral de Fortaleza, through the Brazil Platform (CAAE 15961313.6.0000.5505). Patients who participated in the study signed the Free Informed Consent Terms prepared according to Resolution 466/2012 of the National Health Council. In the present study, 659 women with PFD were examined between September 2013 and November 2016. The eligibility criteria included women > 18 years old who presented with at least one symptom of PFD (UI and/or POP). The exclusion criteria included severe cognitive impairment, psychiatric and neurological diseases and pelvic cancer.

Independent Variables and Dependent Variables

Data were collected during outpatient follow-up of participants using a standardized form collecting sociodemographic data, clinical features and physical examinations. We administered questionnaires that have been translated into Portuguese and validated, including the QoL general questionnaire SF36 Health Survey (SF-36),7 as well as condition-specific questionnaires such as King’s Health
Questionnaire (KHQ) and the Prolapse Quality-of-life Questionnaire (P-QoL).

Medical evaluation was performed using a standardized anamnesis and physical gynecological examination standardized with Pelvic Organ Prolapse Quantification (POP-Q) proposed by the International Continence Society (ICS), classifying the point of greatest prolapse with reference to the hymenial caruncle in stages from zero to four. In relation to POP, women were classified as POP stage < II or stage ≥ II.

The diagnosis of UI type was based on clinical complaints, according to the standardization developed by the ICS. The condition was then classified according to the International Consultation on Incontinence Questionnaire - Short Form (ICIQ-SF) total score, as slight (1–5), moderate (6–12), severe (13–18) or very severe (19–21).

Perineal sensitivity and anal reflex were tested to investigate the integrity of the motor component of the pudendal nerve: bulbocavernous cough and anocutaneous reflexes. Evaluation of the muscular function of the pelvic floor muscles (PFMs) was performed using the Perfect-Oxford Scheme (modified), on a scale of 0 to 5 and muscle strength. Power (P) and endurance (E) were analyzed as components.

Fecal incontinence and chronic pelvic pain were not analyzed in the current study, as the number of cases was too small to have sufficient statistical power.

### Statistical Analysis

For the variables, the data were presented as means and standard deviations (SDs), or medians, with 25th and 75th percentiles. For categorical variables, the participants were exposed to frequency to investigate associations between factors related to sexual activity.

In the analysis of the characteristics of the groups, the Mann-Whitney U-test was used because the data did not adhere to the Gaussian distribution, indicating non-normality in the sample distribution. A significance level of 5% was adopted. The Pearson chi-squared test and the Fisher exact test were used for categorical variables to investigate the associations between the variables. Logistic regression analysis was used to verify the factors influencing sexual activity status.

Variables that exhibited $p < 0.20$ in the univariate model were included in the multiple logistic regression model. Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY, USA) and the R 3.3.1 (The R Foundation, Vienna, Austria) software.

### Results

The results of the present study were based on an analysis of 659 women with PFD, categorized into 2 main groups: 286 SA women (43.4%) and 373 NSA women (56.6%) with PFD.

To describe the clinical diagnoses of PFD of the women and examine the relationships with sexual activity, the variables were divided into UI and POP. Urinary incontinence was classified as mild, moderate, severe and very severe according to the ICIQ-SF final score classification. Pelvic organ prolapse was classified according to the POP-Q system as stage < II or stage ≥ II.

The results were organized into blocks of data from women with SA and NSA status with PFD regarding: a) clinical and demographic characteristics (Table 1); b) characteristics according to the type of PFD (Table 2); c) characteristics according to the physical examination (Table 3); d) logistic regression analyses related to the association between clinical, demographic and PFD characteristics (Table 4); and e) to QoL scores (Table 5).

The mean age of women in the present study was 54.7 ± 12.6 years old. Women in the NSA group were older on average than those in the SA group ($p < 0.001$). Most women...
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### Table 2 Distribution of characteristics according to the type of pelvic floor disorder and sexual activity status

| PFD                  | Sexually active | Non-sexually active | p-value  |
|----------------------|-----------------|---------------------|----------|
| UI (n = 521)         | 239 (45.9)      | 282 (54.1)          | < 0.001aa|
| POP stage, n (%)     |                 |                     |          |
| POP stage <II        | 248 (50.7)      | 241 (49.3)          |          |
| POP stage ≥II        | 28 (18.5)       | 123 (81.5)          |          |
| TVL, (Md ± SD)       | 10 ± 1          | 9 ± 2               | < 0.001bb|
| GH (Md ± SD)         | 4 ± 1           | 4 ± 2               | 0.678bb  |
| PB (Md ± SD)         | 4 ± 1           | 3 ± 1               | < 0.001bb|

Abbreviations: GH, genital hiatus; Md ± SD; mean and standard deviation; POP, pelvic organ prolapse; PB, perineal body; TVL, total vaginal length; UI, urinary incontinence.

aaPearson’s Chi-square test.

bbMann-Whitney U test.

### Table 3 Distribution of characteristics according to the physical examination of women with pelvic floor disorder according to sexual activity

| Physical exam                  | Sexually active | Non-sexually active | p-value |
|--------------------------------|-----------------|---------------------|---------|
| Perineal sensitivity, n (%)    | 0.568a          |                     |         |
| No                             | 10 (50)         | 10 (50)             |         |
| Yes                            | 231 (43.2)      | 304 (56.8)          |         |
| Anal reflex, n (%)             | 0.247a          |                     |         |
| No                             | 42 (41.2)       | 60 (58.8)           |         |
| Yes                            | 187 (43.3)      | 245 (56.7)          |         |
| Muscle strength* (Md ± SD)     | 1.9 ± 1.3       | 1.6 ± 1.3           | 0.079b  |
| (n = 368)                      |                 |                     |         |
| Endurance* (Md ± SD)           | 3.4 ± 2.8       | 2.9 ± 2.7           | 0.097b  |
| (n = 368)                      |                 |                     |         |

Abbreviations: Md ± SD; mean and standard deviation.

apPearson’s Chi-square test.

bMann-Whitney U test.

cOxford scale.

dSustained contraction time in seconds.

in both groups were married. Sexually active women were younger and had a higher level of education, evaluated by the duration of studying. The education level of SA women (7 ± 4 years) was higher than that of NSA women (6 ± 4 years) (p < 0.001).

Table 1 lists the clinical and demographic characteristics of women with PFD, according to their sexual activity status. The results revealed that age (p < 0.001), marital status (p < 0.001), education (p < 0.001), number of births (p < 0.001), obesity (p = 0.004), body mass index (BMI) (p = 0.007), menopause (p < 0.001) and smoking (p < 0.001) were significantly different between the SA and NSA groups, while family income, diabetes (p = 0.967) and systemic arterial hypertension (SAH) (p = 0.021) were not significantly different between groups.

Being married (odds ratio [OR] = 0.43) appeared to have a protective effect on maintaining sexual activity. Exhibiting menopause (OR = 2.28) and being widowed (OR = 2.66) affected the ability to maintain sexual activity. In addition, the results revealed that these variables have relevant confidence intervals (CIs) - menopause (1.08-4.8), widowed (0.39-2.74). In the present study, the main reasons reported for sexual inactivity were the lack of a partner or the presence of disease (cardiovascular or neurological) in a partner.

The groups showed significant differences in demographic characteristics according to the type of PFD (Table 2). In relation to the POP stage (p < 0.001), POP < II, was predominant. However, SA women were more likely to exhibit POP < II while NSA women were more likely to exhibit POP ≥ II. Women with UI were predominantly in the NSA group (n = 282) (p < 0.001).

Total vaginal length (TVL) (p < 0.001) and perineal body (PB) (p < 0.001) were significant factors when compared among the groups. Sexually active women exhibited a higher mean TVL than NSA women. The mean TVL was 10 ± 1 in the SA group and 9 ± 2 cm in the NSA group (p < 0.001).

Regarding physical factors (Table 3), the following variables were not significant: perineal sensitivity (p = 0.568), anal reflex (p = 0.247), muscle strength (p = 0.079) and endurance (p = 0.097).

In the descriptive analysis of the present study, several variables were identified that exhibited significant differences between SA and NSA: age (p < 0.001), marital status (p < 0.001), education (p < 0.001), number of births (p < 0.001), obesity (p = 0.004), BMI (p = 0.007), menopause (p < 0.001), smoking (p = 0.003), UI (p < 0.001), POP (p < 0.001), TVL (p < 0.001) and PB (p < 0.001).

We performed a univariate logistic analysis (Table 4) to identify variables related to sexual activity, revealing a range of factors with significant associations, including age (p < 0.001), marital status (married; [p = 0.021], divorced [p = 0.941], widowed [p = 0.155]), education (p = 0.116), number of deliveries (p = 0.342), menopause (p = 0.030), obesity (p = 0.489), current smoking status (previously smoked; p = 0.826), TVL (p = 0.041), PB (p = 0.912), and UI (p = 0.999).

However, when these variables were adjusted using multivariate logistic regression (Table 4), age (p < 0.001), menopause (p = 0.030) and TVL (p = 0.041) were significantly associated with the absence of sexual activity. However, the analysis of TVL between groups revealed a mean difference of 1 cm between the SA and NSA groups. Considering that this is a consequence rather than a cause of maintaining sexual activity, we decided not to include this finding in the results of the present study.

The results revealed that older patients were more likely to be NSA. In addition, being married was shown to have a protective effect against being NSA. Compared with single women, widows were 2.6 times more likely to be NSA. Women at menopause were twice as likely to be NSA.
### Table 4: Results of the logistic regression analyses of the association of clinical, demographic and type of pelvic floor dysfunction according to sexual activity

| Variables                                      | Univariate logistic regression | p-value | Multivariate logistic regression | p-value |
|------------------------------------------------|--------------------------------|---------|----------------------------------|---------|
|                                                  | OR (CI 95%)                     |         | OR (CI 95%)                      |         |
| Age (Md ± SD) (n = 642)                         | 1.12 (1.09–1.14)                | < 0.001 | 1.07 (1.03–1.12)                 | < 0.001 |
| Marital status, n (%) (n = 627)                 |                                |         |                                  |         |
| Singlef                                          | –                              | –       |                                  | –       |
| Married                                          | 0.45 (0.28–0.72)                | < 0.001 | 0.43 (0.21–0.88)                 | 0.021   |
| Divorced                                         | 1.12 (0.57–2.17)                | 0.735   | 1.03 (0.39–2.74)                 | 0.941   |
| Widowed                                          | 5.82 (2.61–12.96)               | < 0.001 | 2.66 (0.69–10.3)                 | 0.155   |
| Educationd (Md ± SD) (n = 608)                  | 0.94 (0.91–0.98)                | 0.003   | 1.05 (0.98–1.13)                 | 0.116   |
| Number of deliveries (n = 647)                  | 1.17 (1.10–1.25)                | < 0.001 | 1.06 (0.94–1.19)                 | 0.342   |
| Menopause (n = 564)                              |                                |         |                                  |         |
| Yesa                                            | 6.32 (4.40–9.08)                | < 0.001 | 2.28 (1.08–4.8)                  | 0.030   |
| Obesity (n = 659)                                | 0.44 (0.25–0.78)                | 0.005   | 1.39 (9.54–3.58)                 | 0.489   |
| Smoking (n = 636)                                |                                | –       |                                  | –       |
| Previsously smoked                               | 1.83 (1.28–2.61)                | < 0.001 | 1.06 (0.59–1.93)                 | 0.826   |
| Currently smoking                                | 0.97 (0.56–1.69)                | 0.936   |                                  |         |
| BMI (n = 491)                                    | 0.95 (0.92–0.98)                | 0.010   | 0.97 (0.91–1.03)                 | 0.411   |
| TVL (n = 634)                                    | 0.74 (0.66–0.82)                | < 0.001 | 0.81 (0.66–0.99)                 | 0.041   |
| PB (n = 636)                                     | 0.75 (0.65–0.86)                | < 0.001 | 1.01 (0.78–1.31)                 | 0.912   |
| UI (n = 521)                                     | 0.17 (0.08–0.36)                | < 0.001 | 0.000                            | 0.999   |
| POP stage, n (%) (n = 640)                       |                                |         |                                  |         |
| POP stage <II                                    | 1.19 (0.84–1.69)                | 0.322   | 0.55 (0.17–1.75)                 | 0.316   |

Abbreviations: BMI, body mass index; CI, confidence interval; Md ± SD; mean and standard deviation; OR, odds ratio; POP, pelvic organ prolapse; PB, perineal body; TVL, total vaginal length; UI, urinary incontinence.

"Years of study.

"Versus no menopause.

†Variable reference used for variables with more than two response options.

*Multivariable logistic regression model.

### Table 5: Distribution of quality of life questionnaire scores of women with pelvic floor disorder according to sexual activity

| Quality of life questionnaire | Sexually active | Non-sexually active | p-value $^{a}$ |
|-------------------------------|-----------------|---------------------|----------------|
| SF 36 Med (25th–75th percentile) (n = 494) |  |  |  |
| GHP score                     | 52 (32–72)      | 57 (35–72)          | 0.254          |
| Functional capacity           | 60 (35–85)      | 50 (25–75)          | 0.012 $^{*}$   |
| Daily activities limitations  | 25 (0–100)      | 0 (0–100)           | 0.495          |
| Emotional limitations         | 33 (0–100)      | 33 (0–100)          | 0.559          |
| Social limitations            | 75 (50–100)     | 75 (37.5–100)       | 0.811          |
| Vitality                      | 50 (30–70)      | 52.5 (30–80)        | 0.467          |
| Pain                          | 51 (31–62)      | 51 (32–72)          | 0.234          |
| Mental health                 | 60 (44–80)      | 64 (44–80)          | 0.371          |
| KHQ Med (25th–75th percentile) (n = 568) |  |  |  |
| GHP score                     | 50 (25–75)      | 75 (25–75)          | 0.028          |
| UI impact                     | 66.6 (33.3–100) | 100 (66.6–100)      | 0.005 $^{*}$   |
| Daily activities limitations  | 50 (16.6–66.6)  | 50 (16.6–83.3)      | 0.345          |

(Continued)
Women with very severe UI were three times more likely to be NSA compared with women with mild UI.

The results of the QoL questionnaires (SF-36, KHQ and PQol) (*Table 5*) revealed that the groups did not exhibit significant differences in General Perceptual Health (GPH) evaluation variables. The PQol contained a larger number of domains exhibiting significant associations.

**Table 5 (Continued)**

| Quality of life questionnaire | Sexually active | Non-sexually active | p-value* |
|------------------------------|-----------------|---------------------|----------|
| Physical limitations         | 50 (16.6–83.3)  | 50 (16.6–100)       | 0.174    |
| Social limitations           | 22.2 (0–44.4)   | 33.3 (0–55.5)       | 0.100    |
| Personal relationships       | 33.3 (0–66.6)   | 0 (0–33.3)          | < 0.001* |
| Emotions                     | 44.4 (22.2–77.7)| 49.9 (22.2–88.8)    | 0.334    |
| Sleep and disposition        | 33.3 (16.6–66.6)| 50 (0–83.3)         | 0.370    |
| Measure of gravity           | 53.3 (33.3–73.3)| 46.6 (33.3–73.3)    | 0.733    |

PQol Med (25th–75th percentile) (*n* = 640)

| Factor                      | Sexually active | Non-sexually active | p-value* |
|-----------------------------|-----------------|---------------------|----------|
| GHP score                   | 50 (25–75)      | 50 (50–75)          | 0.202    |
| Impact prolapsed            | 33.3 (33.3–100)| 100 (33.3–100)     | < 0.001* |
| Impact on daily activities  | 16.6 (0–66)     | 50 (0–100)          | < 0.001* |
| Physical limitations        | 16.6 (0–50)     | 33.3 (0–83.3)       | < 0.001* |
| Social limitations          | 0 (0–22.2)      | 11.1 (0–44.4)       | < 0.001* |
| Personal relationships      | 33.3 (0–50)     | 0 (0–50)            | 0.009*   |
| Emotions                    | 33.3 (11.1–66.6)| 44.4 (22.2–88.8)    | 0.203    |
| Sleep/energy                | 16.6 (0–50)     | 16.6 (0–50)         | 0.490    |
| Severity                    | 25 (8.3–37.4)   | 33.3 (16.6–50)      | 0.003*   |
| Total PISQ 12 score         | 28 (22–34)      | –                   | –        |

Abbreviations: GHP, general health practice; KHQ, King’s health questionnaire; Med (25th–75th percentile), median and percentile (25–75%); PQol, prolapse quality of life; PISQ, Pelvic organ prolapse/urinary incontinence sexual questionnaire; SFQ, short form health survey; UI, urinary incontinence.

*p < 0.20.*
features of the prolapse did not appear to interfere with genital body image or with sexual function. In addition, the presence of POP was not found to be associated with being sexually active or inactive.\textsuperscript{19}

In the current study, we found UI in 239 (45\%) and 282 (54.1\%) women in the SA and NSA groups, respectively. Similar rates of UI in women have been reported in other studies, which also indicated that age, marital status and UI-independent predictors of sexual inactivity, negatively affected female sexual activity status, in addition to UI.\textsuperscript{20}

The general perceptual health variables of the QoL instruments used (SF-36, KHQ and PQoL) in SA and NSA women in the present study did not exhibit significant differences between groups. In contrast, a previous study reported that QoL decreases with age and decreasing hormonal levels.\textsuperscript{21}

In the present study, the SF-36, which only revealed a significant result for the functional capacity variable \( (p = 0.012) \), was used to determine the QoL of women with PFD according to sexual activity.

The questionnaires can provide a useful complement to patient history and self-reported results, and were developed to assess the symptoms, the degree of incompatibility and QoL in patients with PFD.\textsuperscript{22}

In the present study, only two KHQ domains exhibited relevant results: impact of UI and personal relationships. A study by Karbage et al.\textsuperscript{22} indicated that UI affects sexual activity and QoL.

The results of the median scores of the questionnaires among women with PFD in the present study revealed significant effects for a range of PQoL variables: impact of POP \((p < 0.001)\), impact on daily activities \((p < 0.001)\), physical limitations \((p = 0.003)\), social limitations \((p < 0.001)\), personal relationships \((p = 0.009)\) and severity \((p = 0.003)\).

It is relatively common for QoL to be compromised in POP. In accordance with the current findings, a study by Svihrova et al.\textsuperscript{23} using the PQoL reported that women with POP exhibited severely impaired QoL.

In the study population in the present study, the analysis of socioeconomic characteristics of SA and NSA women with PFD revealed that the mean age was 47 (±9) years old in SA women, and 61 (±12) years old in NSA women. Thus, many older women were SA, while PFD was negatively associated with sexual activity. As reported by Fashokun et al.,\textsuperscript{4} patient age significantly differed between women with and without PFD.

Most women in the present study, in both groups, were married or in stable relationships. The average household income was higher among SA women. In the period of the survey, the average income was equivalent to approximately two minimum wages. Similar results regarding marital status and income were reported by Martins et al.\textsuperscript{24}

In the current study, TVL was found to be significantly associated with the likelihood of SA (10 ± 1) \((p < 0.041)\). Based on the current findings, and on those of other studies reporting that TVL is not relevant to sexual activity, we did not include these data in our study, as we believe that such a finding is likely to be a consequence rather than a causal factor in maintaining sexual activity.\textsuperscript{25}

Since the present study had a cross-sectional design, it was not possible to determine causality. However, despite this limitation, the current findings demonstrated an association of UI and POP with the maintenance of sexual activity. A further limitation of the present study was an inability to identify the causes of sexual inactivity among women. In addition, although some women reported that the lack of a partner or the presence of a disease (cardiovascular and neurological) was the cause of sexual inactivity, this issue requires more comprehensive investigation.

**Conclusion**

The current results revealed that age and postmenopausal status negatively affected sexual activity, while being married facilitated sexual activity in women with PFD. Presence of POP and UI did not affect sexual activity. Non-sexually active women with genital prolapse exhibited significantly impaired QoL compared with SA women.

**Contributors**

All of the authors contributed with the project and data interpretation, the writing of the article, the critical review of the intellectual content, and with the final approval of the version to be published.

**Conflict of Interests**

The authors have no conflict of interests to declare.

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