

# Association between the Functionality of Pelvic Floor Muscles and Sexual Satisfaction in Young Women

## *Associação entre a funcionalidade dos músculos do assoalho pélvico e a satisfação sexual em mulheres adultas jovens*

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### Abstract

**Objective** The objective of this study is to associate the results obtained while assessing the pelvic floor muscles (PFM) functionality with the score of sexual satisfaction of young adult women.

**Methods** This is an observational and cross-sectional study. The inclusion criteria were women aged between 20 and 40 years who have had sexual intercourse, nulliparous, BMI lower than 25 kg/m<sup>2</sup>, and absence of pelvic floor dysfunction. The evaluation consisted of both the medical history and assessment of the PFM functionality using the Perina pressure biofeedback and Oxford Scale. We measured sexual satisfaction using the Female Sexual Quotient questionnaire and used the Kolmogorov-Smirnov test to verify the normality of the data. We analyzed non-parametric variables using the Spearman correlation test. The significance level was 5%.

**Results** A total of 80 women with a median age of 26 years and median BMI of 21.64 kg/m<sup>2</sup> participated in this study. We divided the subjects into two groups, best and worse PFM functionality, according to median Perina pressure biofeedback and Oxford scale. We found no difference between the groups when comparing the sexual satisfaction scores. There was only a slight significant correlation between the Contraction Voluntary Average obtained using the pressure biofeedback and the primary domain ( $r = 0.27$ ;  $p = 0.01$ ).

**Conclusion** This study found a slight correlation between PFM functionality and the functionality of the primary domain of the Female Sexual Quotient questionnaire. Therefore, it is not possible to state whether there is an association between the PFM functionality and female sexual satisfaction in young adults.

### Keywords

- ▶ pelvic floor muscles
- ▶ sexual dysfunction
- ▶ physiotherapy

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## Resumo

**Objetivo** Associar as medidas obtidas pela avaliação da funcionalidade da musculatura do assoalho pélvico com o escore da satisfação sexual de mulheres adultas jovens.

**Métodos** Estudo observacional e transversal. Os critérios de inclusão foram mulheres com idade entre 20 e 40 anos, que já tiveram relação sexual, nulíparas, índice de massa corporal inferior (IMC)  $25 \text{ kg/m}^2$  e ausência de queixas de disfunção do assoalho pélvico. A avaliação foi constituída por uma ficha de anamnese e avaliação da funcionalidade dos músculos do assoalho pélvico (PFM), a partir do *biofeedback* pressórico Perina e da Escala Oxford. A satisfação sexual foi medida pelo questionário Quociente Sexual Feminino. O teste Kolmogorov-Smirnov foi utilizado para verificar a normalidade dos dados. As variáveis não-paramétricas foram analisadas por meio do teste de Correlação de Spearman. O nível de significância adotado foi de 5%.

**Resultados** Foram avaliadas 80 mulheres, com mediana de 26 anos de idade e mediana do IMC de  $21,64 \text{ kg/m}^2$ . As participantes foram divididas em dois grupos, melhor e pior funcionalidade dos PFM, de acordo com a mediana da pressão do *biofeedback* pressórico e da Escala Oxford. Não encontramos diferença entre os grupos Oxford, quando comparamos os escores do questionário de satisfação sexual. Houve somente correlação significativa fraca entre a Contração Voluntária Média, obtida através do *biofeedback* pressórico e do domínio preliminares ( $r = 0.27$ ;  $p = 0.01$ ).

**Conclusão** O presente estudo verificou correlação fraca entre funcionalidade dos PFM e domínio preliminares do questionário Quociente Sexual Feminino. Por essa razão não é possível afirmar se há ou não associação entre a funcionalidade dos PFM e a satisfação sexual feminina de adultas jovens.

## Palavras-chave

- ▶ músculos do assoalho pélvico
- ▶ disfunção sexual
- ▶ fisioterapia

## Introduction

Human sexuality is multifactorial, receiving influence from biological, psychological, and social factors.<sup>1</sup> Sexual satisfaction results from a sufficiently long stimulation, and the feeling of sexual arousal free of any negative outcome such as pain, leading to orgasm.<sup>1</sup> Sexual dissatisfaction can result from sexual dysfunctions affecting any of the partners, or can exist independently of such dysfunctions. It is possible, even relatively frequently, to find women who desire sexual activity, are aroused, have orgasms, and still feel dissatisfied.<sup>2</sup> A healthy sexual response is a set of four successive stages: desire, arousal, orgasm, and resolution. Sexual dysfunction, therefore, involves some alteration in one or more of the phases of the sexual response cycle, or pain associated to the act, which manifests in a persistent or recurring manner.<sup>3</sup>

Sexual dysfunction (SD) is characterized by disturbances in one or more stages of the sexual response cycle or by pain associated with the sexual intercourse. All these generate suffering or interpersonal difficulties, making the woman incapable of participating in the sexual relation as she wishes.<sup>4</sup> Sexual dysfunction is prevalent in both sexes, but in the majority of studies, women are more affected. Studies show prevalence rates as high as 10 to 52% in men versus 25 to 63% in women. Such disparate values are justified by the diversity and subjectivity of criteria, assessment methods, definitions, and sampling techniques. Few studies have been performed on female SD (FSD), and those related to primary

health care and healthy women or to the general population are rare.<sup>5</sup> In the United States, ~10 million women complain of a decrease in sexual desire, pain, and discomfort during intercourse, as well as difficulty in reaching orgasm.<sup>6</sup> A study of SD prevalence in Brazil<sup>3</sup> evaluated 1749 women and identified 30% to 43% who reported some type of sexual dysfunction, with lack of sexual desire, pain during intercourse, and orgasmic dysfunction as the more prevalent complaints.<sup>3</sup> There are specific questionnaires to evaluate female sexual satisfaction, among them the Female Sexual Function Index (FSFI)<sup>6,7</sup> and the Female Sexual Quotient (SQ-F),<sup>8</sup> which deliver scores that measure sexual satisfaction and their different domains.<sup>9</sup>

The pelvic floor muscles' (PFM) contractions are believed to influence sensation during vaginal penetration,<sup>10</sup> while the pubococcygeus and iliococcygeal muscles are held responsible for the involuntary contractions during orgasm.<sup>11,12</sup> Hence, the changes in these muscles' functionality could be related to the orgasmic inability,<sup>13</sup> leading to decreased sexual satisfaction. Various techniques can be used to evaluate the PFM functionality. Currently, for clinical and diagnostic purposes, pressure measurements of vaginal contraction (pressure biofeedback and vaginal palpation) are more common due to their ease of application and rapid results, highly relevant to clinical practice.<sup>14</sup>

In his systematic review on PFM training - part of the sexual dysfunction treatment - Bo<sup>15</sup> identified only three studies that proved that the training of these muscles improves sexual satisfaction of postpartum women; further,

no studies that associate SD and PFM functionality were identified. Currently, there are few studies on the influence of PFM functionality on sexual satisfaction in healthy women. However, they only evaluated the correlation in a population of young adult women without pelvic floor dysfunctions.<sup>16</sup> Thus, the objective of this study was: (1) to associate the measurements obtained during the assessment of the PFM functionality with the sexual satisfaction score of young adult women and (2) to verify if there is any difference in sexual satisfaction among women with different degrees of PFM functionality.

## Methods

This study presents an observational and cross-sectional design. We invited female university students of the Universidade Federal do Rio Grande do Sul, in the city of Porto Alegre, to participate in the study. We recruited participants by means of posters and electronic media, being therefore a non-probabilistic convenience sample. The study received approval from the Ethics and Research Committee of the Universidade Federal do Rio Grande do Sul (UFRGS) No 26017914.6.0000.5347.

Women between 20 and 40 years, who already had sexual relations, nulliparous, with a body mass index (BMI) lower than 25 kg/m<sup>2</sup>, and without complaints of pelvic floor dysfunction, such as urinary incontinence and prolapse, were included in the study. The recruitments took place from March to June 2014.

After the subjects read and signed the Informed Consent form, we collected data such as age, weight, and height based on a medical anamnesis. Thereafter, the Sexual Quotient-Female Version (SQ-F) questionnaire<sup>8</sup> was applied. This instrument is an easy to complete questionnaire with accessible language, elaborated and validated for Brazilian women. It aims to evaluate female sexual satisfaction through the assessment of physical, emotional, and relational domains pertinent to sexual satisfaction. The questionnaire is composed of ten questions and evaluates five domains: desire and sexual interest (questions 1, 2, and 8); foreplay (question 3); arousal and harmonious interaction with the partner (questions 4 and 5); comfort in sexual intercourse (questions 6 and 7); orgasm and sexual satisfaction (questions 9 and 10). Each question is rated on a scale ranging from zero to five and the sum of the obtained score is multiplied by two, resulting in a value between 0 and 100. The higher values indicate better performance/sexual satisfaction. In the present study, we considered scores lower than 60 as the cut-off point to classify low sexual satisfaction.<sup>8</sup>

After applying the questionnaire, we evaluated PFM functionality using a pressure biofeedback device (Perina-Quark-996-2, ANVISA, no. 80079190005). This apparatus registers the pressure exerted by the voluntary contraction of the PFM (0 to 46.4 cm H<sub>2</sub>O, with intervals of 1.6 cm H<sub>2</sub>O). The participant was invited to lie down on a stretcher in lithotomy position. Next, the pressure probe, covered with a condom without lubricant, was introduced in the vaginal canal using intimate gel. Subsequently, the participant was instructed to perform three maximum voluntary contractions (MVC) of the

PFM; we measured the pressure values and calculated the mean MVC.<sup>17</sup> During the voluntary contraction of the PFM, the abdominal region was palpated to guide the participants to maintain the abdominal muscles relaxed. In the course of the assessment, the participant was instructed to follow the verbal commands of the examiner, such as "attention, one, two, three, and now!," "contract," "ok, relax."

Then, in the same position as previously described, we evaluated PFM functionality through bidigital vaginal palpation. The examiner, with the right hand duly fitted with a latex glove and lubricating gel, positioned 4 to 6 cm of the index and middle fingers in the vaginal cavity. During the evaluation, the participant was guided to follow identical verbal commands as previously described. After these measurements, the examiner withdrew the fingers from the vaginal cavity of the participant, ending the functional evaluation. The score given to this assessment followed the classification of the Modified Oxford scale,<sup>18</sup> which classifies the functionality of the PFM at the elevator anus muscle from 0 to 5. This scale uses the following scores: (0) no pressure – no discernible contraction; (1) flickering contraction, not sustained; (2) weak, distinctly palpable contraction, not sustained; (3) moderate muscle contraction, increase in vaginal pressure, and small cranial elevation; (4) satisfactory contraction, average vaginal pressure with elevation of the vaginal wall toward the pubic symphysis; and (5) strong muscle contraction, high vaginal compression, with positive movement toward the pubic symphysis.

To calculate the sample size, we took into account a standard deviation of 22.9 cmH<sub>2</sub>O<sup>19</sup> in pressure, assessed by means of the voluntary contraction of PFM evaluated with pressure biofeedback, with a maximum error of the estimate equal to 5 cmH<sub>2</sub>O. Thus, we defined a minimum of 74 participants. We calculated the sample size in the WinPepi program, version 4.0.

We used the Kolmogorov-Smirnov test to verify the normality of the data. The continuous numerical parametric variables were expressed as mean and standard deviation, while the non-parametric data were expressed as medians and interquartile intervals (IQI).

We performed the correlation analysis of non-parametric data with the Spearman correlation test. To assess the differences in sexual satisfaction among women with best or worse PFM functionality, the participants were divided into two groups, best functionality of PFM (BFPFM) and Worse functionality of PFM (WFPPFM), based on the total mean of the MVCs and the means of the Oxford scale. We used the Student's *t*-test to analyze the difference in parametric data, while the Mann-Whitney U test was used to analyze non-parametric data. In all the analyses, a significance level of 5% ( $p \leq 0.05$ ) was set. We analyzed the data in the Statistical Package for Social Sciences (SPSS) program, version 21.0.

## Results

Eighty women participated in this study. The median age was 26 years (20 - 38 years old); median BMI was 21.6 kg/cm<sup>2</sup> (17.3 - 25.3 kg/cm<sup>2</sup>).

**Table 1** Characterization of the sample of women with MFAP and PFAP from pressure biofeedback levels and the Modified Oxford scale

Variables	WFPFM-P (n = 44)	BFPFM-P (n = 36)	P	WFPFM-OS (n = 45)	BFPFM-OS (n = 35)	P
Age <sup>A</sup>	25 (23 - 30.7)	27 (24 - 31)	0.3	26 (23 - 32)	26 (23 - 30)	0.4
BMI <sup>A</sup>	21.5 (20 - 24)	23 (20 - 24)	0.4	22 (20 - 24)	22 (20 - 24)	0.5

Abbreviations: BMI, Body Mass Index; BFPFM-OS, best functionality of the PFM by Oxford scale BFPFM-P, best functionality of PFM by pressure; WFPFM-P, worst functionality of PFM by pressure; WFPFM-OS, worst functionality of PFM by the Oxford scale.

<sup>A</sup>, median and interquartile range (P25-P75). Mann-Whitney U test.

\*p, level of significance ( $p \leq 0.05$ ).

The evaluation of the PFM functionality by pressure biofeedback revealed an average of 20.1 cmH<sub>2</sub>O ( $\pm 9.6$ ). The PFM functionality assessed by vaginal palpation evidenced a median of 3.6 (1 - 5). The correlation between the two assessment instruments assessing the PFM function (pressure biofeedback levels and Oxford scale), identified a positive and moderate association ( $r = 0.5$ ,  $p < 0.05$ ) between the instruments.

Using these data, we divided the women into two groups according to the pressure biofeedback (P) and Oxford scale results (OS). Taking the mean obtained in P as a reference, 44 women were included in the Best PFM functionality group (BFPFM-P) and 36 women in the Worse PFM functionality group (WFPFM-P). Regarding the median obtained in the Modified Oxford Scale, 45 women were included in Best PFM functionality group (BFPFM-OS) and 35 in the Worse PFM functionality Group (WFPFM-OS). We compared the Best and Worst PFM functionality groups with respect to age and anthropometric characteristics, finding no significant difference ( $\rightarrow$  **Table 1**).

It was also possible to compare the total scores of the SQ-F among women with Best and Worst PFM functionality in the groups. When comparing the total scores of the SQ-F, according to the pressure biofeedback, we found a median of 78 (72 - 85.5) in the WFPFM-P group and of 79 (72 - 84) in the BFPFM-P group, without any significant difference ( $p = 0.8$ ). There was also no significant difference in the comparison of the domains of the SQ-F between the groups ( $\rightarrow$  **Table 2**).

When comparing the groups according to the Oxford scale, the median of the total scores of the SQ-F questionnaire was 78 (74 - 84) for the WFPFM-OS group and 80 (72 - 84) for the BFPFM-OS group, with no significant difference ( $p = 0.8$ ). In the comparison of the SQ-F domains, there was also no significant difference between the groups ( $\rightarrow$  **Table 3**).

The associations obtained between the methods of evaluation of the PFM functionality - pressure biofeedback levels and Modified Oxford scale - and the Total SQ-F Score did not exhibit a significant correlation. There was only a significant but slight correlation between the mean MVC, obtained through pressure biofeedback levels, and the foreplay domain ( $r = 0.27$ ;  $p = 0.01$ ).

## Discussion

The objective of this study was to associate the measurements obtained in young adult women when assessing the PFM functionality with the sexual satisfaction score. Furthermore, the study aimed to analyze whether there is a difference in the sexual satisfaction among women with different degrees of PFM functionality. The results did not identify any significant association between the PFM functionality and sexual satisfaction.

The prevalence of SD presents little change with age, while sexual satisfaction decreases. It is important that sexual life be functional with age, but several health problems affect sexuality, contributing to a greater sexual

**Table 2** Comparison of the total score of the SQ-F and its domains from pressure biofeedback levels

Variables	WFPFM-P (n = 44)	BFPFM-P (n = 36)	P
Desire <sup>A</sup>	11 (9.2 - 13)	11 (10 - 12)	0.6
Foreplay <sup>A</sup>	5 (4 - 5)	5 (5 - 5)	0.08
Arousal <sup>A</sup>	9 (8 - 9)	8.5 (8 - 9)	0.6
Comfort <sup>A</sup>	5 (5 - 6)	5 (5 - 6)	0.8
Orgasm and satisfaction <sup>A</sup>	8 (7 - 9)	8 (7 - 9)	0.9
Score <sup>A</sup>	78 (72 - 85.5)	79 (72 - 84)	0.8

Abbreviations: BFPFM-P, best functionality of PFM by pressure; WFPFM-P, worst functionality of PFM by pressure.

<sup>A</sup>, median and interquartile range (P25-P75). Mann-Whitney U test.

\*p, level of significance ( $p \leq 0.05$ ).

**Table 3** Comparison of the total score of the SQ-F and its domains in the two groups from the modified oxford scale

Variables	WFFPM-OS (n = 45)	WFFPM-OS (n = 35)	P
Desire <sup>A</sup>	11 (10 - 12)	11 (10 - 12)	0.6
Foreplay <sup>A</sup>	5 (4 - 5)	5 (4 - 5)	0.5
Arousal <sup>A</sup>	8 (8 - 9)	9 (8 - 9)	0.5
Comfort <sup>A</sup>	5 (5 - 6)	5 (5 - 6)	0.8
Orgasm and satisfaction <sup>A</sup>	8 (7 - 9)	8 (7 - 9)	0.9
SCORE <sup>A</sup>	78 (74 - 84)	80 (72 - 84)	0.8

Abbreviations: BFFPM-OS, best functionality of the PFM by the Oxford scale; WFFPM-OS, worst functionality of PFM by the Oxford scale. <sup>A</sup>, median and interquartile range (P25-P75). Mann-Whitney U test. \*p, level of significance ( $p \leq 0.05$ ).

dissatisfaction in older individuals.<sup>20</sup> Thus, it is also important to understand the association between sexual dysfunctions and sexual satisfaction at a younger age, when the factors that may influence sexual satisfaction are less important.<sup>21</sup>

Women with SD, with an average age of 37 years, who present a best PFM functionality attain higher scores in the orgasm and arousal domains of the FSFI questionnaire when compared with women with worse functionality.<sup>11</sup> In addition, when associating the duration of the PFM contraction with the orgasm and arousal domains of the FSFI questionnaire, we observed a positive correlation, suggesting that both orgasm and arousal are related to the improvement of the PFM functionality.<sup>11</sup> However, according to Bo,<sup>15</sup> the evidence associating dysfunction of the PFM and SD is still limited.

With respect to women without a dysfunction, a study by Martinez et al<sup>16</sup> assessed women aged 18 to 35 years. This study associated the PFM functionality with sexual satisfaction, and with expected BMI. This study involved 40 women assessed through the Female Sexual Function Index (FSFI) questionnaire, the Ortiz Scale, digital vaginal palpation, and by the Perina pressure biofeedback. We found significant positive associations between the assessment by pressure biofeedback levels and the sexual satisfaction and lubrication domains. Our study showed only a slight association between the mean MVC by pressure biofeedback levels and the foreplay domain in the SQ-F questionnaire. One of the reasons for these differences may be the use of different instruments when evaluating sexual satisfaction.

There is no published parameter of normal pressure values generated by the PFM voluntary contraction, which hinders possible comparisons. In the present study, the mean pressure generated by the PFM contraction of the 80 women was 20.12 cmH<sub>2</sub>O, while the mean value of the 40 women from the Martinez et al<sup>16</sup> study was 8.83 cmH<sub>2</sub>O. Although the apparatus used in the two studies was a calibrated Perina pressure biofeedback equipment, the vaginal probe could have been different from the one used in the present study. Therefore, based on both studies, it is not possible to conclude that the difference found between the mean pressure

values of the two groups of women represent a difference in the PFM functionality.

In this sense, the Oxford scale (from 0 to 5) and the Ortiz Scale (from 0 to 4) may be more appropriate for the samples comparison. Both scales are similar and use scores to measure the functionality of the pelvic muscles, in which scores < 3 indicate a loss in the PFM functionality.<sup>22</sup> However, the Martinez et al<sup>16</sup> study evidenced that, according to the Ortiz Scale, there is a large difference between the number of women with Best and Worst PFM functionality. This result suggests that the women followed in the Martinez et al study already presented worse PFM functionality compared with the women from the present study.

This study's limitations relate to the factors taken into consideration when grouping the participants. We made this assessment by measuring the PFM functionality scores and not the sexual satisfaction ones. This criterion was adopted when considering the main objective of the study: to verify and associate the PFM functionality with sexual satisfaction of young women. Using the mean pressure biofeedback allowed for a homogeneous sample distribution within the groups as opposed to using measures of sexual satisfaction, which would result in heterogeneous sample distribution.

It is still not possible to identify the influence of PFM functionality on the sexual satisfaction of young women. It is possible that PFM dysfunction is associated with sexual dysfunctions such as vaginismus and dyspareunia. However, regarding the orgasmic response and pleasure during penetration, components of sexual satisfaction, it is more difficult to define the role of PFM functionality.<sup>1</sup>

In conclusion, we found no association between sexual satisfaction and PFM functionality within the studied population. According to the SQ-F, sexual satisfaction was normal among young women who present best PFM functionality as well as among those who exhibit inferior functionality of such musculature. Thus, based on this outcome and in the absence of studies that assess the relationship between PFM functionality and sexual satisfaction in young women and without SD, there is still no evidence of such a relationship. More studies are needed that use instruments that, in addition to evaluating the PFM functionality, may assess

the variables related to the psychosocial factors involved in sexual satisfaction.

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