


# Pelvic floor muscle training program for women in the puerperal period: clinical progress after intervention

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## SUMMARY

**OBJECTIVE:** To evaluate the sexual function of women in the puerperal period after a postpartum pelvic floor musculature training program. We also sought to evaluate correlations between sexual dysfunction in the women and their delivery type and compare the frequency of sexual dysfunction and the quality of resumed sexual function following vaginal and cesarean deliveries.

**METHODS:** This clinical study included an intervention, carried out between July and December 2019, in which data were collected about 28 rooming-in women at a Maternity School. Data were divided into vaginal delivery and cesarean delivery. Sexual function was evaluated by the Female Sexual Function Index and the International Consultation on Incontinence Questionnaire-Short Form to assess the Incontinence Urinary and qualifies urinary loss. The intervention consisted of a muscle training exercise program. ANOVA tests were used to establish differences between groups.

**RESULTS:** There was an improvement in all outcomes, but there was no time *versus* group interaction. Improvement in sexual function was observed ( $p < 0.001$ ), the impact of urinary incontinence on quality of life ( $p < 0.001$ ), and pressure of the muscles of pelvic floor muscles ( $p < 0.001$ ) over time. There was no time *versus* group interaction for sexual function ( $p = 0.87$ ), the impact of urinary incontinence on quality of life ( $p = 0.88$ ), and pressure of the pelvic floor muscles ( $p = 0.66$ ).

**CONCLUSIONS:** Pelvic floor muscle exercise programs seem to be a very promising strategy concerning improving sexual activity among puerperal patients.

**Keywords:** Sexual behavior. Postpartum period. Sexuality. Urinary incontinence.

## INTRODUCTION

Pregnancy is a critical phase in a woman's life, and her experience is influenced by some factors, including hormonal, physical, and psychological changes. During this period, these transformations significantly impact her concept of sexuality, generally leading to problems in life for two<sup>1,2</sup>.

Many uncertainties and anxieties permeate and sometimes impact women's daily lives, and consequently their sexual

partners, especially about the pregnancy-*puerperium* period<sup>2,3</sup>. Some studies<sup>1-4</sup> indicate that both pregnancy and the *puerperium* constitute a crucial phase for the appearance of sexual problems and urinary incontinence (UI), and some women may show decreased sexual interest in general at this stage of life<sup>5,6</sup>.

The pelvis is considered the lower part of the trunk and starts from the pelvic bones' upper edge. It is divided into a smaller pelvis and a broader pelvis. The pelvic floor (PF) is the

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most overloaded structure during pregnancy<sup>3,7,8</sup>. It is responsible for supporting the pelvic organs and maintaining urinary, fecal, and sexual functions and includes the pelvic and urogenital diaphragms. Both form a muscle group that closes the lower opening of the pelvis<sup>7,9</sup>.

The levator ani and coccygeal muscles form the pelvic diaphragm. The urogenital diaphragm (or membrane of the perineum) is a more superficial layer formed by the ischioavernosus, bulbocavernosus, transverse superficial, and deep muscles of the perineum, and striated anal sphincter<sup>7</sup>.

The PF muscles made up of 70% slow-twitch (type 1) fibers and 30% fast-twitch (type 2) muscle fibers, are considered the only transverse muscles that support a load of the human body<sup>7,10</sup>. Like all skeletal striated muscles, the PF muscles have four properties that are excitability, which is the ability to respond to stimuli with contractility. The latter is the ability to contract when receiving a stimulus; extensibility, which is the ability to passively or actively stretch; elasticity, which is the ability to return to resting length after being subjected to stretching or shortening<sup>3,7</sup>.

Respecting the PF dysfunction, the correct assessment is critical, consisting of a complete medical history and physical examination, including examining the PF<sup>10,11</sup>.

A fundamental aspect of the evaluation includes researching an unfavorable obstetric history (difficult deliveries, use of forceps, prolonged labor, and traumatic ruptures or episiotomies) without forgetting to address the patient's intestinal patterns, including diarrhea, constipation, or both<sup>8,12</sup>.

Regarding sexuality, the couple may have decreased desire and frequency of sexual activity, but the desire is increased in some cases. Couples tend to abstain from vaginal penetration, and the frequency of sexual activity may decrease for fear of harming the fetus, cause a miscarriage or premature birth<sup>3,8,13</sup>. There may be changes in the choice of sexual positions, particularly when discomfort/pain is felt<sup>11</sup>.

The most common female sexual complaint during pregnancy and after childbirth is dyspareunia, or pain during vaginal penetration, especially after the first pregnancy. When the couple cannot adapt to changes in sexual activity during pregnancy<sup>8,14</sup>, and after childbirth, this may cause critical emotional issues that negatively affect the welfare of both parties<sup>15</sup>.

The presence of sexual dysfunction may be a factor resulting from a sum of factors, which promote total or partial barriers in the woman's sexual response, related to desire, excitement, and orgasm<sup>8,16</sup>, negatively impacting her quality of life.

This study aimed to evaluate the sexual function of puerperal women after a postpartum pelvic floor musculature training program, as well as to evaluate some correlation between sexual dysfunction in puerperal women and the way of delivery, and

to compare the frequency of sexual dysfunction and the quality of the resumption of sexual function in puerperal women of vaginal and cesarean delivery.

## METHODS

We conducted a prospective pilot study at rooming-in of a public university hospital. The first participant was recruited on July 01, 2019, and the last on December 31, 2019.

As inclusion criteria, we looked for apparently healthy postpartum women. Women under the age of 18 were excluded from our study, as well as those suffering from psychiatric disorders and/or taking any drugs known to interfere with sexuality (antidepressants, anxiolytics, and neuroleptics).

Eligible women who were rooming-in were randomly selected and invited to participate. After having discussed the study's objectives, responsibilities, and the procedures involved, the volunteers who chose to participate signed the Informed Consent Form (ICF) and were asked to complete a questionnaire on sociodemographic, clinical, and behavioral characteristics. They were asked about age, ethnicity, marital status, education, origin, general history, family, obstetric history, and data on the previous pregnancy, smoking, and use of illicit drugs and alcohol.

The intervention consisted of a muscle training exercise program, including PF exercises with manual awareness, exercises with adductor dissociation, exercises with the sitting patient, and standing exercises. In addition, the FSFI questionnaires (Female Sexual Function Index)<sup>17</sup>, were applied to assess the female sexual response in the postpartum period and the ICIQ-SF (International Consultation on Incontinence Questionnaire-Short Form)<sup>18</sup>, to assess the impact of Incontinence Urinary quality of life and qualifies urinary loss. The volunteers signed the Free and Informed Consent Form (ICF) and were evaluated during the 48 hours after delivery (still hospitalized), and in the second and third months postpartum, this monitoring was carried out at rooming-in of the referred maternity.

Data collection took place in four stages: the application of the evaluation form, questionnaires, and physical examination to women in labor; assistance during the immediate puerperium period, consisting of four physiotherapy sessions in the first 48 hours after delivery and delivery of a booklet with exercises for the PF and postpartum care; a two-month reevaluation: reevaluation of the puerperal woman 60 days after the delivery date, with the delivery of a booklet with other exercises for the PF; a three-month reevaluation: reevaluation of the puerperal woman 90 days after the date of delivery.

The database was built using the Statistical Package for Social Sciences (SPSS) software version 22.0. We first performed

exploratory data analysis describing the sample according to the sociodemographic, clinical, and behavioral aspects of the women studied. Next, a univariate analysis of the sample was performed, and we compared the averages of each domain according to the risk of sexual dysfunction ( $FSFI \leq 26.5$ ) using the Student's *t*-test for independent samples.

Descriptive statistics were performed to present the socio epidemiological characteristics of the research volunteers. Inferential statistics were used to establish the possible differences between the groups and analyze the primary outcome (sexual function) and the secondary outcomes (UI and vaginal manometry). ANOVA tests were used to establish differences between groups, except for vaginal manometry, since only two evaluations were possible.

### Ethics

This study was approved by the Ethics Committee of Universidade Federal do Rio Grande do Norte (UFRN), number 30951413.7.0000.5292. The study was conducted following the Declaration of Helsinki and its modifications<sup>19</sup>.

## RESULTS

In general, the observed result was that over time, there was an improvement in all outcomes, but there was no time-*versus*-group interaction. Table 1 shows the general characteristics of the sample submitted to the physical therapy intervention. There was a balance between the results of studied patients in the CD and VD groups concerning age, gestational age at the time of delivery, and APGAR values in the first and fifth minutes in the studied patients.

Improvement was observed in sexual function ( $p < 0.001$ ), impact of urinary incontinence on quality of life ( $p < 0.001$ ),

**Table 1.** Socio-demographic, behavioral, and clinical of the study population (n =28).

	CD	VD
Age (years)	30.36±6.52	29.07±5.38
Schooling (%) up to High School	61.35	98.22
College	39.65	1.88
Marital Status (%) living with a partner	78.57	92.86
living without a partner	21.43	7.14
Gestational Age	38.43±0.98	37.29±1.80
Apgar 1st minute	8.57±0.53	8.71±0.76
Apgar 5th minute	8.86±0.38	9.00±0.00

CD: cesarean delivery; VD: vaginal delivery; Apgar: Activity/muscle tone.

and pressure of the muscles of PF muscles ( $p < 0.001$ ) over time (Figure 1). On the other hand, there was no time-*versus*-group interaction for sexual function ( $p = 0.87$ ), impact of urinary incontinence on quality of life ( $p = 0.88$ ), and PF muscles' pressure ( $p = 0.66$ ).

Table 2 shows the comparison of values between groups, highlighting that there was no significant difference in each assessment. There was no relationship between the mode of delivery (vaginal and cesarean), and the report of impaired sexual function in the patients studied. Therefore, there does not seem to be a difference in the return to sexuality when comparing postpartum women with normal and cesarean delivery after performing the PF exercise program proposed by the study in question. Over the three months of evaluation, regardless of the type of delivery, sexual function remained the same.

## DISCUSSION

The assessment of women's degree of sexual satisfaction is a current and constant problem since numerous variables, such as social, human, biological, psychological, physiological, and cultural taboos, can influence the degree of final sexual satisfaction<sup>1,8</sup>.

The sexual complaint is one of the most frequent problems patients regularly share with obstetricians, and, unfortunately, it continues to be approached in a very simplistic way most of the time. Considering that sexual dysfunction may be associated with an increased risk of conflicts between the couple during pregnancy<sup>8,12</sup>, the etiological diagnosis of this condition is important. Therefore, appropriate treatment can be instituted when necessary to avoid the many affective problems—the non-acceptance of sexual relations during pregnancy, the fear of resuming this activity, and others—and assess the correlation between delivery type and sexual dysfunction in the puerperium<sup>20-22</sup>. During pregnancy, the relative hypo-estrogenism, similar to climacterics, influences these patients' sexual intercourse and sexual dysfunction. Additionally, the muscles have estrogen and testosterone receptors that decrease with aging and reduction of ovarian function<sup>23-25</sup>. Besides that, the progressive increase in uterine volume increases intra-abdominal pressure and overload in the PF. These increases added to the excessive gain in body mass and the action of hormones such as relaxin, progesterone, and estrogen that generate more excellent elasticity of the PF tissues<sup>7,26</sup> can cause urinary and fecal incontinence, pain, and sexual dysfunction if the musculature is not prepared. Progesterone is responsible for decreasing the pressure of urethral closure and also for the hypotonicity of the PF, and relaxin and estrogen increase the amount of water in the tissues of the pelvic region<sup>7,27</sup>, which directly relates to decreases in the strength of PF muscles and, consequently,

to the emergence of urinary incontinence, as mentioned by several study authors<sup>1,8,10,28</sup>. They are also essential during labor, as this region must have sufficient extensibility to allow the fetus to pass through the vaginal canal without lacerations. The lack of stretching and awareness of this musculature can generate important perineal<sup>26</sup>.

Some studies show that the stretching of perineal structures is extreme during the fetus's passage through the vaginal canal. They showed that the perineal body is subjected to an elongation of up to 65% of its resting state and concluded that PF muscles have their extensibility increased by up to 177% during the passage of the fetus<sup>1,7,26</sup>. Thus, awareness

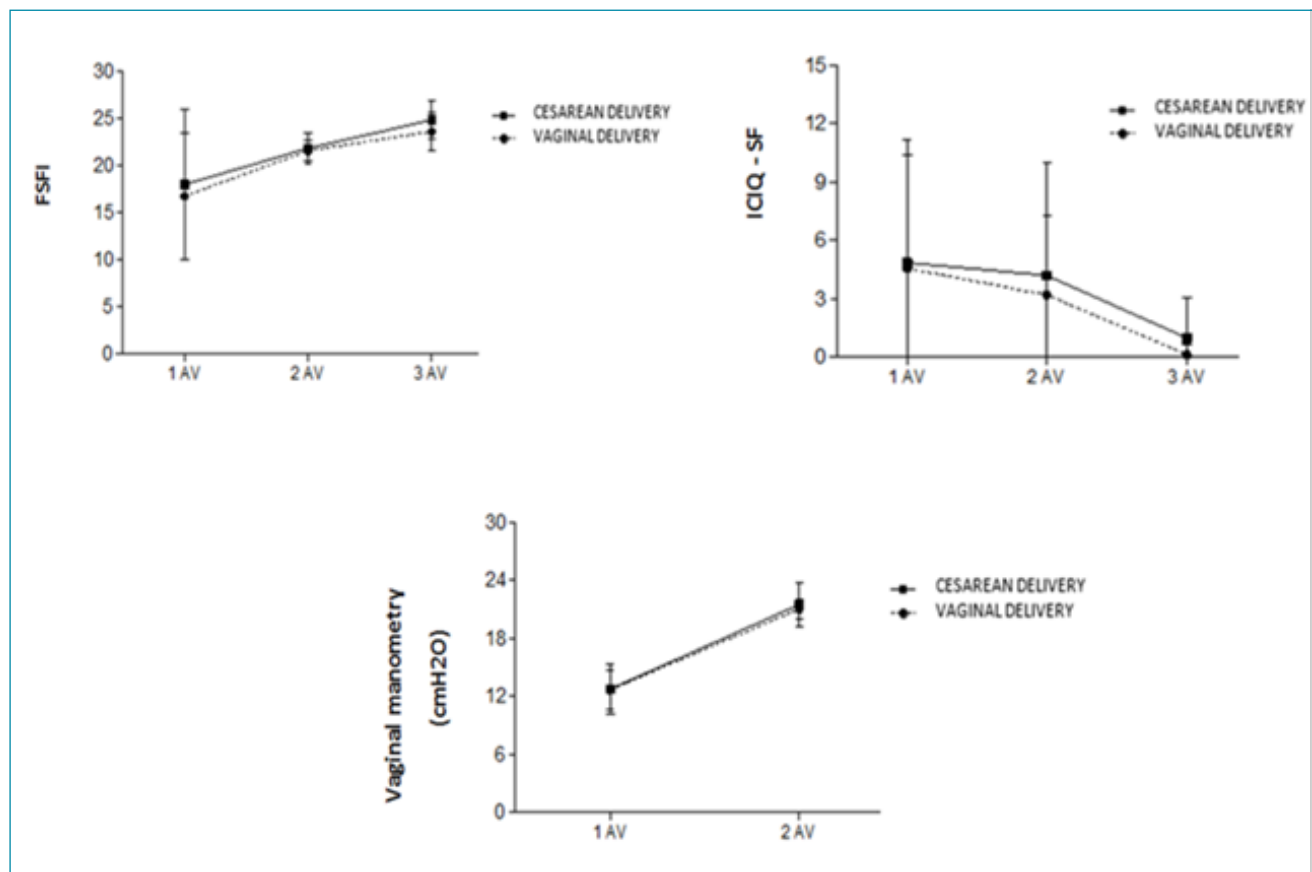


Figure 1. Evaluation of sexual function, the impact of urinary incontinence on quality of life, and vaginal manometry over three months.

Table 2. Comparative values between volunteers for cesarean delivery and vaginal delivery (n=28).

		CD (n=14)	VD (n=14)	p-value
FSFI	1 <sup>st</sup> AV	17.97±2.58	16.75±2.03	0.61
	2 <sup>nd</sup> AV	21.60±1.43	21.75±1.33	0.11
	3 <sup>rd</sup> AV	24.82±1.98	23.59±1.98	0.66
ICIQ-SF	1 <sup>st</sup> AV	4.86±6.35	4.57±5.81	0.90
	2 <sup>nd</sup> AV	4.21±5.75	3.21±4.08	0.60
	3 <sup>rd</sup> AV	1.08±2.14	0.13±0.52	0.14
VM (cmH <sub>2</sub> O)	1 <sup>st</sup> AV	12.80±2.69	12.69±1.96	0.90
	2 <sup>nd</sup> AV	21.50±2.29	21.03±1.06	0.49

CD: cesarean delivery; VD: vaginal delivery; FSFI: female sexual function index; ICIQ-SF: international consultation on incontinence questionnaire-short form; VM: vaginal manometry; cmH<sub>2</sub>O: centimeters of water.

and gaining extensibility of PF muscles are essential for the woman to experience the gestational period with greater safety and prepare for possible vaginal delivery<sup>8,11</sup>. During the expulsive phase, the perineum tissues and muscles are subject to spontaneous laceration due to the passage of the fetus through the vaginal canal or provoked (instrumentalization of childbirth)<sup>26</sup>. It is known that there are several risk factors for perineal laceration<sup>8,20</sup>, and we can mention some such as the fetus with great weight at birth, the second stage of prolonged labor, primiparity, the position adopted during the expulsive phase, the directed pull, the white race, among others<sup>1,8</sup>. PF muscles training has little to do with childbirth outcomes; it is more useful for preventing urinary, fecal, and sexual dysfunctions. Some studies, however, analyzed the effects of training on some aspects, such as the duration of the second stage of delivery and the prevalence of laceration, but no significant results were found to prove the influence of PF muscle training on positive delivery outcomes<sup>26,27</sup>.

The great motivation and benefit of this study were to investigate physiotherapy as a facilitating agent in the puerperium, progressively improving sexual function. The study results show that the training of the PF muscles can emerge as an important alternative for the prevention and treatment of this type of woman's condition, reducing possible physical and emotional complications. Women who underwent the study's exercise program improved sexual function and muscle pressure measured by vaginal manometry. As a limitation of the study, we can mention the sample size and the difficulty in assessing PF

muscles' extensibility. Unlike other muscle groups, stretching the PF does not involve the range of motion of joints.

This study's principal limitation includes the relatively small number of participants enrolled, but the latter is justified by the COVID-19 pandemic we are facing. However, there are no other publications related to this subject, and the results presented in this study can improve sexuality and, consequently, the quality of life in women in the postpartum period.

## CONCLUSIONS

The prescription of PF muscle exercise programs for the improvement of sexual function of women in the puerperal period seems to be a very promising strategy concerning improving the resumption of sexual activity in women in the postpartum period.

## AUTHORS' CONTRIBUTIONS

**MNM:** Conceptualization, Data curation, Formal Analysis, Writing – original draft, Writing – review & editing. **MTABCM:** Conceptualization, Data curation, Formal Analysis, Writing – original draft, Writing – review & editing. **VTC:** Data curation, Formal Analysis. **MCO:** Data curation, Formal Analysis. **KSM:** Conceptualization, Writing – original draft, Writing – review & editing. **ACAS:** Writing – original draft, Writing – review & editing. **AKG:** Conceptualization, Data curation, Formal Analysis, Writing – original draft, Writing – review & editing.

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