Revista Brasileira de Enfermagem
REBEn

Pelvic floor dysfunction in primiparous women up to 6 months after delivery: cohort study

Disfunções do assoalho pélvico em primíparas até 6 meses após o parto: estudo de coorte

Disfunción del suelo pélvico en primíparas hasta 6 meses después del parto: estudio de cohorte

Sheyla Guimarães Oliveira[I]
ORCID: 0000-0002-2180-6981

Adriana Caroci-Becker[II]
ORCID: 0000-0003-3112-8480

Edilaine de Paula Batista Mendes[III]
ORCID: 0000-0002-8541-3490

Maria Luiza Gonzalez Riesco[II]
ORCID: 0000-0001-9036-5641

Robson da Costa Oliveira[IV]
ORCID: 0000-0001-6532-2893

Sonia Maria Junqueira Vasconcellos de Oliveira[II]
ORCID: 0000-0002-8007-2092

[I] *Hospital Municipal Dr Moysés Deutsh. São Paulo, São Paulo, Brazil.*
[II] *Universidade de São Paulo. São Paulo, São Paulo, Brazil.*
[III] *Hospital Santa Barbara d'Oeste. Limeira, São Paulo, Brazil.*
[IV] *Universidade Ibirapuera. São Paulo, São Paulo, Brazil.*

How to cite this article:
Oliveira SG, Caroci-Becker A, Mendes EPB, Riesco MLG, Oliveira RC, Oliveira SMJV. Pelvic floor muscle strength after birth in primiparous women: a cohort study. Rev Bras Enferm. 2021;74(5):e20200607. https://doi.org/10.1590/0034-7167-2020-0607

Corresponding author:
Sheyla Guimarães Oliveira
E-mail: sheylaenf@hotmail.com

Submission: 09-17-2020 **Approval:** 01-20-2021

ABSTRACT

Objective: To analyze pelvic floor muscular strength (PFMS), urinary (UI) and anal (AI) incontinence and dyspareunia in primiparous women up to 6 months after normal or cesarean delivery. **Methods:** this is a prospective cohort with 169 women (128 normal births, 41 cesarean sections), followed between 50-70 and 170-190 days postpartum, when PFMS was measured using perineometry, and UI and AI and dyspareunia, through interview. **Results**: PFMS, UI and dyspareunia were similar between types of delivery. The difference was significant only for the time elapsed, with improvement in the studied period (2 and 6 months postpartum). Regarding AI, there was a significant difference between 2 and 6 months postpartum, with an interaction between type of delivery and time (p=0.022). **Conclusion**: the type of delivery did not show any influence on pelvic floor dysfunctions, except for AI. For all outcomes, there was an improvement in the period studied.
Descriptors: After Childbirth Period; Pelvic Floor; Muscle Strength; Urinary Incontinence; Dyspareunia.

RESUMO

Objetivo: Analisar a força muscular do assoalho pélvico (FMAP), a incontinência urinária (IU) e anal (IA) e a dispareunia em primíparas até 6 meses após o parto normal ou cesariana. **Métodos:** Coorte prospectiva com 169 mulheres (128 parto normal, 41 cesariana), acompanhadas entre 50-70 e 170-190 dias pós-parto, quando foi mensurada a FMAP, mediante a perineometria, e avaliadas a IU e IA e a dispareunia, mediante entrevista. **Resultados**: A FMAP, a IU e a dispareunia foram similares entre os tipos de parto. A diferença foi significativa apenas para o tempo decorrido, com melhora no período estudado (2 e 6 meses pós-parto). Em relação à IA, houve diferença significante entre 2 e 6 meses pós-parto, com interação entre tipo de parto e tempo (p=0,022). **Conclusão**: O tipo de parto não mostrou influência nas disfunções do assoalho pélvico, exceto na IA. Para todos os desfechos, houve melhora no período estudado.
Descritores: Período Pós-Parto; Assoalho Pélvico; Força Muscular; Incontinência Urinária; Dispareunia.

RESUMEN

Objetivo: Analizar fuerza muscular del suelo pélvico (FMSP), incontinencia urinaria (IU) y anal (IA) y dispareunia en mujeres primíparas hasta 6 meses después del parto normal o por cesárea. **Métodos:** Cohorte prospectiva con 169 mujeres (128 partos normales y 41cesáreas), seguidas entre 50-70 y 170-190 días posparto, cuando se midió la FMSP mediante perineometría, y se evaluó la IU, IA y dispareunia, mediante entrevista. **Resultados:** FMSP, IU y dispareunia fueron similares entre los tipos de parto. La diferencia fue significativa solo para el tiempo transcurrido, com mejoría em el período estudado, com mejoría em el período estudiado (2 y 6 meses posparto). Em cuanto a la IA, hubo una diferencia significativa entre los 2 y 6 meses posparto, com uma interacción entre el tipo de parto y el tiempo (p=0,022). **Conclusión:** El tipo de parto no mostro influencia em las disfunciones del suelo pélvico, excepto em la IA. Para todos los resultados, hubo uma mejora em el período estudiado.
Descriptores: Periodo Posparto; Suelo Pélvico; Fuerza Muscular; Incontinencia Urinaria; Dispareunia.

INTRODUCTION

Vaginal delivery is related to changes in the pelvic floor, leading to decreased pelvic floor muscle strength (PFMS)[1-3].

A study that analyzed the effect of different types of delivery in primiparous women, at 6 and 8 weeks postpartum, concluded that vaginal delivery is an independent risk factor for damage to the pelvic floor muscles[3]. Moreover, the decrease in PFMS can trigger pelvic floor dysfunction (PFD) such as urinary (UI) and anal (AI) incontinence, dyspareunia and other morbidities, affecting psychological, physical, social, personal and sexual relationships[1,4-5].

The International Continence Society (ICS) defines UI as a complaint of any involuntary loss of urine and AI as an involuntary loss of feces and/or flatus[6].

PFDs usually present their first episode in pregnancy or in the postpartum period[7]. The frequency of these symptoms in the postpartum period is relevant, but it is often underestimated. A prospective cohort study of 976 women showed a prevalence of UI symptoms in approximately 50% of cases, one year after the first delivery. The study also showed that the type of delivery influenced the increase in UI, since vaginal delivery and instrumental delivery increased the risk of UI three to four times, compared to cesarean section[8].

High frequencies of UI (21.6%) and AI (16.3%) were found in the prospective multicenter study at 3 months postpartum[4]. Another study found that injury to the anal sphincter during vaginal delivery was a risk factor for AI; however, an increased risk of AI was not identified in nulliparous women, with cesarean section or normal delivery without lesions of the anal sphincter[9].

In turn, AI appears to be associated with decreased PFMS and pelvic organ prolapse[10-12]. A survey that assessed the relationship between PFD and PFMS found that PFMS was significantly lower among women who had an operative vaginal delivery[3,12].

There is little scientific evidence on the presence of dyspareunia in pregnancy and postpartum and on the pelvic floor muscle function. However, the prevalence of dyspareunia is relatively high, as a cohort found that 85.7% of women reported this complaint in the first sexual intercourse after delivery, 44.7%, 43.7% and 22.6% remained with pain at 3, 6 and 18 months after delivery, respectively[13]. A cohort that analyzed 300 nulliparous women did not find a relationship between PFMS variations and dyspareunia[14].

PFMS assessment can be performed by gynecological examination, using the methods of digital vaginal palpation, perineometry, ultrasound, electromyography, manometry, magnetic resonance, computed tomography, endoanal ultrasound, surface electromyography and vaginal cones, with perineometry and digital vaginal palpation being more used[14-17]. The correct assessment of PFMS can help in the diagnosis and treatment of PFD, since these morbidities are usually caused by a decrease in PFMS[1,11,16]. Some authors, however, argue that although these methods are different, they are positively correlated[16-17].

The strengthening of the pelvic floor muscles is a recognized strategy for the prevention and reduction of morbidities in the genitourinary and anal tract that can arise in childbirth and continue in the postpartum period[5,10]. In this sense, knowing PFD after delivery and drawing a profile of the PFMS is important to improve these training programs during pregnancy and after delivery, implement nursing care based on scientific evidence and promote women's health.

OBJECTIVE

To analyze PFMS, UI, AI and dyspareunia in primiparous women up to 6 months after normal childbirth or cesarean section.

METHODS

Ethical aspects

The study was approved by the Municipal Health Council of the Health Authority of Itapecerica da Serra and by the Research Ethics Committee of *Universidade de São Paulo* School of Nursing. The participation of women was voluntary, guaranteeing anonymity.

Design, period, and place of study

This is a prospective cohort study guided by STROBE, carried out from January 2014 to February 2016, at the Birth Center (BC) of *Pronto-Socorro e Maternidade Municipal Zoraide Eva das Dores* (PSMMZED - Emergency Room and Maternity), which assists pregnant women of usual risk, and in Basic Health Units (BHU) in the municipality of Itapecerica da Serra, metropolitan region of great São Paulo, Brazil.

Population and sample

The population consisted of women who had a childbirth at PSMMZED, according to the following eligibility criteria: primiparous, with normal childbirth or full-term cesarean section; Single, live newborn; without previous abdominal or urogenital surgery; without illnesses or physical conditions that interfere with PFMS; without difficulty with Portuguese or communication.

The calculation of the sample size was the same used in a previous study, considering the comparison of PFMS between women with normal childbirth and cesarean section, in which a Cohen effect size equal to 0.699 was observed for type I error equal to 5% and power of 90% test[18].

Based on childbirths that occurred at PSMMZED in 2011 and 2012, with the proportion of three normal childbirths for each cesarean, 96 women would be needed (72 with normal childbirth and 24 with cesarean). The sample was calculated using the G * Power 3.1.9.2 program and followed the methodology described by Chow et al. (2002)[19].

Considering the possibility of losses from follow-up, it was decided to expand the recruitment of postpartum women by at least 30% to obtain the estimated sample. The inclusion of women in the cohort was for convenience and the final calculated sample of at least 96 participants was obtained.

Study protocol

Participants were recruited during hospitalization after

childbirth in the rooming-in. At that moment, they were informed about the research and signed the informed consent form. Follow-up after hospital discharge was performed at the PSMMZED office or at BHU, depending on women's preference, up to 6 months after childbirth.

Data were collected, by two trained researchers, in three stages. Stage 1 was performed during hospitalization after childbirth, with the inclusion of the participant in the study and obtaining data on sociodemographic characterization and clinical and obstetric conditions: age, self-reported skin color, education, occupation, marital status, perineal condition in normal childbirth (intact and first degree perineal laceration or episiotomy and second degree perineal laceration or above), previous UI (before or during pregnancy), through interview and consultation of the medical record, using a form with closed questions, prepared exclusively for the study and completed by the researchers. In stages 2 and 3, between 50-70 and 170-190 days after childbirth, respectively, PFMS, UI, AI and dyspareunia were evaluated. Body Mass Index (BMI) was assessed for the purpose of confounding control for the variation of PFMS. It was also asked if the woman had resumed sexual relations.

At the end of stages 1 and 2, the woman was invited to participate in the next stage. Between 7 and 2 days before the next stage, the researchers made contact with the participant, by telephone, in order to remind her of the return. In case of not showing up for the consultation, another telephone contact was made to arrange a new return.

Exposure was considered to be the type of childbirth, normal or cesarean. As outcomes, PFMS, UI, AI and dyspareunia were considered.

PFMS was assessed with the electronic pressure perineometer model Peritron-9300® (Laborie, Canada), which records the PFMS from 0.1 cm of water (cmH_2O) to 300 cmH2O. The device has a silicone-coated vaginal probe 8 cm long and 3 cm in diameter. The measurements were made with the woman in a gynecological position and the highest perineometry value was considered, recorded in three consecutive measurements, with an interval of 15 seconds.

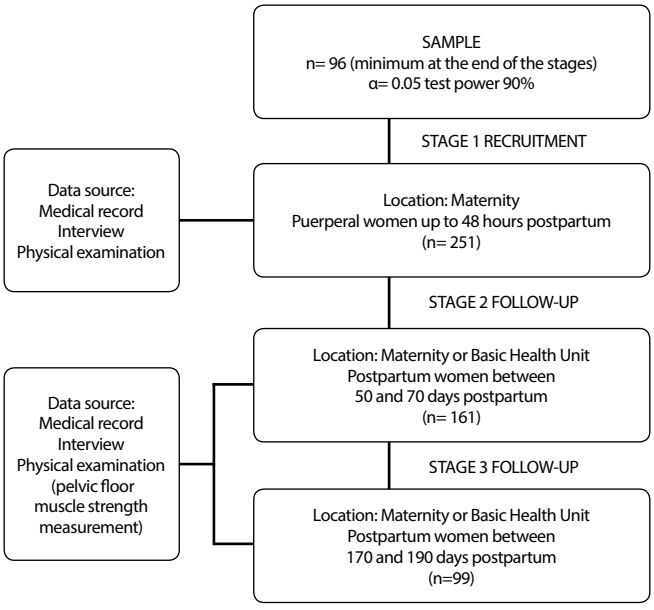

Figure 1 - Flowchart of study's sample and stages, Itapecerica da Serra, São Paulo, Brazil, 2017

UI, AI and dyspareunia were assessed by interview. Involuntary loss of urine in any frequency, quantity and situation was considered UI. AI refers to any involuntary loss of flatus or feces. Dyspareunia was assessed as pain during sexual intercourse. For these outcomes, the last 4 weeks prior to the interview were considered.

The study stages are shown in Figure 1.

Analysis of results, and statistics

Data were recorded in a form designed specifically for the research, stored in the Excel application and analyzed by the Statistical Package for Social Sciences (SPSS) program, version 22.0.

Absolute and relative frequencies of categorical variables and the mean and standard deviation (SD) of quantitative variables were calculated. In the bivariate analysis, the Wilcoxon-Mann-Whitney, Fisher's exact and chi-square tests were used. For repeated measures, a mixed effects model was adopted for quantitative variables and a generalized mixed effects model with a Firth penalty for categorical variables.

All tests were carried out in two-tailed form, assuming the probability of occurrence of a 5% error of the first type (p value=0.05).

RESULTS

In stage 1, 251 women were recruited. Of these, 169 women were followed in stage 2, and 99 were followed in stage 3. The reasons for loss of follow-up were change of address and lack of a telephone number, making contact impossible to confirm the return.

Table 1 shows the sociodemographic, clinical and obstetric characteristics collected during the hospitalization period after childbirth. The data refer to the 169 women, of whom 128 (75.7%) had normal childbirth and 41 (24.3%) had cesarean section. Among women with normal childbirth, the mean age was significantly lower (p=0.022); however, in the analysis by age group, this difference is no longer significant. It is worth mentioning that none of the women in the sample presented third or fourth degree lacerations. There was no significant difference in relation to skin color, education, occupation, marital status and previous UI according to the type of childbirth.

As expected, all women who underwent a cesarean section had intact perineum. In normal childbirth, women with first degree perineal lacerations were grouped with those who had intact perineum (n=59; 46.5%) and those with second degree perineal lacerations were grouped with those who had episiotomy (n=68; 53.5%) (data not shown in table).

Tables 2 and 3 are presented the variables evaluated at 2 and 6 months after childbirth.

There was a reduction in BMI during the period studied, especially among women who had normal childbirth. The difference was significant both for the type of childbirth (p=0.002) and for the elapsed time (p=0.039), with no interaction between childbirth and time.

Table 1 - Characteristics of women, according to the type of childbirth and *p* value, Itapecerica da Serra, São Paulo, Brazil, 2014-2016

Variable	Type of childbirth				*p* value
	Normal		Caesarian		
	n/mean	%/SD	n/mean	%/SD	
Age (years) n=169	21.3	4.9	23.1	5.1	0.022*
< 20	59	46.2	11	26.8	
20 ⊦ 25	42	32.8	16	39.0	
25 ⊦ 30	18	14.1	10	24.4	0.166†
30 ⊦ 35	6	4.7	3	7.3	
35 ⊦ 40	3	2.3	1	2.4	
Skin color (n=169)					
White	73	57.0	28	68.2	
Brown	43	33.6	9	22.0	0.525†
Black	11	8.6	4	9.8	
Yellow	1	0.8	-	-	
Education (years) (n=169)					
< 9	3	2.3	1	2.4	
9 ⊦ 12	36	28.1	12	29.3	1.000†
≥ 12	89	69.6	28	68.3	
Occupation (n=169)					
Paid	42	32.8	11	73.2	0.474‡
Unpaid	86	67.2	30	26.8	
Marital status (n=150)					
With partner	102	87.2	28	84.8	0.729‡
Without partner	15	12.8	5	15.2	
Previous urinary incontinence (n=169)					
Yes	20	15.6	11	26.8	0.108‡
No	108	84.4	30	73.2	

**Wilcoxon-Mann-Whitney test; †Fisher's exact test; ‡ Chi-square test*

One of the outcomes of interest in the study was PFMS assessment, which was similar among women with normal childbirth and cesarean section, both at 2 months and 6 months after childbirth, but the results indicated a small increase at 6 months in both groups (p=0.002), with no interaction between type of childbirth and elapsed time (Table 2).

Adopting the cutoff point of PFMS in 30 cmH_2O, more than two thirds of women presented values below this point at 2 and 6 months after childbirth, respectively: <30 cmH_2The_=71.4% and 67.7%; ≥30 cmH_2O=28.6% and 32.3% (data not shown in table).

Regarding the outcomes UI, AI and dyspareunia, there was a significant difference between 2 and 6 months after childbirth (UI: p=0.005, AI: p=0.044 and dyspareunia: p=0.005), with interaction between type of childbirth and time only for AI (p=0.022). It is worth noting that there was only a complaint of loss of flats; however, no woman reported loss of feces. For all outcomes, there was improvement at 6 months after childbirth. In turn, in the comparison between the type of childbirth, no outcome showed significant difference (Table 3).

Regarding the resumption of sexual relations, there was also no difference in relation to the type of childbirth, but there was a significant increase in the proportion of women who had resumed sexual relations at 6 months after childbirth, in both groups (p<0.001), as already expected for this period after childbirth (Table 3).

Table 2 - Body mass index and pelvic floor muscle strength at 2 and 6 months after childbirth, according to the type of childbirth and *p* value, Itapecerica da Serra, São Paulo, Brazil, 2014-2016

Variable	Type of childbirth				*p* value*		
	Normal		Caesarian		Childbirth	Time	Childbirth x time
	n	Mean (SD)	n	Mean (SD)			
Body mass index							
2 months after childbirth	128	24.4 (3.6)	41	26.4 (4.2)	0.002	0.039	0.368
6 months after childbirth	74	23.9 (3.6)	25	26.1 (4.9)			
Pelvic floor muscular strength							
2 months after childbirth	128	23.5 (15.5)	41	23.3 (14.1)	0.682	0.002	0.457
6 months after childbirth	74	26.8 (13.7)	25	24.4 (12.4)			

**Mixed effects model*

Table 3 – Urinary and anal incontinence, dyspareunia and resumption of sexual intercourse 2 and 6 months after childbirth, according to the type of childbirth and *p* value, Itapecerica da Serra, São Paulo, Brazil, 2014-2016

Variable	Type of childbirth				*p* value*		
	Normal		Caesarian		Childbirth	Time	Childbirth x time
	n	%	n	%			
Urinary incontinence							
2 months after childbirth	10	7.8	4	9.8	0.997	0.005	0.613
6 months after childbirth	3	4.1	-	-			
Anal incontinence							
2 months after childbirth	6	4.7	-	-	0.078	0.044	0.022
6 months after childbirth	1	1.4	-	-			
Dyspareunia							
2 months after childbirth	45	44.5	14	43.7	0.167	0.005	0.172
6 months after childbirth	10	14.1	-	-			
Resumption of sexual relations							
2 months after childbirth	97	75.8	32	78.1	0.451	**<0.001**	0.503
6 months after childbirth	71	95.9	24	96.0			

**Generalized mixed effects model with Firth penalty.*

DISCUSSION

There is research indicating a relationship between the type of childbirth and PFD[2,20-22]. A cross-sectional study observed that the mean PFMS was 8.92 cmH_2O lower in women undergoing cesarean section, compared to those with vaginal childbirth[20]. Other authors found no significant difference between the type of childbirth and the decrease in PFMS[16,23]. In the present study, the results revealed that the mean PFMS of women in the after childbirth were slightly lower among those who underwent cesarean section, compared to those of normal childbirth, but without statistical difference. When comparing PFMS averages at 2 and 6 months after childbirth, an increase in PFMS was found over time, regardless of the type of childbirth. Although the averages remain below 30 cmH_2O, the proportion of women with PFMS ≥30 cmH2O more than doubled in both groups. Reinforcing these findings, a survey showed PFMS values of 54.1 cmH_2O at 98 days and 59.9 cmH_2O at one year after childbirth, unrelated to the type of childbirth[24].

Although literature points out that the BMI can influence the choice of the type of childbirth and be associated with morbidities[8,25-28], in the present study, the significant difference observed in BMI should not be considered a confounding factor in relation to PFMS, given that its variation has behaved similarly over time, regardless of the type of childbirth.

Several studies show that the type of childbirth can be a risk factor for the decrease of PFMS and the consequent appearance of UI and AI; however, they state that these changes can be avoided or reduced with perineal exercises to strengthen the pelvic floor muscles[5,10,29-31].

As for UI, the time elapsed in the after childbirth was the only significant association, as the UI decreased significantly both among women with normal childbirth and among those with cesarean sections. Data also showed that there was a reduction in the number of women with this complaint not only in the period after childbirth, but also in relation to previous UI, i.e., the prevalence of UI before or during pregnancy (15.6% and 26.8%, among women with normal childbirth and cesarean section, respectively) was greater than at 2 (7.8% and 9.8%, among women with normal childbirth and cesarean section, respectively) and 6 months after childbirth (4.1% only between women with normal childbirth).

A cross-sectional study found that the likelihood of UI in the after childbirth increased 20-fold among women who manifested UI during pregnancy[20]. Likewise, other studies have found that previous UI and multiparity are risk factors for UI after childbirth more important than the type of childbirth, alone[32-33]. And yet the authors emphasize the need for prevention from the beginning of pregnancy to after childbirth by performing perineal exercises[5,26,32].

The scientific literature shows a wide variation in the prevalence of UI (14.1 to 68.8%)[33-34], although a prevalence similar to that of this study at 6 months after childbirth is observed in other studies[20,35]. UI can also be persistent, as a cohort study that evaluated primiparous women in the after childbirth found a prevalence of 47% after 12 months[14]. These variations are justified, in a way, by differences in the methods and populations studied, with specific clinical and obstetric characteristics in each case series[20,29,34].

In the current study, there was a low frequency of AI at 2 months after normal childbirth (4.7%), with total remission at 6 months, and no case of post-cesarean AI. However, it is worth mentioning that the loss was only from flatus, and not from feces. It is noteworthy that more than half of women with normal childbirth had episiotomy or second degree perineal laceration.

Higher prevalence of AI was found at 6 months after childbirth in a Brazilian study, but with women of varying parities (5.5%)[20]. In contrast, rates higher than those in the present study were found in nulliparous women, with values of 16.3% and 17%, at 3 and 12 months after childbirth, respectively[4,14]. The probable justification is due to the use of non-standardized definitions, the lack of questioning by health professionals and also by the embarrassment of women themselves who may not have reported the complaint to professionals[36].

The present study points out that most women had returned to sexual relations 2 months after childbirth and, practically, all of them, at 6 months after childbirth. Thus, the return to sexual intercourse was not associated with the type of childbirth, but in time for after childbirth. These findings are similar to another study, which found a decrease in the occurrence of sexual intercourse at 12 weeks, both after normal childbirth and after cesarean section, with no significant difference[37]. Another study also found no association between the return of sexual relations and the type of childbirth[38].

Almost half of the women reported dyspareunia 2 months after childbirth, regardless of the type of childbirth, and this symptom was reduced to 14.1% at 6 months after normal childbirth and to zero after cesarean section. A prospective cohort study found that almost all women experienced some form of pain during intercourse after childbirth. Dyspareunia was reported by 44.7% women who resumed sexual intercourse at 3 months after childbirth (431/964), 43.4% women at 6 months after childbirth (496/1144), 333/1184 (28.1 %) women at 12 months after childbirth and 289/1236 (23.4%) women at 18 months after childbirth. Of the 496 women who reported dyspareunia 6 months after childbirth, one third (162/496, 32.7%) reported persistent dyspareunia 18 months after childbirth[39]. In turn, the improvement of dyspareunia during the period after childbirth has been identified in different studies[13,27].

In the literature, few studies have been found that associate dyspareunia with PFMS, but knowledge about dyspareunia and its role on the pelvic floor is still limited[14]. Some authors bring data similar to the present study[1,13-14,39]. There was a correlation between PFMS and sexual satisfaction and lubrication, showing that women who had higher PFMS have better sexual function[40].

In a prospective cohort study with 554 primiparous women, she concluded that sexual involvement is common among primiparous women after vaginal childbirth. At twelve months after childbirth, more than half of women with third and fourth degree lacerations (174) presented complaints of dyspareunia, whereas those without lacerations or with first degree lacerations (191) reported better outcomes. Although sexual problems are common in the puerperal period, it is important to pay attention to these issues during pre and after childbirth care and assessment, as the prevention of perineal lacerations and early identification of sexual dysfunctions such as dyspareunia can minimize their effects and prevent dysfunctions persist beyond the puerperal period[41].

It is worth noting that, in addition to BMI, another characterization variable with a significant difference between women with normal childbirth and cesarean section was age. However, given that there was no significant difference for the outcomes PFMS, UI and dyspareunia according to the type of childbirth, the possibility of confusion attributed to these variables should be minimized.

Study limitations

Limitations are considered the loss of follow-up of many women from 2 to 6 months after childbirth and the non-use of validated questionnaires, such as the International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF)[42] and the Female Sexual Function Index (FSFI)[43] for the investigation of PFD. Another possible limitation refers to the lack of information about AI, dyspareunia and sexual activity prior to childbirth. These variables were not part of the data collection instrument of the study and could not be analyzed in the characterization of women according to the type of childbirth.

Contributions to nursing, health, or public health

The results of this study collaborate with the identification of perineal outcomes that may be associated with the type of childbirth, with the construction of a PFMS profile and provide data for the elaboration of a training program for the pelvic floor muscles, seeking prevention and reduction of morbidities in the genitourinary tract, especially UI, AI and dyspareunia. It favors professionals working in the care of the pregnancy-puerperal cycle, in the awareness that they need to identify women who have or those with a predisposition to develop UI, AI and dyspareunia to contribute to prevention or implement treatment.

CONCLUSION

Regardless of the type of childbirth, there was an improvement in PFMS, UI and dyspareunia, between 2 and 6 months after childbirth. AI occurred only in women with normal childbirth, with improvement also between 2 and 6 months.

REFERENCES

1. Juliato CRT. Impact of Vaginal Delivery on Pelvic Floor. Rev Bras Ginecol Obstet [Internet]. 2020;42(2):65-6. https://doi.org/10.1055/s-0040-1709184
2. Myer ENB, Roem JL, Lovejoy DA, Abernethy MG, Blomquist JL, Handa MD. Longitudinal changes in pelvic floor muscle strength among parous women. Am J Obstet Gynecol. 2018;219(5):482.e1-7. https://doi.org/10.1016/j.ajog.2018.06.003
3. Zhao Y, Zou L, Xiao M, Tang W, Niu HY, Qiao FY. Effect of different delivery modes on the short-term strength of the pelvic floor muscle in Chinese primipara. BMC Pregnancy Childbirth. 2018;18(1):275. https://doi.org/10.1186/s12884-018-1918-7
4. Torrisi G, Minini G, Bernasconi F, Perrone A, Trezza G, Guardabasso V, et al. A prospective study of pelvic floor dysfunctions related to delivery. Eur J Obstet Gynecol Reprod Biol. 2012;160(1):110-5. https://doi.org/10.1016/j.ejogrb.2011.10.010
5. Sigurdardottir T, Steingrimsdottir T, Geirsson RT, Halldorsson TI, Aspelund T, Bø K. Can postpartum pelvic floor muscle training reduce urinary and anal incontinence? an assessor-blinded randomized controlled trial. Am J Obstet Gynecol. 2020;222(3):247.e1-247.e8. https://doi.org/10.1016/j.ajog.2019.09.011
6. Abrams P, Andersson KE, Apostolidis A, Birder L, Bliss D, Brubaker L, et al. Sixth International Consultation on Incontinence. Recommendations of the International Scientific Committee: evaluation and treatment of urinary incontinence, pelvic organ prolapse, and fecal incontinence. Neurourol Urodyn. 2018;37(7):2271-2. https://doi.org/10.1002/nau.23551
7. Brown S, Gartland D, Perlen S, McDonald E, MacArthur C. Consultation about urinary and faecal incontinence in the year after childbirth: a cohort study. BJOG. 2015;122(7):954-62. https://doi.org/10.1111/1471-0528.12963
8. Johannessen HH, Stafne SN, Falk RS. Prevalence and predictors of double incontinence 1 year after first delivery. Int Urogynecol J. 2018;29:1529-35. https://doi.org/10.1007/s00192-018-3577-7
9. Schei B, Johannessen HH, Rydning A, Sultan A, Mørkved S. Anal incontinence after vaginal delivery or cesarean section. Acta Obstet Gynecol Scand. 2019;98(1):51-60. https://doi.org/10.1111/aogs.13463
10. Dumoulin C, Hay-Smith EJC, Mac Habée-Séguin G, Mercier J. Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women: a short version Cochrane Systematic reviews with meta-analysis. Neurourol Urodyn. 2015;34(4):300-8. https://doi.org/10.1002/nau.22700
11. Brincat C, Crosby E, McLeod A, Fenner DE. Experiences during the first four years of a postpartum perineal clinic in the USA. Int J Gynaecol Obstet. 2015;128(1):68-71. https://doi.org/10.1016/j.ijgo.2014.07.026
12. Blomquist JL, Muñoz A, Carroll M, Handa VL. Association of delivery mode with pelvic floor disorders after childbirth. JAMA. 2018;320(23):2438-47. https://doi.org/10.1001/jama.2018.18315
13. McDonald EA, Gartland D, Small R, Brown SJ. Frequency, severity and persistence of postnatal dyspareunia to 18 months post partum: a cohort study. Midwifery. 2016;34:15-20. https://doi.org/10.1016/j.midw.2016.01.012
14. Tennfjord MK, Hilde G, Stær-Jensen J, Engh ME, Bø K. Dyspareunia and pelvic floor muscle function before and during pregnancy and after childbirth. Inter Urogynecol J. 2014;25(9):1227-35. https://doi.org/1007/s00192-014-2373-2
15. Petricelli CD, Resende APM, Elito Jr J, Araujo Jr E, Alexandre SM, Zanetti MRD, et al. Distensibility and strength of the pelvic floor muscles of women in the third trimester of pregnancy. BioMed Res Int. 2014;(3):437867. https://doi.org/10.1155/2014/437867

16. Riesco MLG, Costa ASC, Oliveira SMJV, Lopes MHBM. Perineal Muscle Strength During Pregnancy and Postpartum: the Correlation Between Perineometry and Digital Vaginal Palpation. Rev Latino-Am Enfermagem. 2010;18:1138-44. https://doi.org/10.1590/S0104-11692010000600014

17. Brazález BN, Lacomba MT, Villa P, Sánchez Sánchez B, Prieto Gómez V, Asúnsolo del Barco A, et al. The evaluation of pelvic floor muscle strength in women with pelvic floor dysfunction: a reliability and correlation study. Neurourol Urodyn. 2018;37(1):269-77. https://doi.org/10.1002/nau.23287

18. Mendes EPB, Oliveira SMJV, Caroci AS, Francisco AA, Oliveira SG, Silva RL. Pelvic floor muscle strength in primiparous women according to the delivery type: cross-sectional study. Rev Latino-Am Enfermagem. 2016;24:e2758. https://doi.org/10.1590/1518-8345.0926.2758

19. Chow SC, Shao J, Wang H. A note on sample size calculation for mean comparisons based on noncentral t-statistics. J Biopharm Stat. 2002;12(4):441-56. https://doi.org/10.1081/BIP-120016229

20. Zizzi PT, Trevisan KF, Leister N, Cruz CS, Riesco MLG. Women's pelvic floor muscle strength and urinary and anal incontinence after childbirth: a cross-sectional study. Rev Esc Enferm USP. 2017;51:e03214. https://doi.org/10.1590/S1980-220X2016209903214

21. Muraca GM, Liu S, Sabr Y, Lisonkova S, Skoll A, Brant R, et al. Episiotomy use among vaginal deliveries and the association with anal sphincter injury: a population-based retrospective cohort study. CMAJ. 2019;191(42):E1149-58. https://doi.org/10.1503/cmaj.190366

22. D'Souza JC, Monga A, Tincello DG. Risk factors for obstetric anal sphincter injuries at vaginal birth after caesarean: a retrospective cohort study. Int Urogynecol J. 2019;30(2):1747-53. https://doi.org/10.1007/s00192-019-03978-x

23. Li H, Wu RF, Qi F, Xiao AM, Ma Z, Hu Y, et al. Postpartum pelvic floor function performance after two different modes of delivery. Genet Mol Res. 2015;14(2):2994-3001. https://doi.org/10.4238/2015.April.10.9

24. Elenskaia K, Thakar R, Sultan AH, Scheer I, Beggs A. The effect of pregnancy and childbirth on pelvic floor muscle function. Int Uroginecol J. 2011;22(11):1421. https://doi.org/10.1007/s00192-011-1501-5

25. Riesco MLG, Fernandes-Trevisan K, Leister N, Cruz CDS, Caroci AS, Zanetti MRD. Urinary incontinence related to perineal muscle strength in the first trimester of pregnancy: cross-sectional study. Rev Esc Enferm USP. 2014;48(Esp):32-8. https://doi.org/10.1590/s0080-623420140000600005

26. Woodley SJ, Boyle R, Cody JD, Mørkved S, Hay-Smith EJC. Pelvic floor muscle training for prevention and treatment of urinary and faecal incontinence in antenatal and postnatal women. Cochrane Database Syst Rev. 2017;12(12):CD007471. https://doi.org/10.1002/14651858.CD007471.pub3

27. Waqiah N, Lotisna D, Abdullah N. Risk factors for stress urinary incontinence following vaginal and caesarean delivery. Indones J Obstet Gynecol. 2019;7(1):49-52. https://doi.org/10.32771/inajog.v7i1.830

28. Urbankova I, Grohregin K, Hanacek J, Krcmar M, Feyereisl J, Deprest J, et al. The effect of the first vaginal birth on pelvic floor anatomy and dysfunction. Int Urogynecol J. 2019;30:1689-96. https://doi.org/10.1007/s00192-019-04044-2

29. Ludviksdottir I, Hardardottir H, Sigurdardottir T, Ulfarsson GF. Comparison of pelvic floor muscle strength in competition-level athletes and untrained women. Laeknabladid. 2018;104(3):133-8. https://doi.org/10.17992/lbl.2018.03.177

30. Franco EM, Negre JLL, Parés D, Cerro CR, Tardiu LA, Cuadras D, et al. Anatomic and functional evaluation of the levator ani muscle after an obstetric anal sphincter injury. Arch of Gynecol Obstet. 2019;299(4):1001-6. https://doi.org/10.1007/s00404-019-05070-7

31. Ulfah M, Novitasari D, Murniati M. Combination of pelvic floor and abdominal muscle exercises to reduce perineum pain in postpartum mothers. Medisains J. 2019;17(2):33-7. https://doi.org/10.30595/medisains.v17i2.5150

32. Rocha J, Brandão P, Melo A, Torres S, Mota L, Costa F. Assessment of urinary incontinence in pregnancy and postpartum: observational study. Acta Med Port. 2017;30(7-8):568-72. https://doi.org/10.20344/amp.7371

33. Leroy LS, Lúcio A, Lopes MHBM. Risk factors for postpartum urinary incontinence. Rev Esc Enferm USP. 2016;50(2):200-7. https://doi.org/http://dx.doi.org/10.1590/ S0080-623420160000200004

34. Freitas LM, Bø K, Fernandes ACNL, Uechi N, Duarte TB, Ferreira CHJ. Pelvic floor muscle knowledge and relationship with muscle strength in Brazilian women: a cross-sectional study. Int Urogynecol J. 2019;30(11):1903-9. https://doi.org/10.1007/s00192-018-3824-y

35. Valeton CT, Amaral VF. Evaluation of urinary incontinence in pregnancy and postpartum in Curitiba Mothers Program: a prospective study. Int Urogynecol J. 2011;22(7):813-18. https://doi.org/10.1007/s00192-011-1365-8

36. Caroci AS, Riesco MLG, Rocha BMC, Ventura LJ, Oliveira SG. Evaluation of perineal muscle strength in the first trimester of pregnancy. Rev Latino-Am Enfermagem. 2014;22(6):893-901. https://doi.org/10.1590/0104-1169.3600.2492

37. Eid MA, Sayed AM, Abdel-Rehim ZS, Mostafa T. Impact of the mode of delivery on female sexual function after childbirth. Int J Impot Res. 2015;27(3):118-20. https://doi.org/10.1038/ijir.2015.2

38. Pereira TRC, Dottori EH, Mendonça FMAF, Beleza ACS. Assessment of female sexual function in remote postpatum period: a cross-sectional study. Rev Bras Saude Mater Infant. 2018;18(2):289-94. https://doi.org/10159/1806-93042018000200003

39. McDonald EA, Gartland D, Small R, Brown SJ. Dyspareunia and childbirth: a prospective cohort study. BJOG. 2015;122(5):672-9.https://doi.org/10.1111/1471-0528.13263

40. Martinez CS, Ferreira FV, Castro AA, Gomide LB. Women with greater pelvic floor muscle strength have better sexual function. Acta Obstet Gynecol Scand. 2014;93(5):497-502. https://doi.org/10.1111/aogs.12379

41. Gommesen D, Nøhr E, Qvist N, Rasch V. Obstetric perineal tears, sexual function and dyspareunia among primiparous women 12 months postpartum: a prospective cohort study. BMJ Open. 2019;16;9(12):e032368. https://doi.org/10.1136/bmjopen-2019-032368

42. Tamanini JTN, Dambros M, D'Ancora CAL, Palma PCR, Netto Jr NR. Validation of the International Consultation on Incontinence Questionnaire: short form (ICIQ-SF) for Portuguese. Rev Saúde Pública. 2004;38(3):438-44. https://doi.org/10.1590/S0034-89102004000300015

43. Pacagnella RC, Vieira EM, Rodrigues Jr OM, Souza C. [Cross-cultural adaptation of the Female Sexual function index]. Cad Saúde Pública [Internet]. 2008 [cited 2019 Dec 15];24(2):416-26. Available from: https://www.scielo.br/pdf/csp/v24n2/20.pdf. Portuguese