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Nocturia and others urinary symptoms in three stages of postpartum according mode of delivery

Noctúria e outros sintomas urinários nos três estágios do pós-parto conforme o tipo de parto

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Abstract

Introduction: There are risk factors causing urinary symptoms associated with childbirth. The aim was to investigate the presence of urinary symptoms in postpartum. **Methods:** Prospective cohort study was undertaken. The women were evaluated three times. The first interview was face-to-face at 2 days after the childbirth. At 2 and 8 weeks after delivery, the patients were interviewed by telephone. **Results:** 132 women were divided into two groups according to the mode of delivery: VG (vaginal delivery group) and CG (cesarean group). The average age of the women was 25.54 (± 5.65) years in VG and 25.23 (± 5.26) years in CG ($p = 0.869$). The most frequent symptom in both groups was nocturia. **Conclusion:** urinary symptoms tend to worsen throughout the postpartum period, regardless of the mode of delivery.

Keywords: Urinary Incontinence; Nocturia; Quality of Life.

Resumo

Introdução: Existem fatores de risco para sintomas urinários, que são associados ao parto. O objetivo deste estudo foi investigar a presença de sintomas urinários no pós-parto. **Métodos:** Foi realizado um estudo de coorte prospectivo. As voluntárias foram avaliadas em três momentos. A primeira entrevista foi face-a-face em dois dias após o parto. Com duas e oito semanas após o parto, as pacientes foram avaliadas por telefone. **Resultados:** 132 mulheres foram alocadas em dois grupos de acordo com o tipo de parto: VG (parto vaginal) e CG (parto cesáreo). A média de idade das mulheres foi 25.54 (± 5.65) anos no VG e 25.23 (± 5.26) no CG ($p = 0.869$). O sintoma mais frequente nos dois grupos foi a noctúria. **Conclusão:** os sintomas urinários tendem a agravar-se ao longo do período de pós-parto, independente do tipo de parto.

Descritores: Incontinência urinária; Noctúria; Qualidade de vida.

Introduction

Symptoms are subjective indications of illnesses or alterations in health that are perceived by the patient, caregivers, or companions. They may be described during an interview and are typically qualitative. Lower urinary tract symptoms (LUTS) are classified according to the phase of bladder function, i.e., the storage and voiding phases¹.

Urinary tract symptoms interrupt sleep, affect morbidity and mortality, and have a negative impact on quality of life². There have been reports of concerns associated with social activities and negative effects on daily activities and an impact on quality of life, regardless of women's life stage³.

The postpartum period is a stage of the pregnancy and childbirth cycle marked by physical, psychological, and emotional changes⁴. It begins immediately after birth with the delivery of the placenta, and there is no agreement in the literature regarding its end⁵. In addition to physical changes, the postpartum period is characterized by various biological, psychological, and social changes and intense emotional fluctuations⁶.

During pregnancy, women experience various different physiological modifications that include lower urinary tract⁷. The physiological changes that occur in the body because of pregnancy and childbirth are not completely resolved until approximately 6 months postpartum. Some alterations in the genito-urinary system may require significant time to be reverted, or may never return to their pre-pregnancy state⁸. Thus, there are risk factors causing urinary tract issues described in the literature that are associated with pregnancy and childbirth; these factors include mode of delivery, newborn weight, parity, and other factors such as age and obesity⁹.

The literature shows the relation between¹⁰ the pregnancy and the presence of LUTS, but there has been limited discussion on the postpartum phase evaluated early in this period or

from a longitudinal perspective. Furthermore, there is no consensus regarding increases and decreases in these symptoms. Therefore, this study aimed to investigate the presence of inferior urinary tract symptoms in women in an early postpartum period (two days after birth) and up to eight weeks postpartum.

Materials and methods

Study participants

A longitudinal study was undertaken to investigate the relation between the lower urinary tract symptoms with the mode of delivery. 160 candidates were recruited from the Maternidade das Quintas in the Brazil in 2015. Inclusion criterias were women at 2 days postpartum who had delivered a singleton pregnancy vaginally or via cesarean section and who did not have gestational diabetes. Exclusion criteria were only withdraw consent or loss contact during the second or third interview.

Because the study involved human subjects, it was submitted for analysis by the Research Ethics Committee of the Federal University of Rio Grande do Norte. It was approved under Case No. 1.053.701, on May 07, 2015. The purpose of the study and the procedures were duly explained to all volunteers, who then signed the free and clear informed consent form, following the rules and guidelines proposed by Resolution 466/12 of the National Health Council.

Data Collection

It was performed three evaluations. In the first assessment occurred at the Maternidade das Quintas and an evaluation form developed by the researchers was applied. This form was used to obtain each woman's identifying information, sociodemographic data, medical history, lifestyle data, gynecological and obstetric history, information on the current birth, and the presence of LUTS. LUTS investigated in this study included stress incontinence (SI), urge in-

continence (UI), mixed incontinence (MI), nocturia, frequent urination, dysuria, poor stream, post-micturition dribble, and symptoms of urinary tract infection. The researcher wondered if women had each symptom and they answered “yes” or “no”. Next, a physical examination was performed to obtain information on weight and height to calculate each woman’s body mass index (BMI). The average of time for the evaluation was fifteen minutes. BMI was calculated as body weight (in kilograms) over height (in meters) squared; it is expressed as kg/m^2 . All the patient assessment was performed by physical therapy students and supervised by a physiotherapist.

At 2 and 8 weeks after the delivery, the patients were interviewed by telephone and were questioned regarding the presence of lower urinary tract symptoms using the same evaluation form applied during the first assessment. Again the investigated asked if women had some symptom and they answered “yes” or “no”. The average of time for the second and third evaluation was ten minutes, each.

To evaluate the impact of incontinence on quality of life, the International Consultation on Incontinence Questionnaire–Short Form (ICIQ-SF) was applied. This questionnaire was translated and validated for the Brazilian population by Tamanini et al.¹² in 2004. It is a brief, four-question survey with an additional eight self-diagnosis items with regard to incontinence conditions. The questionnaire was applied in all three assessments (the in-person evaluation and the two telephone evaluations).

Data Analysis

The test Kolmogorov-Smirnov was applied for verify the data normality. The variables presented a normal distribution ($p > 0.05$), so averages and standard deviations were used to exhibit the quantitative variables. The confidential interval (CI) was also showed. Frequency distribution was used for the category variables. In the univariate analysis, with the aim of compare

the urinary tract symptoms in the three postpartum periods within the groups, was used the Cochran’s test to assess the significance of the associations. The test to verify the associations between two categorical variables was the Chi-square Test. In order for compare two variables (a categorical and quantitative) was used the independent T-test. The Relative Risk (RR) was calculated for the nocturia in the three stages of postpartum, considering the mode of delivery. The data was organized and analyzed using the Software Statistical Package for Social Science for Windows, version 20.0. *P*-values < 0.05 were considered to be statistically significant. The power of study was 93%, this calculation was based on ratios between 63-87% of lower urinary tract symptoms such in previous studies with postpartum women and at 95% Intraclass Correlation Coefficient (CCI)¹³⁻¹⁵.

Results

A total of 160 women were included in the study, although 28 were excluded after withdrawing consent ($n=2$), the patients could not be contacted for the second evaluation ($n=10$), or for third evaluation ($n=16$). The total study loss rate was therefore 17.50%. The 132 women included in the analysis were divided into two groups according to mode of delivery: the vaginal birth group (VG = 68) and the cesarean section group (CG = 64).

The average age of the women in VG was 25.54 (± 5.65 , CI: 18.00-37.00) years, whereas that in CG was 25.23 (± 5.26 , CI: 18.00-38.00) years. There was no statistically significant difference between the two groups in terms of age ($p = 0.869$). The average of family income (in Brazilian currency) in VG was 1.60 (1.01, CI: 0.50-6.00) and 1.50 (0.97, CI: 0.00-7.00). Others general characteristics of the sample are presented in Table 1.

Furthermore, obstetric history was considered. The average number of pregnancies was 2.23 ± 1.57 in VG and 1.84 ± 0.99 in CG. In VG, the average newborn weight was 3.31 (± 0.47) kg; in

Table 1: Socio-demographic variables of the sample according to the type of delivery

	VG (n=68)	CG (n=64)
Race declared		
Black	17.60% (12)	9.40% (6)
White	14.70% (10)	18.85% (12)
Brown	67.60% (46)	68.80% (44)
Civil status		
With partner	73.50% (50)	75.00% (48)
Without partner	26.50% (18)	25.00% (16)
Education		
Until five years	20.60% (14)	18.80% (12)
Eight years	5.90% (4)	17.20% (11)
Nine to ten years	22.10% (15)	17.20% (11)
Eleven years	45.60% (31)	35.90% (23)
Under graduate student	2.90% (2)	3.10% (2)
Graduate student	2.90% (2)	7.80% (5)
Education in years of study.		

CG, it was 3.49 (± 0.48) kg ($p = 0.579$). Incontinence during pregnancy was found to be more frequent in the VG (36.80%) than in the CG (21.90%). The average newborn weight did not differ statistically between the groups ($p = 0.579$).

The frequency of urinary incontinence on pregnancy in VG was 36.80% and 21.90% in CG. In relation to obstetric data, the average of number pregnancies in VG was 2.22 (± 1.58 , CI: 1.00-9.00) and 1.84 (± 0.99 , CI: 1.00-5.00) in CG. The mean of number of vaginal births in VG was 2.00 (± 1.38 , CI: 1.00-7.00) and in CG was 0.23 (± 0.63 , CI: 0.00-3.00). The average of number of cesarean deliveries was 0.02 (± 0.17 , CI: 0.00-1.00) in VG and 1.37 (± 0.62 , CI: 1.00-4.00). The average of newborn's weight was 3.31 (± 0.47 , CI: 2.21-4.75) kg in VG and 3.49 (± 0.48 , CI: 2.75-4.60) kg.

As regards to physical examination, the mean of postpartum weight on the 2nd day was 70.12 (± 11.49 , CI: 51.00-106.70) kg in VG and 69.96 (± 9.32 , CI: 45.40-95.00) kg in CG. The average of height in VG was 1.58 (± 0.06 , CI: 1.43-1.77) m and 1.58 (± 0.06 , CI: 1.42-1.75) in CG. The mean of BMI was 27.77 (± 3.83 , CI: 19.24-39.19) kg/m² in VG and 19.39 (± 3.69 , CI: 19.39-38.78) kg/m² in CG. The mean of abdominal circumference

was 96.21 (± 14.42 , CI: 44.00-128.00) cm in VG and 100.42 (± 10.77 , CI: 60.00-129.00) cm in CG.

Among the types of incontinence considered, UI was found to be the most prevalent (15.60% of incontinence cases in CG). When the 2-day postpartum period and the 2-week postpartum period were compared, SI tended to reduce the course of the postpartum phase in CG; however, it increased over time in VG. The prevalence of MI in CG was unchanged; however, it rised time in VG.

The most frequent urinary tract symptom among the women was nocturia, which was reported by 28.60% and 43.80% of the women in VG and CG, respectively. The frequency of LUTS among women in the vaginal delivery group and the cesarean section group is presented in Tables 2 and 3, respectively. All three postpartum periods were associated with frequent urination among women in the vaginal delivery group, and all three periods were associated with UI and nocturia among women from CG.

The women undergoing to cesarean delivery had an increase risk for nocturia in the first (RR = 1,76), second (RR = 1,71) and third (RR = 1,44) phases of postpartum.

Discussion

This study is the first that show the frequency of various urinary symptoms in three phases of postpartum period. This article aimed to start this discussion, once these problems lead to repercussions beyond physical health. The results were able to demonstrate how the urinary complaints behave during the postpartum. However, the causes for this have not yet been elucidated.

Due to of the requirement for a description of the symptoms that most commonly affect postpartum women, this study included a base survey to associate this phases according to mode of delivery. The findings of this study show that LUTS present different rates of prevalence when the 2-day and 8-week after childbirth

Table 2: Presence of lower tract urinary symptoms in 2 days, 2 weeks and 8 weeks postpartum according women of vaginal delivery group (VG)

LUTS	2 days	2 weeks	8 weeks	p-value
Urgency	16.20% (11)	16.20% (11)	13.20% (9)	0.827
Drip post voiding	16.20% (11)	19.10% (13)	25.00% (17)	0.341
Weak jet	2.90% (2)	4.40% (3)	5.90% (4)	0.651
Dysuria	11.80% (8)	5.90% (4)	7.40% (5)	0.444
Urinay infeccion	0.00% (0)	2.90% (2)	2.90% (2)	0.264
SI	4.40% (3)	2.90% (2)	10.30% (7)	0.122
UI	1.50% (1)	5.90% (4)	5.90% (4)	0.325
MI	0.00% (0)	1.50% (1)	5.90% (4)	0.074
Pollakiuria [§]	1.50% (1)	5.10% (3)	10.80% (7)	0.018*
Nocturia [§]	28.60% (18)	28.30% (17)	22.40% (15)	0.607
Daytime urinary frequency [§]	3.80 (± 1.13)	4.40 (±1.41)	4.61 (± 1.77)	
Nighttime urinary frequency [§]	0.95 (± 0.93)	1.25 (± 1.06)	0.95 (± 0.96)	
ICIQ-SF	6.50 (± 2.38)	10.20 (± 4.96)	8.14 (± 5.27)	

SI: Stress incontinence; UI: urge incontinence; MI: mixed incontinence. ICIQ-SF: International Consultation on Incontinence Questionnaire Short Form. *p*-value for Cochran test. * Statistically significant difference. § *n* = 60.

Table 3: Presence of lower tract urinary symptoms in 2 days, 2 weeks and 8 weeks postpartum according women of cesarean section group (CG)

LUTS	2 days	2 weeks	8 weeks	p-value
Urgency	10.90% (7)	14.10% (9)	23.40% (15)	0.104
Drip post voiding	18.80% (12)	20.30% (13)	21.90% (14)	0.898
Weak jet	9.40% (6)	9.40% (6)	10.90% (7)	0.913
Dysuria	9.40% (6)	9.40% (6)	7.40% (5)	0.292
Urinay infeccion	6.30% (4)	1.60% (1)	9.40% (6)	0.670
SI	10.90% (7)	6.30% (4)	1.60% (1)	0.067
UI	3.10% (2)	3.10% (2)	15.60% (10)	0.007*
MI	1.60% (1)	1.60% (1)	1.60% (1)	1.000
Pollakiuria [§]	9.40% (6)	9.40% (6)	7.80% (5)	0.779
Nocturia [§]	43.80% (28)	39.10% (25)	29.70% (19)	0.035*
Daytime urinary frequency [§]	4.10 (± 2.09)	3.94 (±1.53)	4.10 (± 1.45)	
Nighttime urinary frequency [§]	1.56 (± 1.19)	1.38 (± 1.24)	1.17 (± 1.04)	
ICIQ-SF	12.22 (± 4.46)	14.00 (± 3.67)	10.75 (± 4.80)	

SI: Stress incontinence; UI: urge incontinence; MI: mixed incontinence. ICIQ-SF: International Consultation on Incontinence Questionnaire Short Form. *p*-value for Cochran test. * Statistically significant difference. § *n* = 52.

were compared. This information corroborates that of other studies which have demonstrated that LUTS are common postpartum^{16,17} and reflect multifactorial etiology¹⁸.

In relation to loss of urine, the literature reports that incontinence is associated with both vaginal delivery (OR=1.76, 95% CI, 1.03–3.00), and cesarean section (OR=2.39, 95% CI,

1.08–5.29)¹⁹. In the current study, incontinence was not highly prevalent. SI was the most frequent type of UI among women in VG, whereas UI was the most frequent type among women in CG. In the study by Wang et al.²⁰, the prevalence of SI was found to be 17.10%, and women who had undergone cesarean section were more frequently affected (*p* < 0.01). Thus, it is clear that

regardless of the type of delivery, labor is associated with the onset of loss of urine in women.

Incontinence during pregnancy and newborn weight are risk factors for complaints in the postpartum²⁰. In our study, women delivered vaginally were those who had a higher frequency of UI in pregnancy. Similar to our findings, Leroy and Lopes²¹ found a 28.2% frequency of incontinence during pregnancy. In our study, there was no statistically significant difference in newborn weight between the two groups ($p = 0.579$). With regard to mode of delivery, one study found levator ani muscle avulsion to be present in 21% of women 3 months after vaginal delivery²². Furthermore, this injury has been found to be associated with signs and symptoms of pelvic floor dysfunction²³. Moreover, Hanna et al.²⁴ suggested that even 2 years postpartum, mode of delivery has no influence on urinary tract symptoms. Elective cesareans are described in the literature as a procedure that protects pelvic floor structure and aids in the prevention of LUTS²⁵. However, this preventive effect may be limited to the first few months after childbirth²⁶.

Quality of life has been associated with incontinence. A study by Oliveira et al.²⁷ which included ICIQ-SF found an average score of 7.2 for this questionnaire, indicating significant impact on quality of life. The average score for this form found in the present study was higher in CG than in VG. This finding suggests that loss of urine has a greater impact on quality of life among women who undergo a cesarean section than those who have a vaginal delivery.

In relation to irritative urinary symptoms, the nocturia was the most prevalent and urgency was the second, in both groups. The higher frequency of these complaints may result in a suspected diagnosis of overactive bladder, which includes urinary urgency and may or may not be accompanied by incontinence. Considering these symptoms in postpartum women is important because overactive bladder is present at high rates and affects quality of life²⁸. In one study¹⁷, 32.6% of the women who experienced an

increase in urinary frequency during pregnancy did not experience an improvement in modifications postpartum. The same study reported that 62.7% of the women who experienced urinary urgency during pregnancy presented in the postpartum too, whereas 29% of the women experienced the symptom for the first time postpartum. Meanwhile, 68% of the women reported that UI persisted postpartum, while in 30.5% of this group experienced this complaint for the first time after childbirth. Thus, irritative symptoms should be further investigated during pregnancy.

Nocturia was the most prevalent LUTS in this present study and has been reported as the most prevalent symptom in elderly women, although it affects a significant proportion of younger individuals²⁹. However, in the first few days after childbirth, mothers awaken several times during the night to care for the newborn. Consequently, nocturia may be overestimated, and these reports may generate confusion between the real and observed prevalence. In the study by Scarpa et al.²⁶, prevalence of nocturia differed according to parity and the number of deliveries. Nocturia was reported by 44.4% of primiparous women, 41.7% of women who had 2 or 3 deliveries, and 73.3% of multiparous women who had more than four deliveries. Nocturia is a frequent symptom in the postpartum, regardless of mode of delivery.

Women in our study who underwent cesarean section presented a statistically significant increase in irritative symptoms, such as nocturia and UI. This finding is associated with the use of a urinary catheter during cesarean section. However, the study performed by Scarpa et al.²⁶ did not consider the mode of delivery to be a determining factor for the presence of LUTS. The authors suggested that pregnancy is the factor that may trigger urinary tract symptoms, regardless of mode of delivery²⁶.

The first difficulty of the study was loss of contact with the women during the second and third evaluations because the women had changed phone numbers or because phone con-

tact was not possible. The lack of an in-person interview for the second and third evaluations was another limitation because variations in weight and height could not be measured. Other limitation involves the data on frequency of urination. Some of the women were not able to report urinary frequency, which caused difficulty in identifying nocturia and frequent urination. The most important limitation can be the lack of a standardized questionnaire translated and validated for Portuguese.

This study offers epidemiological data on urinary tract symptoms in women in the postpartum period and reflects the variability in the investigated LUTS according to mode of delivery. Given the relevance and prevalence of these symptoms found in this study, it is important to highlight the value of determining lower urinary tract symptoms that affect postpartum women.

Conclusion

Therefore, lower urinary tract symptoms experienced by postpartum women tend to increase during the postpartum phase after both vaginal delivery and cesarean section. For this reason, we believe that physiotherapy should be done preventively before pregnancy. However, problems started during pregnancy should be treated as soon as possible.

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