



## Risk factors for postpartum urinary incontinence\*

Fatores de risco para incontinência urinária no puerpério

Factores de riesgo para incontinencia urinaria en el puerperio

Lígia da Silva Leroy<sup>1</sup>, Adélia Lúcio<sup>2</sup>, Maria Helena Baena de Moraes Lopes<sup>3</sup>

### How to cite this article:

Leroy LS, Lúcio A, Lopes MHBM. Risk factors for postpartum urinary incontinence. Rev Esc Enferm USP. 2016;50(2):200-207. DOI: <http://dx.doi.org/10.1590/S0080-623420160000200004>

\* Extracted from the dissertation "Incontinência urinária no puerpério: fatores de risco e impacto na qualidade de vida", Faculdade de Enfermagem, Universidade Estadual de Campinas, 2011.

<sup>1</sup> Universidade Estadual de Campinas, Faculdade de Enfermagem, Programa de Pós-Graduação em Enfermagem, Campinas, SP, Brazil.

<sup>2</sup> Universidade Estadual de Campinas, Faculdade de Enfermagem, Pós-Doutorado, Campinas, SP, Brazil.

<sup>3</sup> Universidade Estadual de Campinas, Faculdade de Enfermagem, Campinas, SP, Brazil.

### ABSTRACT

**Objective:** To investigate the risk factors for postpartum urinary incontinence (UI) and its characteristics. **Method:** This was a case-control study with 344 puerperal women (77 cases and 267 controls) with up to 90 days postpartum. In a single session, participants were given a questionnaire with sociodemographic and clinical data and two others that assessed urine leakage, leakage situations, and type of UI. **Results:** Stress UI was present in 45.5% of the women, incidents of urine leakage several times a day in 44.2%, of which 71.4% were in small amounts and 57.1% when coughing or sneezing. In 70.1% of cases, UI began during pregnancy and remained through the postpartum period. After running a binary logistic regression model, the following factors remained in the final model: UI during pregnancy (OR 12.82, CI 95% 6.94 – 23.81,  $p < 0.0001$ ), multiparity (OR 2.26, CI 95% 1.22 – 4.19,  $p = 0.009$ ), gestational age at birth greater or equal to 37 weeks (OR 2.52, CI 95% 1.16 – 5.46,  $p = 0.02$ ) and constipation (OR 1.94, CI 95% 1.05 – 5.46,  $p = 0.035$ ). **Conclusion:** Most often, UI first appeared during pregnancy and remained through the postpartum period. Urinary incontinence during pregnancy, multiparity, gestational age at birth greater or equal to 37 weeks, and constipation were presented as risk factors. In the studied group, stress UI was more frequent.

### DESCRIPTORS

Urinary Incontinence; Urinary Incontinence, Stress; Postpartum Period; Risk Factors; Obstetric Nursing.

### Corresponding author:

Maria Helena Baena de Moraes Lopes  
Rua Tessália Vieira de Camargo, 126  
Cidade Universitária Zeferino Vaz  
CEP 13083-887 – Campinas, São Paulo, Brazil  
mhbaena@unicamp.br

Received: 06/13/2015  
Approved: 12/29/2015

## INTRODUCTION

Urinary incontinence (UI) is a frequent condition during the pregnancy-puerperium cycle, with a prevalence of 18.6% to 75%<sup>(1)</sup> during pregnancy and 6% to 31%<sup>(2)</sup> postpartum, according to the characteristics of the investigated population, the definition of UI, and the period in question<sup>(3-4)</sup>.

The pathophysiology of UI during pregnancy and the puerperium is multifactorial and involves pregnancy itself, hormonal changes, changes in the urethral angle, anatomical injury after birth, and dynamic forces involving muscle and connective tissue<sup>(2)</sup>.

Both urinary incontinence during pregnancy and in the immediate postpartum period can predict the long-term existence of this condition<sup>(5)</sup>. A prospective cohort study conducted twelve years after birth revealed that 66% of the incontinent women during the first pregnancy or recent puerperium (three months) reported UI after birth, compared to 32.6% of previously continent women in one of those periods<sup>(5)</sup>. A more recent cohort study, also conducted twelve years after birth, showed that of the women who reported UI three months after birth, 76.4% were still incontinent 12 years later (953/1247), indicating that this condition commonly goes unresolved<sup>(6)</sup>.

Stress UI (SUI) is more common among puerperal women, followed by mixed UI (MUI) and urge UI (UUI). Generally, episodes of urine leakage are infrequent and the amount of urine leakage is small<sup>(3-4,7-10)</sup>.

Maternal age greater than 35 years, UI during pregnancy, elevated body mass index (BMI), multiparity, and normal birth are considered risk factors for postpartum UI<sup>(4,7,9-14)</sup>. A 10-year cohort study developed with the goal of assessing the effect of the first normal birth on urinary symptoms showed that it was associated with an increase in SUI, in addition to UUI, regardless of maternal age or number of births<sup>(14)</sup>.

Other factors such as: color or race, episiotomy, perineal tears, newborn's head circumference, newborn's weight, gestational age at birth, smoking, and constipation require further studies in order to prove their association with postpartum UI<sup>(7,12,14-16)</sup>.

Urinary incontinence results in decreased quality of life during pregnancy<sup>(1)</sup> and the puerperal period<sup>(17)</sup>, pointing to the importance of research on factors that can result in this condition. However, there are few studies with adequate sample size investigating risk factors for UI in the postpartum period<sup>(10)</sup>. Professionals that are familiar with such factors can conduct early identification of women with a greater probability of developing this condition and can thus take preventive measures to reduce the prevalence of UI.

Thus, the objective of this study was to investigate the risk factors for postpartum UI among women receiving care at a tertiary teaching hospital in the state of São Paulo, Brazil. Furthermore, the researchers aimed to characterize UI according to type, frequency and amount of urine leakage, situations in which leakage occurs, and the onset of this condition.

## METHOD

This case-control study was previously approved by the research ethics committee of the Faculty of Medical

Sciences of the Universidade Estadual de Campinas (resolution no. 247/2010) and conducted according to the required ethical standards.

The sample consisted of women with up to 90 days postpartum present at the obstetrics outpatient facility of a public tertiary teaching hospital in the state of São Paulo, Brazil, for their postpartum checkup.

The researcher selected puerperal women who met the study's inclusion criteria based on the initial application of a checklist. Thus, both in the study and control groups, women whose UI first appeared before pregnancy and who presented any of the following conditions that increase the possibility of urine leakage or lead to the use of medication that affect the lower urinary tract were excluded: multiple pregnancy, presence of chronic obstructive pulmonary disease, arterial hypertension, neurological disease, diabetes mellitus, urinary tract infection, history of pelvic surgery (with the exception of a cesarean section), kidney stones, current treatment for UI and/or use of medications that interfere with lower urinary tract function.

The women were allocated to one of two groups: incontinent puerperal (IP) and continent puerperal (CP). They were classified as continent or incontinent based on questions 3 and 4 of the International Consultation on Incontinence Questionnaire – Short Form (ICIQ-SF), validated in Portuguese<sup>(18)</sup>, which assess the frequency and amount of urine leakage, respectively, identifying whether or not an individual has UI. Women were classified as IP if they reported any frequency and/or amount of urine leakage in four weeks prior to the interview; they were classified as CP if they answered “never” for question 3 and “none” for question 4 of the ICIQ-SF.

To avoid bias, the puerperal women who filled out the questionnaire and did not report any complaints of urine leakage were asked to answer questions 3 and 4 once more, keeping in mind the immediate postpartum period up to the moment of the study. This was done to assess their state of continence in the puerperium. Those who provided the same answers (“never” for question 3 and “none” for question 4) were considered continent.

A questionnaire was created to gather sociodemographic and clinical data. Three judges with experience in the fields of obstetric gynecology and urogynecology analyzed the questionnaire's content validity. After making the suggested changes and formatting, it was pre-tested with ten puerperal women.

The questionnaire consisted of three sections. Section I contained questions regarding sociodemographic characteristics (age, color, marital status, education level and income), section II investigated the onset of UI, smoking, constipation and number of living children, in addition to the woman's weight (kg) and height (m) as declared by participants on the day of data collection to calculate BMI based on the formula: weight (kg)/height (m)<sup>2</sup>. Finally, section III included data about labor and birth obtained from the participant's chart or the newborn's medical information card.

Potential risk factors investigated in this study were: maternal age ( $\leq 25$ , 26-30, 31-35 and  $> 35$  years), color or race

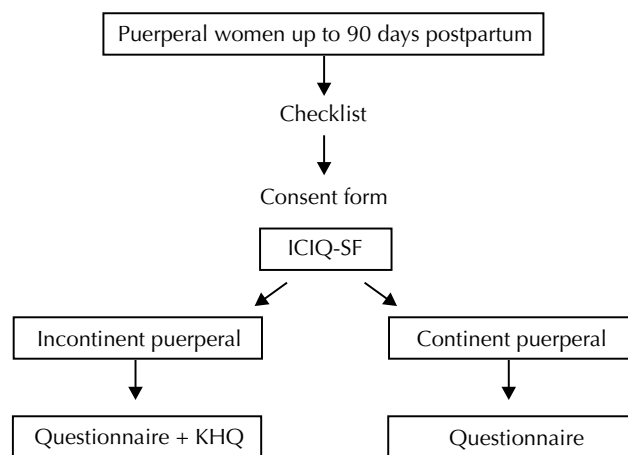
(white, black, yellow, brown, and indigenous, as classified by the Brazilian Institute of Geography and Statistics)<sup>(19)</sup>, UI during pregnancy (yes or no), BMI (underweight: <20 kg/m<sup>2</sup>, normal range: 20–24,9 kg/m<sup>2</sup>, overweight: 25–29,9 kg/m<sup>2</sup> and obese: ≥30 kg/m<sup>2</sup>, according to the literature)<sup>(9)</sup>, parity (primiparous or multiparous), type of current birth (normal, forceps, cesarean), type of previous birth (none, only normal, only cesarean, mostly normal, mostly cesarean, same number of normal and cesarean), episiotomy (yes or no), perineal tears (yes or no), newborn's head circumference (<34, ≥34 cm), newborn's weight (<3000, 3000–3500, >3500g), gestational age at birth (<37, ≥37 weeks), smoking (never smoked, ex-smoker, smoker), and constipation (defined as having fewer than three evacuations per week and the need to make an effort more than 25% of the time when defecating<sup>(20)</sup>, answer categories: yes or no).

Among the group of incontinent women, the ICIQ-SF was used to investigate the frequency, amount and situations of urine leakage. These women were also given the King's Health Questionnaire (KHQ), validated in Portuguese<sup>(21)</sup>, whose scale of symptoms identifies type of UI. Stress urinary incontinence was defined as urinary leakage that occurs when making a physical effort such as coughing, sneezing, running, etc.; UUI was defined as a very strong need to urinate, with urine leakage occurring before reaching the bathroom, and MUI when both options were indicated<sup>(21)</sup>.

The women who met the inclusion criteria were invited to participate in the study and after informed consent forms were signed, data collection began via self-completion questionnaires. However, whenever necessary, participants could ask the researcher questions about any doubts.

The women in the IP group answered the ICIQ-SF, followed by the characterization questionnaire and the KHQ. Those in the CP group answered the ICIQ-SF and the questionnaire created for this study. Figure 1 summarizes the data collection procedure.

Data collection took place during a single visit and lasted approximately two hours, between May and December of 2010.



**Figure 1** – Data collection procedures.

ICIQ-SF – International Consultation on Incontinence Questionnaire – Short Form; KHQ – King's Health Questionnaire.

## SAMPLE SIZE CALCULATION

Sample size was calculated to detect an odds ratio of 3.0, or one case to three controls, assuming a significance level of 5% and statistical power of 80%, being that the prevalence of exposure among the cases was estimated at 20%<sup>(22)</sup>. The estimated sample size was 74 cases and 222 controls.

No initial matching criteria were established, but posteriorly, marital status, education level, and family income of the two groups were compared to assess any differences regarding these characteristics.

## STATISTICAL ANALYSIS

Descriptive statistics was used, including absolute and relative frequencies of categorical variables and measures of position and dispersion of continuous variables. The Kolmogorov-Smirnov test indicated lack of normal distribution between groups and so nonparametric tests were employed. The sociodemographic and clinical characteristics of the groups were compared using Pearson's chi-squared test for categorical variables and the Mann-Whitney test for continuous variables. The binary logistic regression model was adjusted to assess possible risk factors for UI. The sociodemographic and clinical models that presented values for  $p \leq 0.20$  in bivariate analysis were tested in the model. The variables for the final model were chosen according to stepwise selection criteria<sup>(23)</sup>.

Values were considered statistically significant if  $p < 0.05$  ( $\alpha = 5.0\%$ ). Data analysis was conducted with SAS software (version 9.1.3, SAS Institute Inc., Cary, NC, USA, 2002–2003).

## RESULTS

A total of 441 women were interviewed. Of these, 97 were excluded for not meeting the selection criteria. A comparison of the included and excluded puerperal women using the Mann-Whitney test showed differences in terms of age ( $p < 0.0001$ ) and education levels ( $p = 0.0496$ ), with greater means among excluded women. However, the groups were similar regarding time postpartum ( $p = 0.9870$ ).

Thus, 344 women were included in this study (77 cases and 267 controls). The mean age of participants was  $25.9 \pm 7.7$  years (ranging from 13 to 45 years) and mean time postpartum was  $52.3 \pm 12.0$  days (ranging from 12 to 87 days). Most were nonwhite (65.7%), i.e., brown or black (none were yellow or indigenous), 70.9% were married, had an average of  $9.9 \pm 2.7$  years of formal education (ranging from 5 to 18 years) and had a mean monthly family income of two minimum wages, or BRL 1,212.50  $\pm$  773.50 at the time of the study (ranging from BRL 200 to 6,000).

Of the total amount of participants, 53.8% (185) were primiparous and 46.2% (159), multiparous. Most of the puerperal women were submitted to cesarean sections (54.9% or 189), 39.5% (136) had normal births and 5.5% (19) had a forceps delivery. At birth, the women were approximately in their 38<sup>th</sup> week of pregnancy ( $SD = 3.1$ , varying from 24 to 42) and had, on average,  $2 \pm 1.0$  living children (ranging from 1 to 7). Urinary incontinence during pregnancy was reported by 28.2% (97).

Regarding previous births, 12.2% (42) had been submitted to a cesarean section, 15.1% (52) had been submitted to a normal or forceps delivery and 18.9% (65) to both. Episiotomies were performed on 23.8% (82) of the women, of which 17.2% (59) presented some degree of perineal tearing.

Table 1 presents the mean, standard deviation, median,

1<sup>st</sup> and 3<sup>rd</sup> quartiles, minimum and maximum values of the following variables: age, time postpartum, education level, family income, gestational age, and number of living children. The study and control groups differed only in terms of gestational age, which together with maternal age was an investigated risk factor.

**Table 1** – Mean, standard deviation, 1<sup>st</sup> and 3<sup>rd</sup> quartiles, minimum and maximum values of variables: age, time postpartum, education level, family income, gestational age and number of living children, according to group (case or control) – Campinas, São Paulo, Brazil, 2010.

| Variable                  | Case n=77 |                    |        |          |          |       |        | Control n=267 |                    |        |          |          |       |        | P-value <sup>†</sup> |
|---------------------------|-----------|--------------------|--------|----------|----------|-------|--------|---------------|--------------------|--------|----------|----------|-------|--------|----------------------|
|                           | mean      | standard deviation | median | Q1 (25%) | Q3 (75%) | MIN   | MAX    | mean          | standard deviation | median | Q1 (25%) | Q3 (75%) | MIN   | MAX    |                      |
| Age                       | 26.9      | 7.6                | 27.0   | 20.0     | 33.0     | 14.0  | 45.0   | 25.6          | 7.8                | 26.0   | 19.0     | 30.0     | 13.0  | 45.0   | 0.1896               |
| Time postpartum           | 51.5      | 10.9               | 47.0   | 44.0     | 59.0     | 31.0  | 83.0   | 52.5          | 12.3               | 48.0   | 44.0     | 62.0     | 12.0  | 87.0   | 0.7132               |
| Education level           | 9.8       | 2.7                | 10.0   | 8.0      | 12.0     | 5.0   | 16.0   | 9.9           | 2.7                | 10.0   | 8.0      | 12.0     | 5.0   | 18.0   | 0.4968               |
| Family income             | 1149.6    | 621.1              | 1000.0 | 600.0    | 1500.0   | 200.0 | 3000.0 | 1230.7        | 812.3              | 1000.0 | 700.0    | 1500.0   | 200.0 | 6000.0 | 0.6528               |
| Gestational age           | 38.4      | 2.6                | 39.0   | 37.9     | 39.9     | 28.0  | 42.0   | 37.6          | 3.2                | 38.4   | 36.7     | 39.4     | 24.3  | 41.4   | 0.0365               |
| Number of living children | 1.90      | 1.14               | 1.00   | 1.00     | 3.00     | 1.00  | 5.00   | 1.64          | 1.01               | 1.00   | 1.00     | 2.00     | 1.00  | 7.00   | 0.0661               |

<sup>†</sup> P-value calculated with the Mann-Whitney test.

Among IP women, the characteristics of UI were assessed with the ICIQ-SF and KHQ questionnaires. Women presented SUI as the most common type of UI (45.5%), followed by MUI (28.6%) and UUI (26%). Most of the women presented urine leakage several times a day (44.2%), followed by 2 to 3 times a week (26%), in small amounts (71.4%), although approximately 12% reported large volumes. Regarding situations in which urine leakage

occurs, most (57.1%) reported coughing or sneezing, followed by 49.4% with leakage when exercising and 26% before reaching the bathroom.

The data in Table 2 present the risk factors investigated in this study and their association with UI after delivery. The occurrence of postpartum UI was significantly associated with pregnancy UI ( $p < 0.0001$ ), multiparity ( $p = 0.0291$ ), and gestational age at birth greater or equal to 37 weeks ( $p = 0.0193$ ).

**Table 2** – Comparison of incontinent and continent puerperal women regarding frequency of risk factors for urinary incontinence (UI) – Campinas, São Paulo, Brazil, 2010.

| Risk factors               | Puerperal women (n= 344) |      |                   |      | P-value <sup>†</sup> |
|----------------------------|--------------------------|------|-------------------|------|----------------------|
|                            | Incontinent (n=77)       |      | Continent (n=267) |      |                      |
|                            | N                        | %    | N                 | %    |                      |
| <b>Age (years)</b>         |                          |      |                   |      |                      |
| ≤25                        | 36                       | 46.8 | 132               | 49.4 | 0.1399               |
| 26-30                      | 13                       | 16.9 | 69                | 25.8 |                      |
| 31-35                      | 15                       | 19.5 | 31                | 11.6 |                      |
| >35                        | 13                       | 16.9 | 35                | 13.1 |                      |
| <b>Color/race</b>          |                          |      |                   |      |                      |
| White                      | 30                       | 39.0 | 88                | 33.0 | 0.3283               |
| Nonwhite                   | 47                       | 61.0 | 179               | 67.0 |                      |
| <b>UI during pregnancy</b> |                          |      |                   |      |                      |
| No                         | 23                       | 29.9 | 224               | 83.9 | <0.0001              |
| Yes                        | 54                       | 70.1 | 43                | 16.1 |                      |

continued...

...continuation

| Risk factors                             | Puerperal women (n= 344) |      |                   |      | P-value † |
|--|--------------------------|------|-------------------|------|-----------|
|  | Incontinent (n=77)       |      | Continent (n=267) |      |           |
|  | N                        | %    | N                 | %    |           |
| <b>Current BMI (kg/m<sup>2</sup>)</b>    |                          |      |                   |      |           |
| Underweight (<20)                        | 1                        | 1.3  | 18                | 6.7  | 0.3335    |
| Normal range (20-24.9)                   | 35                       | 45.5 | 116               | 43.4 |           |
| Overweight (25-29.9)                     | 26                       | 33.8 | 85                | 31.8 |           |
| Obese (≥30)                              | 15                       | 19.5 | 48                | 18.0 |           |
| <b>Parity</b>                            |                          |      |                   |      |           |
| Primiparous                              | 33                       | 42.9 | 152               | 56.9 | 0.0291    |
| Multiparous                              | 44                       | 57.1 | 115               | 43.1 |           |
| <b>Type of current birth</b>             |                          |      |                   |      |           |
| Normal                                   | 28                       | 36.4 | 108               | 40.4 | 0.2806    |
| Forceps                                  | 7                        | 9.1  | 12                | 4.5  |           |
| Cesarean                                 | 42                       | 54.5 | 147               | 55.1 |           |
| <b>Type(s) of previous birth(s)</b>      |                          |      |                   |      |           |
| None (primiparous)                       | 33                       | 42.9 | 152               | 56.9 | 0.1446    |
| Only vaginal birth (normal or forceps)   | 15                       | 19.5 | 37                | 13.9 |           |
| Only cesarean section                    | 10                       | 13.0 | 32                | 12.0 |           |
| Mostly vaginal (normal or forceps)       | 5                        | 6.5  | 12                | 4.5  |           |
| Mostly cesarean                          | 6                        | 7.8  | 7                 | 2.6  |           |
| Same number of vaginal and cesarean      | 8                        | 10.4 | 27                | 10.1 |           |
| <b>Episiotomy</b>                        |                          |      |                   |      |           |
| No                                       | 60                       | 77.9 | 202               | 75.7 | 0.6809    |
| Yes                                      | 17                       | 22.1 | 65                | 24.3 |           |
| <b>Perineal tearing</b>                  |                          |      |                   |      |           |
| No                                       | 64                       | 83.1 | 221               | 82.8 | 0.9435    |
| Yes                                      | 13                       | 16.9 | 46                | 17.2 |           |
| First degree                             | 8                        | 61.5 | 31                | 67.4 |           |
| Second degree                            | 5                        | 38.5 | 15                | 32.6 |           |
| <b>Newborn's head circumference (cm)</b> |                          |      |                   |      |           |
| <34                                      | 32                       | 41.6 | 137               | 51.3 | 0.1315    |
| ≥34                                      | 45                       | 58.4 | 130               | 48.7 |           |
| <b>Newborn's weight (g)</b>              |                          |      |                   |      |           |
| <3000                                    | 31                       | 40.3 | 136               | 50.9 | 0.1828    |
| 3000-35000                               | 24                       | 31.2 | 77                | 28.8 |           |
| >3500                                    | 22                       | 28.6 | 54                | 20.2 |           |
| <b>Gestational age at birth (weeks)</b>  |                          |      |                   |      |           |
| <37                                      | 12                       | 15.6 | 77                | 28.8 | 0.0193    |
| ≥37                                      | 65                       | 84.4 | 190               | 71.2 |           |
| <b>Smoking</b>                           |                          |      |                   |      |           |
| Never smoked                             | 61                       | 79.2 | 196               | 73.4 | 0.1505    |
| Ex-smoker                                | 14                       | 18.2 | 46                | 17.2 |           |
| Smoker                                   | 2                        | 2.6  | 25                | 9.4  |           |
| <b>Constipation</b>                      |                          |      |                   |      |           |
| No                                       | 32                       | 41.6 | 144               | 53.9 | 0.0557    |
| Yes                                      | 45                       | 58.4 | 123               | 46.1 |           |

† P-value calculated with Pearson's chi-squared test.

In bivariate analysis, the variables that presented  $p < 0.20$  and were tested in the logistic model were: age, UI during pregnancy, parity, type(s) of previous birth(s), newborn's head circumference, newborn's weight, gestational age at birth, smoking, and constipation. Urinary incontinence during pregnancy, parity, gestational age at birth and constipation remained in the final model.

After running the binary logistic regression, the following variables proved to be risk factors for postpartum UI: UI during pregnancy (OR 12.82, CI 95% 6.94 – 23.81,  $p < 0.0001$ ), multiparity (OR 2.26, CI 95% 1.22 – 4.19,  $p = 0.0094$ ), gestational age at birth greater or equal to 37 weeks (OR 2.52, CI 95% 1.16 – 5.46,  $p = 0.0199$ ) and constipation (OR 1.94, CI 95% 1.05 – 5.46,  $p = 0.0345$ ).

## DISCUSSION

Regarding the onset of UI, 70.1% of the women with postpartum incontinence had been affected by incontinence during pregnancy; furthermore, there was a strong association between UI during pregnancy and increased risk for UI in the puerperium (OR 12.82), corroborating the results of other studies<sup>(4,9-11)</sup>. These findings indicate that in most cases, UI first appeared during pregnancy and remained after birth, in accordance to a previous study in which most of the incontinent women in the puerperium experienced involuntary urine leakage in the third trimester of pregnancy, although only 4% of them developed UI after birth<sup>(8)</sup>.

Other authors have also observed that UI during pregnancy increases the risk of UI in the puerperium. A study conducted with primiparous women a year postpartum showed that women with UI during pregnancy were five times more likely to develop SUI (OR 5.79, CI 95% 2.79 – 12)<sup>(24)</sup>. Another study included only primiparous women and found that participants with UI during pregnancy were 2.3 more likely to present UI six months postpartum (IC 95% 2.2 – 2.4)<sup>(9)</sup>.

Studies indicate that women who have vaginal births present greater prevalence of postpartum UI compared to women submitted to cesarean sections<sup>(3,6)</sup>. Furthermore, persistent postpartum UI is less common in women with only cesarean sections compared to women with only spontaneous vaginal deliveries<sup>(6)</sup>. In the present study, this was not observed, perhaps due to the small sample size.

Other risk factors found in this study were multiparity (OR 2.26), gestational age at birth greater or equal to 37 weeks (OR 2.52) and constipation (OR 1.94). The association between multiparity and postpartum UI has already been shown by previous studies<sup>(10-11)</sup>. Gestational age at birth has been investigated by few studies and they did not show an association with postpartum UI<sup>(12)</sup>. However, the greater the gestational age, the greater risk for UI during pregnancy and the greater prevalence of UI<sup>(25)</sup>, being that urine leakage is more common in the third trimester of pregnancy<sup>(8,10)</sup>. Therefore, greater gestational age at birth can influence postpartum UI, as it elevates the risk of pregnancy UI. This is probably due to the greater time and pressure of the pregnant uterus on pelvic suspensory

(ligaments) and supporting (endopelvic fascia and muscles) structures, as suggested by other authors<sup>(25)</sup>.

A previous study also demonstrated an association between constipation with postpartum UI<sup>(16)</sup>. This association is justified because constipation is related to repeated pelvic pressure and tension, occurring more often than birth<sup>(26)</sup>.

The rectum and the lower urinary tract are intimately related, as they originate from the same embryonic structure, possess the same peripheral innervation, and the central processing of afferent activity occurs in the same area of the brain<sup>(27)</sup>. The intimate proximity of these systems suggests that dysfunctions in one of them can influence the other's function, even mechanically<sup>(28)</sup>. One study that assessed whether rectal distension influenced the results of a urodynamic test showed that rectal distension can cause detrusor hyperactivity in some women; however, the data were inconclusive and further research is needed<sup>(27)</sup>.

A cohort study conducted six months postpartum showed that chronic constipation was a risk factor for postpartum UI (OR 1.86, CI 95% 1.03 – 3.34)<sup>(16)</sup>. Another cross-sectional study conducted with non-puerperal women indicated that constipation was just as significant as obstetric trauma in causing pelvic floor problems (OR 2.35, CI 95% 1.27 – 4.34)<sup>(26)</sup>.

The participants in this study presented SUI as the most common type of UI and also reported losing more urine when coughing or sneezing and/or exercising. Furthermore, they declared small amounts of urine leakage, findings that corroborate those of previous studies<sup>(4,10)</sup>. There was a high frequency of UI episodes, in which approximately 44% of the puerperal women reported leaking urine several times a day, different from previous studies in which UI was not very frequent after birth<sup>(3-4,10)</sup>. This difference found in this study is probably due to the recent postpartum period investigated, which was up to 90 days.

The short postpartum period investigated (up to 90 days) restricts analyses and comparisons with longer studies. The present data can only be used with puerperal women who present sociodemographic and clinical characteristics similar to those described. Another limitation of this study was that not all of the Roma III<sup>(20)</sup> diagnostic criteria were used to identify cases of constipation.

It is important for all health professionals that care for women to know that UI during pregnancy is a risk factor for postpartum UI, and it is important that history of urine leakage be included as part of prenatal care. Similarly, intestinal constipation should also be investigated and treated.

The results indicate that efforts to prevent postpartum UI should begin during pregnancy. Prenatal pelvic floor muscle exercises reduce the prevalence of UI during pregnancy and in the postpartum (up to 12 weeks)<sup>(29)</sup> and are therefore indicated as a prevention measure.

Other studies with greater sample sizes are needed to investigate risk factors according to other types of UI. This would allow for the implementation of specific treatments according to type of UI, thus reducing the prevalence of this condition.

## CONCLUSION

Most of the women reported urine leakage in small amounts, however, it occurred several times a day, in general when coughing or sneezing. Urinary incontinence often appeared first during pregnancy and remained in

the puerperal period. Risk factors for postpartum UI were: UI during pregnancy, multiparity, gestational age at birth greater or equal to 37 weeks, and constipation. In the studied group of puerperal women, stress UI was more frequent.

## RESUMO

**Objetivo:** Investigar os fatores de risco para a incontinência urinária (IU) no puerpério e as suas características. **Método:** Trata-se de estudo caso-controle com 344 puérperas (77 casos e 267 controles), com até 90 dias pós-parto. Foi aplicado, em um único momento, um questionário para os dados sociodemográficos e clínicos, e dois outros para avaliar a perda urinária, situações de perda e o tipo de IU. **Resultados:** Apresentaram IU de esforço 45,5%, perda urinária diversas vezes ao dia 44,2%, sendo 71,4% em pequena quantidade e 57,1% ao tossir ou espirrar. Em 70,1% dos casos a IU iniciou-se na gestação e permaneceu no puerpério. Ao ajustar-se um modelo de regressão logística binária, apenas IU na gestação (OR 12,82, IC 95% 6,94 – 23,81,  $p < 0,0001$ ), multiparidade (OR 2,26, IC 95% 1,22 – 4,19,  $p = 0,009$ ), idade gestacional no parto maior ou igual a 37 semanas (OR 2,52, IC 95% 1,16 – 5,46,  $p = 0,02$ ) e constipação (OR 1,94, IC 95% 1,05 – 5,46,  $p = 0,035$ ) permaneceram no modelo final. **Conclusão:** A IU iniciou-se frequentemente na gestação e permaneceu no puerpério. A presença de IU na gestação, multiparidade, idade gestacional no parto maior ou igual a 37 semanas e constipação foram fatores de risco. No grupo estudado a IU de esforço foi a mais frequente.

## DESCRITORES

Incontinência Urinária; Incontinência Urinária por Estresse; Período Pós-parto; Fatores de Risco; Enfermagem Obstétrica.

## RESUMEN

**Objetivo:** Investigar los factores de riesgo para incontinencia urinaria (IU) en el puerperio y sus características. **Método:** Se trata de estudio de caso-control con 344 puérperas (77 casos y 267 controles), con hasta 90 días post parto. Se aplicó, en un solo momento, un cuestionario para los datos sociodemográficos y clínicos, y dos otros para evaluar la pérdida urinaria, situaciones de pérdida y el tipo de IU. **Resultados:** Presentaron IU de esfuerzo el 45,5%, pérdida urinaria diversas veces al día el 44,2%, siendo el 71,4% en pequeña cantidad y el 57,1% al toser o estornudar. En el 70,1% de los casos la IU se inició en la gestación y permaneció en el puerperio. Al ajustarse un modelo de regresión logística binaria, solo IU en la gestación (OR 12,82, IC 95% 6,94 – 23,81,  $p < 0,0001$ ), multiparidad (OR 2,26, IC 95% 1,22 – 4,19,  $p = 0,009$ ), edad gestacional en el parto mayor o igual que 37 semanas (OR 2,52, IC 95% 1,16 – 5,46,  $p = 0,02$ ) y constipación (OR 1,94, IC 95% 1,05 – 5,46,  $p = 0,035$ ) permanecieron en el modelo final. **Conclusión:** La IU se inicia a menudo en la gestación y permanece en el puerperio. La presencia de IU en la gestación, multiparidad, edad gestacional en el parto mayor o igual que 37 semanas y constipación fueron factores de riesgo. En el grupo estudiado la IU de esfuerzo fue la más frecuente.

## DESCRIPTORES

Incontinencia Urinaria; Incontinencia Urinaria de Esfuerzo; Periodo Posparto; Factores de Riesgo; Enfermería Obstétrica.

## REFERENCES

- Sangsawang B, Nucharee S. Stress urinary incontinence in pregnant women: a review of prevalence, pathophysiology, and treatment. *Int Urogynecol J*. 2013;24(6):901-12.
- Sievert KD, Amend B, Toomey PA, Robinson D, Milsom I, Koelbl H, et al. Can we prevent incontinence? ICI-RS 2011. *Neurourol Urodyn*. 2012;31(3):390-9.
- Thom DH, Rortveit G. Prevalence of postpartum urinary incontinence: a systematic review. *Acta Obstet Gynecol*. 2010;89(12):1511-22.
- Solans-Domènech M, Sánchez E, Espuña-Pons M. Urinary and anal incontinence during pregnancy and postpartum. *Obstet Gynecol*. 2010;115(3):618-28.
- Viktrup L, Rortveit G, Lose G. Does the impact of subsequent incontinence risk factors depend on continence status during the first pregnancy or the postpartum period 12 years before? A cohort study in 232 primiparous women. *Am J Obstet Gynecol*. 2008;199(1):73.e1-73.e4.
- MacArthur C, Wilson D, Herbison P, Lancashire RJ, Hagen S, Toozs-Hobson P et al. Urinary incontinence persisting after childbirth: extent, delivery history, and effects in a 12-year longitudinal cohort study. Prolong study group. *BJOG*. 2015 Apr 2. doi: 10.1111/1471-0528.13395. [Epub ahead of print]
- Sangsawang B. Risk factors for the development of stress urinary incontinence during pregnancy in primigravidae: a review of the literature. *Eur J Obstet Gynecol Reprod Biol*. 2014;178:27-34.
- Raza-Khan F, Graziano S, Kenton K, Shott S, Brubaker L. Peripartum urinary incontinence in a racially diverse obstetrical population. *Int Urogynecol J*. 2006;17(5):525-30.
- Wesnes SL, Hunskaar S, Bo K, Rortveit G. The effect of urinary incontinence status during pregnancy and delivery mode on incontinence postpartum: a cohort study. *BJOG*. 2009;116(5):700-7.
- Lima JLDA Lopes MHB. Prevalência de incontinência urinária no ciclo grávido-puerperal [resumo]. *Rev Estima*. 2009;7(3):46.
- Botelho S, Silva JMD, Palma P, Herrmann V, Riccetto C. Can the delivery method influence lower urinary tract symptoms triggered by the first pregnancy? *Int Braz J Urol*. 2012;38(2):267-76.

12. Eftekhar T, Hajibaratli B, Ramezanzadesh F, Shariat M. Postpartum evaluation of stress urinary incontinence among primiparas. *Int J Gynecol Obstet.* 2006;94(2):114-8.
13. Rogers RG, Leeman LL. Postpartum genitourinary changes. *Urol Clin N Am.* 2007;34(1):13-21.
14. Altman D, Ekström A, Gustafsson C, López A, Falconer C, Zeterström J. Risk of urinary incontinence after childbirth. *Obstet Gynecol.* 2006;108(4):873-8.
15. Carroli G, Mignini L. Episiotomy for vaginal birth. *Cochrane Database Syst Rev.* 2009;(1):CD000081.
16. Ewings P, Spencer S, Marsh H, O'Sullivan M. Obstetric risk factors for urinary incontinence and preventative pelvic floor exercises: cohort study and nested randomized controlled trial. *J Obstet Gynaecol.* 2005;25(6):558-64. Erratum in: *J Obstet Gynaecol.* 2005;25(8):834-5.
17. Leroy LS, Lopes MHBML. Urinary incontinence in the puerperium and its impact on the health-related quality of life. *Rev Lat Am Enfermagem.* 2012;20(2):346-53.
18. Tamanini JTN, Dambros M, D'Ancona CAL, Palma PCR, Netto Jr NR. Validação para o português do "International Consultation on Incontinence Questionnaire-Short Form" (ICIQ-SF). *Rev Saúde Pública.* 2004;38(3):438-44.
19. Instituto Brasileiro de Geografia e Estatística. Metodologia do censo demográfico 2000. Rio de Janeiro: IBGE; 2003.
20. Longstreth GF, Thompson WG, Chey WD, Houghton LA, Mearin F, Spiller RC. Functional bowel disorders. *Gastroenterology.* 2006;130(5):1480-91.
21. Tamanini JTN, D'Ancona CAL, Botega NJ, Netto Jr NR. Validação do "King's Health Questionnaire" para o português em mulheres com incontinência urinária. *Rev Saúde Pública.* 2003;37(2):203-11.
22. Glazener CMA, Herbison GP, MacArthur C, Lancashire R, McGee MA, Grant AM, et al. New postnatal urinary incontinence: obstetric and other risk factors in primiparae. *BJOG.* 2006;113(2):208-17.
23. Draper NR, Smith H. Applied regression analysis. New York: Wiley & Sons; 1998.
24. Diez-Itza I, Arrue M, Ibañez L, Murgiondo A, Paedes J, Sarasqueta C. Factors involved in stress urinary incontinence 1 year after first delivery. *Int Urogynecol J.* 2010;21(4):439-45.
25. Lin KL, Shen CJ, Wu MP, Long CY, Wu CH, Wang CL. Comparison of low urinary tract symptoms during pregnancy between primiparous and multiparous women. *Biomed Res Int.* 2014;2014:303697. doi: 10.1155/2014/303697.
26. Amselem C, Puigdollers A, Azpiroz F, Sala C, Videla S, Fernández-Fraga X, et al. Constipation: a potential cause of pelvic floor damage? *Neurogastroenterol.* 2010;22(2):150-3, e48.
27. Panayi DC, Khullar V, Digesu GA, Spiteri M, Hendricken C, Fernando R. Rectal distension: the effect on bladder function. *Neurourol Urodyn.* 2011;30(3):344-7.
28. Averbek MA, Madersbacher H. Constipation and LUTS: how do they affect each other? *Int Braz J Urol.* 2011;37(1):16-28.
29. Boyle R, Hay-Smith EJC, Cody JD, Mørkved S. Pelvic floor muscle training for prevention and treatment of urinary and fecal incontinence in antenatal and postnatal women: a short version Cochrane Review. *Neurourol Urodyn.* 2014;33(3):269-76.