

# STRESS URINARY INCONTINENCE AMONG WOMEN PARTICIPATING IN THE FAMILY HEALTH PROGRAM OF DOURADOS (MS), BRAZIL

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## ABSTRACT

**OBJECTIVE.** To describe the prevalence of stress urinary incontinence (SUI) among women older than 20 years participating in the Family Health Program (FHP) of the municipality of Dourados (MS), Brazil, and to correlate it with the following variables: age, body mass index (BMI), parity, number of pregnancies, hysterectomy, smoking, and diabetes mellitus.

**METHODS.** Cross-sectional household survey. We interviewed 336 women older than 20 years who had no exclusion criteria. Two forms were used during the interviews: an evaluation sheet containing demographic data and the International Consultation on Incontinence Questionnaire - Short Form (ICIQ-SF) assessing the impact on quality of life (QOL). For the statistical analysis, we used the chi-square test, Student's t test, the corrected coefficient of contingency and a forward stepwise logistic regression model.

**RESULTS.** Prevalence of SUI was 21.4%. In terms of risk factors, age ( $p = 0.113$ ), smoking ( $p = 0.796$ ), and diabetes mellitus ( $p = 0.221$ ) showed no statistically significant association; however, BMI ( $p = 0.007$ ), number of pregnancies ( $p = 0.018$ ), parity ( $p = 0.032$ ), and hysterectomy ( $p = 0.024$ ) showed a weak association. Using logistic regression, only pairing of weight and hysterectomy was able to predict the outcome (SUI). Most women with SUI (63.9%) had very severe impairment in the QOL.

**CONCLUSION.** The prevalence of SUI was similar to that found in other studies; BMI, parity, number of pregnancies, and hysterectomy were associated with this disease, which seriously impairs the QOL.

**KEY WORDS:** Stress urinary incontinence. Quality of life. Risk factors. Parity. *Diabetes mellitus*. Obesity

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## INTRODUCTION

Urinary incontinence (UI) is defined as involuntary loss of urine through the urethra.<sup>1</sup> This condition can be classified into three common types: stress urinary incontinence (SUI), urge urinary incontinence (UUI), and mixed urinary incontinence. In SUI, urine leakage occurs when there is increased intra-abdominal pressure, such as while practicing physical exercise, coughing, or sneezing. UUI is the inability to hold urine because of a strong need to void. Mixed urinary incontinence is a combination of the two previous conditions.<sup>2</sup>

The economic impact of UI is significant both for the public health system and the families of patients with this pathology. In the United States, the cost of the treatment of patients with UI was estimated to be approximately \$ 19.5 million in 2000.<sup>3</sup> The annual amount paid for routine care of a U.S.

woman with UI was estimated at \$ 900.00.<sup>4</sup> Studies have shown the negative impact of UI on the social, sexual, and psychological dimensions.<sup>5</sup> Fultz et al. assessed the impact of UI in 3,364 employed women and demonstrated impairment of work rhythm because of increased frequency of bathroom breaks.<sup>6</sup> Tamanini et al., using the International Consultation on Incontinence Questionnaire (ICIQ-SF), showed that among 225 patients with UI, 8.9% (20) and 17.8% (40) considered the impact of this condition on their quality of life to be severe and very severe, respectively.<sup>7</sup> Telephone interviews conducted in 2003 with 82,196 people over 65 years demonstrated that the prevalence of UI is twice as high in women compared to men and UI is significantly associated with depression.<sup>8</sup>

The prevalence of female UI can range from 8.5% to 55%.

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This difference can be explained by the different populations studied, study designs, and definitions used.<sup>9</sup> Anger et al. analyzed 9,965 questionnaires completed during household interviews conducted between 1999 and 2000 in the United States and found a prevalence of 38%.<sup>10</sup> In a study conducted between 2005 and 2006 using household interviews and clinical examination in a mobile examination center, 1,961 non-pregnant U.S. women older than 20 years were evaluated for pelvic floor disorders and UI was found in 15.7% of the participants, being much more frequent than fecal incontinence and pelvic organ prolapse, which were 9.0% and 2.9%, respectively.<sup>11</sup> Considering separately the types of urinary incontinence, Fultz et al. found 52% of SUI, 10% of UUI, 37% of mixed UI, and 2% of other types.<sup>6</sup> A study conducted with 400 women showed quite different results: 18.3% had SUI, 17.5% had UUI, and 39.5% had mixed UI.<sup>12</sup> In a study conducted in 1997, the authors interviewed 410 women and found that 12.6% of those with incontinence had SUI.<sup>13</sup> Interviews with 1,012 women older than 18 years living in Western Turkey also had contradictory results: the prevalence of UUI, SUI, and mixed UI was 25.6%, 33.1%, and 41.3%, respectively.<sup>14</sup> A study conducted with 3,614 Japanese nurses between 20 and 64 years old showed a prevalence rate of UI of 16.7%, with SUI being the most common type (72.7%), followed by UUI (12.1%), and the least common type was mixed UI (9.9%).<sup>15</sup> Guarisi et al. conducted a cross-sectional household survey in Campinas (state of São Paulo), Brazil, and interviewed 456 women between 45 and 60 years from October 1997 to January 1998. The prevalence of SUI was 35%.<sup>16</sup> In 2005, another study interviewed 646 women between 12 and 79 years old who spontaneously sought care through the Prevention Program of Gynecologic Cancer of Hospital Amaral Carvalho in Jaú, state of São Paulo, Brazil. The prevalence of UI found in this sample was 34.8% and 50.2% for the patients were older than 40 years.<sup>7</sup>

Risk factors for UI are also highly debatable. Age is considered a major risk factor, with significantly increased prevalence between 75 and 79 years old.<sup>10</sup> A prevalence rate of 20% was found in women younger than 60 years, but among women over 80 years, the prevalence increased to 44%.<sup>17</sup> Panugthong et al. conducted cross-sectional study analyzing 400 menopausal women and found that obesity was a risk factor.<sup>18</sup> Subak et al. observed that loss of 5% to 10% of body weight leads to a reduction in urinary incontinence.<sup>19</sup> Burgio et al. published the results of a prospective study that followed up 101 women with morbid obesity who underwent laparoscopic gastric reduction, with a 44% reduction in the prevalence of urinary incontinence.<sup>20</sup> A study that included 182 Jordanian women between 50 and 65 years showed that body mass index (BMI) had no significant correlation with SUI.<sup>21</sup> Fritel et al. analyzed questionnaires answered by 2,625 women between 49 and 61 years and found increased prevalence of SUI associated with parity, but did not find a

correlation with vaginal delivery,<sup>22</sup> and this finding does not agree the finding by other authors describing vaginal delivery as a leading cause of neuromuscular impairment of pelvic floor and UI.<sup>23</sup> Donforth et al. found an association between type 2 diabetes mellitus and smoking with UI.<sup>24</sup> Tamanini et al. found that diabetes mellitus was a risk factor for UI, with a three times increase in the chance of symptom onset. Guarisi et al.<sup>7</sup> found no change in the risk of SUI caused by smoking and BMI.<sup>16</sup> Even though hysterectomy can be considered a risk factor,<sup>25</sup> a recently published study that analyzed 23,792 nurses did not show such correlation.<sup>26</sup> However, a study involving 3,537 Taiwanese women between 25 and 59 years demonstrated that hysterectomy was the greatest risk factor among gynecological surgeries.<sup>27</sup>

The objective of the present study was to describe the prevalence of SUI in women older than 20 years enrolled in the Urban Family Health Program (FHP) of Dourados (state of Mato Grosso), Brazil, as well as to analyze the correlation of certain risk factors and to observe the impact on the quality of life.

## METHODS

There are 33 urban teams of the FHP. Each team cares for an average of 900 families and all of them are identified by a number. A survey conducted in the Information System of Primary Care on October 20, 2009 showed that there were 43,829 women older than 20 years enrolled in this program. Ten families from each team were randomly selected and this random sampling was performed using the software Biostat 4.0. The sample was initially composed of 333 subjects. According to Barbetta's formula to calculate sample size, 333 subjects would guarantee a sampling error between 5% and 6%.

The present study was approved by the Committee of Internships, Practice, Research and other Senior Research Projects of the Department of Health of Dourados on June 2, 2009. On August 31, the study was approved by the Human Research Ethics Committee of UNIGRAN (Project No. 317/09). The questionnaires were administered during September and the first two weeks of October by the researchers.

The researchers read the consent form to the participants after they accepted the invitation to participate in the study. Even after signing the consent form, the subjects were told they could ask to be excluded from the study without any impact on guidance and referrals. Participants' confidentiality was ensured in all phases of the study.

This was a cross-sectional study with the following inclusion criteria: being female, being older than 20 years, agreement to participate in the study, and signing the consent form (Appendix IV). Exclusion were: women younger than 20 years, indigenous, having central neuropathies, being pregnant, having given birth recently (birth less than three months ago), having urinary tract infection or UI not caused by stress.

The instruments used were a questionnaire for clinical

assessment and a questionnaire of quality of life (ICIQ-SF). The clinical assessment questionnaire included the following data: height, weight, BMI, age, gestational history, diabetes mellitus, smoking, and hysterectomy. The second questionnaire was developed by the International Continence Society (ICS)<sup>28</sup> and was validated into Portuguese in 2004.<sup>29</sup> It evaluated the impact of incontinence on daily life using a numerical scale and clinically graded SUI. The present study showed a significant correlation between this questionnaire and urodynamics, and the questionnaire was considered "gold standard" to assess UI.<sup>30</sup> Hajebrahimi et al. reported equivalent results when the questionnaire was answered by the subject or completed by the researcher.<sup>31</sup>

When it was not possible to administer questionnaires to a family because of the absence of residents or lack of subjects that could be included in the study, an attempt was made with the next registered family (the family related to the next number). To facilitate the approach of the family, the visits were monitored by health care providers.

Database processing was done using the software Excel® for Windows®. Statistical analyses were performed using the software SPSS® (Statistical Package for the Social Sciences, Chicago, IL, USA) version 13 for Windows®. For the tables, we used mean as position measure and standard error as measure of data dispersion. To assess the possible association between the variables, we used the chi-square test (Fisher's exact test for 2 × 2 contingency tables). We used the corrected coefficient of contingency (CC\*) to evaluate the strength of association between variables. Quantitative variables were analyzed using the Shapiro-Wilk test to determine whether or not their distribution was normal. The comparison of means between groups was performed using Student's t test for independent samples or Mann-Whitney test based on the fact that there were normal distribution variables or abnormal distribution variables. We used a forward stepwise logistic regression model to establish which variables are possible determinants of the presence of SUI. The significance level was established at  $p < 0.05$  (two-tailed) for all tests.

## RESULTS

We administered 336 household surveys. There were three additional surveys because in three cases more than one subject lived in the same house. Of this sample, 72 subjects had a clinical diagnosis of SUI, resulting in a prevalence of 21.4% for this population.

In order to find possible associations between some of the variables measured and the presence of SUI, the variables were rearranged into categories that enable their analysis using the chi-square test.

The variable age was categorized into three levels: 20 to 39 years, 40 to 59 years, and 60 or older. The chi-square test showed that there is no statistically significant association between these two variables ( $\chi^2 = 4.362$ ,  $gl = 2$ ,  $p = 0.113$ ).

The BMI of each participant was classified into one of two categories according to its value. Normal or Low: BMI < 25. Overweight or Obese: BMI ≥ 25. The chi-square test (Fisher's exact test) found a statistically significant association between these two variables ( $\chi^2 = 7.250$ ,  $df = 1$ ,  $p = 0.007$ ). CC\*, which is an indicator of the strength of association between two variables was 0.205, which suggests a weak strength of association. That is, approximately 20.5% of the variation of a variable can be explained by the variation of another variable.

Table 2 shows the number of pregnancies classified into three categories: None, 1 or 2, 3 or more. Although the chi-square test demonstrated a statistically significant association with the presence of SUI ( $\chi^2 = 8.034$ ,  $df = 2$ ,  $p = 0.018$ ), the corrected coefficient of contingency showed that this association was weak (CC\* = 0.216).

Parity is the sum of all deliveries (vaginal delivery and cesarean section). Parity was categorized into two levels: up to two deliveries, and three or more deliveries. The chi-square test (Fisher's exact test) demonstrated a statistically significant association ( $\chi^2 = 4.786$ ,  $gl = 1$ ,  $p = 0.032$ ), however this association was also weak (CC\* = 0.168).

The association between hysterectomy and SUI was also weak (CC\* = 0.195) but statistically significant ( $\chi^2 = 6.504$ ,  $gl = 1$ ,  $p = 0.024$ ).

Both smoking and diabetes mellitus had no statistically significant association with SUI, showing, respectively, in the chi-square test (Fisher's exact test)  $\chi^2 = 0.348$ ,  $gl = 1$ ,  $p = 0.796$  and  $\chi^2 = 1.460$ ,  $gl = 1$ ,  $p = 0.221$ .

We used a logistic regression model to identify variables that can predict the outcome of SUI. The variables included in this forward stepwise model were: age, weight, BMI, hysterectomy (categorical), smoking (categorical) and diabetes mellitus (categorical), vaginal delivery, and cesarean sections. Only the association of the variable weight with the variable hysterectomy can predict the outcome. The comparison between the groups with and without SUI demonstrated statistically significant differences in the variables age, weight, BMI, number of pregnancies, and number of deliveries (Table 3). In these variables, the group that had SUI always showed means higher in comparison with the group that did not have SUI.

Analyzing the responses to the ICIQ of 72 women with

**Table 1 - Distribution by category of BMI of women with and without SUI**

BMI	SUI	Normal or low	Overweight or total obese
NO	116 43.9%	148 56.1%	264 100%
YES	19 26.4%	53 73.6%	72 100%
TOTAL	135 40.2%	201 59.8%	336 100%

**Table 2 - Distribution of frequencies of pregnancies Number of pregnancies in the groups with and without SUI**

Pregnancies	SUI	None 1 or 2 pregnancies	3 or more pregnancies	Total
No	47 17.8%	96 36.4%	121 45.8%	264 100%
Yes	5 6.9%	22 30.6%	45 62.5%	72 100%
Total	52 15.5%	118 35.1%	166 49.4%	336 100%

**Table 3 - Mean, standard error and p-value of the comparison of means between the groups WITH and WITHOUT SUI for each variable measured in the sample**

	SUI	mean	s.e.	p-value
Age (years)	Yes	45.76	1.77	0.032
	No	41.92	0.94	
Weight (kg)	Yes	71.40	1.62	0.029
	No	67.29	0.88	
Height (cm)	Yes	159.36	0.76	0.888
	No	159.23	0.43	
BMI	Yes	27.67	0.62	0.028
	No	26.10	0.33	
Number of pregnancies	Yes	3.19	0.27	0.013
	No	2.62	0.14	
Vaginal deliveries	Yes	1.83	0.30	0.065
	No	1.43	0.14	
Cesarean	Yes	0.99	0.13	0.998
	No	0.97	0.07	
Number of deliveries	Yes	2.82	0.26	0.037
	No	2.40	0.13	

SUI, most of them (63.9%) believed that SUI greatly affected their quality of life.

## DISCUSSION

In the present study, the prevalence of SUI in the sample investigated was 21.4%. Such percentage is higher than that found in a study conducted in Australia, where 506 women answered a questionnaire related to urinary symptoms and showed a prevalence of 16.1%.<sup>32</sup> This difference may be associated with the mean age of this sample, which was 53.7 years, being higher than the mean age of our study, which was 45.76 years in symptomatic patients and 41.92 years in asymptomatic patients, considering that the peak prevalence of SUI is between 25 and 49.<sup>33</sup> Rortveit et al. administered a questionnaire to 15,307 women and found a prevalence of 12.2% for SUI, but the mean age was 36.6, which is lower than the mean found in our sample.<sup>34</sup> The differences found

in the prevalence rates in several studies may be explained by different definitions of the types of UI. For example, SUI can be clinically defined as having only symptoms of this type or predominantly symptoms of this type, and this last option can be confused with the definition of mixed UI.<sup>35</sup> Different ethnic groups also explain the variation in the prevalence rate observed in studies conducted in countries with different ethnic profiles. A study that analyzed 5,506 adults between 30 and 79 years showed that the prevalence of SUI in groups of white, black and Hispanic women were, respectively, 35.4%, 9.4%, and 14.5%.<sup>35</sup>

Taking into account the variable age, there was no statistically significant association with SUI, a finding confirmed in a study conducted by Botleroa et al.<sup>32</sup> We found that some studies have reported increased prevalence of UI as the subjects get older,<sup>14,36</sup> however, when evaluating this variable, these studies do not distinguish between different types of UI, an important detail because UUI and mixed UI have a peak prevalence after the sixth decade life.<sup>37</sup> An important factor that may have affected the results of the present study is that only 16.1% of the sample was over 60 years.

BMI showed a weak association with SUI in our study. Studies that do not evaluate the types of UI separately show strong association with obesity.<sup>38,39</sup> A randomized study showed that weight loss is associated with decrease in the prevalence of UI.<sup>40</sup> A study conducted in the state of Washington, USA, interviewed women between 30 and 90 years and showed that the variable BMI > 30 kg m<sup>2</sup> doubled the risk of developing UI.<sup>41</sup> Tennstedt et al. believe that the ratio between abdominal circumference and pelvic circumference is a better predictor than BMI because it indirectly measures the intra-abdominal pressure that affects the pelvic floor and elevates the intravesical pressure.<sup>35</sup>

A weak but statistically significant association was also found between the number of pregnancies and SUI. A literature review published in 2003 reported the increased risk of UI in multiparas.<sup>37</sup> Slieker-Ten Hove et al., assessing risk factors for double incontinence (urinary and fecal), found no association between parity and SUI.<sup>42</sup> These findings should be evaluated taking into account the type of delivery. Recent studies show that women undergoing elective cesarean section had a lower prevalence of SUI than those undergoing this procedure on an emergency basis because of obstructed labor and they had the same prevalence of urinary disorder as the women who gave birth via vaginal delivery.<sup>43,44</sup> Considering the findings of these studies, we believe that, in regions where the percentage of elective cesarean delivery is very high due to cultural or socioeconomic issues, there may be a low prevalence of SUI even in multiparas.

In the present study, hysterectomy showed a weak association with SUI. In 2009, López et al. published data from 276 interviews with women between 21 and 64 years old living in the city of Bayamón (Puerto Rico) and found similar

results.<sup>45</sup> Atman et al. prospectively followed up two groups of patients during 30 years and showed that the group of those who underwent hysterectomy had a higher risk of undergoing surgery for SUI.<sup>46</sup> A study evaluating this surgery with the three types of UI only found an association with the mixed form in the group with SUI and did not find that hysterectomy was a statistically significant risk factor. The authors believe that this mixed symptomatology is related to neural and urethral support damage caused during this gynecological procedure.<sup>32</sup> A meta-analysis performed by Gimbel, comparing UI after subtotal and total hysterectomy, demonstrated that the patients who underwent the first surgery had a lower incidence of UI.<sup>47</sup> This finding seems to contradict the previous opinion because we believe that the involvement of the urethral support is greater when the cervix is removed.

Smoking was not associated with SUI in the present study, but it is important to highlight that the percentage of smokers in this sample was extremely low (7.1%). Studies have reported that this habit is associated with UI because of the action of nicotine stimulating detrusor muscle contraction<sup>48</sup> and because smokers have chronic cough that increases intra-abdominal pressure.<sup>49</sup>

Our results also showed no association between diabetes mellitus and SUI, and the percentage of patients with diabetes was also low (7.7%). Danforth et al. found, in a recent study, the association of this pathology only with UUI.<sup>50</sup> We should also keep in mind that obesity is a risk factor for type 2 diabetes mellitus,<sup>51</sup> therefore, the existence of the first variable can affect the results of studies assessing risk factors.

Analyzing the result found when comparing the means of both groups, we found that the variable age, when using the chi-square test, is not associated with SUI, showing a statistically significant difference. We believe that this finding may be related to the influence of other variables, since, in theory, older women have more pregnancies and deliveries.

Most women with SUI in our study reported severe impairment when assessing their quality of life. This finding may be caused by the low mean age of our sample considering that in the fifth decade of life women are usually fully active. A study involving 749 women living in Hong Kong showed that the two factors that had the highest impact on quality of life were impairment of social activity and emotional well-being.<sup>52</sup> Some studies have shown a low impact on the quality of life of women with UI; however, they were conducted during pregnancy or in the first year postpartum.<sup>53,54</sup> This difference in results might be associated with the fact that the women in these situations see UI as an expected disorder for such situations instead of considering it a disease. Córcoles et al., studying 126 women with SUI, demonstrated impairment in their quality of life with gradual deterioration as they got older. The authors correlated this finding with the fact that the degree of UI and the incidence of urinary tract infection increase in older patients.<sup>55</sup> The questionnaire known as The

Kings Health Questionnaire (KHQ) has been used in several studies assessing the quality of life and UI.<sup>54,55</sup> A study comparing the ICQ-SF with the KHQ has been conducted and showed that both have similar sensitivity and specificity, and the ICQ-SF was considered to have better applicability because it has fewer questions.<sup>56</sup>

## CONCLUSION

Based on the present study, we conclude that the prevalence of UI in this sample of women participating in an urban FHP was 21.4%, which is similar to that found in other studies. The variables BMI, number of pregnancies, parity and hysterectomy had statistically significant associations with SUI, however after calculating CC\* these associations were shown to be weak. Using logistic regression, we found that the only association of variables that can predict the outcome (SUI) were weight and hysterectomy. Most women with SUI in our sample (63.9%) considered the impairment caused by this disease to be very severe with regard to their quality of life. When comparing the mean age of both groups, we found a statistically significant difference; however, this finding may be associated with the presence of other variables such as parity and number of pregnancies.

**No conflicts** of interest declared concerning the publication of this article.

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Artigo recebido: 02/01/10  
Aceito para publicação: 14/09/10

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