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Factors Associated with Urinary Incontinence in Pregnant Women Attending Prenatal Consultations in Six Public Health Facilities in the City of Ouahigouya, Burkina Faso

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Abstract

Objective: To study risk factors for urinary incontinence (UI) in pregnant women in six health facilities in the city of Ouahigouya. Methodology: We conducted a cross-sectional, analytical observational study from May 1 to August 30, 2023 in six health facilities in the city of Ouahigouya. Binary logistic regression was used to identify risk factors associated with UTI. Results: The prevalence of UI was 39.3%. The mean age of incontinent women was 26.5 ± 6.2 years, with extremes of 18 and 44 years. Stress UI (55%) was the most frequent type. On univariate analysis, age over 25 (OR = 2.6), multiparity (OR = 2.8), number of gestures, body mass index greater than or equal to 25 kg/m^2 (OR = 2.1), infantile enuresis (OR = 2.6), recurrent urinary tract infections (OR = 2.6), previous vaginal delivery (OR = 14.5) and third trimester of pregnancy (OR = 1.7) significantly increased the risk of UTI. Independent risk factors were previous vaginal delivery (OR = 17.6), previous caesarean section (OR = 5.2), third trimester of pregnancy (OR = 2.01), body mass index greater than or equal to 25 kg/m^2 (OR = 2.09) and coffee consumption (OR = 4.5). Conclusion: UTI is highly prevalent in pregnant women. Obstetrical parameters are strongly associated with the risk of UTI during pregnancy.

Keywords

Urinary Incontinence, Pregnancy, Risk Factors, Burkina Faso

1. Introduction

UI is both a medical and a psychosocial problem. It is estimated that over 200 million women worldwide suffer from UI [1]. These figures are certainly underestimates, as more than half of all women prefer not to talk about their symptoms due to the taboo nature of the condition [2].

The risk of UTI increases considerably during pregnancy [3]. According to Brown *et al.* [3], the risk of UTI is the highest in the third trimester of pregnancy. The prevalence of UTI during pregnancy varies between 21.1% and 71% according to the literature [4]-[6].

The few studies carried out in sub-Saharan Africa report a prevalence of 11.4% in Ethiopia [7], 28.1% in Nigeria [8] and 43.03% in Benin [9]. Overall, this seems lower than the prevalences reported in developed countries.

The most common type of urinary incontinence during pregnancy is stress incontinence [3] [6] [10]. Hormonal changes, increased intra-abdominal pressure and the pressure exerted by the uterus on the bladder and pelvic floor during pregnancy are factors that favour the development of stress urinary incontinence (SUI) [11]-[13]. In Nigeria Okunola and al found that age, body mass index, parity and vaginal delivery have been reported [14]. According to Dinç in Türkiye, SUI after delivery was related to the mother's history of SUI before pregnancy (PR 2.4) and during pregnancy (PR 2.0), as well as having undergone vaginal delivery (PR 2.0) [11].

In our daily practice, pregnant women rarely complain of UTI during prenatal consultations. To our knowledge, this is the first study of UTI in pregnant women in Burkina Faso. The aim of the present study was to determine the prevalence of UTI during pregnancy and to identify the risk factors associated with this condition in order to improve its management.

2. Methodology

We conducted a cross-sectional, analytical observational study from May 1 to August 30, 2023.

The study population consisted of all pregnant women attending antenatal consultations.

The study was multicentric and involved six public health facilities in the town of Ouahigouya. These were the Centre Social et de Promotion de Soins (CSPS) of Zoodo, Naba and Gourga, the Centres médicaux (CM) of Kapalin and Lazaret, and the gynecology-obstetrics department of the CHUR of Ouahigouya.

We included in this study all pregnant women fulfilling the following criteria:

- Pregnant women aged between 18 and 45.
- Pregnant women who consented to participate in the study.

Random sampling was used. The sample size was estimated on the basis of data published by Berhe *et al.* in Ethiopia [15], who reported a prevalence of 23% for UTI during pregnancy. Considering a precision $\alpha = 0.05$ and a study power of 90%, and using OpenEpi software, the sample size was estimated at 273 for a cross-

sectional study. To compensate for possible non-responses, the size of our sample was increased by 20% (n = 328), which increases its power.

The number of pregnant women to be surveyed in each of the six health facilities was estimated from the proportion of pregnant women who consulted for their first prenatal consultation during the year 2022.

An interview with the women and a literature review were used for data collection.

Data were entered on a microcomputer and analyzed using Statistical Package for Social Science (SPSS) version 20.0 (SPSS Inc., Chicago, IL).

Modalities of each qualitative variable were presented in terms of frequency and percentage, and quantitative variables in terms of mean, standard deviation (SD), minimum value (min) and maximum value (max). A binary logistic regression model was used to assess the association between each explanatory variable and the variable of interest.

The study was carried out with the consent of the pregnant women. Anonymity was respected.

Informed consent was obtained from the pregnant women before the interview, and the anonymity of the questionnaires was preserved.

3. Results

Of 328 women surveyed, 129 presented with urinary incontinence, representing a prevalence of 39.3% (129/328).

3.1. Socio-Demographic Characteristics

The socio-demographic characteristics of incontinent women are presented in Table 1.

Table 1. Distribution of incontinent women by socio-demographic characteristics (n = 129).

Socio-demographic characteristics	Number	Percentage
Age		
<20 years	19	14.7
[20 - 30 years]	65	50.4
[30 - 40 years]	38	29.5
≥40 ans	07	05.4
Profession		
Housewife	101	78.2
Informal sector	14	10.9
Pupil/student	09	07
Civil servant	05	03.9
Level of education		
No schooling	44	34.1
Primary	39	30.2
Secondary	45	34.9
Higher	01	0.8

3.2. Obstetrical Profile of Incontinent Women

The mean age of incontinent women at menarche was 14.6 ± 1.4 years, with extremes of 11 and 19 years. The average age of incontinent women during their first pregnancy was 18.6 ± 2 years, with extremes of 14 and 25 years. The average number of incontinent women's gestures was 3.3 ± 1.8, with extremes of 1 and 8.

Table 2 shows the distribution of incontinent women by obstetrical profile.

Table 2. Distribution of incontinent women by obstetrical profile (n = 129).

Obstetrical characteristics	Number	Percentage
Parity		
Nulliparous	25	19.4
Primiparous	25	19.4
Multiparous	79	61.2
Delivery mode		
Never delivered	17	13.2
vaginal delivery	92	71.3
Cesarean section	20	15.5
Episiotomy		
Yes	27	20.9
No	102	79.1
Pregnancy trimester		
First	14	10.9
Second	40	31
Third	75	58.1

3.3. Comorbidities and Lifestyle of Incontinent Women

Table 3 shows the distribution of incontinent women according to comorbidities and lifestyle.

3.4. Staturo-Weight Profile

The mean body mass index of incontinent women was 25.2 ± 3.2 kg/m^2, with extremes of 17.2 and 34.3 kg/m^2.

Clinical features of urinary incontinence.

The clinical characteristics of urinary incontinence are shown in Table 4.

3.5. Factors Associated with Urinary Incontinence

In univariate analysis, pregnant women aged 25 and over were 2.6 times more likely to develop UI than pregnant women under 25 (p = 0.001; OR = 2.6 [1.6; 4.1]).

The risk of UTI during pregnancy was 2.6 times higher in women with a history of chronic cough and a history of abdominal surgery, respectively (p = 0.001; OR =

Table 3. Distribution of incontinent women according to comorbidities and lifestyle (n = 129).

History and lifestyle	Number	Percentage
Diabetes		
Yes	01	0.8
No	128	99.2
Chronic cough		
Yes	03	2.3
No	126	97.7
Chronic urinary tract infection		
Yes	8	6.2
No	121	93.8
Infantile enuresis		
Yes	05	3.9
No	124	96.1
Abdominal surgery		
Yes	06	4.7
No	123	95.3
Sports		
Yes	25	19.4
No	104	80.6
Coffee		
Yes	60	46.5
No	69	53.5

Table 4. Clinical characteristics.

Clinical features	Number	Percentage
Type of urinary incontinence		
Stress urinary incontinence	71	55
Urge incontinence	31	24
Mixed urinary incontinence	27	21
Quantity of urine lost		
A few drops	55	42.6
Small quantity	66	51.2
Large quantity	08	06.2
Frequency of urine loss		
Less than once a week	07	05.4
More than once a week	101	78.3
More than once a day	21	16.3
Wearing a pad		
Yes	24	18.6
No	105	81.4
Social limitation		
Yes	77	59.7
No	52	40.3

2.6 [2.3; 3.04]) and (p = 0.003; OR = 2.6 [2.278; 3.0]).

In the case of coffee consumption, the risk is 3.9 times higher (p = 0.001; OR = 3.9 [2.4; 6.4]).

The risk is 4.3 times higher in women with a history of vaginal delivery than in those with a history of Caesarean delivery (p = 0.003; OR = 4.3 [1.7; 11.2]) and 2.6 times higher in women who had their first pregnancy before the age of 18 (p = 0.001; OR = 2.6 [1.6; 4.1]).

The risk of urinary incontinence was higher in the third trimester than in the first trimester (p = 0.026; OR = 1.732 [1.068; 2.811]).

In addition, pregnant women with a BMI greater than or equal to 25 kg/m^2 were 2 times more likely to develop UI during pregnancy (p = 0.001; OR = 2.139 [1.361; 3.360]).

But in multivariate analysis, only vaginal delivery, third trimester of pregnancy, BMI ≥ 25 and coffee consumption were associated with occurrence of UI with statistically significant differences as shown in Table 5.

Table 5. Multivariate analysis of factors associated with urinary incontinence.

Variables	P	OR	IC (95%)
Urinary infection	0.999		
Deliver mode			
Nulliparous	Ref		
Vaginal deliver	0.001	17.6	5.66; 54.97
Cesarean	0.002	5.2	1.88; 14.6
Trimester			
1st trimester	Ref		
2nd trimester	0.253	1.7	0.7; 4.2
3rd trimester	0.015	2.01	1.1; 3.5
BMI	0.006	2.09	1.2; 3.5
Coffee	0.001	4.5	2.6; 7.7

4. Discussion

Limitations and constraints of the study:

- We chose an analytical cross-sectional observational study that does not allow us to establish a cause-and-effect relationship but rather suggests a causal link between urinary incontinence and the identified factors.
- Our study was limited to only six health facilities in the city of Ouahigouya and the results may not reflect the real prevalence of UI in the city of Ouahigouya, let alone in all of Burkina Faso.
- The taboo nature of the subject, especially in our context, may lead some women to give biased answers to certain questions.
- The data collection method was based on the declaration of clinical symptoms,

without physical examination or urodynamic assessment. This could introduce biases for the diagnosis and classification of the type of UI.

The overall prevalence of UTI in pregnant women in the present study was 39.3%. This prevalence is similar to that reported by some African authors in previous studies. Houeto *et al.* [16] in Benin, Abdullah *et al.* [17] in Nigeria and Rajavuori *et al.* [18] in Finland reported a prevalence of 43.03%, 34.3% and 39.5% respectively.

On the other hand, our prevalence is significantly higher than those reported by Bekele *et al.* [7] in Ethiopia and Adaji *et al.* [19] in Nigeria, who reported a prevalence of 11.4% and 21.1% respectively. Higher prevalences were reported by Wang *et al.* [20] in China, Moossdorff-Steinhauser *et al.* [21], Mohd Yusoff *et al.* [22] in Malaysia and Barbosa *et al.* [23] in Brazil, who found a prevalence of 52%, 41%, 84.5% and 55% respectively.

Generally speaking, the prevalence of UTIs varies from one study to another, from one country to another, and within the same country from one author to another, from one year to another. Several factors may explain this difference in prevalence from one country to another, and from one study to another the nature of the population studied, sometimes with very different samples (age and sample size).

In the present study, stress UTI accounted for 55% of all types of UTI. This result is in agreement with those of Moossdorff-Steinhauser *et al.* [21] and Berhe al [15] in Ethiopia, who found 63% and 58.9% respectively.

However, other authors have found results contrary to our own. This is the case of Santini *et al.* [24] in Brazil, who reported a predominance of mixed UTI.

Our result could be explained by hormonal factors and physiological change during pregnancy, in addition to existing genetic structures [25]. A possible reason could also be an increase in intra-abdominal pressure during sneezing, coughing and laughing; as a result, internal pressure on the bladder exceeds that of urethral closure, leading to urine leakage [15].

In the present study, more than half the women (51.2%) had small drops during bladder leakage. Over 81% of women did not wear pads, and 78.3% had a frequency of urine loss of more than once a week. These different parameters show that moderate UI was the most dominant form. Nevertheless, this study showed that nearly 60% of incontinent women had a social limitation. Authors such as Hansen *et al.* [26] and Martinez *et al.* [27] reported moderate urine loss in 90 and 83.1% respectively.

The severity of UI is assessed differently in the literature. Some studies have assessed the severity of UI according to clinical characteristics (quantity and frequency of urine leakage). This is the case of Sangsawanga *et al.* [28]; others, on the other hand, have based their assessment of the severity of UI on the impact it has on the quality of life of incontinent women (psychosocial discomfort, discomfort with daily activities, discomfort with sexual activity) [29].

Risk factors for urinary incontinence during pregnancy.

Our study showed that vaginal delivery (p = 0.001; OR = 17.6) and caesarean section (p = 0.002; OR = 5.2) are strong independent risk factors for UI during pregnancy. Oliviera *et al.* [6] in Brazil reported that vaginal delivery increased the risk of UTI in pregnancy by 2.5 compared with caesarean section. Santini *et al.* [24] reported that Caesarean section increased the risk of UTI by 2.5 times in their Brazilian study.

This is because vaginal delivery causes distension of the pelvic floor ligaments. This can weaken the urethral sphincter, leading to SUI.

Wang *et al.* in China [20] reported that Caesarean section showed no protective or aggravating effect in their studies.

There is a correlation between BMI and the risk of UTI during pregnancy (p = 0.006). Pregnant women with a BMI greater than or equal to 25 kg/m^2 are 2 times more likely to develop UTI. The risk of UTI increases with a woman's weight. Other authors such as Wesnes *et al.* [30] have reported similar results.

One possible explanation is that obesity creates tension on the pelvic floor due to increased intra-abdominal pressure. This could lead to pressure on the bladder, altering blood flow and innervation to the bladder and urethra. However, Abdullah *et al.* [17] found that BMI was not significantly associated with UI during pregnancy, and had no clear explanation for this finding.

The third trimester of pregnancy is an independent risk factor for UTI (OR = 2). Our result is similar to that reported by Kok *et al.* [31]. They found no significant difference between the first and third trimesters in terms of risk of UTI. However, they did note that the risk was multiplied by 3 in the third trimester compared with the first trimester.

In fact, the possible reason could be due to the increase in uterine and fetal weight during the progression to the third trimester, thus contributing to an increase in arterial pressure on the bladder and reduced bladder capacity. This can lead to bladder weakness during pregnancy [20]. Also, the weight of the fetus and its appendages increases pressure on the bladder and pelvic floor. The combination of these factors can lead to UI in the third trimester of pregnancy [23].

On the other hand, other authors such as Kocaöz *et al.* found no correlation between trimester of pregnancy and the occurrence of UTI [4].

Coffee consumption was an independent risk factor for UTI during pregnancy (p = 0.001; OR = 4.5 [2.6; 7.7]). Some authors have reported similar results. Tingthong *et al.* in Thailand [32] found a 3-fold increase in the risk of UTI in pregnant women who consumed coffee, and Wang *et al.* [20] also reported a 1.7-fold increase. According to the latter, caffeine could contract the bladder in advance, contributing to the occurrence of UTI during pregnancy.

However, Abdullah *et al.* [17] in Malaysia concluded that there was no significant association between coffee consumption and UTI. Okunola *et al.* in Nigeria [8] also found no significant association between coffee consumption and the risk of UTI during pregnancy. Mohd Yusoff *et al.* [22] even found that coffee consumption was a protective factor against the risk of UTI during pregnancy.

In fact, caffeine is thought to have a direct effect on the smooth muscle of the bladder. It can irritate the bladder tissue and potentially cause involuntary bladder contraction. It may thus contribute to urge incontinence.

5. Conclusions

The study showed a high prevalence of urinary incontinence in pregnant women. The taboo nature of this condition masks the socio-professional embarrassment it causes, making it difficult both to determine its true prevalence and to encourage women to talk to their doctor about it. To achieve this, the presence of bladder weakness should be systematically sought during prenatal consultations.

This study identified five independent risk factors for urinary incontinence in pregnant women. These were a history of vaginal delivery, a history of caesarean section, coffee consumption, second trimester of pregnancy and body mass index. Reducing coffee consumption, one of the two modifiable risk factors in this study, could therefore reduce the risk of urinary incontinence during pregnancy.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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