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Prevalence and determinants of lower urinary tract symptoms before and during pregnancy in a cohort of Nigerian women

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ABSTRACT

Background: Pregnancy and childbirth are thought to be associated with development of lower urinary tract symptoms (LUTS). The study aimed at ascertaining prevalence rates of LUTS before and during pregnancy, the determinants and perceived effects of these symptoms on the life of the women. **Materials and Methods:** Questionnaires in which LUTS were defined according to recommendations of International Continence Society was administered on consecutive women who delivered at ≥ 37 weeks' gestation to ascertain the presence or absence of LUTS before and during pregnancy and perceived effects on their life. Data was also collected on their socio-demographic and obstetric features. Descriptive statistics and relationship between LUTS and other variables were analyzed using SPSS version 16. **Results:** Prevalence rates of LUTS before and during pregnancy were 52.9% and 89.2%, respectively, and mostly included nocturia and stress urinary incontinence. Women were more likely to develop LUTS during pregnancy ($P = 0.002$, OR 4.99, 95% CI 1.793 – 13.906). Only 14.4% and 41.7% reported any burden on their daily life before and during pregnancy, respectively. Previous vaginal delivery ($P = 0.01$, OR 3.12, 95% CI 2.91-5.62), grand-multiparity ($P = 0.04$, OR 4.15, 95% CI 3.82-7.24) were associated with LUTS prior to pregnancy while presence of LUTS before pregnancy ($P = 0.001$, OR 10.80, 95% CI 4.24-27.52), previous vaginal delivery ($P = 0.002$, OR 6.38, 95% CI 4.25-12.43) and moderate maternal obesity ($P = 0.03$, OR 2.56, 95% CI 1.82-3.47) were predictive of LUTS during pregnancy. **Conclusion:** LUTS are common among women both before and during pregnancy but most of them were not bothered by the LUTS. Those with previous vaginal delivery and are grand-multiparous are more likely to develop LUTS prior to pregnancy while the presence of LUTS before pregnancy, vaginal delivery and maternal obesity are determinants of LUTS during pregnancy.

Keywords: Determinants, lower urinary tract symptoms, pregnancy

INTRODUCTION

Lower urinary tract symptoms (LUTS) are common during pregnancy and after child birth^[1,2] and both are considered as significant factors responsible for the development of urinary incontinence among women. These LUTS which include stress urinary incontinence (SUI), urgency, urge incontinence,

nocturia, and hesitancy may impact negatively on the quality of life of women. LUTS are usually thought to result from hormonal and mechanical changes that occur during pregnancy^[3,4] or the effects of childbirth on the integrity of the pelvic floor muscles as depicted by the increase prevalence of these symptoms in women with increasing parity and previous vaginal deliveries.^[5-7] Elevated levels of estrogen and progesterone in pregnancy lead to relative hypotonia, thereby resulting in increased urinary bladder capacity.^[8] Upward and anterior displacement of the bladder has also been linked to LUTS in pregnancy. Childbirth may lead to damage to the fascia, ligaments and muscles of the pelvic floor as well as injury to the pudendal nerve and so predispose to onset of LUTS in women.^[9,10]

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The prevalence of these LUTS before and during pregnancy varies and depends on the definition used, the study population and the study design. The degree of LUTS especially urinary incontinence worsens with increasing gestational age and accidental loss of urine is reported by 17-25% of women in early pregnancy and increases to 36-67% in late pregnancy.^[11] Several factors have been linked with the onset of LUTS in pregnancy and after delivery. Obstetric factors implicated include previous vaginal delivery, increasing parity, exposure to oxytocics, instrumental vaginal delivery, and fetal macrosomia.^[9,12,13] Other factors associated with increase prevalence of LUTS are maternal obesity as reflected by high body mass index (BMI) and increasing maternal age.^[14,15]

LUTS especially stress or urge urinary incontinence is associated with psychological morbidity and adverse effects on the quality of life of women.^[16] However, few women seek medical assistance for these complaints with only about 25% of symptomatic women doing so,^[17] probably because of embarrassment of discussing such symptoms with their family members and health workers.

LUTS impact the daily life of affected individuals. There is scarcity of information about the prevalence rates and risk factors of urinary incontinence and other urological symptoms before and during pregnancy as well as their perceived impact on women's quality of life in Jos, North-central Nigeria. This study aimed at determining the magnitude of LUTS among women at Bingham University Teaching Hospital, Jos by ascertaining the prevalence and determinants of LUTS as well as their impacts on the quality of life among this cohort of Nigerian women.

MATERIALS AND METHODS

This was a cross-sectional study of women with singleton pregnancy who delivered at ≥ 37 weeks' gestation from January to June 2012 in Bingham University Teaching Hospital, Jos. Recruitment of the women at term was to ensure uniformity as onset of LUTS peak during the third trimester and increases with gestational age. Consecutive eligible women were recruited before discharge from the hospital after delivery. Women with diabetes mellitus, previous vesico-vaginal fistula repair, cardio-respiratory and renal diseases were excluded from the study. Verbal consent was obtained from the subjects before participation in the study.

Interviewer administered questionnaire was used to collect information from the women by a trained nursing staff on the first or second day postpartum in the postnatal ward to ascertain the presence of LUTS. Enquiry was made about the occurrence of these urinary symptoms prior to and during the pregnancy. The LUTS questionnaire developed by Liang *et al.*,^[18] where LUTS were defined according to the International Continence Society^[19] was used for the study. The women were also asked whether the symptoms impacted negatively in their quality of life and this was devised and graded by the researchers as "none" (No negative effect), "slight" (Occasional wetting of underwear but no discomfort), "moderate (Discomfort resulting from wetting of underwear)" and "severe" (Need to change underwear)".

The questionnaire consisted of eight questions that described SUI, frequency, urge incontinence, nocturia, urgency, incomplete emptying, voiding difficulties, and straining. Responses to the questions were dichotomous as "yes" or "No". In addition, questions regarding their demographic data and obstetric features were asked for each patient and their height and weight were also taken to ascertain their body mass index (BMI). It took approximately 15 minutes to complete each questionnaire.

The data were analyzed using SPSS version 16 for windows (SPSS Inc., Chicago, IL, USA). Continuous variables are presented as Mean values \pm standard deviation (SD) while categorical ones are presented as percentages. The prevalence rates of the various LUTS before and during pregnancy were also determined. Risk factors for onset of LUTS before and during pregnancy among the women were ascertained. Probability values < 0.05 were considered as statistically significant. Ethical clearance for the study was obtained from the Human Research and Ethics committee of Bingham University Teaching Hospital, Jos.

RESULTS

During the period of study, 459 women who delivered at ≥ 37 weeks of gestation were approached to participate in the study but 13 of them declined giving a response rate of 97.2%. The average gestational age at delivery was 38.5 ± 1.2 weeks (range 37-42 weeks). The parity range of the women before delivery was 0-8 with average of 1.2 ± 1.5 deliveries. The women ages ranged between 17-42 years and a mean of 29.8 ± 4.9 years. The average weight and height of the women were 79.3 ± 1.4 Kg and 1.61 (standard deviation) meters respectively with

a mean body mass index (BMI) of 30.6 ± 4.9 kg/m². Table 1 shows the socio-demographic characteristics of the 466 women.

The prevalence rates of all the LUTS increased during pregnancy 398 (89.2%) compared to the pre-pregnancy period 236 (52.9%). During pregnancy, women were five times more likely to develop LUTS compared to the pre-pregnancy period ($P = 0.002$, OR 4.99, 95% CI 1.793-13.906). The most common LUTS reported among the women before and during pregnancy was nocturia (38.6% versus 77.6%). Most of the LUTS including SUI, frequency, nocturia, urge incontinence and incomplete emptying were significantly higher in frequency during pregnancy than prior to pregnancy ($P < 0.05$).

Also, women that had mild urinary incontinence before pregnancy were more likely to develop severe SUI during pregnancy compared to those that had no prior SUI ($P < 0.001$, OR 4.47, 95% CI 2.087-9.574). The prevalence rates of the various LUTS before and during pregnancy are shown in Table 2.

Women who reported LUTS prior to and during pregnancy were enquired separately about the perceived effect of the LUTS on their daily life. Only 14.4% of them reported any burden in their daily life before pregnancy while 41.7% reported burden of LUTS in their life during pregnancy. Table 3 shows the perceived burden or effects of LUTS before and during pregnancy among the women.

Previous history of vaginal delivery ($P = 0.01$, OR 3.12, 95% CI 2.91-5.62) and grand-multiparity ($P = 0.04$, OR 4.15, 95% CI 3.82-7.24) were predictive of onset of LUTS before pregnancy while presence of LUTS before pregnancy ($P = 0.001$, OR 10.80, 95% CI 4.24-27.52), previous vaginal delivery ($P = 0.002$, OR 6.38, 95% CI 4.25-12.43) and moderate maternal obesity ($P = 0.03$, OR 2.56, 95% CI 1.82-3.47) were associated with the development of LUTS during pregnancy [Table 4].

DISCUSSION

Our study found prevalence rates of LUTS of 52.9% and 89.2% among the women before and during pregnancy, respectively. This prevalence rate prior to pregnancy is higher than a reported rate of 44.4% among gynecological patients in Pakistan.^[20] However, the rate during pregnancy is comparable to 94.1% reported from Zaria, Nigeria,^[21] higher than 42.6%, 24.2% and

Table 1: Socio-demographic characteristics of the study population

Characteristics	Frequency	Percentage
Age (years)		
≤20	18	4.0
21-25	60	13.4
26-30	176	39.5
31-35	126	28.3
>35	66	14.8
Total	446	100.0
Parity		
0	160	35.9
1-4	262	58.7
≥5	24	5.4
Total	446	100.0
Weight (kg)		
≤50	4	0.9
51-70	106	23.8
71-90	254	56.9
91-110	62	13.9
111-130	8	1.8
>130	12	2.7
Total	446	100.0
Height (meters)		
≤1.50	28	6.3
1.51-1.60	196	43.9
1.61-1.70	196	43.9
1.71-1.80	26	5.8
Total	446	100.0
Body mass index (kg/m ²)		
≤24.9	46	10.3
25-29.9	156	35.0
30-34.9	164	36.8
≥35	80	17.9
Total	446	100.0

Table 2: Prevalence rates of LUTS before and during pregnancy

LUTS	N=446 (%)	
	Frequency before pregnancy	Frequency during pregnancy
Stress Urinary incontinence		
*Mild SUI	68 (15.2)	170 (38.1)
*Severe SUI	72 (16.1)	112 (25.1)
Frequency	78 (17.5)	172 (38.6)
Nocturia	172 (38.6)	346 (77.6)
Urgency	44 (9.9)	140 (31.4)
Urge incontinence	56 (12.6)	100 (22.4)
Incomplete emptying	40 (9.0)	110 (24.7)
Voiding difficulty	22 (4.9)	28 (6.3)
Straining	14 (3.1)	36 (8.1)

**Some women reported multiple LUTS, SUI: Stress Urinary incontinence, LUTS: Lower urinary tract symptoms

Table 3: Perceived effects of LUTS on the daily life of the study population

Perceived effects	Before pregnancy (%) N=236	During pregnancy (%) N=398
None	202 (85.6)	232 (58.3)
Slight	24 (10.2)	138 (34.7)
Moderate	10 (4.2)	24 (6.0)
Severe	0 (0.0)	4 (1.0)

LUTS: Lower urinary tract symptoms

Table 4: Risk factors influencing onset of LUTS before and during pregnancy

Risk factors	Before pregnancy			During pregnancy		
	P values	OR	95% CI	P values	OR	95% CI
Age (>35 years)	0.92	1.04	0.53-2.05	0.16	0.50	0.93-1.30
Grand-multiparity	0.04	4.15	3.82-7.24	0.78	0.88	0.36-2.16
Previous vaginal delivery	0.01	3.12	2.91-5.62	0.002	6.38	4.25-12.43
BMI (≥ 35 kg/m ²)	0.27	0.67	0.33-1.37	0.03	2.56	1.82-3.47
Presence of LUTS before pregnancy				0.001	10.80	4.24-27.52

LUTS: Lower urinary tract symptoms, BMI: Body mass index, OR: Odds ratio, CI: Confidence interval

63.8% reported among pregnant women respectively in Pakistan, Netherlands and Brazil.^[22-24] Higher prevalence rate of LUTS noted during pregnancy in this study may be attributable to pregnancy and childbirth as they are associated with onset of urinary incontinence and other LUTS and pregnancy is a recognizable risk factor for the development of these symptoms after delivery.^[25,26]

The differences in rates of prevalence of LUTS may be ascribed to variation in definitions used for LUTS and the obstetric populations. This was evidenced in the study from Zaria where majority of women were multiparous and used questionnaires developed by International Consultation on Incontinence Questionnaire on Female Lower Urinary Tract Symptoms (ICIQ-FLUTS)^[21] and the research by Van Brummen *et al.* in the Netherlands where urogenital distress inventory (UDI) was used to assess impacts of LUTS.^[23]

However, nocturia, SUI, frequency and urgency were the most common LUTS reported both before and during pregnancy in the current study and this is in agreement with findings from other studies.^[1,21,27] Consistent with previous reports, these symptoms were significantly more prevalent during pregnancy.^[25,27]

We observed that nocturia was the commonest LUTS during pregnancy (77.6%) and this concurs with the findings from Zaria, Nigeria (94.1%) and New Delhi, India (72.9%)^[21,25] but in contrast to the most common finding of SUI (45%) in Irbid, Jordan.^[28] The variation in prevalence rates of nocturia may be due to differences in definitions adopted and the gestational ages at which the studies were conducted. The gestational ages at which the studies were done vary as they were carried out among pregnant women at different trimesters of

pregnancy.^[21,28] SUI was the second most common LUTS both before and during pregnancy and women with mild SUI prior to pregnancy were more likely to develop severe SUI during pregnancy. The reported prevalence of SUI in pregnancy is higher than 26.5% from Zaria, Nigeria,^[21] but comparable to previous findings that ranged between 31% and 59%.^[6,14,26]

However, the prevalence of increased urinary frequency during pregnancy was considerably higher than the report from Zaria (17.6%)^[21] but lower than 40.3% and 74.0% reported among pregnant women in Taiwan and Netherlands, respectively.^[27,29] Another storage phase symptom in this study was urinary urgency, detected in 22.4% of the women during pregnancy. This is similar to the finding of 22.9% by Chaliha *et al.*,^[30] but lower than 62.0% reported by Cutner *et al.*^[31]

Despite the relatively high prevalence of most LUTS before and during pregnancy among the women, they seemed to have no negative impact on their daily life both before and during pregnancy. About 41.7% of the study population nonetheless reported negative impact of LUTS on their lives. Only 1% of these women reported severe negative effects on their lives which is in contrast to report by Yamazaki who discovered that about 6.3% of his subjects had severe negative effects on their lives.^[32] This low proportion of self-reported negative effect of LUTS in pregnancy may not be unrelated to the believe that LUTS are normal during pregnancy and after childbirth^[21,33]

In our study, we observed that grand-multiparity and history of previous vaginal delivery were risk factors for the development of LUTS before pregnancy while presence of LUTS before pregnancy, history of vaginal delivery and moderate maternal obesity were predictive of LUTS in pregnancy. Maternal age did not influence the onset of LUTS before and during pregnancy in this study. The risk factors noted before pregnancy were also seen among women in Saudi Arabia but unlike in our study, maternal age positively influenced the onset of LUTS among the Saudi women.^[33] Similarly, maternal age has been found to influence the development of LUTS during pregnancy contrary to the findings in this study.^[15,23,25] This may not be unconnected to the fact that pregnancy itself is a risk factor as seen in the current and other studies.^[25,26,34]

Maternal obesity and history of previous vaginal delivery are known risk factors for the development of LUTS during pregnancy and these findings are

consistent with other reports.^[14,35,36] Previous vaginal delivery affects the integrity and nervous supply of the pelvic floor while obesity predisposes to increase intra-abdominal pressure which can lead to onset of LUTS in pregnancy.

The limitations of this study include recall bias which might affect the prevalence rates of LUTS particularly before pregnancy. LUTS were not confirmed by objective measures such as urodynamic studies and pad tests. The use of standardized tool for LUTS (international Continence Society) makes our findings suitable for comparison with reports from different clinical settings.

In conclusion, though the prevalence of LUTS was relatively high both prior to and during pregnancy in this cohort of Nigerian women, most of them seemed to have no self-reported negative impact. Our data illustrate the magnitude of these morbidities and the need for appropriate healthcare in the study population.

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