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An Observational Study of Identifying Risk Factor Associated with Lower Urinary Tract Symptoms Among Pregnant Women

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Abstract

Introduction: Many women experience lower urinary tract symptoms during pregnancy, which can be distressing and disabling. The prevalence of these symptoms varies widely depending on the terminologies and definitions used in relation to lower urinary tract complaints, as well as the study population and design.

Methods: This observational study was conducted in Department of Obstetrics & Gynecology, in a tertiary care institute located in central India, over a period of 12 months.300 patients who having lower urinary tract symptoms were studied to asses or identified risk factor for LUTS. Data was studied and statistically analyzed.

Results: The prevalence of storage symptoms was more than those of urinary incontinence (UI) and voiding symptoms. Among LUTS, Frequent urination and Pain/ discomfort in lower abdomen were the most common symptom ranging from mild to severe reported by 96%(288) and 94.6%(284) subjects respectively. Leakage related to physical activity (stress) was reported by 56.66% whereas leakage of few drops on cough, sneezing was reported by 40% subject showing stress predominant incontinence in pregnant women. The total median scores from the UDI-6 increased with gestational week, and statistical significant difference was identified ($p<0.05$). According to the results of the linear regression analysis, daily coffee consumption, smoking, multiparity, mode of delivery, high BMI, maternal age, were found to be significant associated with the mean score of UDI-6 in pregnant women.

Conclusions: LUTS were found to be common among pregnant adolescents, with storage symptoms being the most frequently reported. Education and awareness should be raised about LUTS in pregnant women, allowing proper evaluation and counselling for this complain.

Keywords: Lower urinary tract symptoms (LUTS)

Introduction

Lower urinary tract symptoms (LUTS) are defined from the pregnant women's perspective and can occur during

storage, voiding, and post-micturition. These symptoms may also manifest in relation to sexual intercourse, pelvic organ prolapse, or as lower urinary tract pains and LUTD syndromes.[1]

Adaptations during the gestational period, including hormonal and mechanical changes, can adversely affect the lower urinary tract, leading to the onset of urinary symptoms and urinary incontinence (UI) in women of childbearing age.[2] Several factors can exacerbate such symptoms, including advanced maternal age, smoking, number of pregnancies and births, mode of delivery, obesity, constipation, mechanical bladder compression, increased levels of relax in hormone, reduced urethral resistance, and pelvic floor muscle dysfunction, among others .[3]

During pregnancy, the prevalence of urinary incontinence (UI) ranges from 18.6 to 75.0% and tends to increase as pregnancy progresses, particularly from the second trimester onwards.[4] Stress urinary incontinence (SUI) is the most common type, affecting approximately 31% of nulliparas and 42% of multiparas.[5]. Besides UI, other urinary symptoms are also common during pregnancy, including nocturia, pollakiuria, urge incontinence (UUI), dysuria, and a sensation of incomplete emptying. Pregnancy is identified as one of the main risk factors for the development of these symptoms, with women experiencing more complaints of SUI, nocturia, and pollakiuria compared to nulliparous women.[6]

Despite the prevalence of lower urinary tract symptoms (LUTS) during pregnancy, there has been limited quantification and characterization of such symptoms. Even in countries where studies have been conducted, concerns have arisen regarding the consistency and standardization of methodologies, particularly regarding the use of questionnaires. Additionally, the absence of uniform guidelines for conducting these studies complicates comparisons across regions and populations. This lack of standardization hampers the development of comprehensive insights into the prevalence, severity, and impact of LUTS during pregnancy, impeding the development of effective interventions and support mechanisms. Addressing these methodological and standardization issues is crucial for advancing research in this area and improving the management of urinary symptoms in pregnant women.

Materials and Methods

Study design: This study was Hospital based observational study done in Department of obstetrics and gynaecology, SMS medical college Jaipur.

Duration of study: The period of study was from November 2022 to November 2023 (after taking the approval from institutional review board of ethical committee).

Sample Size: Sample size was calculated as 80% study power and α error 0.05% assuming standard deviation 31.4 in pain or discomfort in lower abdomen, pelvic, genital area, case as found in seed article. For minimal detectable mean difference of 38 in pain or discomfort in lower abdomen and pelvic region and genital each group, 30 pregnant women as sample size making total of 120 with expecting 10% drop off, lost to follow up making it 132 which is further rounded to minimum 150 total pregnant women and 300 as final sample size at present study.

Study universe: all pregnant women attending the antenatal out pregnant women department

Study population: 300 pregnant females who had complain of lower urinary tract symptoms and seeking antenatal care and who were willing to be enrolled in the study after applying inclusion and exclusion criteria and obtaining informed consent.

Inclusion Criteria

All pregnant women who had lower urinary tract symptoms.

- Who were in age group between 18 and 40 years
- Willing to participate in study and given written and informed consent.
- Women not participating in other study.
- Were able to understand the tools for the study.

Exclusion Criteria

- Women who had a verbal communication problem and complete loss of hearing.
- Women with past history of urological or pelvic organ prolapse surgery
- Women having any psychiatric illness or medication.

Methodology

This was an interview based cross-sectional study conducted at antenatal out pregnant women clinics of the SMS Jaipur. All female pregnant women full filling the eligibility criteria who came with complain of lower urinary tract symptoms was enrolled in the study. The purpose of the study was explained to the pregnant women and informed consent was taken according to the study performa. In obstrical history number of children, mode of delivery (normal\instrumental delivery), and birth weight of previous heaviest child was taken as these factor may be associated with incidence of LUTS. Pregnant women with acute urinary infection, neurological disease and having past history of urological or pelvic organ prolapse surgery were excluded from this study. Permission for use of UDI-6 questionnaires was taken and the purpose of use of questionnaire was explained to all of them.

Data instrument will have 3 parts

Socio demographic: Age, marital status, socioeconomic status, education, occupation, religion.

Clinical Characterstics: Self-reported history, obstetrics history, height, weight, BMI, medical and surgical history detailed systemic and local examination was done as per the protocol. All pregnant women had urine complete and microscopic examination and blood sugar estimation. After requirement for urine culture and sensitivity was done.

Urogenital Distresss Inventory 6: UDI-6 is a short version of a condition-specific quality of life instrument— UDI, and was introduced in 1994. Presently, due to its feasibility, UDI-6 is much more often used than its longer version. UDI-6 was designed to assess the severity of urinary distress symptoms based on the level of discomfort experienced during the past month.UDI-6 contains six questions that cover three areas: irritative symptoms (items one and two), stress symptoms (items three and four), and obstructive or discomfort symptoms (items five and six). UDI-6 level of validation according to ICI grades is A. UDI-6 consists of 6 items: 1— Frequent urination, 2—Leakage related to feeling of urgency, 3— Leakage related to activity, 4—Coughing, or sneezing small amounts of leakage (drops), 5—Difficulty emptying the bladder, and 6—Pain or discomfort in the lower abdominal or genital area.

Obstructive or discomfort symptoms (items five and six). Participants answer each section by choosing one of four options: Greatly, moderately, a little bit, and not at all. Each answer received a number of points between zero and three, with greatly ‘receiving three points and not at all receiving zero points. Maximum raw score in it was 18, final score was calculate by dividing raw score from 6 multiplied by 100. Total score was from 0 to 100. Higher scores in UDI-6 indicate higher disability.

Result and Discussion

Table 1: Prevalance of Luts in Among Pregnant Women

Parameter	Not at all	Little Bit	Moderate	Greatly
	No. of Cases	No. of Cases	No. of Cases	No. of Cases
Frequent Urination	12(4%)	100(33.33%)	144(48%)	44(14.67%)
Urgency	160(53.33%)	60(20%)	44(14.67%)	36(12%)
Stress	136(45.33%)	84(28%)	54(18%)	26(8.67%)
Small amount of urine leakage	180(60%)	20(6.67%)	44(14.67%)	56(18.67%)
Difficulty emptying your bladder	150(50%)	100(33.33%)	20(6.67%)	30(10%)
Pain & Discomfort in lower abdomen or genital	16(5.3%)	152(50.6%)	78(26.0%)	54(18%)

Table1: shows the prevalence and severity of urinary symptoms reported using UDI-6 Schedule. Among the symptoms, frequent urination affected 14.67 % greatly a, 48% moderately, 33.33 % little bit and only 4 % not at all. Urgency was varied, with 53.33%(160) pregnant women not experiencing it at all, 20% reporting it a little bit, 14.67% experiencing moderate urgency, and 12% reporting it greatly. Stress-related symptoms 45.33% pregnant women reporting none at all, 28% a little bit,18% moderately, and 8.67%greatly. Leakage of small amounts of urine was most commonly reported not at all by 60% pregnant women, a little bit by 6.67%, moderately by14.67%, and greatly by 18.67%. Difficulty emptying the bladder was experienced by 50% pregnant women not at all, a little bit by 33.33%), moderately by 6.67%, and greatly by 10%. Finally, pain and discomfort in the lower abdomen or genital area was reported by 10% pregnant women not at all, a little bit by 55.33%, moderately by 26.67%, and greatly by 18%.

Graph 1:

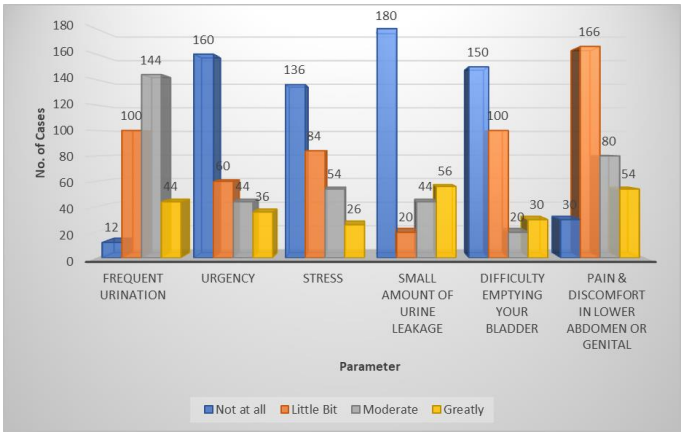

Table 2: Socio-Demographic and Obstetric Characteristic of Pregnant Women as Risk Factor for Luts:

	Category	No. of pregnant women	percentage	mean	UDI-6 mean score	p-value
Age distribution	<30yrs	260	86.67%	26.6yrs	27.34	0.01
	>30yrs	40	13.33%		29.61	
education	educated	264	88%		27.88	0.61
	uneducated	36	12%		28.28	
occupation	housewives	226	24.6%		27.26	0.3
	employed	74	75.33%		28.14	

socioeconomic status	Lower Class	92	30.67%		30.3	0.02
	Lower Middle Class	92	30.67%		30	
	Middle Class	18	6%		29.56	
	Upper Middle Class	6	2%		26.79	
	Upper Class	92	30.67%		26.14	
religion	hindu	120	40		27.92	0.002
	muslim	170	56.67		28.07	
	sikh	10	3.33%		25.28	
BMI(Kg/m2)	<18.5	22	7.33%	26.39±4.03	26.64	0.19
	18.5-24.9	212	70.67%		27.56	
	>25	66	22%		28.13	
parity	nullipara	124	41.33%		22.1	<0.0001
	Primipara	120	40.00%		31.71	
	Multipara	56	18.66%		31.9	
Trimester	First Trimester	20	6.67%	7.40±2.47	25.32	<0.0001
	Second Trimester	56	18.67%		28.61	
	Third Trimester	224	74.67%		31.64	
Mode of delivery	LSCS	42	14%		27.91	<0.0001
	Normal Vaginal Delivery	136	45.33%		33.76	
	Not Available	122	40.67%			

Observation

Demographic Data

In the present study, the mean age of the participants was 26.39 years. Women younger than 30 years had a mean UDI-6 score of 27.34, while those aged 30 years and older had a higher mean UDI-6 score of 29.61. The p-value of 0.01 indicates a statistically significant difference in UDI-6 scores between these age groups, suggesting that age may influence urogenital distress symptoms.

Saffarini J H et al [7] also demonstrated an association between the severity of urinary distress symptoms (UDI-6 score) and the pregnant woman's age. This finding aligns with existing literature showing that urinary incontinence and LUTS are more common in older women [L27,28].

In our patient population, 94 individuals had completed graduation, 86 had secondary education, 70 had primary education, 14 had matriculated, and 36 were uneducated. While occupational status did not significantly impact urogenital distress levels measured by the UDI-6, patients in lower socio-economic classes reported higher levels of urogenital distress compared to those in higher socio-economic classes.

Similarly, Ahmad Q T et al [9] found a mean age of 26.9 years in their study group, with the majority of

participants educated to a university level (71.2%). Most subjects were housewives (77.8%) and lived in moderate-income households (48%). Participants with higher socioeconomic status had a better QoL score, which is consistent with findings from other studies showing a significant association between socioeconomic status and urinary incontinence. This cohort was more likely to seek medical advice and treatment in earlier stages [A41].

Rett M T et al [8] found that age, body mass index (BMI), and the number of vaginal deliveries were significantly higher in G2 than in G1.

Prevelence of Luts

Cutner et al. found that 62% of pregnant women experienced urgency, and 18% experienced urge incontinence. Another study of 519 nulliparous women found that urgency was reported by 2.2% before pregnancy, 22.9% during pregnancy, and 7.8% at 12 weeks postpartum. Urge incontinence was reported by 0.5% before pregnancy, 8.0% during pregnancy, and 2.2% at 12 weeks postpartum. These symptoms are thought to be caused by detrusor instability and poor bladder compliance during pregnancy, likely due to elevated progesterone levels [O15].

Education Status

The majority of pregnant women in this study were educated (88%), but LUTS prevalence was higher among uneducated women. This may be because the study was based on self-reported schedules.

LUTS is a developing concept in urology, encompassing various urological issues such as lower urinary tract infections and idiopathic overactive bladder symptoms. This trend is also observed in pregnant women, especially since those with higher incomes have better access to primary healthcare, enabling prompt treatment of LUTS and any underlying conditions.

BMI

In this study, the majority of participants, 212 patients, fell within the healthy weight range (BMI 18.5 to 24.9 kg/m²). Sixty-six patients were classified as overweight (BMI 25 to 29.9 kg/m²), and 22 were underweight (BMI below 18.5 kg/m²). The mean BMI for the group was 26.39 kg/m². The UDI-6, which measures urogenital distress, showed mean scores of 26.64 for underweight individuals, 27.56 for those with a healthy BMI, and 28.13 for overweight individuals. A p-value of 0.19 indicates no statistically significant difference in UDI-6 scores across these BMI categories, suggesting that BMI does not significantly impact urogenital distress levels in this sample.

Parity

In this study, nulliparous individuals (those who have not given birth) had the lowest mean UDI-6 score at 22.78. Primiparous (first-time mothers) and multiparous (multiple births) individuals exhibited significantly higher scores of 31.71 and 31.9, respectively. The statistical analysis revealed a highly significant p-value of less than 0.0001, indicating a substantial and statistically significant difference in mean UDI-6 scores across these parity categories. This suggests that parity status is strongly associated with urogenital distress levels, with higher scores observed among those who have given birth compared to those who haven't.

Multiparity is a significant factor contributing to LUTS and incontinence, as supported by Saffarini et al. [7]. This may be due to the higher incontinence rate related to weakened pelvic floor muscles in multiparous women.

Mode of Delivery

In this study, individuals who underwent Lower Segment Cesarean Section (LSCS) had a mean UDI-6 score of 27.91, whereas those who had a normal vaginal delivery reported a significantly higher mean score of 33.76. The

statistical analysis revealed a highly significant p-value of less than 0.0001, indicating a substantial and statistically significant difference in mean UDI-6 scores between these two delivery methods. This suggests that the mode of delivery significantly influences urogenital distress levels, with higher scores observed among those who had normal vaginal deliveries compared to those who underwent LSCS.

Duration of Amenorrhoea

In this study, individuals who experienced amenorrhoea since the first trimester had a mean UDI-6 score of 25.32, those with amenorrhoea since the second trimester had a score of 28.61, and those with amenorrhoea since the third trimester reported the highest mean score of 31.64. The statistical analysis revealed a highly significant p-value of less than 0.0001, indicating a substantial and statistically significant difference in mean UDI-6 scores across these amenorrhoea categories.

Conclusion

In this study, pregnant women who were older, Muslim, illiterate, of low socioeconomic status, in the overweight BMI group, and housewives were more likely to have LUTS. Frequent urination and pain/discomfort in the lower abdomen were the most prevalent symptoms. The total mean score on the UDI-6, which measures the impact of urological disorders on daily living. Addressing LUTS in pregnant women is crucial for enhancing their quality of life, and comprehensive care approaches should be integrated into prenatal care routines to achieve this goal, emphasizing the need for attention to these symptoms and their management during pregnancy.

Pelvic floor muscle exercises should be emphasized post-pregnancy, and education should be provided to all childbearing women regarding this to prevent the LUTS.

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