

Recurrent Urinary Tract Infection in Pregnancy Clinical Presentation and Feto-Maternal Outcome

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Abstract

There is a gap in substantial evidence regarding the increased likelihood of adverse outcomes associated with frequency of urinary tract infections (UTI) in pregnancy in our country. A cross-sectional study was conducted in the Department of Obstetrics & Gynaecology, BGB Hospital, Satkania, Chattogram, Bangladesh, from February 2023 to January 2024, to observe the maternal and fetal outcomes between respondents with single and recurrent episode of UTIs during their pregnancies. A total of 100 randomly selected women aged between 18 and 38 years having UTI during their pregnancy were enrolled in this study. Recurrent episode of UTI was observed in 38% cases. Urban women were more prevalent with the recurrence. Gestational diabetes (GDM), anaemia, cystitis were more commonly observed in recurrent UTI group. Higher proportions of preterm labor, preterm birth, low birth weight (LBW), neonatal sepsis, prematurity, intrauterine growth restriction (IUGR), and neonatal intensive care unit (NICU) admissions were evident more in recurrent UTI group compared to single episode of UTI group. Recurrence of UTI in pregnancy requires further evaluation for its risk factors during antenatal visits.

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Introduction

The worldwide prevalence of pregnancy related urinary tract infections (UTIs) stands at 23.9%.¹ During pregnancy, it constitutes 10% of all hospital admissions.² UTIs in pregnancy, especially when recurrent, further signifies the clinical concern due to their association with maternal discomfort, complications, and adverse fetal outcomes. UTIs are frequently encountered in women overall, and especially prevalent among pregnant women.³ Recurrent UTI is characterized by the incident of two or more episodes of infection throughout pregnancy, affecting approximately 4-5% of pregnancies.^{4,5} Failure to treat asymptomatic bacteriuria during pregnancy leads to a subsequent UTI rate of approximately 25%.⁶ Recurrent UTIs in pregnancy pose an additional challenge due to the potential development of antibiotic resistance. Frequent use of antibiotics to treat UTIs increases the risk of developing resistant bacterial strains, complicating treatment and

potentially limiting effective therapeutic options.⁷ Anatomical changes in the urinary tract, hormonal fluctuations, altered immune function, and comorbidities, increase risk of recurrent UTIs during pregnancy. Additionally, behavioral factors such as inadequate hydration and poor hygiene practices may exacerbate the risk of recurrent UTIs in pregnant women. UTI stands among the most prevalent bacterial infections in prenatal period, posing potential risks to both maternal

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health and fetal development. Certain global recommendations advise the screening as well as management of antenatal asymptomatic bacteriuria (ASB) as a preventive measure against UTIs and potential adverse pregnancy outcomes.⁸ These recommendations are not established in our country, which exposes pregnant cases in higher risks of UTI related maternal and fetal consequences. Moreover, despite the high prevalence, there remains a lack in evidence in the literature regarding the impact of recurrent UTIs on pregnancy outcomes compared to single episodes. Therefore, the present study aims to investigate and compare maternal and fetal outcomes among pregnant women with single versus recurrent episodes of UTI.

Methods

This cross-sectional study was conducted in the Department of Obstetrics & Gynaecology, BGB Hospital, Satkania, Chattogram, from February 2023 to January 2024. Eligibility screening for enrollment include- women aged 18 to 38 years, who were admitted to the Gynae Department for prenatal care and delivery and have history of UTI during their pregnancy period. Exclusion criteria encompassed pregnant women with pre-existing medical conditions, which can impact the maternal or fetal outcome (chronic conditions like, diabetes mellitus, chronic hypertension, connective tissue disorders, etc.). Additionally, patients with incomplete medical records and investigation reports were also excluded. 100 cases diagnosed with UTI was chosen utilizing a random sampling technique. UTI diagnoses were confirmed through urine routine and microscopic examination. Women who had completed regular antenatal checkups (WHO recommended

8 schedules)⁹ and undergone routine urine examinations were selected as the sampling frame for this study. This approach was aimed at including participants who had been consistently monitored for urinary tract infection (UTI) during their pregnancy. By focusing on this subset of women, the impact of diagnosed UTIs on clinical presentation and pregnancy outcomes could be better assessed, while cases where UTI may have been present but remained undiagnosed due to irregular monitoring or missed examinations were excluded.

A single episode of UTI was defined as the occurrence of single episode of urinary tract infection confirmed by routine and microscopic examination of urine. A recurrent episode of UTI was defined as the occurrence of urinary tract infection two times or more, confirmed by routine and microscopic examination of urine.¹⁰

Face-to-face interview was conducted to collect data. Additionally, medical records and investigation reports of the patients were assessed retrospectively. Demographic information, clinical presentation, UTI diagnosis, maternal and fetal outcomes were assessed and compared among the group of respondents who had single episode of UTI during their pregnancy with the group of respondents who had multiple episodes of UTI. All data were analyzed using IBM-SPSS software version 25.0. Descriptive statistics were employed to outline demographic as well as clinical features. Bivariate analysis (chi-square test, t-test) was conducted to compare maternal and fetal outcomes between the groups with single versus multiple episodes of UTI. Statistical significance was determined when the p-value was 0.05 or less. Approval for the study was obtained from the Institutional Review

Committee of the BGB Hospital, Satkania, Chattogram, Bangladesh.

Results

In this study, among 100 pregnancy UTI cases, single episode of UTI was found in 62% cases, while recurrent episode of UTI was observed in 38% cases (34% cases with 2 episodes and 4% cases with more than 2 episodes of UTI). The mean age of the respondents was 26.34 ± 4.24 years in the group with single episode of UTI, while it was 25.74 ± 3.24 years in women with recurrent UTI. The difference in age among two groups was not statistically significant ($p > 0.05$). Recurrent UTI was significantly more common among urban women than that of rural women ($p < 0.05$) (Table-I). Among symptoms of UTI among the groups showed that, frequency of urination, dysuria and loin pain were recorded

significantly higher in proportion in the group of respondents with recurrent UTI than the group of respondents with single episodes of UTI ($p < 0.05$). Asymptomatic cases were significantly lower in proportion in the group of respondents with recurrent episodes of UTI (5.26%) than the group of respondents with single episode of UTI (41.94%). Gestational diabetes (GDM) and pregnancy induced hypertension (PIH) was evident among 12.90% and 1.61% of the single episode of UTI cases and 31.58% and 7.89% of the recurrent UTI cases respectively. GDM was significantly more evident in recurrent UTI cases ($p < 0.05$). The BMI of the respondents were not statistically different among the groups ($p > 0.05$). Proportion of respondents with anemia and cystitis were significantly higher among the recurrent UTI cases ($p < 0.05$) (Table-II).

Table-I: Sociodemographic characteristics of the participants (N=100)

Variables		Single UTI (n=62)		Recurrent UTI (n=38)		p-value
		Frequency	Percentage	Frequency	Percentage	
Age (Mean \pm SD in years)		26.34 \pm 4.24		25.74 \pm 3.24		>0.05 ^a
Residence	Urban	16	25.81	20	52.63	<0.05 ^b
	Rural	46	74.19	18	47.37	

a denotes, p-value reached from independent sample test; b denotes, p-value reached from Chi square test after adjusting with Fisher's exact.

Table-II: Frequency of UTI episodes in relation to clinical presentation of the sample (N=100)

Variables		Single UTI (n=62)		Recurrent UTI (n=38)		p-value
		Frequency	Percentage	Frequency	Percentage	
Symptoms of UTI	Frequency	34	54.84	34	89.47	<0.05
	Urgency	21	33.87	17	44.74	>0.05
	Dysuria	20	32.26	25	65.79	<0.05
	Loin pain	14	22.58	20	52.63	<0.05
	Fever	4	6.45	6	15.79	>0.05
	Asymptomatic	26	41.94	2	5.26	<0.001
Comorbidities	GDM	8	12.90	12	31.58	<0.05
	PIH	1	1.61	3	7.89	>0.05
Parity	Primi	19	30.60	9	23.70	>0.05
	Multi	43	69.40	29	76.30	
BMI (kg/m ²)		25.09	3.69	24.47	3.87	>0.05
Anemia		14	22.58	22	57.89	<0.001
Cystitis		2	3.23	7	18.42	<0.05

p-value reached from Chi square test after adjusting with Fisher's exact.

Preterm labour and preterm birth was higher in proportion in the recurrent episodes of UTI group, and in case of preterm labor, this difference in proportion was statistically significant ($p<0.05$). Recurrent episodes of UTI group exhibited

significantly higher proportions of low birth weight (LBW), neonatal sepsis, prematurity, intrauterine growth retardation (IUGR), and NICU admissions compared to single episode of UTI group ($p<0.05$) (Table-III).

Table-III: Pregnancy (feto-maternal) outcomes of the participants (N=100)

Variables		Single		Recurrent		p value
		(n ₁ =62)		(n ₂ =38)		
		Frequency	Percentage	Frequency	Percentage	
Maternal outcome	PROM	13	20.97	4	10.53	>0.05
	Preterm labor	1	1.61	9	23.68	<0.001
	Preterm birth	-	-	2	5.26	>0.05
Neonatal outcome	LBW	12	19.35	21	55.26	<0.001
	Neonatal sepsis	1	1.61	4	10.53	<0.05
	Prematurity	2	3.23	7	18.42	<0.001
	IUGR	5	8.06	14	36.84	<0.001
	NICU admission	7	11.29	21	55.26	<0.001
	Hyperbilirubinemia	-	-	2	5.26	>0.05

p-value reached from Chi square test after adjusting with Fisher's exact.

Discussion

During pregnancy, urinary tract infections (UTIs) stand out as one of the prevailing bacterial infections. One of the notable aspects of UTIs in pregnancy is their tendency to recur. Overlapping symptoms with normal pregnancy discomfort and asymptomatic bacteriuria makes it challenging for these conditions to receive the necessary clinical attention. This study investigated 100 cases of pregnancy-related urinary tract infections (UTIs) in women who remained under periodic monitoring for UTI through urine microscopic examination. The recurrence during the same pregnancy have been recorded among 38.0% of them, which is alarmingly high. In another study, recurrent UTI was recorded in 26.6% of the pregnant women.¹¹ Previous study findings suggested that, even after antibacterial treatment, nearly half of the patients either do not successfully eliminate their bacteriuria or face a recurrence with the same organism during their

pregnancy.¹² Among the sociodemographic factors, we have seen that, recurrences of UTIs were significantly more common in urban residents than rural residents ($p<0.05$), such differences have also depicted in other research.¹³ Differences in stress levels, dietary habits, and lifestyle factors between urban and rural women, potentially contributing to these results. The observation of symptoms of UTI among the groups showed that, frequency of urination, dysuria and loin pain were significantly higher in proportion in the group of respondents with recurrent UTI than the group of respondents with single episodes of UTI ($p<0.05$). Asymptomatic cases were significantly lower in proportion in the group of respondents with recurrent UTI than the group of respondents with single episode of UTI ($p<0.05$). It has been seen that, women experiencing recurrent UTIs often possess a heightened ability to accurately self-

diagnose based on symptoms, evident in an 84% positive culture rate, signifying the prominence of symptoms in recurrent UTIs compared to single episodes.¹⁴ Asymptomatic bacteriuria occurs in 5-10% of pregnant women¹⁵, however in this study, prevalence was much elevated with asymptomatic cases comprised for 28%. It's important to note that even if someone isn't experiencing the typical symptoms of UTI, it doesn't necessarily mean they're free from a urinary tract infection. The absence of these symptoms can sometimes lead to a false sense of security, but it's possible that harmful bacteria are still present and actively attacking the urinary tract. Diabetes and gestational diabetes, raises the likelihood of UTIs during pregnancy. In this study, GDM was significantly more prevalent in recurrent UTI cases compared to single episodes ($p < 0.05$). Studies indicate that diabetic women experience higher incidence and recurrence rates of UTIs.^{12,16} Glycosuria increases the favorable environment for bacterial growth and thus increases the risk of UTI and its recurrence in pregnancy.¹⁷ Although not statistically significant in this particular study, it's worth noting that PIH was more prevalent among those with recurrent UTIs. These findings align with other studies, which have shown that UTIs can elevate the risk of maternal hypertension.¹⁸ While the present study revealed a higher prevalence of recurrent UTI among respondents with multi-parity, this association did not reach statistical significance ($p > 0.05$). Parallel with our findings, other studies highlighted that pregnant women with high parity face an increased risk of UTI.^{19,20} While the BMI of the respondents did not show statistically significant differences among the groups ($p > 0.05$), it is important to note that, research findings have consistently linked obesity to

increased susceptibility to UTI and its recurrence.^{21,22} This study observed that, proportion of respondents with anemia and cystitis were significantly higher among the recurrent UTI cases ($p < 0.05$). Similar observation showed in other studies where, anemia frequently accompanies UTIs during pregnancy, which is even more frequent with recurrent UTI.²³⁻²⁵ Development of cystitis is also found to be more common with recurrent UTI.^{26,27}

Recurrent UTI is frequently associated with pregnancy related complications.²⁵ In this study, evidence of preterm labor was statistically significantly higher in proportion in the recurrent episodes of UTI group ($p < 0.05$). The preterm birth was in this study was two in number and both were evident with recurrent UTI cases. Recurrent episodes of UTI group exhibited significantly higher proportions of LBW, neonatal sepsis, prematurity, IUGR, and NICU admissions compared to single episode of UTI group ($p < 0.05$). The cases of preterm delivery in those with recurrent UTI was not significantly different from that of women experiencing a single episode of UTI during pregnancy.¹¹ Our research not only presents an opportunity to uncover new insights into the significance of UTI management in pregnant women but also emphasizes the importance of addressing UTI recurrence among individuals with prior history. Our findings reveal that pregnant women previously treated for UTIs are at a heightened risk of experiencing recurrence, and adverse outcomes. However, limitations of this study included its cross-sectional design and a small sample size that inherently restricts the ability to establish causal relationships between variables and generalizability of the results observed.

Conclusion

Our data revealed that recurrent UTI in pregnancy was considerably high in our samples. Women with recurrent episodes of UTI exhibit higher proportions of preterm labor, preterm birth, low birth weight (LBW), neonatal sepsis, prematurity, intrauterine growth restriction (IUGR), and NICU requirement compared to those with a single episode of UTI. This study finding signifies the importance of cautious monitoring and proactive intervention strategies for UTI during antenatal care. It is also crucial to ensure the widespread adoption of urine examination as a routine component of antenatal checkups becomes imperative, not only for early detection and management of initial UTIs but also for ongoing surveillance and prevention of recurrent infections.

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