

Prevalence and Risk Factors of Urinary Tract Infections among Pregnant Women in Hospitals of Rawalpindi and Islamabad

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Abstract: Urinary tract infection (UTI) is a common occurrence during pregnancy and can have negative effects on both the mother and the fetus. It is estimated that UTIs occur in almost 20% of all pregnancies. The goal of this study was to determine the prevalence of UTIs among pregnant women and identify the risk factors in hospitals located in Islamabad-Rawalpindi. This cross-sectional study was conducted in four different hospitals in the region. A total of 155 pregnant women were randomly selected to participate in the study. Statistical Package of Social Sciences (SPSS 24) and MS Excel were used for data input and analysis. The average age of the pregnant women was 27.56 ±5.6, ranging from 17 to 50 years old. The prevalence of urinary tract infection was found to be 47% (73 out of 155). Most of the women, 63 (40.65%), were in their second trimester. 68 (43.87%) of the pregnant women were experiencing their second pregnancy, and 42.58% had a previous history of urinary tract infections. Among the 73 positive UTI samples, the most isolated pathogen was E. Coli, accounting for 46.58% of the cases. The analysis also indicated a significant association between the first and second trimesters and the presence of UTIs, with a P-value of <.001. In conclusion, this study found that risk factors such as prior UTI history and being in the first or second trimester are associated with pregnancy related UTIs. These findings highlight the importance of screening all pregnant women for UTIs and raising awareness about the negative impact of UTIs on both mothers and fetuses during pregnancy.

Keywords: UTI, Pregnancy, Infections, Prevalence

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1. Introduction

A urinary tract infection (UTI) is characterized by the presence of microorganisms or inflammation in the bladder, urethra, or renal pelvis and kidneys (Younis et al., 2019). Urinary tract infection is a highly prevalent and expensive medical complication of pregnancy, affecting around 20% of all pregnancies. Furthermore, 10% of all hospitalizations during pregnancy can be attributed to UTI (Al-Shahrani and Belali, 2023; Younis et al., 2019). Urinary tract infections (UTIs) are especially common among pregnant women. Pregnancy significantly increases the likelihood of UTIs due to anatomical and physiological variations in the uterus, the pressure of the fetus on the bladder, an increase in bladder volume, and changes in muscle tone (Anwar et al., 2018). Unsanitary practices and urinary secretions may additionally affect the advancement of illness. Around 90% of pregnant women experience ureteral dilatation, a condition that continues until childbirth. It can lead to an increase in urinary stagnation and the backflow of urine from the ureter to the bladder. Furthermore, the natural increase in the amount of fluid in the blood during pregnancy leads to a decrease in urine concentration. As a result, almost 70% of pregnant women experience glycosuria, a condition that promotes the growth of bacteria in the urine (Parida et al., 2018).

Untreated UTIs during pregnancy may result in severe complications. Three typical clinical presentations of UTIs during pregnancy are asymptomatic bacteriuria, acute pyelonephritis and acute cystitis (Ranjan et al., 2017). Additional symptoms include nausea, vomiting, frequent micturition, dysuria, hematuria, mucous in the urine, lower abdominal cramps or pain, and pain during sexual intercourse. Many different types of bacteria, including *Escherichia Coli* (*E. Coli*), enterococci, *Klebsiella*, *Staphylococcus aureus*, *Pseudomonas sp.*, and *Proteus sp.*, are known to cause UTIs. (Anwar et al., 2022; de Souza et al., 2023; Mehar et al., 2020; Nwachukwu et al., 2018). The prevalence of urinary tract infections (UTIs) in pregnant women exhibits variability across different study populations. In their study, Younis et al. (2019) documented a prevalence of 49.3% for UTIs among pregnant women. A study conducted at Hussain Memorial Hospitals in Lahore, Pakistan, revealed a prevalence rate of 81% for UTIs during pregnancy (Asmat et al., 2021). Another study carried out at SRL Laboratory, Ujjain, India, reported 65% prevalence of UTIs among pregnant women (Bhonsle et al., 2022). Urinary tract infections during pregnancy are more common among women who have had UTIs before. Additional risk factors for UTIs during pregnancy include a higher rate of parity, inadequate prenatal care, urinary tract abnormalities, insufficient fluid intake, sickle cell anemia, and diabetes mellitus. Low socioeconomic status, immunosuppression, advanced maternal age, and delayed initiation of prenatal care are also associated with increased risk (G et al., 2013; Getaneh et al., 2021; Kamran et al., 2022; Younis et al., 2019).

Urinary tract infections are a significant contributor to difficulties for both the fetus and the mother during pregnancy. Pyelonephritis is associated with an elevated risk of preterm birth. The incidence of low-birth-weight infants is associated with an increased fetal mortality risk. Pyelonephritis in pregnant women is linked to preeclampsia, prenatal hypertension, anemia, intermittent kidney dysfunction, a low platelet count, and postpartum endometritis (Vicar et al., 2023). Adverse prenatal outcomes encompass conditions such as restricted fetal growth, acute respiratory distress, premature births, and fetal death. It is linked to the delay and impairment of cognitive and physical development in newborns and adolescents (Ikram et al., 2023; Yaseen et al., 2021). Investigating the prevalence and associated risk factors of UTIs among pregnant women in Islamabad-Rawalpindi hospitals is crucial due to several significant factors including socioeconomic status, delayed reporting to antenatal care, and unhygienic environments. Understanding these factors and their correlation with UTIs can pave the way for improved prenatal care strategies and better health outcomes for pregnant women and their babies.

2. Material & Methodology

This was a cross-sectional study carried out Akbar Naizi Teaching Hospital, Islamabad, NESCOM Hospital, Islamabad, CDA Hospital, Islamabad and Bilal Hospital, Rawalpindi from August 2022 to January 2023. Research approval was obtained from the management of each hospital, and informed consent was obtained from each patient as well. A total of 155 pregnant women were recruited in this study, via random sampling technique. The researcher obtained data from pregnant women through the predetermined questionnaires. The questionnaire gathered data on socio-demographic factors, including age, pregnancy status (gestational age), occupation, history of urinary tract infections, obstetric history, and UTI signs and symptoms.

The study included all pregnant women between the ages of 17 and 50 who visited the hospital's gynecology department. Exclusion criteria for the study included pregnant women who had taken antibiotics within 2 weeks prior to their hospital visit, patients with incomplete medical records, individuals with congenital or acquired urinary tract abnormalities, those on any type of immunosuppressant medication, and patients with renal stones.

Aseptic containers were used to collect midstream urine samples immediately after voiding from participants who had first positive results for leukocytes, nitrites, and pus cells in their routine urine tests. The urine samples were promptly processed for bacterial culture within one hour of collection. When there was a delay, the samples were stored in a refrigerator and handled within a time frame of 4 to 6 hours. A total of 155 urine samples were obtained from

women at various stages of pregnancy. The urine samples were cultivated on cysteine lactose electrolyte deficient (CLED) agar using a calibrated wire loop.

The data was organized and stored in an Excel file, and statistical analysis was conducted using SPSS 24.0. For the categorical data, descriptive statistics were run, focusing on percentages and frequency. A Chi-square test was used to examine the correlation between two category variables. Statistical significance was determined by a p-value lower than 0.05.

3. Results

A total of 155 pregnant women were recruited in this study. The mean age of pregnant women was 27.56 ± 5.6 ranges from 17 to 50 years old. Patients were categorized into different age groups. Based on family income 43.23% of pregnant women were in middle class level (Table 1). The prevalence of UTIs was 47% (73 of 155) (Figure 1).

Table 1: Demographic characteristics of study participants

Age Group Distribution		
Age group	Frequency	Percentage (%)
17-30	74	47.74
31-40	52	33.55
41-50	29	18.71
Family Income		
High	37	23.87
Middle	67	43.23
Low	51	32.90
Occupation		
Employee	63	40.65
Housewife	92	59.35

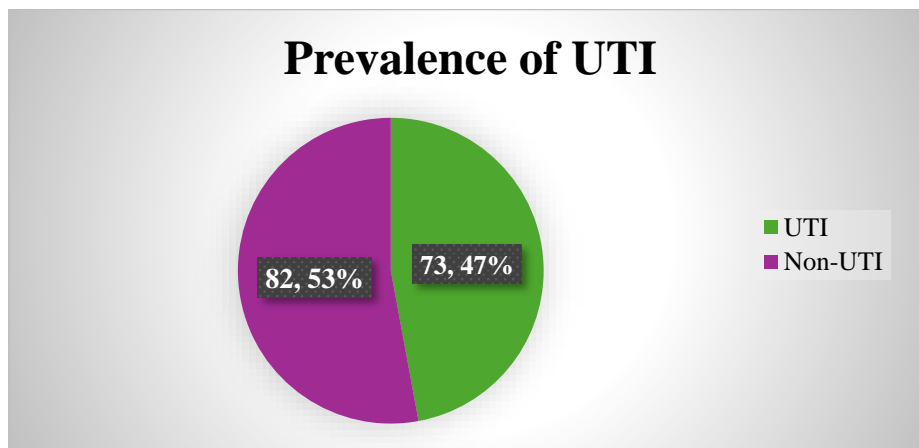


Figure 1: Prevalence of UTI

Table 2 presents the obstetrics and medical variables of pregnant women who were part of the study. It is noteworthy that, specifically 63 individuals (40.65%), were in their second trimester. In addition, 68 (43.87%) pregnant women were experiencing their second gravidae, and 42.58% had a previous history of urinary tract infections.

Table 2: Obstetrics and Medical Factors

Trimester		
	Frequency	Percentage (%)
1st Trimester	39	25.16
2nd Trimester	63	40.65
3rd Trimester	53	34.19
Gravidae		
1st Gravidae	39	25.16
2nd Gravidae	68	43.87
3rd Gravidae	48	30.97
History of UTIs		
Present	66	42.58
Absent	89	57.42

Figure 2 presents the occurrence of UTIs symptoms among study participants. 46 (29.68%) out of 155 reported different UTIs symptoms.

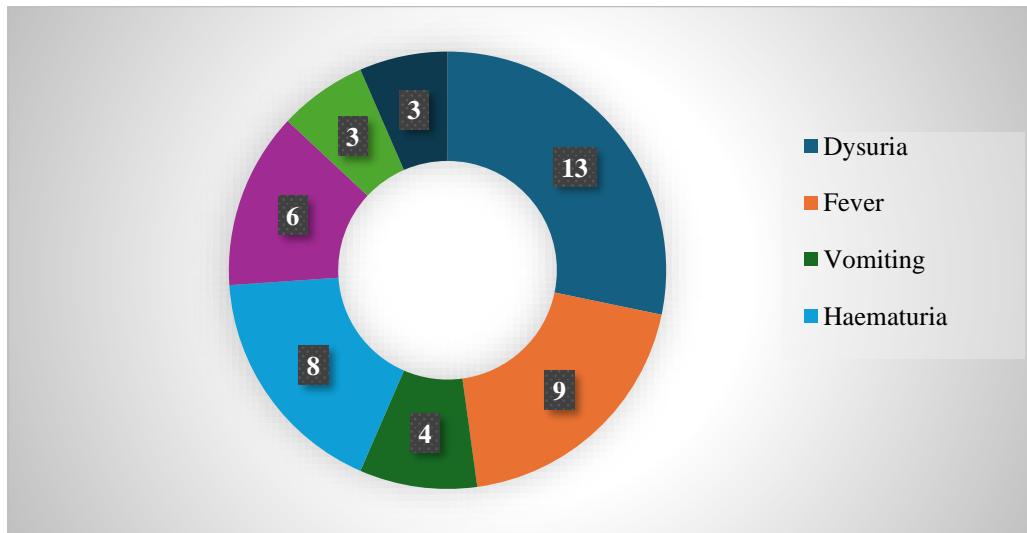


Figure 2: Symptoms of UTI among pregnant women's.

Out 73 positive UTI samples, E. Colis was more frequently isolated (46.58%), followed by Staphylococcus aureus (24.66%) (Table 3).

Table 3: Distribution of isolated pathogen from urine culture.

Isolated Pathogen	Frequency	Percentage (%)
Escherichia Colis	34	46.58
Staphylococcus aureus	18	24.66
Proteus sp	12	16.44
S.saprophyticus	5	6.85
Enterococcus faecali	4	5.48

There was strong significant association between first, second trimester and the presence of UTI as indicated by the P-value of <.001 (Table 4). There was a higher frequency of infection in those pregnant women's having 1st children (100%) and 50.0% among second children, with significant relationship (P=<.001) (Table 5). The data also suggests that UTI is significantly associated with the first and second pregnancies.

Table 4: Association of Pregnancy trimester and UTI

Trimester * UTI Cross-tabulation				
		UTI		Total
		UTI	Non-UTI	
Trimester	1st Trimester	39	0	39
	2nd Trimester	34	29	63
	3rd Trimester	0	53	53
Total		73	82	155

Chi-Square= 92.185
Phi- Cramer's = .771
P-Value= <.001

Table 5: Association of Gravidae and UTI

Gravidae * UTI Cross-tabulation				
		UTI		Total
		UTI	Non-UTI	
Gravidae	1st gravidae	39	0	39
	2nd gravidae	34	34	68
	3rd gravidae	0	48	48

Chi-Square= 86.770
Phi- Cramer's = .748
P-Value= <.001

Total	73	82	155	
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Assessing the risk of recurrence, past history of urine tract infection was important risk factor as 66 out of 66 cases with a history of UTI currently have UTI (Table 6). This data suggests that there is a very strong association between the history of UTI and the current UTI status.

Table 6: Association of UTI history with current UTI status

UTI History * UTI Cross-tabulation				
		UTI		Total
		UTI	Non-UTI	
UTI History	Present	66	0	66
	Absent	7	82	89
Total		73	82	155

Chi-Square= 129.115
Phi- Cramer's = .913
P-Value= .000

4. Discussion

The most common medical consequence of pregnancy is infection of the urinary tract (UTI), which can vary from asymptomatic bacteruria to pyelonephritis. The physiologic and anatomical changes that occur during a normal pregnancy put pregnant women at a higher risk of having UTIs. The current research set out to identify the variables that put pregnant women in Islamabad-Rawalpindi hospitals at increased risk of developing a urinary tract infection. One hundred fifty-five pregnant women who were pregnant patients participated in the current study. The prevalence of UTIs among pregnant women was found to be 47% overall in this study. This is almost consistent with the findings of Younis et al 2019, reported 49.3% prevalence of UTIs during pregnancy in their study. Similarly, a study reported 56% prevalence of UTIs during pregnancy (Nwachukwu et al., 2018). In contrast to our findings, (Asmat et al., 2021) reported 81% prevalence of UTIs among pregnant women. Furthermore, the average age of the pregnant women in the study was 27.56, which is approximately in the vicinity of the typical age range for UTIs during pregnancy (Vicar et al., 2023).

There is a remarkable relationship between the trimesters of pregnancy and the chance of getting a urinary tract infection (UTI), as indicated by the strong significant association between the first and second trimesters and the presence of UTI (p-value of <.001). Multiple studies have shown that the risk of urinary tract infections (UTIs) increases during pregnancy, with the second trimester being the most vulnerable. A study found the prevalence of UTI to be 53.6% in the second trimester, compared to 34.8% in the first trimester, underscoring the importance of monitoring and prevention measures during this period (Younis et al., 2019) The correlation between UTIs and the trimesters of pregnancy is significant because of the potential consequences for maternal and fetal health. Serious problems may arise if pregnancy-related UTIs are not addressed. This highlights the need for preventing, detecting, and managing UTIs in pregnant women for the well-being of the mother's and the fetus's health. According to the results, there is a strong correlation (P=<.001) between the frequency of UTIs among pregnant women who have their first child (100%) and those who have their second child (50%). Previous studies on the prevalence of UTIs during pregnancy support this finding. Studies by (Mukherjee and Mukherjee, 2018; Yaseen et al., 2021; Younis et al., 2019), have consistently highlighted the increased susceptibility to UTI during pregnancy. To further corroborate the relevance of the link seen

in the given result, (Mehtar et al., 2020) and (Myroshnychenko et al., 2023) highlighted the relationship between maternal age, stage of pregnancy, and UTI incidence. Furthermore, the study by (Haghdoust et al., 2020) emphasized the importance of hygiene habits in the context of UTI during pregnancy, which could potentially contribute to the differing frequencies of UTI observed in women with first and second children. Existing literature have discussed the association between UTI during pregnancy and the risk of preeclampsia, highlighting the potential implications of UTI frequency in pregnant women with first and second children.

In the current study, previous history of UTI was significantly associated with current UTI status of the pregnant women's (P-value=.000). Furthermore, E.Coli (46.58%)s was frequently isolated pathogen from the urine culture samples of pregnant women's. A study focused on UTI among pregnant women and associated factors at a primary health care facility Ghana, found that E.coli was the most commonly isolated bacterium from urine cultures, accounting for 27.80% of the total (Vicar et al., 2023). Overall, the results of the current study are consistent with existing literature on UTI prevalence during pregnancy, emphasizing the need for targeted interventions and management strategies to address the varying frequencies of UTI in pregnant women with different parity statuses.

5. Conclusion

In this study, the prevalence of UTI among pregnant women was high (47%). The most often isolated bacterium was E. Coli. Pregnancy-related UTIs have been linked to risk factors, including prior UTI history and the first and second trimesters. Given the additional benefits to both the mother and the fetus, all expectant mothers should undergo screening for UTIs during pregnancy using a urine culture. This study emphasizes the necessity of increasing UTI awareness and growing the resources available to prevent UTIs during pregnancy.

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