Original Article

Urinary Tract Infections in Women of Child Bearing Age

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Abstract

Objective: The study aimed to assess the frequency and risk factors of urinary tract infections (UTIs) among women of childbearing age and evaluate the association between age, anemia, and UTI prevalence in patients attending the Gynaecology and Obstetrics Clinic at a tertiary care hospital in Karachi.

Methodology: A cross-sectional study was conducted among 91 women aged 18-45 years. Data was collected using a structured online questionnaire and analyzed through SPSS version 20.0. Descriptive statistics and the chi-square test were applied to assess the association between anemia severity, age groups, and UTI occurrence, with $p<0.05$ considered statistically significant.

Results: The frequency of UTI in this population was found to be 37% (n=34). Among symptomatic cases, the most common initial symptom was burning micturition (26.4%, n=24), followed by increased frequency of urination (22%, n=20). The most prevalent microorganism identified in UTI cases was Escherichia coli (73%, n=66), followed by Klebsiella spp. (12%, n=11), Proteus mirabilis (8%, n=7), Pseudomonas aeruginosa (5%, n=5), and Staphylococcus aureus (2%, n=2). A significant proportion of women (46.2%, n=42) were mildly anemic, and anemia was found to be significantly associated with UTI ($p < 0.001$). Additionally, the majority of women belonged to middle socioeconomic status (65%, n=59), which also showed a significant association with UTI.

Conclusion: UTI remains a prevalent health issue among women of childbearing age. Significant risk factors include anemia, socioeconomic status, and post-coital voiding habits. The identification of Escherichia coli as the most common causative agent suggests the need for targeted antibiotic strategies. Increased awareness of hygiene practices and timely medical consultations can help mitigate the risk of UTIs in this population.

Keywords: Anaemia, Escherichia coli, Postcoital voiding, Risk Factors, Socioeconomic factors, Risk Factors, Urinary Infections

Introduction

Urinary tract infections (UTIs) are a significant public health issue, commonly affecting the bladder (cystitis), kidneys (pyelonephritis), and urethra (urethritis).[1] UTIs are primarily caused by bacterial pathogens such as Escherichia coli, Klebsiella species, Pseudomonas species, Proteus, Staphylococcus, and Enterococcus, though viral and fungal causes have been noted as well.[2] UTIs are defined by the presence of $\geq 10^5$ CFU/mL of urine in symptomatic or asymptomatic patients.[3] Diagnostic criteria also include microscopy findings of more than 5 WBCs/HPF in conjunction with a positive urine culture.[4] Women of reproductive age are particularly at risk of UTIs due to anatomical factors, such as their shorter urethra and the close proximity of the urethral opening to the anal region.[5] Worldwide, UTIs affect an estimated 150 million people annually, with women aged 20-40 years having a 25-30% lifetime risk of developing a UTI. In women of childbearing age, the prevalence of UTIs is 4%, compared to 1% in school-aged children.[6]

Several factors contribute to UTI risk, including anatomical, behavioral, and genetic influences. Common risk factors include recent sexual activity, use of diaphragms with spermicide, delayed post-coital voiding, prolonged catheterization, pregnancy, neurogenic bladder dysfunction, poor hygiene, and contraceptive use.[7] The most frequently reported symptom of UTI is dysuria, with urgency, frequency of urination, fever, abdominal pain, and back pain also being common.[8]

Anemia occurs during pregnancy as the mother's blood volume increases by 30-40%, causing the plasma volume to increase more than red blood cells, leading to a decrease in blood hemoglobin levels.[9] In various studies, an association was found between UTI and anemia, which may be detrimental to the health of the mother and the fetus.[10]

Despite a wealth of research on UTIs, the majority of studies concentrate on large populations without taking socioeconomic characteristics, cleanliness habits, and risk factors unique to a specific location into account. The prevalence of UTIs is higher in underdeveloped nations like Pakistan due to a lack of awareness, poor access to treatment, and inadequate sanitation. There is currently a dearth of information on the prevalence of UTIs and the risk factors that are linked to them in this population of women who are of childbearing age.

Furthermore, although anemia is a well-known health concern for women of reproductive age, nothing is known about how it may increase the incidence of UTIs. Filling in these information gaps may yield fresh perspectives on methods for managing and preventing UTIs.

This study aimed to assess the frequency and risk factors of UTIs among women of childbearing age attending the Gynecology and Obstetrics clinics at Jinnah Postgraduate Medical Centre, Karachi. The rising incidence of UTIs, coupled with a lack of awareness regarding their risk factors, underscores the need for this study to highlight modifiable contributors to UTI occurrence and provide insights for prevention.

Methodology

This cross-sectional study was conducted in the Gynecology and Obstetrics clinics at a tertiary care hospital in Karachi over six months after receiving approval from the Institutional Review Board (JSMU/IRB/2021/487). A total of 91 participants were selected using a non-probability convenience sampling. Inclusion criteria included women aged 18-45 visiting the clinic. Exclusion criteria were women who declined to participate. Data was collected through a structured online questionnaire in English, administered via Google Forms. Due to language barriers, verbal translations into Urdu were provided, and responses were translated back into English. A pilot study was conducted to ensure content validity. Data was extracted to Microsoft Excel, with participant confidentiality maintained. Only the principal investigator had access to the responses, which were kept anonymous. Data was stored in a password-protected file accessible only to the research team. Demographic data included age, marital status, and comorbidities. Data was analyzed using SPSS version 20.0. The chi-square test was employed for statistical analysis, with a 95% confidence interval and a p-value of 0.05 as the threshold for significance. Categorical data was presented as proportions, and continuous data as means with standard deviations. Pearson's chi-square test was used to evaluate associations. Ethical approval was obtained from the Institutional Review Board of Jinnah Sindh Medical University. Informed consent was obtained from all participants, and ethical guidelines for maintaining confidentiality and protecting participant identities were strictly followed. Consent was obtained through the completion of the questionnaire.

Results

Out of 91 participants, 54.9% (n=50) were aged 15-25 years, 33% (n=30) were aged 25-35 years, and 12.1% (n=11) were aged 35-45 years. The majority of participants (70.3%, n=64) were married, 28.6% (n=26) were single, and 1.1% (n=1) were divorced. Regarding education, 84.6% (n=77) had completed elementary education, while 13.2% (n=12) were uneducated. Socioeconomically, 31.9% (n=29) belonged to the low socioeconomic group, while 64.8% (n=59) belonged to the middle class.

Among the participants, 47.3% (n=43) were pregnant, while 38.5% (n=35) were not pregnant. Of the pregnant women, 29.37% (n=13) were in their third trimes-

ter, and 32.6% (n=14) were multiparous. When asked about previous diagnoses of urinary tract infection (UTI), 38.46% (n=35) reported a history of UTI, while 61.5% (n=56) had no such history.

The overall frequency of asymptomatic UTI in this population was 12.1% (n=11), whereas symptomatic UTI was observed in 35.2% (n=32). Among the women with symptomatic UTI, 26.4% (n=24) reported burning micturition as the first symptom, while 22% (n=20) noted an increased frequency of urination.

Regarding sexual activity, 49.5% (n=45) of the women reported no sexual activity in the past two weeks. Among the participants, 26.4% (n=24) indicated that they sometimes void after sexual intercourse. Furthermore, only 27.5% (n=25) had a positive history of catheterization, while the remaining participants did not.

Majority of women were mildly anemic (46.2%, n=42), and 13.2% (n=12) were moderately anemic. A chi-square test showed a statistically significant association between age and anemia severity, with a p-value of < 0.001. Table 2. It was more severe in pregnant females Table3.

During the survey, 89% (n=81) of the women were not diabetic, indicating no significant association between diabetes and UTI (p = 0.08).

According to the survey, 35.2% (n=32) had used contraceptives like pills and condoms, while 51.6% (n=47) had never used them. Additionally, 47.3% (n=43) had normal urinary habits, while the remaining women reported difficulty in controlling urine or waking up from sleep to urinate.

The most prevalent microorganism causing UTI was Escherichia coli (73%, n=66), followed by Klebsiella spp. (12%, n=11), Proteus mirabilis (8%, n=7), Pseudomonas aeruginosa (5%, n=5), and Staphylococcus aureus (2%, n=2).

Table 1. Demographics of patients with UTI

Variable	Category	Count (n)	Percentage
Age	18-25 years	50	54.9%
	25-35 years	30	33.0%
	35-45 years	11	12.1%
Marital Status	Married	64	70.3%
	Single	26	28.6%
	Divorced	1	1.1%
Education Level	Elementary Education	77	84.6%
	Uneducated	12	13.2%
Socioeconomic Status	Low	29	31.9%
	Middle	59	64.8%
Pregnancy Status	Pregnant	56	61.5%
	Not Pregnant	35	38.5%
Trimester during pregnancy	First	14	15.3%
	Second	18	19.78%
	Third	24	29.37 %
	Not Applicable (Not Pregnant)	35	38.5%
Parity	Nulliparous	13	30.2%
	Primiparous	11	25.6%
	Multiparous	14	32.6%
	Not Applicable (Not Pregnant)	35	38.5%
Previous UTI Diagnosis	Yes	35	38.46%

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	No	56	61.5%
Symptomatic UTI	Yes	35	38.46 %
	No	56	61.5%
Anemia Severity	Mild	43	47.25%
	Moderate/severe	12	13.2%
	None	36	39.6%
Diabetes Status	Yes	10	11.0%
	No	81	89.0%

Table 2. Anemia with respect to age

Variable	Anemia					
Age		None (>12g/dL)	Mild (< 12 g/dL)	Moderate/ severe (< 10 g/dL)	Total	p-value
	18-25 years	8	15	27	50	<.001
	25-35 years	14	9	7	30	
	35-45 years	8	2	1	11	
Total		30	26	35	91	

Table 3. UTI patient's anemia status with respect to pregnancy

Anemia		Pregnancy			
		No	Yes	Total	p-value
	None	4	26	30	<.001
	Mild	11	15	26	
	Moderate/severe	20	15	35	
Total		35	56	91	

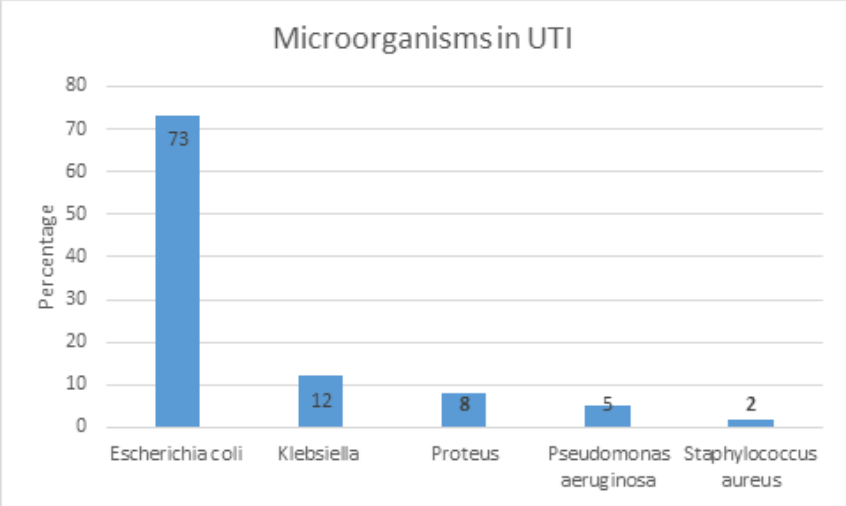

Figure 1: Microorganisms in UTI

Discussion

Our study aimed to assess the frequency and risk factors of urinary tract infections (UTI) among women of childbearing age attending the gynecology and obstetrics clinic at Jinnah Postgraduate Medical Centre, Karachi. Among the 91 participants, 54.9% were aged between 15-25 years, and 33% were aged 25-35 years. The frequency of UTI in our study was 38.46 %, which is lower compared to another study where the prevalence was reported as 62.6%.[11] The most common symptom reported in our study was a burning sensation during micturition (26.4%), followed by an increased frequency of urination (22%). In contrast, other studies have identified additional symptoms, such as pain in the pubic area and hematuria, which were not as prominent in our population.[12]

Socioeconomic status emerged as a significant risk factor in our study, with 64.8% of the women belonging to the middle class and 31.9% from the lower class. This is in line with a similar study that found 80% of UTI cases in lower socioeconomic groups.[13] Additionally, diabetes is known to increase the risk of UTI due to elevated blood sugar levels and decreased immunity. Our study found that 11% of participants were diabetic, which is low as only females up to 45 years of age were included as compared with previous studies indicating a higher UTI risk among diabetic individuals.[14]

95% of cases of anemia in women who are of childbearing age are caused by iron deficiency, which is frequently brought on by inadequate iron consumption and improper use of iron supplements; in our study, anemic patients were 60% as 61% were pregnant females causing pregnancy-induced anemia (9). Among women of reproductive age, Pakistan has the fourth-highest prevalence of anemia (41.3%).[15] Our study showed a chi-square test showed a statistically significant association between age and anemia severity, with a p-value of < 0.001. This indicates that anemia severity was more prevalent among younger participants, particularly those aged 18-25 years Table 2. It was more severe in pregnant females Table 3.

According to our research, Escherichia coli was the most common microorganism (73%), which is in line with international studies that have proven it to be the primary pathogen that causes UTIs because of its capacity to stick to the urothelium.[16] The next most frequent isolates, Klebsiella spp. (12%) and Proteus mirabilis (8%) are also linked to complex UTIs. Although they were less common, Pseudomonas aeruginosa (5%) and Staphylococcus aureus (2%) are important in catheter-associated and hospital-acquired infections.

These findings highlight the significant presence of UTI in this population and suggest the importance of considering both symptomatic and asymptomatic cases. Further investigation into risk factors, including pregnancy and socioeconomic status, could help in better understanding UTI prevalence in women of childbearing age.

Our findings emphasize the importance of improving awareness of UTI risk factors among women of childbearing age, particularly in lower and middle socioeconomic groups. While the prevalence of UTI has declined in developed countries due to better healthcare access and hygiene practices, the burden remains significant in resource-limited settings. Educating women about the importance of personal hygiene, timely micturition, and managing risk factors such as diabetes could reduce the frequency of UTIs and improve overall health outcomes in our population.

There are various restrictions on this study. First, the results cannot be applied to larger populations due to the limited sample size (n=91) and single-center study design. Second, using self-reported data could lead to recall bias, especially when it comes to cleanliness habits and urine symptoms. Furthermore, it is unable to establish causal links between UTI risk factors and illness occurrence due to the study's cross-sectional design. This study did not evaluate patterns of microorganism resistance, which are essential for directing antibiotic treatment.

This study highlights the need for regular health examinations and targeted awareness programs to address the underlying risk factors for UTI. By promoting better hygiene practices and increasing access to healthcare, we can reduce the incidence of UTIs and improve women's health in underserved communities.

Conclusion

In conclusion, the strong correlations between WHtR, fasting insulin, and HOMA-IR highlight the significant impact of central obesity on insulin metabolism. These findings emphasize the importance of WHtR as a practical and reliable measure for assessing the risk of hyperinsulinemia and related metabolic conditions. Monitoring and managing WHtR could be crucial for early detection and intervention in individuals predisposed to metabolic syndrome and type 2 diabetes.

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Authors' Contribution Statement

SR revised it critically for important intellectual content. FS has given final approval of the version to be published. ML contributed to conception and design, or acquisition of data, analysis and interpretation of data. JA contributed to conception and design, or acquisition of data, analysis and interpretation of data. SK contributed to conception and design, or acquisition of data, analysis and interpretation of data. SK contributed to conception and design, or acquisition of data, analysis and interpretation of data. All authors are accountable for their work and ensure the accuracy and integrity of the study.

Confilct of Interest

Authors declared no conflict on interest

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None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.