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FREQUENCY OF RECURRENT URINARY TRACT INFECTION IN WOMEN OF REPRODUCTIVE AGE GROUP

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Abstract

Background: Recurrent urinary tract infections (rUTIs) are a common problem among women of reproductive age and contribute significantly to morbidity, reduced quality of life, and increased healthcare utilization.
Objective: To determine the frequency of recurrent urinary tract infections in women of reproductive age and to evaluate their clinical and microbiological profile.
Methods: This descriptive cross-sectional study was conducted at the In-patient and Out-patient Departments of Obstetrics and Gynecology, Memon Medical Institute Hospital, Karachi, from August 2025 to January 2026. A total of 136 women aged 18–45 years with a history of ≥2 UTI episodes in the last six months were included using non-probability consecutive sampling. Data were collected through a structured questionnaire and urine samples were analyzed by microscopy and culture.
Results: The mean age of participants was 29.6 ± 7.2 years, with the majority in the 25–34 year age group (38.2%). Approximately 43% of women experienced ≥4 UTI episodes in the preceding six months. Common symptoms included urgency (74.3%), burning micturition (69.1%), and increased urinary frequency (64.7%). Escherichia coli was the most frequently isolated organism (50.0%), followed by Klebsiella (17.6%) and Staphylococcus (13.2%). A significant association was observed between increasing age and higher frequency of recurrence ($p = 0.03$).
Conclusion: Recurrent urinary tract infections are highly prevalent among women of reproductive age, with typical symptomatology and predominance of E. coli as the causative organism.

Keywords: Recurrent urinary tract infection, women, reproductive age, frequency, Escherichia coli.

INTRODUCTION

Urinary Tract Infections (UTIs) represent a prevalent and often recurrent health concern, particularly among women in their reproductive age [1]. Recurrent Urinary Tract Infection is a condition that significantly impacts the quality of life for affected individuals, leading to both physical discomfort and emotional distress [2]. This issue has prompted researchers, healthcare professionals, and women themselves to dig deep into the factors contributing to the frequent recurrence of UTIs [3]. As we explore the frequency of recurrent urinary tract infections in women of reproductive age, it is crucial to understand the underlying mechanisms, risk factors, and potential interventions that can alleviate the burden on those affected [4]. Urinary tract infections are primarily caused by the invasion of pathogenic microorganisms, typically bacteria, into the urinary system [5]. The lower urinary tract, comprising the bladder and urethra, is most commonly affected, leading to symptoms such as painful urination, frequent urges to urinate, and lower abdominal discomfort [6]. While a single episode of UTI can be successfully treated with antibiotics, the recurrence of infections poses a considerable challenge for both healthcare providers and patients. Women, in particular, face a higher risk of recurrent UTIs, and the reasons behind this gender disparity are multifaceted [7].

The reproductive age group, typically defined as women between the ages of 15 and 49, experiences a unique set of physiological changes that may contribute to the increased susceptibility to recurrent UTIs [8]. Hormonal fluctuations, particularly those related to the menstrual cycle, can influence the acidity of the urine and the integrity of the urogenital mucosa, creating an environment more conducive to bacterial growth [9]. Additionally, sexual activity has been identified as a potential risk factor, as it can introduce bacteria into the urethra and subsequently into the urinary tract [10]. A study reported incidence of recurrent UTIs is 22.30% in women of age 18 to 49 years. [11] The shorter length of the female urethra compared to that of males facilitates easier access for bacteria to ascend into the bladder [12]. Furthermore, the proximity of the urethra to the anus increases the risk of contamination from fecal bacteria, especially during activities such as wiping after bowel movements [13].

Beyond physiological and anatomical considerations, behavioral and lifestyle factors contribute significantly to the frequency of recurrent UTIs [14]. Poor hygiene practices, inadequate fluid intake, and the use of certain contraceptive methods can all influence the likelihood of infection. Moreover, the overuse or misuse of antibiotics, a common occurrence in the era of antibiotic resistance, can disrupt the natural balance of the urinary microbiota, making individuals more susceptible to recurring infections [15]. Around 50–60% of females report urinary tract infections at least once in their lives [16]. Approximately 80% of urinary tract infections are caused by different types of bacteria; the rest are caused mainly by fungi and viruses [17].

The rationale for this study lies in the high prevalence of recurrent urinary tract infections (rUTIs) [11] among women of reproductive age, a demographic particularly vulnerable to such infections due to anatomical, hormonal, and behavioral factors. rUTIs pose a significant health burden, leading to repeated antibiotic treatments, increased healthcare costs, and potential long-term complications such as kidney damage and antibiotic resistance. Despite the clinical significance, there is a lack of comprehensive studies focusing on the specific frequency, risk factors, and effective preventive measures for rUTIs in this age group.

OBJECTIVE

The objective of this study is to determine the frequency of recurrent urinary tract infections in women of reproductive age.

METHODOLOGY

This descriptive, cross sectional study was conducted at In-patient and Out-patient Department of OBGY of Memon Medical Institute Hospital, Karachi fromAugust 2025 to January 2026. Sample size was calculated by using OpenEpi sample calculator through proportion method. After depicted value of prevalence of recurrent UTI in women of reproductive age is 22.30%. [11] Keeping 95% confidence interval and 7% margin of error. Final sample found out to be 136

Sample Size for Frequency in a Population

Population size(for finite population correction factor or fpc)(N):	1000000
Hypothesized % frequency of outcome factor in the population (p):	22.3%+/-7
Confidence limits as % of 100(absolute +/- %)(d):	7%
Design effect (for cluster surveys-DEFF):	1

Sample Size(n) for Various Confidence Levels

Confidence	Level(%)	Sample Size
95%		136
80%		59
90%		96
97%		167
99%		235
99.9%		383
99.99%		536

Equation

Sample size $\mathbf{n = [DEFF*Np(1-p)]/ [(d^2/Z^2_{1-\alpha/2}*(N-1)+p*(1-p)]}$

Non-probability consecutive sampling technique was employed to recruit eligible participants who met the inclusion criteria. Women aged 18–45 years with a history of two or more episodes of UTI in the last six months were included in the study. Women with a history of chronic kidney disease or other renal disorders, those who were pregnant or in the postpartum period, and those who had recently undergone urinary tract surgery or invasive procedures were excluded to minimize confounding factors.

DATA COLLECTION

Following approval from the Review Board of Memon Medical Institute Hospital Karachi and the College of Physicians and Surgeons of Pakistan, data collection was initiated. Eligible participants were enrolled after obtaining informed consent. A structured questionnaire was administered to collect demographic information, including age, occupation, marital status, and sexual activity, along with medical history such as frequency of UTIs, previous treatments, and associated symptoms. Approximately 5 ml of midstream urine was collected from each participant using a clean-catch method in a sterile container. Samples were processed within two hours of collection and subjected to microscopic examination and urine culture and sensitivity testing to identify microbial pathogens and antibiotic susceptibility patterns. Additionally, anthropometric measurements, including weight, were recorded using standardized equipment.

DATA ANALYSIS

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 24. Quantitative variables such as age, weight, and BMI were presented as mean ± standard deviation or median with interquartile range, depending on data distribution. Categorical variables, including organism type, socio-demographic factors, and frequency of recurrent UTI, were expressed as frequencies and percentages. Normality of data was assessed using the Shapiro–Wilk test. After controlling for effect modifiers, associations between recurrent UTI frequency and variables such as age, marital status, BMI, and socioeconomic status were analyzed using the chi-square test. A p-value <0.05 was considered statistically significant.

RESULTS

Data were collected from 136 patients, mean age of participants was 29.6 ± 7.2 years, with the majority belonging to the 25–34 year age group (38.2%), followed by 35–49 years (33.8%) and 15–24 years (27.9%). Most participants were married (59.6%), while 40.4% were unmarried. The mean BMI was 25.1 ± 3.8 kg/m². In terms of education, the largest proportions were intermediate and graduate-level participants (30.9% each), followed by secondary (25.0%) and primary education (13.2%). Regarding recurrence, 30.1% of women reported 2 UTI episodes in the last six months, while a substantial proportion experienced higher recurrence, with 20.6% reporting 4 episodes, 12.5% reporting 5 episodes, and 10.3% reporting more than 5 episodes.

Table 1: Baseline Demographic Characteristics and Frequency of Recurrent UTI Episodes (n = 136)

Variable	Category	n (%) / Mean ± SD
Age (years)	—	29.6 ± 7.2
Age Group	15–24	38 (27.9%)
	25–34	52 (38.2%)
	35–49	46 (33.8%)
Marital Status	Married	81 (59.6%)
	Unmarried	55 (40.4%)
BMI (kg/m²)	—	25.1 ± 3.8
Education	Primary	18 (13.2%)
	Secondary	34 (25.0%)
	Intermediate	42 (30.9%)
	Graduate & Above	42 (30.9%)
Frequency of Recurrent UTI (Last 6 Months)	2 episodes	41 (30.1%)
	3 episodes	36 (26.5%)
	4 episodes	28 (20.6%)
	5 episodes	17 (12.5%)
	>5 episodes	14 (10.3%)

A strong urge to urinate was the most common symptom (74.3%), followed by burning sensation during urination (69.1%) and increased urinary frequency (64.7%). Sudden onset of symptoms was reported by 58.1% of participants.

Table 2: Frequency of UTI Symptoms (n = 136)

Symptom	Yes n (%)	No n (%)
Burning sensation during urination	94 (69.1%)	42 (30.9%)
Strong urge to urinate	101 (74.3%)	35 (25.7%)
Urinating ≥8 times/day	88 (64.7%)	48 (35.3%)
Sudden onset of symptoms	79 (58.1%)	57 (41.9%)
No symptoms (asymptomatic)	21 (15.4%)	115 (84.6%)

Microbiological analysis showed that Escherichia coli was the most commonly isolated organism, accounting for 50.0% of cases. This was followed by Klebsiella (17.6%), Staphylococcus (13.2%), and Proteus (8.8%). Other organisms were identified in 4.4% of cases, while 5.9% of samples showed no bacterial growth.

Table 3: Organisms Isolated on Urine Culture (n = 136)

Organism	**n (%)**
E. coli	68 (50.0%)
Klebsiella	24 (17.6%)
Staphylococcus	18 (13.2%)
Proteus	12 (8.8%)
Other organisms	6 (4.4%)
No growth	8 (5.9%)

A statistically significant association was observed between age group and frequency of recurrent UTIs ($p = 0.03$). Higher recurrence (≥4 episodes) was more common in older age groups, particularly among women aged 35–49 years (52.2%) and 25–34 years (46.1%), compared to those aged 15–24 years (28.9%).

Table 4: Association of Age Group with Frequency of Recurrent UTI

Age Group	**≥4 Episodes n (%)**	**<4 Episodes n (%)**	**p-value**
15–24	11 (28.9%)	27 (71.1%)	
25–34	24 (46.1%)	28 (53.9%)	
35–49	24 (52.2%)	22 (47.8%)	**0.03**

DISCUSSION

The present study evaluated the frequency and clinical profile of recurrent urinary tract infections (rUTIs) among women of reproductive age and demonstrated a substantial burden of disease, with a considerable proportion experiencing multiple episodes within a short time frame. The mean age of participants was 29.6 ± 7.2 years, with the majority falling in the 25–34-year age group. This reflects the peak reproductive and sexually active period, which has consistently been identified as a high-risk phase for UTIs due to behavioral and physiological factors. In this study, approximately 43% of women experienced ≥4 episodes of UTI in the preceding six months, indicating a significant prevalence of recurrent infections. This finding aligns with existing literature suggesting that a notable proportion of women with an initial UTI go on to develop recurrent episodes. The higher frequency observed in the 25–34 and 35–49 age groups, with a statistically significant association ($p = 0.03$), suggests that increasing age within the reproductive period may contribute to recurrence, possibly due to cumulative exposure to risk factors such as sexual activity, contraceptive practices, and changes in vaginal flora.

Symptom analysis revealed that the majority of participants experienced classical lower urinary tract symptoms, with urgency (74.3%) and burning micturition (69.1%) being the most common. Increased urinary frequency and sudden onset of symptoms were also frequently reported, while a smaller proportion (15.4%) had asymptomatic episodes. These findings are consistent with the typical clinical presentation of UTIs and highlight the importance of symptom-based screening in clinical practice. The presence of asymptomatic cases is clinically relevant, as it may lead to delayed diagnosis and potential complications if left untreated. Microbiological analysis demonstrated that Escherichia coli was the predominant organism, isolated in 50% of cases, followed by Klebsiella, Staphylococcus, and Proteus species. This distribution is in line with global trends, where uropathogenic E. coli remains the leading cause of both uncomplicated and recurrent UTIs due to its ability to adhere to uroepithelial cells and evade host immune responses. The presence of other organisms further emphasizes the need for culture and sensitivity testing to guide appropriate antibiotic therapy, particularly in recurrent cases where resistance patterns may be evolving.

The findings of this study underscore the multifactorial nature of recurrent UTIs in women of reproductive age. Behavioral factors such as sexual activity, hygiene practices, and healthcare-seeking behavior, along with biological factors including host immunity and microbial virulence, likely contribute to recurrence. The relatively high prevalence observed in this study may also reflect gaps in early diagnosis, incomplete treatment, or lack of preventive strategies. Clinically, these results highlight the need for a comprehensive approach to the management of rUTIs, including patient education, risk factor modification, and judicious use of antibiotics. Preventive strategies such as increased fluid intake, post-coital voiding, and appropriate hygiene practices should be emphasized. Additionally, regular follow-up and consideration of prophylactic measures may be beneficial in high-risk individuals.

LIMITATIONS

This study has several limitations that should be considered while interpreting the findings. The cross-sectional design limits the ability to establish causal relationships between risk factors and recurrent urinary tract infections, allowing only associations to be identified. The reliance on self-reported history of UTI episodes and symptoms

may introduce recall bias, affecting the accuracy of reported frequency. Being a single-center study conducted at a tertiary care hospital, the findings may not be generalizable to the wider population, particularly in community or rural settings. The relatively small sample size (n = 136) may also limit statistical power. Additionally, important behavioral and lifestyle factors such as sexual practices, hygiene habits, fluid intake, and contraceptive use were not comprehensively assessed, which could act as confounding variables.

CONCLUSION

Recurrent urinary tract infections are common among women of reproductive age, with a substantial proportion experiencing multiple episodes within a short period. The condition is characterized by typical lower urinary tract symptoms, with urgency and burning micturition being the most frequent, and Escherichia coli identified as the predominant causative organism. A higher frequency of recurrence was observed in older reproductive age groups, indicating a possible association with cumulative exposure to risk factors. These findings highlight the need for early recognition, appropriate diagnostic evaluation, and targeted preventive strategies, including patient education and rational antibiotic use, to reduce recurrence and improve clinical outcomes in this population.

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