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Urinary Tract Infections in Young Males: Frequency and Causative Organisms in DHQ Abbottabad

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ABSTRACT

Background: Urinary tract infections (UTIs) are among the most frequent bacterial infections worldwide. Their prevalence in young males is often underestimated. This study aimed to determine the frequency, causative organisms, and antimicrobial resistance patterns of UTIs in young male patients at DHQ Abbottabad. **Material & Methods:** A descriptive cross-sectional study was conducted over six months at District Headquarters Hospital Abbottabad. Two hundred young male patients aged 15–40 years presenting with urinary symptoms were recruited through consecutive sampling. Patients with structural abnormalities, catheterization, immunocompromised states, or recent antibiotic use were excluded. Midstream urine samples were analyzed for microscopy and culture. Organisms were identified and tested for antibiotic susceptibility using Clinical Laboratory Standards Institute (CLSI) guidelines. Data were analyzed with SPSS v25, applying Chi-square test for associations ($p<0.05$). Ethical approval was obtained from the Institutional Review Board of DHQ Hospital Abbottabad. **Results:** Out of 200 patients, 46 (23%) had culture-proven UTI. The mean age was 28.4 ± 6.2 years. Dysuria (65%) and urinary frequency (52%) were the most common symptoms. Escherichia coli was the predominant pathogen (72%), followed by Klebsiella pneumoniae (15%) and Proteus mirabilis (9%). Nitrofurantoin (78%) and ciprofloxacin (65%) were most effective, while resistance was highest against co-trimoxazole (70%). Recurrent infections were significantly associated with culture positivity ($p=0.032$). **Conclusion:** UTIs are relatively frequent among young males in Abbottabad. Clinical vigilance, routine urine cultures, and rational antibiotic prescribing are essential. Hygiene education and antimicrobial stewardship are recommended.

INTRODUCTION

Urinary tract infections (UTIs) are one of the most common bacterial infections worldwide, accounting for an estimated 150 million cases annually and resulting in substantial morbidity and healthcare expenditure.[1,2] They are most frequently reported in women, largely due to anatomical factors including a shorter urethra and proximity to the perineum. However, UTIs in males, although less frequent, are clinically significant because they are often associated with structural or functional abnormalities of the urinary tract, and hence usually classified as complicated infections.[3,4]

In young men, natural protective mechanisms such as the longer urethra and antibacterial activity of prostatic secretions provide relative protection against infection.[5,6] Nevertheless, when UTIs occur, they may be linked to risk factors such as poor hygiene, unprotected sexual activity, urinary tract instrumentation, or systemic conditions like diabetes mellitus, which compromise host defenses.[7–9] Untreated infections in this population can lead to serious complications including prostatitis, epididymo-orchitis, and pyelonephritis, emphasizing the need for accurate diagnosis and appropriate management.

The epidemiology of UTIs varies across geographic and socioeconomic contexts. In developing countries such as Pakistan, the problem is aggravated by poor sanitation, lack of health literacy, and widespread misuse of antibiotics, which contributes to the emergence of resistant organisms.[10,11] While a considerable body of research has addressed UTIs in women and older men, there is a paucity of data focusing on young males. The novelty of this study lies in examining UTIs specifically in young males from Pakistan, a population rarely studied in detail, thereby filling an important evidence gap.

This study aims to determine the frequency of culture-proven UTIs among young males presenting with urinary symptoms at District Headquarters Hospital Abbottabad, and to identify the causative organisms along with their antimicrobial susceptibility patterns. By doing so, the study intends to provide evidence for rational antibiotic prescribing and preventive measures in this under-studied demographic.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted over a period of six months at District Headquarters Hospital Abbottabad. A total of 200 young male patients aged 15–40 years who presented with urinary symptoms such as dysuria, frequency, urgency, suprapubic pain, or fever were included. Patients were selected using consecutive sampling. Those with structural urinary tract abnormalities, long-term catheterization, immunocompromised conditions, or prior antibiotic therapy within the last 72 hours were excluded from the study.

Midstream clean-catch urine samples were collected under aseptic conditions and transported immediately to the microbiology laboratory. Each sample was subjected to routine microscopy and culture using standard microbiological procedures. Bacterial isolates were identified based on colony characteristics and biochemical tests. Antimicrobial susceptibility testing was performed using the Kirby–Bauer disk diffusion method in accordance with Clinical Laboratory Standards Institute (CLSI) guidelines.

All collected data were analyzed using SPSS version 25. Descriptive statistics were applied to summarize categorical variables as frequencies and percentages, while continuous variables were expressed as mean ± standard deviation. Associations between categorical variables were assessed using the Chi-square test, and a p-value of <0.05 was

considered statistically significant. Ethical approval for the study was obtained from the Institutional Review Board of DHQ Hospital Abbottabad, and informed written consent was obtained from all participants prior to enrollment.

RESULTS

Out of 200 young male patients included in the study, 46 (23%) were found to have culture-proven urinary tract infection, while the remaining 154 (77%) showed no significant bacterial growth (Fig-1). The mean age of patients was 28.4 ± 6.2 years. Dysuria was the most frequent presenting complaint (65%), followed by urinary frequency (52%) and suprapubic pain (28%).

Among the culture-positive cases, Escherichia coli was the predominant pathogen, isolated in 33 (72%) cases. Klebsiella pneumoniae was found in 7 (15%) cases, Proteus mirabilis in 4 (9%), and other organisms in 2 (4%) (Fig-2). This distribution confirmed that E. coli remains the most common causative agent in young male patients with UTIs.

Antimicrobial susceptibility testing revealed that nitrofurantoin was the most effective antibiotic, with 78% sensitivity, followed by ciprofloxacin (65%). Moderate sensitivity was observed for gentamicin (60%) and amoxicillin-clavulanate (55%). In contrast, co-trimoxazole exhibited the highest resistance, with only 30% sensitivity and 70% resistance (Fig-3). The detailed sensitivity and resistance patterns are presented in Table-1. Statistical analysis demonstrated a significant association between history of recurrent urinary infections and culture positivity (p=0.032).

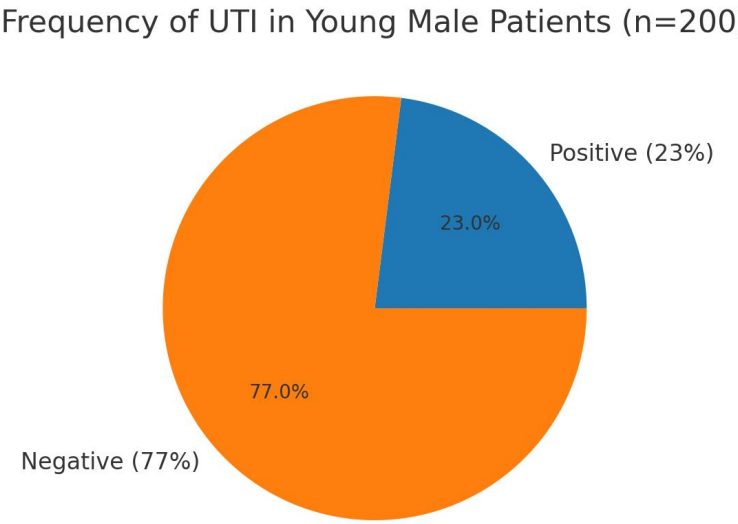

Fig-1: Frequency of UTI among young male patients (positive vs negative).

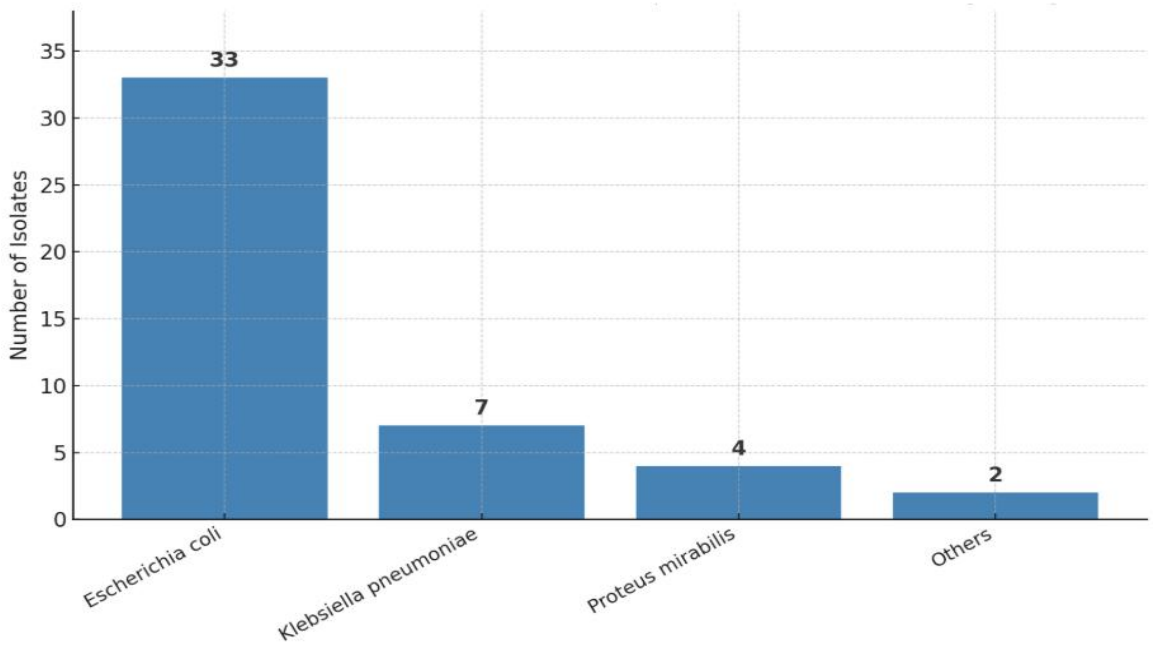

Fig-2: Distribution of causative organisms in UTI cases.

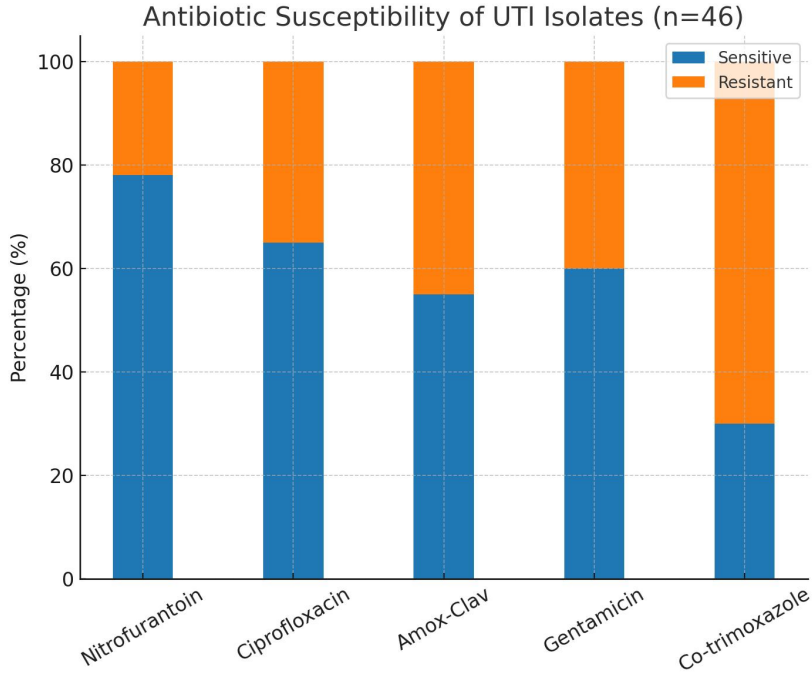

Fig-3: Antibiotic susceptibility patterns (sensitive vs resistant)

Table-1: Antibiotic susceptibility patterns of bacterial isolates (n=46).

Antibiotic	Sensitive (%)	Resistant (%)
Nitrofurantoin	78	22
Ciprofloxacin	65	35
Amoxicillin-Clavulanate	55	45
Gentamicin	60	40
Co-trimoxazole	30	70

DISCUSSION

This study demonstrated that UTIs in young males are not as rare as often perceived, with 23% of symptomatic patients showing culture-proven infections. The prevalence observed was higher than that reported in Western populations, where male UTIs are considered uncommon due to protective anatomical and physiological mechanisms.[12,13] In contrast, findings are more aligned with data from developing countries.[14] Recent Pakistani studies, including one from Peshawar (2025) and another from Kohat (2018), reported comparable prevalence rates among symptomatic males[15,16], reinforcing the significance of UTIs in this age group.

Escherichia coli remained the predominant causative organism (72%), consistent with both local and international literature.[17,18] Its ability to adhere and invade uroepithelial cells through virulence factors such as fimbriae explains its dominance as a uropathogen.[19] Similar pathogen profiles were reported from Peshawar and Dir districts, where E. coli accounted for more than half of isolates, followed by Klebsiella and Proteus species[20,21], which aligns closely with our findings.

Antibiotic resistance patterns pose a growing concern. Co-trimoxazole resistance reached 70%, comparable with multicenter studies in Pakistan, rendering it unsuitable for empirical therapy.[22] Recent data from Rawalpindi (2022) and Southern Punjab (2024) confirm this resistance trend, while also highlighting nitrofurantoin as one of the most reliable agents for empirical use.[23,24] Ciprofloxacin retained moderate sensitivity in our study, though rising resistance to fluoroquinolones has been documented globally and locally, necessitating cautious use.

The findings underscore the need for clinicians to consider UTIs in young males with urinary complaints and to confirm diagnosis with culture rather than empirical assumptions. Preventive strategies including hygiene education and rational prescribing are critical in controlling disease spread and resistance. Limitations of the study include its hospital-based design, relatively small sample size, and lack of socioeconomic and behavioral risk factor analysis.

CONCLUSION

This study highlights that urinary tract infections in young males are more common than generally assumed, with nearly one in four symptomatic patients found to have culture-proven infection. Escherichia coli emerged as the predominant pathogen, consistent with international and regional trends, while high resistance to co-trimoxazole underscores the limitations of relying on older empirical regimens. Nitrofurantoin and ciprofloxacin retained good efficacy and remain reliable first-line treatment choices in this population.

The findings emphasize the need for heightened clinical suspicion when evaluating urinary symptoms in young males. Routine urine cultures should be encouraged to ensure accurate diagnosis and targeted therapy. At the public health level, hygiene promotion, patient education, and the development of local antibiograms are essential to reduce disease burden and guide rational antimicrobial prescribing in order to combat the growing threat of antibiotic resistance.

LIMITATIONS

This study was hospital-based and limited to a single center, which may not reflect true community prevalence. The sample size was relatively small and the study duration short, restricting generalizability. Additionally, important risk determinants such as socioeconomic status, personal hygiene practices, and sexual behavior were not explored,

which may have provided a more comprehensive understanding of the epidemiology of UTIs in young males.

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