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A COMPARATIVE STUDY ON THE PREVALENCE OF E. COLI-ASSOCIATED URINARY TRACT INFECTION AMONG MALE AND FEMALE PATIENTS VISITING ALKHIDMAT RAAZI HOSPITAL, ISLAMABAD

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Abstract

Urinary tract infections (UTIs) are among the most common bacterial infections worldwide, with Escherichia coli (E. coli) being the major causative pathogen.The present study was conducted to determine the comparative prevalence of E. coli–associated UTIs among male and female patients visiting Al-Khidmat Raazi Hospital, Islamabad, and to assess the antimicrobial resistance profile of the isolates. A total of 100 midstream urine samples were collected and processed using standard microbiological techniques. E. coli was isolated and identified through culture and biochemical methods, and antimicrobial susceptibility testing was performed using the Kirby-Bauer disk diffusion method according to CLSI guidelines. Out of the 100 positive samples, 32% were from male patients and 68% from female patients, confirming a higher prevalence in females. Age-wise distribution showed the highest prevalence in the 25–35 and 55–65-year groups. Antibiotic susceptibility testing revealed high resistance rates against amoxicillin (60%), piperacillin-tazobactam (57%), and gentamicin (47%), with variable resistance to other antibiotics. Male isolates showed higher resistance to amoxicillin (71%) compared to females (29%), whereas female isolates confirmed higher resistance to doxycycline (67%) compared to males (43%). Multi-drug resistance (MDR) was observed in 45.5% of isolates. The study highlights the significant burden of E. coli–associated UTIs, particularly among females, and emphasizes the alarming prevalence of antimicrobial resistance. These findings show the importance of careful antibiotic use, regular checking of resistance, and preventive measures to reduce UTI cases and recurrences.

CHAPTER 1
INTRODUCTION

The term urinary tract infection (UTI) includes a wide range of clinical manifestations, such as prostatitis, urosepsis, pyelonephritis, cystitis, and catheter-associated UTI . Numerous clinical indications and symptoms as well as diagnostic tests are used to diagnose UTIs in both clinical practice and research. There are three categories of signs and symptoms: (a) lower urinary tract symptoms, such urgency, frequency, and dysuria; (b) systemic symptoms, like fever; and (c) nonspecific symptoms, like nausea and malaise.{1}. A UTI is one of the most common bacterial illnesses that physicians treat worldwide. There are two forms of UTIs: uncomplicated infections and complicated infections. When a patient's urinary

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tract is clogged or abnormal in any manner, it is referred to as "complicated". Uncomplicated Infections, which are defined as infections that arise inside a normal, clear urinary system, are much more common{2}. Both males and females can get urinary tract infections (UTIs), which are common bacterial infections that affect various urinary tract regions. Women are particularly at risk because of their anatomy and reproductive physiology.Bacterial invasion of the urinary system, including the upper and lower urinary tracts, is typically the cause of the infection. Staphylococcus species, which make up 10% to 15% of the infection, is followed by Escherichia coli, which accounts for 80% to 85% of the infection. Urinary tract infections are thought to be the most frequent hospital-acquired infection and can result from inadequate diagnosis.{3}

Impact of UTI on public health and healthcare system:

UTIs are among the most prevalent bacterial diseases, impacting 150 million individuals annually around the globe. An estimated 2–3 million visits to the emergency department and 10.5 million visits to the doctor for UTI symptoms , occurred in the United States alone in 2007. In 2015 the annual economic impact of these infections, including medical expenses and decreased output, was at US$3.5 billion per year in the US alone. {4}

Both social and personal factors contribute to the burden of recurring UTIs. The illness's clinical and financial costs are included in the social burden, while the social and psychological effects that impair quality of life are included in the personal burden. The significance of illness prevention comes from the high frequency of recurring UTIs, which is a modifiable factor in determining society and individual burdens. Approximately 1% to 6% of all medical visits (roughly 7 million visits and US$1.6 billion yearly) are for UTI consultations. They are linked to a high burden of illness and mortality in the elderly, who are most likely to get UTIs.

The effects of recurring UTIs on individuals and society frequently overlap. For instance, the diagnostic burden has a significant adverse economic impact in addition to affecting quality of life when several urine cultures or imaging tests may be necessary. Both direct and indirect costs are possible; for instance, a patient's well-being and the economy may be impacted by work absence. Medical visits (for ambulatory patients), antibiotic prescriptions, hospital stays, nonmedical travel fees, sick days resulting from the illness, and treating connected illnesses are among the costs.{5}

Both silent and symptomatic UTIs can cause a variety of symptoms, from moderate irritative changing to sepsis, bacteremia, shock, or even death. Urosepsis may have significant death rates of 25% to 60% in particular patient populations .About 60% of individuals with septic shock developed acute kidney damage (AKI), and sepsis is one of the most frequent causes of AKI . Particularly in cases of urinary tract obstruction, acute UTI can result in an abrupt decline in renal function . High rates of morbidity and mortality during acute care are linked to AKI . Following hospital discharge, patients with severe AKI were more likely to develop end-stage renal disease or perhaps pass away .Finding the risk factors for AKI development in UTI patients is essential since sepsis-related AKI results in poor outcomes and higher healthcare expenses. Nevertheless, there weren't many research that addressed this significant problem. In order to determine the risk factors for the development of AKI in patients with UTIs, we

examined the clinical features and changes in renal function in this retrospective analysis.{6}

1.2. E. coli and Its Role in UTIs

Escherichia coli (E. coli) is the primary causative agent of urinary tract infections (UTIs), accounting for approximately 80-90% of cases.{7}

A member of the Enterobacteriaceae family of bacteria, E. coli is the most commonly found habitant of warm-blooded animals' and humans' gastrointestinal tracts and one of the most significant pathogens. It rarely causes disease because it coexists with hosts in a mutually beneficial relationship. The unique traits of E. Coli, including its capacity to grow in both aerobic

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and anaerobic environments, ease of handling, and accessibility to the entire genome sequence.{8}
The Gram-negative bacillus that inhabits the gut microbiota and causes the most common urinary tract infections (UTIs) is E. coli, a virus that grabs opportunities. It is a significant cause of infections acquired in hospitals and the community.{9}
Uropathogenic E Coli survive by infecting the bladder epithelium, releasing nutrients from the host cells through the production of toxins and proteases, and obtaining iron through the synthesis of siderophores. The uropathogens can then ascend to the kidneys by proliferating and escaping host immune monitoring. Once more, they adhere via adhesins or pili to colonize the renal epithelium, after which they produce toxins that damage tissue. As a result, the uropathogens can enter the bloodstream through the tubular epithelial barrier and cause bacteraemia.This bacteria is the part of the normal intestinal flora but can ascend the urinary tract and cause infection when they acquire specific virulence factors. Understanding the pathogenic mechanisms of E. coli is crucial for developing effective prevention and treatment strategies for UTIs.{10}
Escherichia coli remains the predominant uropathogen (80%) isolated in acute community-acquired uncomplicated infections, followed by Staphylococcus saprophyticus (10% to 15%). Klebsiella, Enterobacter, and Proteus species, and enterococci infrequently cause uncomplicated cystitis and pyelonephritis.{11}

1.3. Pathogenesis of E. coli-Associated UTIs..... 12

Bacterial adhesion, a crucial stage in colonization, is the first step in the pathophysiology of UTIs linked to E. coli. Originating in the stomach, Uropathogenic E. Coli (UPEC) first contaminates the periurethral region before moving up the urethra and entering the bladder through the use of pili and flagella.
In **Uncomplicated UTI** ,bacteria attach to and infiltrate the superficial epithelial (umbrella) cells of the bladder . Clear extracellular microorganisms induce a response from the host immune system, especially neutrophils. However, some UPEC invade host cells or build biofilms to get around immunity. They harm host tissues and facilitate further ascend to the kidneys by producing poisons and proteases. Bacteraemia may result from the infection's penetration of the renal barrier if treatment is not received.
The procedure starts similarly for **Complicated UTIs**, which are frequently associated with catheterization, but a damaged bladder is necessary. Bacterial adherence is facilitated by fibrinogen deposition and immunological responses triggered by catheters. After that, UPEC destroys bladder tissue, grows biofilms on catheter surfaces, and may even reach the kidneys. This may also result in a systemic illness if left untreated. {12}

1.4. Prevalence of UTI in Male and Female Patients 12

Urinary tract infections (UTIs) are among the most common bacterial infections affecting populations worldwide, with a significantly higher prevalence in females compared to males. Females are more susceptible due to anatomical factors such as a shorter urethra, which facilitates bacterial ascension into the bladder (Foxman, 2014). The lifetime risk of developing a UTI is approximately 50% for women, with the highest risk occurring in women aged 20-40 years (Medina & Stamm, 2015).
In contrast, UTIs in males are less common but tend to be more complicated when they occur, often associated with underlying urological abnormalities or instrumentation (Khan et al., 2019). The prevalence in males varies with age, increasing significantly in older men due to prostatic hypertrophy and other factors (Geerlings & Stolk, 2014).{13} After respiratory tract infections, urinary tract infections (UTIs) are the most prevalent infection in humans (1). In the United States, UTIs accounted for 8.6 million visits in 2007 (84 percent of which were from women) (2). 10% of women get UTIs each year, and up to 60% of women experience symptomatic UTIs at some point in their lives.{14}

- **Research findings:**
- According to Foxman (2014), the

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prevalence of UTIs in women ranges from 20-50% over their lifetime.

- - In males, the prevalence is approximately 3-5%, with increased rates in elderly populations (Khan et al., 2019).

1.5. Factors Influencing UTI Prevalence 12

➢ **Alterations to Host's Defense:** Use of antibiotics, contraceptives, illnesses like diabetes or sickle cell, and medications can weaken natural defenses, increasing susceptibility.

➢ **Anatomical & Physiological Factors:** Female pelvic anatomy (shorter urethra, proximity of urethra to anus), drier urethral meatus, and lack of prostatic antibacterial properties in males predispose to UTIs.

➢ **Hormonal Changes in Women:** Menopause decreases estrogen levels, thinning vaginal epithelium and reducing Lactobacilli, leading to increased risk of recurrent UTIs.

➢ **Age & Sex:** UTIs are more common in females from age one onward; in males, risk increases after 50 due to prostate issues and uncircumcised status.

➢ **Obstruction:** Blockages in urinary flow cause urine stasis and pressure buildup, facilitating bacterial growth and infections.

➢ **Instrumentation**: Indwelling catheters and urinary procedures can introduce bacteria, with higher risk associated with prolonged use and inadequate antimicrobial therapy.{15}

1.1. Aims and Objectives

The present study has following aims and objectives:

- To determine the prevalence of UTI in Islamabad.
- To determine prevalence of Multi Drug resistance (MDR) *E.coli* in Isamabad.
- To determine antibiotics resistance of the isolates against CLSI recommended list of antibiotics.

CHAPTER 02
REVIEW OF LITERATURE

Khatoon,& Khanam (2023) studied that one of the most prevalent bacterial illnesses in Pakistan is urinary tract infection (UTI). From November 2020 to March 2021, a cross-sectional investigation was carried out in a laboratory. We gathered urine samples, performed culture, and identified the bacterial isolates. 65.1% of 459 urine samples proved positive for bacterial isolates' sensitivity to antibiotics. 23% of the uropathogens were Gram-positive and 76.9% were Gram-negative; the most frequent isolate was E. coli (48.8%).[16]

Zahideen ,& Javed (2022) described that according to a cross-sectional research of 182 patients receiving tertiary care services in Islamabad, the percentage of culture-positive UTI cases by sex was almost equal: 49.45% of men and 50.5% of women. In that same sample, E. coli accounted for 116 out of 182 isolates (63.74%), making it the predominant pathogen. A comparative analysis of the prevalence of E. coli in Islamabad by sex would be directly impacted by these figures, which set the city apart from many other Pakistani cities (which frequently indicate female predominance).[17]

Sabir, Anjum,& Nawaz (2014) studied was conducted to isolate and determine the antibiotic resistance in E. coli from urinary tract infections in a tertiary care hospital, Lahore.Urine samples (n=500) were collected from patients with signs and symptoms of Urinary tract infections. Bacteria were isolated and identified by conventional biochemical profile. Antibiotic resistance pattern of E. coli against different antibiotic was determined by Kirby-Baur method.Bacterial etiological agent was isolated from 402 samples with highest prevalence of E. coli (321, 80%) followed by Staphylococcus aureus (9.4%), Proteus species (5.4%) and Pseudomonas species (5.2%). The E. coli were highly resistant to penicillin (100%), amoxicillin (100%) and cefotaxime (89.7%), followed by intermediate level

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of resistance to ceftazidime (73.8%), cephradine (73.8%), tetracycline (69.4%), doxycycline (66.6%), augmentin (62.6%), gentamycin (59.8%), cefuroxime (58.2%), ciprofloxacin (54.2%), cefaclor (50%), aztreonam (44.8%), ceftriaxone (43.3%), imipenem (43.3%), and low level of resistance to streptomycin (30%), kanamycin (19.9%), tazocin (14%), amikacin (12.7%) and lowest to norfloxacin (11.2%). Out of 321 E. coli isolates, 261 (81%) were declared as multiple drug resistant and 5`` (1.5%) were extensive drug resistant.It is concluded that most of the urinary tract infections in human are caused by multiple drug resistant E. coli.

Vasudevan, (2014) described that Urinary tract infection (UTI) is a common bacterial infection known to affect the different parts of the urinary tract and the occurrence is found in both males and females. Despite the fact, that both the genders are susceptible to the infection, women are mostly vulnerable due to their anatomy and reproductive physiology. The infection is usually caused as a consequence of bacterial invasion of the urinary tract including the lower and the upper urinary tract. Among the bacterial species Escherichia coli account to 80% to 85% of the infection followed by Staphylococcus species that constitutes to 10% to 15%. In addition, bacterial species Klebsiella, Pseudomonas, Proteus and Enterococcus species plays a minor role in conferring the infection. A variety of parameters are related to UTI which include age, parity, gravidity, pregnancy and association of diseases augment the condition of the infection. The current review attempts to highlight the various factors associated with UTI, prime perpetrators responsible for the infection, the emergence of growing resistance and possible remedy to overcome the infection. The review specially focuses on UTI among women during pregnancy.

Wilson & Gaido (2004).Urinary tract infections (UTIs) are among the most common bacterial infections and account for a significant part of the workload in clinical microbiology laboratories. Enteric bacteria (in particular, Escherichia coli) remain the most frequent cause of UTIs, although the distribution of pathogens that cause UTIs is changing. More important is the increase in resistance to some antimicrobial agents, particularly the resistance to trimethoprim-sulfamethoxazole seen in E. coli. Physicians distinguish UTIs from other diseases that have similar clinical presentations with use of a small number of tests, none of which, if used individually, have adequate sensitivity and specificity. Among the diagnostic tests, urinalysis is useful mainly for excluding bacteriuria. Urine culture may not be necessary as part of the evaluation of outpatients with uncomplicated UTIs, but it is necessary for outpatients who have recurrent UTIs, experience treatment failures, or have complicated UTIs, as well as for inpatients who develop UTIs.[18]

Flores-Mireles& Hultgren, (2015) described that Urinary tract infections (UTIs) are a severe public health problem and are caused by a range of pathogens, but most commonly by Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis, Enterococcus faecalis and Staphylococcus saprophyticus. High recurrence rates and increasing antimicrobial resistance among uropathogens threaten to greatly increase the economic burden of these infections. In this Review, we discuss how basic science studies are elucidating the molecular details of the crosstalk that occurs at the host-pathogen interface, as well as the consequences of these interactions for the pathophysiology of UTIs. We also describe current efforts to translate this knowledge into new clinical treatments for UTIs.

Foxman, B. (2014) described that Urinary tract infections (UTIs) are a severe public health problem and are caused by a range of pathogens, but most commonly by Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis, Enterococcus faecalis and Staphylococcus saprophyticus. High recurrence rates and increasing antimicrobial resistance among uropathogens threaten to greatly increase the economic burden of these infections. In this Review, we discuss how basic science studies are elucidating the molecular details of the crosstalk that occurs at the host-pathogen interface, as well as the consequences of these interactions for the pathophysiology of UTIs. We also describe current efforts to translate this knowledge into new clinical treatments for UTIs.

Frontier in Medical & Health Research

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John & Agbo, (2016) describe that UTI is a common bacterial infection that affects components of the urinary system. This infection affects all ages and both sexes. Despite these, women are usually more susceptible to this infection and has a higher prevalence compared to the men. Some of the risk factors responsible for this high prevalence is due to menopause, poor personal hygiene, pregnancy and the close anatomical relationship of the female urethra and the anus. Among the uropathogens involved in this infection, entrobacteriaceae especially the E.coli is usually the most prevalent and accounts for 80-85% of the total isolate. Most often this infection is usually neglected but it is capable of claiming life under severe circumstances. This article therefore reviews the prevalence and predisposing factors responsible for urinary tract infection in adults. UTI being a major problem faced by the populace and the cause of most health care expenditure, it is therefore important to know the predisposing factors responsible for this infection as this will serve as a guide to individuals, care givers and health planners to guide and managed the expected interventions as the management involves drug therapy and patients education.

Noman & Islam, M. K. (2020) studied that urinary tract infections (UTIs) are one of the most common types of infections in children. Resistance to drug used in UTI is universal crisis in the present world. UTIs are usually caused by bacteria living on or in our bodies, and require treatment with antibiotics. A prospectively observational study was conducted in Kurmitola General Hospital (KGH) from January 2018 to December 2018. A total of 519 culture positive UTI children were considered for analysis. Colony counts for these samples were identified, and the profile of antibiotic resistance was identified. Here, samples with a colony count of ≥105 CFU/mL bacteria were considered positive. Among the children 416 children took antibiotics without prescription and among them 205 (49.2%) was culture positive. The most common pathogen was E-coli (74.31%) which prevailed that taking antibiotics without prescription is highly associated with the drug resistant UTI recurrent abdominal pain. Researcher took 19 antibiotics for susceptibility testing to identify the most resistant and safe drug for the UTI patients. According to the present study sensitive antibiotics were Cephradine 0%, Cefotaxim 0%, Imepenam 100%, Cotrimoxale 46%, amoxicillin and clavulanic acid 0%, Cefixime 36%, Cefuroxime 19%, Ceftriaxone 22%, Azithromycin 25%, Nitrofurantoin 66%, Ceftazidime 19%, Ciprofloxacin 47%, Nalidixic acid 36%, Levofloxacin 71% Colistin 79%, Gentamycin 80%, Netilmycin 80%, Amikacin 80% and Meropenam 40%. On the other hand, resistance was Cephradine 100%, Cefotaxim 100%, Imepenam 0%, Cotrimoxale 54%, Amoxicillin and clavulanic acid 100%, Cefixime 64%, Cefuroxime 81%, Ceftriaxone 78%, Azithromycin 75%, Nitrofurantoin 34%, Ceftazidime 81%, Ciprofloxacin 53%, Nalidixic acid 64%, Levofloxacin 29%, Colistin 21%, Gentamycin 20%, Netilmycin 20%, Amikacin 20% and Meropenam 60%. So, the most sensitive drug was Imepenam 100% and the most resistant drugs were Cephradine and Cefotaxim 100% resistance against urinary pathogens. Association between antibiotic use, drug resistance and use of with and without prescription in UTI patients was highly significant. We suggest that empirical antibiotic selection should be based on knowledge of the local prevalence of bacterial organism and their antibiotic resistance in a specific area rather than on universal or even national guidelines.[19]

CHAPTER 03
MATERIAL AND METHODS

5.1:Sample Collection:

A total of 100 clean catch midstream urine samples were collected from Al-khidmat Raazi Hospital CBR Town Islamabad. The samples were collected in sterile plastic bottles and then the collected samples were immediately transported in ice packs to the Microbiology Department of Al-khidmat Raazi Hospital Laboratory within 4-6 hours of collection to avoid contamination and further processing to determine the presence of E.coli in urine samples.

Frontier in Medical & Health Research

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5.2:Inclusion:

All the suspected patients having UTI symptoms such as Pain or burning while urinating, Frequent urination, Blood in urine and cramping in groin or lower abdomen. Patients Al-khidmat Raazi Hospital with kidney stones and suspected UTI were also included.

5.3:Exclusion:

Patient with systemic illnesses other than UTI were excluded like heart diseases, Asthma, allergy.

5.4:Isolation and identification:

The samples were inoculated on cysteine-lactose-electrolyte-deficient (CLED) media through an incinerated wire loop. The inoculation was performed through the striking method inside a flow hood. After inoculation, plates were incubated at 37℃ for 24 hours. The growth as per Kass count (more than 10^5 organism single species count per ml of urine) was considered significant. Colonies were characterized biochemically using the recommended guide lines of Borrow and Feltham 1993 and later on through Gram staining (Gram, 1884). Pure strains were obtained by sub-culturing on MacConkey agar and incubated at 37℃ for 24 hours. The colonies were again Gram stained to confirm the presence of Gram negative rods.

5.5: Antibiotics susceptibility testing:

After the identification of *E.COLI,* Antimicrobial susceptibility testing was performed on Mueller-Hinton agar using Kirby-Bauer disk diffusion method recommended by the Clinical and Laboratory Standards Institute.

Antibiotics disks containing Amoxicillin-Clavulanic acid, Piperacillin Tazobactam, Cefotaxime, Ceftriaxone, Cefixime, Imipenem, Meropenem, Amikacin, Gentamicin, Tobramycin, Doxycycline, fosfomycin ,Ciprofloxacin and Levofloxacin were used. Mueller-Hinton agar plates were incubated at 37℃ for 24 hours. After completion of incubation zones of inhibition were measured for each antibiotic and were compared with Clinical and Laboratory Standards Institute guidelines for sensitivity and resistance. The results were reported as Sensitive, Intermediate, Resistance according to Clinical and laboratory standards institute guideline.

CHAPTER 04
RESULT

Gender distribution

A total of 100 samples were analyzed from Al-khidmat Raazi hospital of Islamabad during the period of three months. Out of total 100 samples, 17 were males (28.3%) and 43 were females (71.7%) (Table 2.1)

Table 2.1: Prevalence of UTI according to Gender.

GENDER	Number of patients	Total *E.coli* Positive cases	Prevalence %
MALES	32	100	32%
FEMALES	68	100	68%

Frontier in Medical & Health Research

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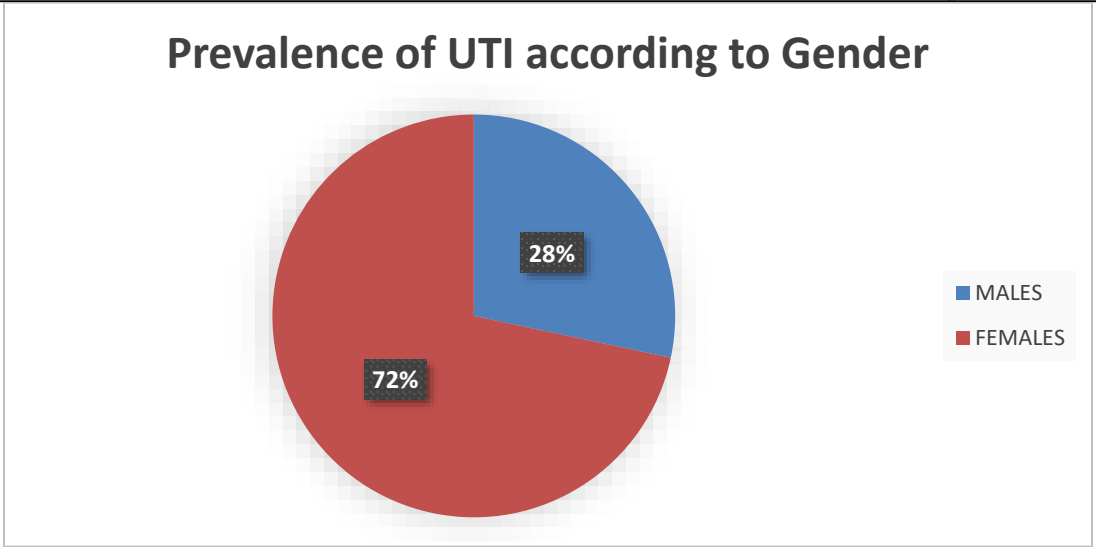


FIG 1.1 Prevalence of UTI according to Gender

Age Distribution

For age distribution, patients were divided into different categories of age: 15-25, 25-35,35-45, 45-55 and 55-65 years. In this study the highest occurrence of UTI patients were found in the age group of --- and ------years. (Table 2.2) (Fig 1.2).

Table no 2.2: Prevalence of UTI in different age groups.

AGE GROUP	TOTAL E.COLI POSITIVE CASES	Male	Female	FREQUENCY DISTRIBUTION	PERCENTAGE (%)
15-25	100	03	05	08	8.0%
25-35	100	13	25	38	38.0%
35-45	100	04	09	13	13.0%
45-55	100	02	07	09	9.0%
55-65	100	11	21	32	32.0%

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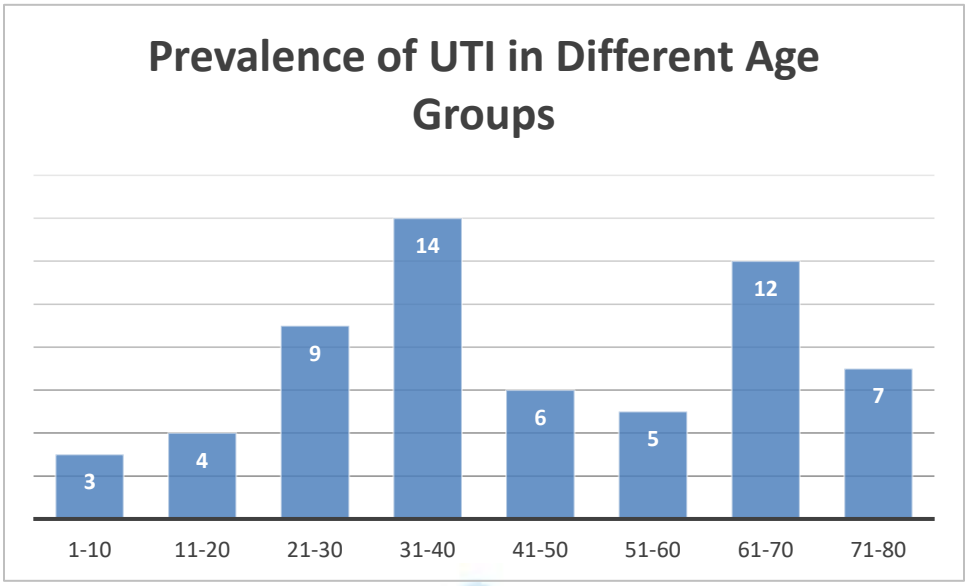


Fig 1.2 Prevalence of UTI in different age groups

6.1:Antibiotic susceptibility pattern:-

Antibiotics	Overall Resistance (%)
Amoxicillin	60
Tazobactam	57
Cefotaxime	2-42
Ceftriaxone	2-42
Cefixime	2-42
Imipenem	2-42
Meropenem	2-42
Amikacin	2-42
Gentamicin	47
Tobramycin	2-42
Doxycycline	2-42
Fosfomycin	2-42
Ciprofloxacin	2-42
Levofloxacin	2-42

The antibiotic susceptibility pattern of urinary tract E.coli was established using Kirby-Bauer disk diffusion method. According to their zone of inhibition, all the drugs have different resistant. The 60 E.coli isolates were tested for their resistant against 14 different antibiotics, amoxicillin ,Tazobactum, cefotaxime, ceftriaxone, cefixime, imipenem, meropenem, amikacin, gentamicin, tobramycin, doxycycline, Fosfomycin, ciprofloxacin, levofloxacin. Detailed analysis of susceptibility pattern of *E.coli* strain showed 60% resistance for Amoxicillin, 57% resistance for Tazobactum and 47% for Gentamicin. Rest of the *E.coli* strains showed a resistant pattern in the range of 2% to 42%. In males most resistance were found against amoxicillin which is about 71% but in female the resistance against amoxicillin was 29%, ciprofloxacin in male was 55% but in female it was 45% resistant, and doxycycline is about 43% in males and 67% in females, (Fig 2.1).

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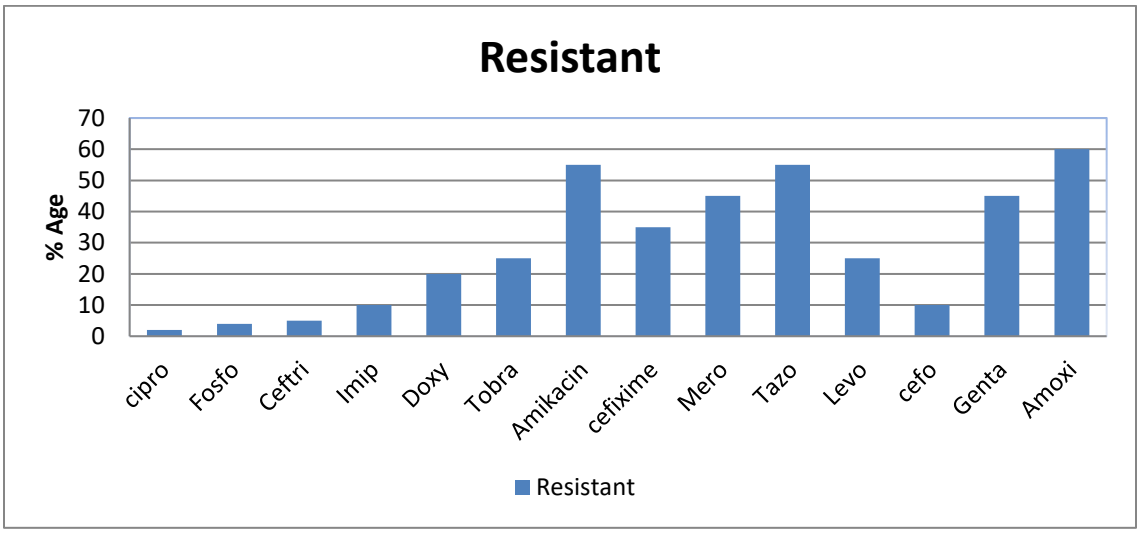


Fig 2.1 Resistance of different drugs

6.2:Multidrug resistant (MDR) E.coli:-

The *E.coli* isolate resistance to more than 8 antimicrobials (belonging to 3 or <3 different classes of antimicrobials) were referred to as MDR *E.coli*. Hence of the 60 isolates tested, 45.5% (27) were resistant to more than 8 drugs whereas 31.3% (19) isolates were resistant to 5 to 8 drugs, 23.2% (14) were resistant to less than 5 drugs.(Fig 3.1).

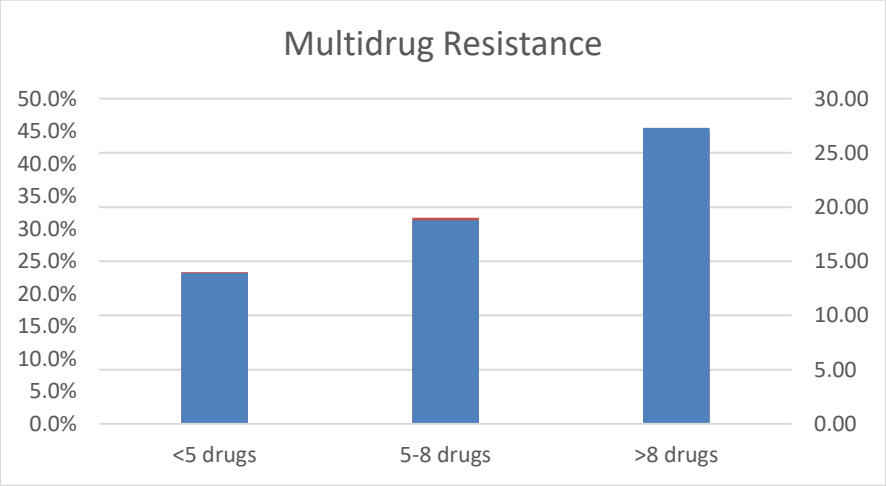


Fig 3.1 Multri-drug Resistance

CHAPTER 05
DISCUSSION

In this study out of total 60 positive samples 17 (28.3%) were males while 43 (71.7%) were females. The highest prevalence of Urinary tract infection were found in those patients whose ages were between 31 to 40 years and 61 to 70 years. In this study antibiotic susceptibility of 60 E.coli isolates against 14 antibiotics were tested. The highest resistance were found against Amoxicillin (60%), Tazobactum (57%) and gentamicin (47%). Rest of the E.coli strains showed a resistance pattern in the range of 2% to 42%. In males most resistance were found against amoxicillin which is

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about 71% but in female the resistance against amoxicillin was 29%, ciprofloxacin in male was 55% but in female it was 45% resistant, and doxycycline was about 43% in males and 67% in females. Moreover, 45.5% isolates were resistant to more than 4 drugs whereas 31.3% isolates were resistant to 2 or 3 drugs and 23.2% were resistant to less than 5 drugs.

As for as the prevalence of Urinary tract infection caused by E.coli with respective to genders and ages group .In our study the prevalence of urinary infections in males were 28.3% while 71.7% were in females while in khan et al., 2021 study the prevalence of UTI in males were 28% while 72% were in females. In the current study, the higher incidence of urinary tract infection were found in between ages of 31 to 40 years and 60 to 70 years, highest resistance were found against amoxicillin which is 60% , 45.5% were resistant to more than 8 drugs which are similar to their findings. The findings are useful for medical officers to determine appropriate antimicrobial treatment in similar cases and it also help health department to formulate antibiotic prescription policies. Education programs and improving the hygienic measures are necessary to prevent contamination with *E.coli* and minimize the use of amoxicillin and amikacin antibiotics. Regular monitoring of antimicrobial susceptibility is recommended.

RECOMMENDATION

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