RESISTANCE OF BACTERIA TAKEN FROM PATIENTS SUFFERING FROM URINARY TRACT INFECTIONS IN THI-QAR PROVINCE TO VARIOUS TYPES OF ANTIBIOTICS

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Abstract: Urinary tract infections are among the most common ailments worldwide, affecting 150 million people a year. UTIs can substantially impair a patient's everyday life as well as their capacity to contribute to society. The current investigation was carried out in January and February of 2024. Forty UTI patients were enrolled in this study: fifteen males (aged 24-90) and twenty-five females (aged 15-84). The commonness of urinary tract infections among female sufferers is higher than of male patients, with samples taken from Al Hussein Hospital demonstrating that 62% of female patients and 37% of male patients affected. All patient age categories were represented in the study samples; the age groups with the highest infection rates, at 40% and 33%, respectively, were those aged 30–40 and 15–30. The current examination looked at several varieties of urinary tract infection-causing bacterial isolates, Escherichia coli had the greatest infection rate (29%), followed by Staphlococcus species (23%), Klebsellia (18%), and Proteus and Pseudomonas (12%). Only 6% of all patients were infected with Enterococcus.

The study aimed to comprehending the relationship between the patient's sociodemographic details, especially age and gender, and the pattern of antibiotic-resistant bacteria in urinary tract infection patients, as well as assessing the results of tests for antibiotic susceptibility for specific isolated bacteria.

Kew word: UTI, Pathogenic Bacteria, Antibiotics Resistance.

Introduction

A particular kind of medication resistance known as antibiotic resistance occurs when a microorganism can withstand the effects of antibiotics. Natural selection drives the evolution of antibiotic resistance by chance mutation, it can even be manipulated by imposing an evolutionary strain on a people. Of the extra-intestinal bacterial diseases that generally occur are infection of the urine tract. Currently, it is among the most prevalent ailments observed in medical practice, impacting patients of every stage of life, including the elderly and babies [1]. Infections of the urinary system are among the most common illnesses globally, affecting 150 million a year. most prevalent illnesses seen in medical practice, affecting patients of all ages, from newborns to the elderly [2]. Many contagions are caused by bacteria that have downward ascended through the intestinal flora to the bladder and kidney across the urethra, this is especially true for females, who are more vulnerable to bacterial transfer since their urethras are deeper and shorter [3]. The rise of antibiotic resistance in the treatment of urinary tract infection is a major public health concern in underdeveloped nations, where is a significant incidence of phony and fake medications of uncertain quality along with high levels of penury, ignorance, and lax hygiene habits [4].

Materials and Methods

There were forty patients in this study, fifteen of them were male and twenty-five were female, varying in age. Samples were taken in January and February of 2024 from Al Hussein Hospital. Mueller-Hinton agar and MacConkey agar were used to cultivate the samples. For twenty-four hours, the infected plates were incubated at 37°C.This test employed the Kirby-Bauer method. A clean cotton swab was dipped into the inoculums to inoculate the surfaces of the plates. Following incubation, the inhibitory zone diameters were measured and recorded in millimeters (mm). By comparing the diameter of the inhibition zone for each antimicrobial agent with the manufacturer's standard, the diameter was translated into the categories of resistant (R), intermediate (I), and sensitive (S) [5].

Result

During the patient's socio-demographic study, a crucial piece of information emerged regarding the proportion of patients of both genders. As depicted in Figure1, fifteen (37.5%) of those diagnosed were male, and twenty-five (62.5%) were female. The data set in Figure2 additionally displayed the proportion of patients' age: 30–45 years old had the highest infection incidence (16/40; 40%), followed by 15–30 years old (13/40; 33%), and 75–90 years old (3/40; 7%). The duration of 60-75 years had the smallest percentage of infections with 12% of cases. The percentage of bacterial infections in patients with urinary tract infections was displayed in the data set in Figure 3. Of the forty samples, five (29%) contained an isolated strain of Escherichia coli, four (23%) contained Staphylococcus bacteria, and the frequency of Klebsiella bacteria was lower (18%). Pseudomonas and Proteus spp. bacteria were found to be infected in 12% of the samples. At 6.6%, Enterococcus had the lowest infection rate. A few selected microbes were tested for antibiotic susceptibility against seven antibacterial medications using the altered Kirby Bauer technique of disk diffusion on Muller Hinton agar, as seen in Figure 4. Though all the isolates from the patients had resistance to ampicillin, erythromycin, gentamicin, and azithromycin, the data indicated that the isolates' susceptibilities and resistance to antibiotics varied. Except for a few Pseudomonas species, they demonstrated azithromycin sensitivity. Except for a few strains of Klebsiella bacteria that demonstrated sensitivity to trimethoprim, every sample also demonstrated resistance to it. As seen in Table 1, certain strains of E. coli bacteria demonstrated susceptibility to the antibiotics imipenem and Nitrofurantion.
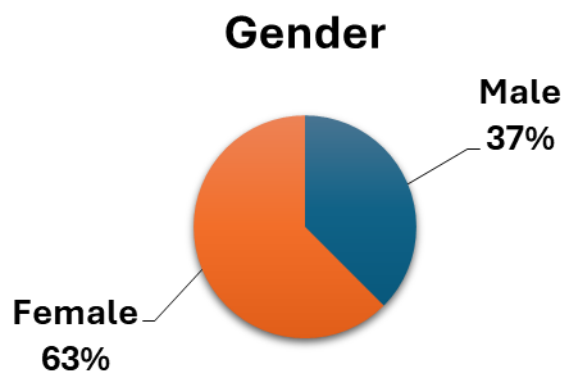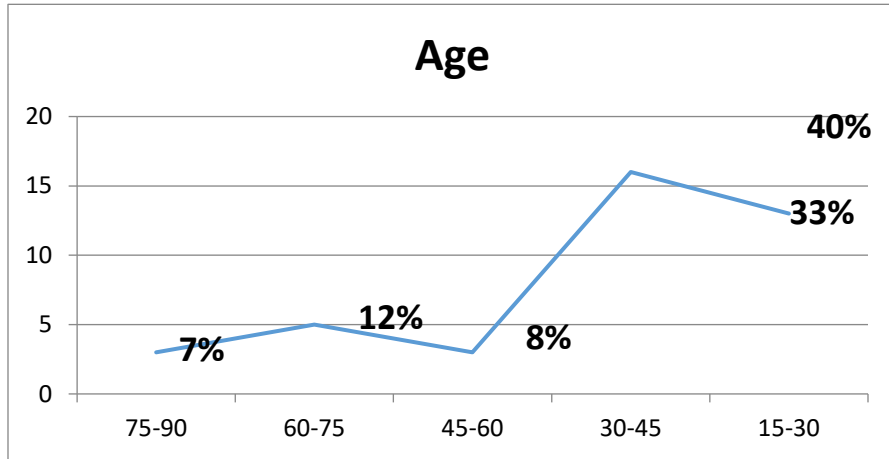

Figure (1): Percentage of Patient of Urinary tract infections according to gender

Figure(2):Percentage of Patient of Urinary tract infections according to Age
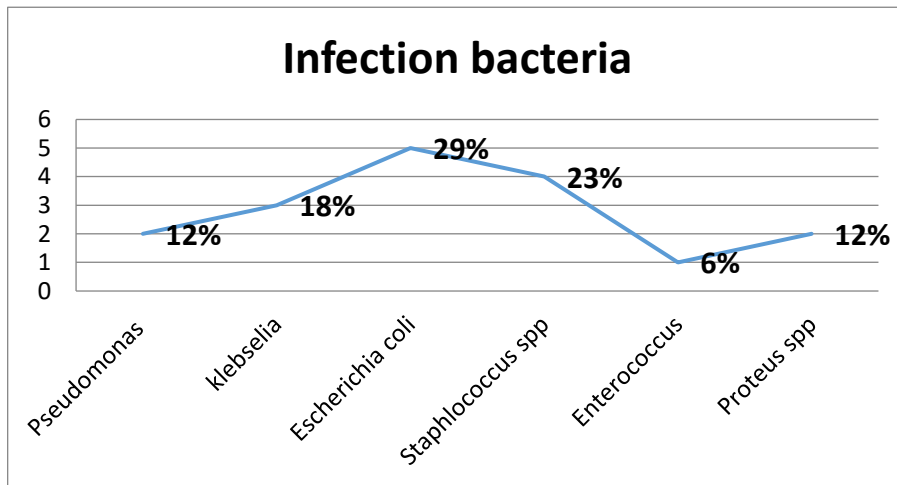

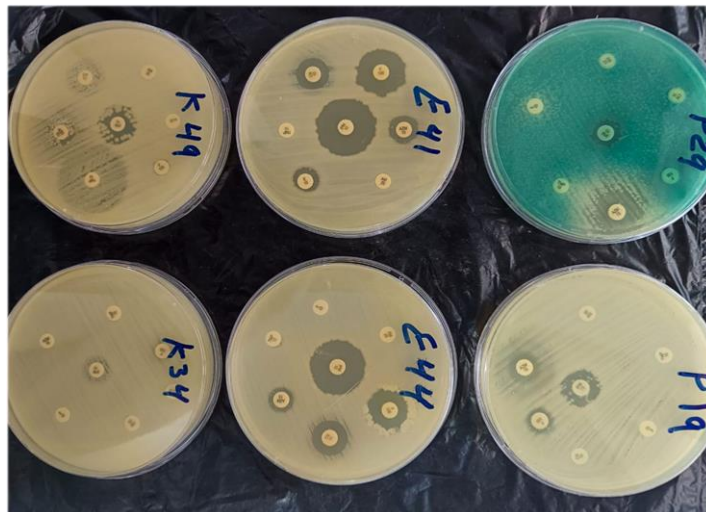**Figure (3):Percentage of Urinary tract infections patient infected with bacteria.**

Figure (4): Sensitivity of the isolates to commonly used antibiotics.

Table (1): Zone of inhibition of isolated bacteria of patients

Antibiotic	Sensitivity	intermediate	Resistance	Zone of inhibition (mm)					
				Isolated species					
				Escherichia coli		Pseudomonas aeruginos		Klebsiella pneuumoniae	
Ampicillin	>17	14-16	≤13	(0) R	(0) R	(0) R	(0) R	(0) R	(0) R
Azithromycin	≥13	-	≤12	(10) R	(11) R	(12) R	(19) S	(0)R	(12) R
Erythromycin	-	-	-	(0) R	(0) R	(0) R	(0) R	(0) R	(0) R
Gentamicin	≥18	15-17	≤15	(15) R	(14) R	(0) R	(0) R	(0) R	(14) R
Imipenem	>23	20-22	≤19	(21) IN	(24) S	(14) R	(11) R	(12) R	(16) R
Nitrofurantion	≥17	15-16	≤14	(15) IN	(19) S	(10) R	(0) R	(0) R	(0) R
Trimethoprim	≥16	11-15	≤10	(0) R	(0) R	(0) R	(0) R	(0) R	(30) S

S: Sensitivity, R: Resistance, IN, intermediate

Discussion

The current study details the degree of antibiotic resistance exhibited by the microorganisms causing UTIs in Nasiriyah for individuals of all ages and genders. The research revealed, with an infection rate of 63% Women are more susceptible to urinary tract infection than men This discovery is connected to earlier research from multiple researchers [6] in Bangladesh, where 64% of patients were female. Their findings are relatively like our study.

According to the current study, E. coli bacteria cause the highest rate of infection (29%). This is consistent with earlier research that found E. coli bacteria to be the primary cause of infection in most cases. It was carried out in Dohuk, northern Iraq (58%) [7], Pakistan (34%) [8], and southern Ethiopia (25%) [9]. Regarding the isolation of Klebsiella bacteria (18%), our investigation yielded results that were similar to those of earlier studies (20%, 10.5%, and 14.3%, respectively). Also, Proteus bacteria appeared at a rate of 12%, this is almost identical to the results of Pakistan, 13.8% [10].

Antimicrobial susceptibility investigation results showed that *E. coli* bacteria had a high level of resistant to ampicillin, gentamicin, and trimethopeim. That contrasts with what was found in [9, 11], which demonstrated the significant antibiotic sensitivity of *E. coli*. Results of another study in [7,12] also showed ampicillin resistance and sensitive to trimethoprim, which was identical to our findings. Imipenem resistance was observed in 18% of the Klebsiella bacteria that were isolated during this study. The results of the isolation were comparable to those of a study carried out in the city of Mosul, where 16.2% of the isolates were isolated; however, this study also demonstrated the high antibiotic sensitivity of Klebsiella [13]. In contrast to our findings, the study carried out in the city of Najaf also revealed a significant sensitivity to imipenem [14]. It has also been demonstrated by other research that Klebsiella resistance to

this antibiotic is low to moderate [15]. The prevalence of Pseudomonas in patients with urinary tract infections was found to be 12%, which is a lower rate than both the 14.3% prevalence in India [16] and the 14.5% overall prevalence in Baghdad [17]. The Baghdad study also revealed similarities with our findings regarding the sensitivity of *E. coli* bacteria to the antibiotic Nitrofurantion; conversely, Pseudomonas demonstrated resistance to this antibiotic, and the India study [17] demonstrated similarities between Pseudomonas in terms of their sensitivity to azithromycin.

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