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A Study on Bacterial Pathogens Causing Urinary Tract Infections and Their Antibiotic Susceptibility Patterns in Some Clinics in Mesallata City

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Abstract:

Background: Urinary tract infection (UTIs) ranks among the most prevalent bacterial illnesses in humans. Misuse of antibiotics increases the possibility of resistant microorganisms. UTIs are difficult to prevent because of the life of bacteria that can be more resistant to antimicrobial drugs. The aim of this study was to determine the prevalence of pathogens isolated from patients with UTI at different ages and genders and the pattern of their susceptibility to antibiotics.

Materials and Methods: The study population was selected from patients attending different outpatient clinics in Msallata city, Libya. This research involved collecting urine specimens from 231 patients with clinically suspected urinary tract infections to assess the prevalence of UTIs and identify pathogens in symptomatic individuals. The specimens were analysed bacteriologically using established protocols. Antimicrobial susceptibility assessments were conducted on the isolated pathogens using the Kirby-Bauer method in accordance with Clinical and Laboratory Standards Institute guidelines.

Results: Out of 231 urine samples (70 male and 161 female) aged 1 month to 80 years, 200 tested positive for urinary tract infection, resulting in 86.6%, whereas 31 (13.4.1%) tested negative for bacterial pathogens. UTI was more common in women (76.5% (153/200) vs. 23.5% (47/200).

The prevalence of Gram-negative bacteria was higher than gram positive bacteria. They were *Escherichia coli* (91/200, 45.5 %); followed by *Klebsiella pneumoniae* (43/200, 21.5 %).

The highest distribution of urinary tract infection among the age groups of patients (40/200, 20 %) was in adults (30 to less than 40 years); followed by the age group (20 to less than 30 years); then children (1 to less than 10 years); the lowest rate (6/200, 3 %) was in the elderly (70 years and more).

Based on the antibiotic sensitivity test of most urinary tract infection isolates. An allergy test showed that isolates of *Escherichia coli*, the most common cause of urinary tract infections, were hypersensitive to Ceftriaxone (CRO), Amoxicillin (AMX), Gentamicin (CN), and Nitrofurantoin (F), while Chloramphenicol (C), Nitrofurantoin worked best against *Klebsiella pneumonia*. While these isolates showed high resistance to Ampicillin (AMP) and Amoxicillin. *Proteus spp*. They were susceptible to ciprofloxacin (CIP) and gentamicin but more resistant to Tetracycline (TE) and Nitrofurantoin.

Staphylococcus aureus and *Streptococcus Faecalis* were resistant to Nalidixic acid (NA) but sensitive to most antibiotics used to varying proportions.

Conclusion: This study highlights the significant occurrence of UTIs among the examined patient population. A diverse range of bacterial species was isolated, with *E. coli* emerging as the most prevalent pathogen, particularly among female patients. Moreover, the majority of these isolates

exhibited high levels of resistance to the isolated antimicrobial agents, reflecting the growing concern about antibiotic resistance in UTI management.

Keywords: Urinary tract infection ; Urine culture ; Antibiotic sensitivity testing.

1- Introduction

Urinary tract infections are a major health concern that impact millions of individuals annually. Urinary tract infections affect both sexes and are the second most prevalent kind of infection in the body **(Morgan & McKenzie, 1993)**. Due to their morphology and reproductive physiology **(Vasudevan, 2015)**, women are more susceptible to the infection than men, even though both sexes are exposed to it. In women aged 20 to 40, the incidence ranges between 25 and 30%, while in elderly patients, older women over 60, it ranges between 4 and 43% **[Stamm & Hooton, 1993; Pinson *et al.*, 1994]**.

In addition, urinary tract infections are among the most common infectious diseases that appear on an outpatient basis. It can be caused by many fungi and viruses, however, bacteria are considered to be the most common causative agent **(Foxman, 2014)**. Only 10% of urinary tract infections are caused by Gram-positive bacteria, while 90% are caused by Gram-negative bacteria. Several factors determining the presence of bacteria (more than 10^5/ML) in the urine determine the frequency of urinary tract infection **(Zone & Guide, 2017)**.

According to **Seifu & Gebissa (2018)**, *staphylococcal* species account for about 10-15% of urinary tract infections, while *Escherichia coli* is the main pathogen of urinary tract infections, accounting for about 65-90%. Moreover, according to **Vasudevan (2015)**, other bacterial species such as *Klebsiella*, *Pseudomonas*, *Proteus*, and *Enterococcus* have little effect on the occurrence of infection.

UTIs are associated with age, parity, pregnancy, pregnancy, and the presence of conditions that can exacerbate the infection **(Vasudevan, 2015)**.

Urinary tract infections, especially in humans with diabetes, can lead to serious complications that include organ damage, dysuria (pain or burning sensation during urination) and even loss of life due to pyelonephritis in severe cases **(Litwin *et al.*, 2005)**.

In most scientific microbiology laboratories, urine samples are tested more frequently than all other types of samples **[Williams and Schaefer, 2004; Mittal *et al.*, 2004]**.

The rapid sensitivity to silent bacteriuria makes the diagnosis of UTI particularly difficult in elderly individuals **[Mittal *et al.*, 2004; Mittal *et al.*, 2009]**.

When treating a urinary tract infection, antibiotics are usually given before the results of microbiological tests. This will lead to treatment failure and antibiotic resistance **[Butler *et al.*, 2015; Zone & Guide, 2017]**.

One of the most important developments in cutting-edge pharmaceutical medicine became the discovery of antibiotics. however, provision and overuse of antibiotics eventually leads to microbial resistance to them **(Butler *et al.*, 2017)**. The **World Health Organization stated in 2014** that antibiotic resistance is becoming an international public health issue and a major opportunity for modern pharmaceutical medicine as a result, every usa has focused on this dependently **(World Health Organization, 2021)**. By identifying and recognizing the bacteria that cause UTIs, antibiotic resistance can be addressed effectively **(Gágyor *et al.*, 2015)**.

2. Material and Methods

This study relied on collecting urine samples from 231 patients with urinary tract infections to measure the prevalence of urinary tract infections and identify pathogens in patients with clinical symptoms of UTI.

2.1. Area and period of study

The study population was selected from patients attending some outpatient clinics in the city of Mesallata – Libya. Overall, 231 untreated outpatients with different clinical symptoms of UTIs, were involved in this study which had a duration from February 2025 to November 2025.

2.2. Inclusion criteria

This study included patients of different ages and genders who had symptoms of or were suspected of having a urinary tract infection (pyelonephritis or cystitis).

2.3. Exclusion criteria

In this study Patients having a urinary catheter, stent, were not included, nor were those with asymptomatic bacteriuria.

2.4. Collection and working with samples

Airtight, well-sterilized containers of appropriate size were used to collect early morning urine samples for rapid analysis. To minimize the possibility of contamination, each patient received appropriate sampling instructions **(Gilbert *et al.*, 2018)**.

Within no more than two hours of collecting the urine sample, maintaining a room temperature of 25 degrees Celsius, each sample was classified to include the patient's age and gender and processed in the laboratory using routine urinalysis to confirm the presence of infection and urine culture to identify the bacterial species causing urinary tract infections using standard pour plate method, 100 µl of urine samples were placed on two types of media: macConkey agar and blood agar (Oxoid, UK) **(Sewify *et al.*, 2016)**.

The urine samples were incubated at a temperature of 37°C for 24–48 hours to allow bacterial growth and isolation of urinary tract pathogens. Subsequently, antimicrobial susceptibility testing was performed using antibiotic discs.

The type of microorganisms causing urinary tract infections was identified after the culture process by studying the characteristics of the growing colonies, performing a Gram stain to determine the shape and arrangement of the bacteria, and conducting biochemical tests.

The some most important antibiotics that have been used Ampicillin (AMP), Amoxicillin (AMX), Ciprofloxacin (CIP), Ceftriaxone (CRO), Nalidixic acid (NA), Tetracycline, Gentamicin (CN), Nitrofurantoin (F) and Sulfamethoxazole (SXT). Isolated microbes were classified as sensitive, intermediate, and resistant to antibiotics according to the attached standardized table (Hudzicki, 2009).

According to the Clinical and Laboratory Standards Institute, the Kirby–Bauer disk diffusion method was used to test bacterial sensitivity to antibiotics on Mueller–Hinton agar medium **(Hudzicki, 2009)**, using a sterile cotton swab to spread the surface of the agar plates.

Antibiotic tablets were placed by the tablet diffusion method and containing a specific concentration obtained from the company (Oxoid) were placed on the agar surface using sterile technique. The antibiotic results were described by measuring the diameter of the inhibition zone to the nearest millimeter using a ruler or caliper; the measurement includes the diameter of the disk and comparing it to the antibiotic sensitivity chart **(Hudzicki, 2009)**.

According to the criteria established by **Sewify *et al.*, (2016)**, bacterial isolates are classified as susceptible (S) when the diameter of the inhibition zone exceeds 17 mm, intermediate (I) when it ranges from 12 to 17 mm, and resistant (R) when it is less than 12 mm.

2.5. Statistical Analysis

The data was entered into the computer after coding; to perform the statistical operations required for data analysis using the statistical program, statistical packages for social sciences (SPSS , Version 28.0) **(IBM Corp., 2021)**,), were used to answer the questions of the study at a significant level (0.05), which is an acceptable level in the social and human sciences in general, Since we sometimes need to calculate some reliable indicators of the phenomenon in terms of the value at which values

are averaged or discounted, in terms of the degree of homogeneity of the values taken by the variable, and also whether there are anomalous values Therefore, we need to present some statistical measures by which we can identify the characteristics of the phenomenon in question, as well as the possibility of comparing two or more phenomena.

The most important of these are measures of centralism and dispersion. The following has been used:

- Frequency distributions: to determine the number of frequencies, and the percentage of repetition of all study variables.
- Chi^2 test to determine differences between response ratios in non-ordinal measures

3. Results

Of the 231 urine samples tested (70 male and 161 female) aged between 1 month and 80 years old, 200 individuals tested positive for urinary tract infection, resulting in a total incidence of 86.6%, while 31 (13.4%) were negative for the presence of bacterial pathogens (no bacterial growth). The majority of the study participants were female, 69.7% (161/231). All patients participating in the study were from the city of Mesallata (Table 1).

The prevalence of UTI was higher in females than in males (76.5% (153/200) vs. 23.5% (47/200)), as the majority of bacterial species were isolated from female patients, but the difference was not statistically significant (P = 0.565); however, only 47/200 (23.5%) isolates were from male patients.

Table 1: prevalence of UTI infection among males and females

	UTI infection				Total (n=231)	
	Positive (n=200)		Negative (n= 31)			
Gender	No	%	No	%	No	%
Male	47	23.5	20	64.5	67	29
Female	153	76..5	11	35.5	164	71

The most common microorganisms isolated in both genders were 153/200 (76.5%) in females and 47/200 (23.5%) in males of the total urine culture. where the prevalence of Gram-negative bacteria was higher than that of Gram-positive bacteria. They were *Escherichia coli* (91/200, 45.5%), followed by *Klebsiella pneumoniae* (43/200, 21.5%); then *Staphylococcus aureus* (30/200, 15%); *Proteus spp.* (18/200, 9%); and the smallest number of isolated microorganisms was *Streptococcus Faecalis* (18/200, 9%) (Table 2).

Table 2: Results of Chi-square test to determine the relation between Type of Bacteria and gender

UTI pathogen	Prevalence of UTI (Male) n=47		Prevalence of UTI (Female) n=153		Total infection (n=200)		P-Value Sig.
	No	%	No	%	No	%	
E. coli	20	42.5	71	46.4	91	45.5	
K. pneumoniae	10	21.3	33	21.6	43	21.5	**0.565**
Proteus spp.	3	6.4	15	9.8	18	9	
S. aureus	7	14.9	23	15	30	15	
S. Faecalis	7	14.9	11	7.2	18	9	
Chi^2 Calculated = 2.958 , df=4 , Chi^2 Tabular = 9.488							

***P*-value <0.05 Significant , P-value <0.01 Highly significant , P-value > 0.05 non-Significant**

Table No. (2) indicates that the chi-square value is (2.958), which is lower than the critical threshold of (9.488). This suggests that there was no significant relationship between gender and the kind of urinary tract bacteria, as corroborated by the P-value (0.565), which is above 0.05.

As for the age group the highest prevalence (40/200, 20%) was found in the age group of 30 to less than 40 years. The next age group was 20 to less than 30 years, followed by children aged 1 to less than 10 years. The elderly (70 years and older) showed the lowest incidence (06/200, 3%)(Table 3).

Table 3: Results of Chi-square test to determine the relation between Type of bacteria and the age

Age		bacteria					Total	P-Value Sig.
		S. aureus	E.coli	*Proteus spp.*	*K. pneumoniae*	*S. Faecalis*		
less than 1 year	NO.	1	8	0	3	1	13	0.032
	%	7.7%	61.5%	0.0%	23.1%	7.7%	100.0%	
1 to less than 10 years	NO.	5	13	2	6	4	30	
	%	16.7	43.3	6.7	20	13.3	100.0%	
10 to less than 20 year	NO.	6	15	5	3	0	29	
	%	20.7%	51.7%	17.2%	10.3%	0.0%	100.0%	
20 to less than 30year	NO.	5	14	2	8	4	33	
	%	15.2%	42.4%	6.1%	24.2%	12.1	100.0%	
30 to less than 40year	NO.	9	20	5	3	3	40	
	%	22.5%	50.0%	12.5%	7.5%	7.5%	100.0%	
40 to less than 50year	NO.	0	12	2	5	2	21	
	%	0.0%	57.1%	9.5%	23.8%	9.5%	100.0%	
50 to less than 60year	NO.	2	3	0	6	3	14	
	%	14.3%	21.4%	0.0%	42.9%	21.4%	100.0%	
60 to less than 70year	NO.	0	6	1	6	1	14	
	%	0.0%	42.9%	7.1%	42.9%	7.1%	100.0%	
70 years and more	NO.	2	0	1	3	0	6	
	%	33.3%	0.0%	16.7%	50.0%	0.0%	100.0%	
Total	**NO.**	**30**	**91**	**18**	**43**	**18**	**200**	
	%	15.0%	45.5%	9.0%	21.5%	9.0%	100.0%	
Chi^2 Calculated = 48.373 , df=32 , Chi^2 Tabular = 43.773								

Table 3 indicates that the computed chi-square value is (48.373), exceeding the tabulated value of (43. 773).This signifies a correlation between age and the type of urinary tract bacteria, corroborated by the p-value (0.032), which is below 0.05.

The table shows that the prevalence of *K. pneumonia* escalates with age, especially among individuals aged 50 and older. It was noted that *S. aureus* and fecal bacteria decreased in individuals aged 40 years and older, while *E. coli* was absent in those aged 70 years and more . Moreover, bacteria of the genus *Proteus spp*. she was absent in the age group from 50 to under 60 years.

The results of the allergy showed test indicated that the isolates of *E. coli* were hypersensitive to ceftriaxone (82.4%), followed by amoxicillin (81.3%) and both gentamicin, nitrofurantoin (79.1% each), and then ciprofloxacin (75.8%). The sensitivity to tetracycline and sulfamethoxazole was low, at 59.3% and 51.6%, respectively. Additionally. Furthermore, these isolates exhibited high resistance

to ampicillin (28.6%), nalidixic acid, chloramphenicol, and sulfamethoxazole, as well as tetracycline (20.9% each).

The *K. pneumoniae* isolates were extremely resistant to ampicillin (88.4%) and amoxicillin (79.07%) but highly sensitive to nitrofurantoin (48.8%) and chloramphenicol (55.8%).

prosecution of *Proteus spp*. allergies. Some isolates (38.9%) were resistant to tetracycline and nitrofurantoin, followed by chloramphenicol and ampicillin (22.2%) and varying degrees of resistance to the remaining antibiotics (Table 4). The isolates' rates of sensitivity to gentamicin and ciprofloxacin were in the range (72.2% and 55.5%), respectively.

S. aureus isolates showed low sensitivity to most tested antibiotics. The isolates exhibited a sensitivity of 66.7% to sulfamethoxazole and 56.7% to chloramphenicol, while demonstrating significant resistance of 50% to ampicillin and 60% to nalidixic acid.

S. faecalis bacteria were most sensitive to chloramphenicol (72.2%), followed by nitrofurantoin (61.1%) and gentamicin (55.5%).

The highest percentage of resistance was against nalidixic acid antagonists and tetracycline (61.1% each) (Table 4).

Table 4: Antimicrobial susceptibility patterns of bacterial isolates causing UTI.

Bacterial isolates	Antimicrobial susceptibility	Percentage (%) of isolates									
		AMP (10 µg)	CIP (5 µg)	AMX (10 µg)	C (30 µg)	NA (30 µg)	CN (10 µg)	CRO (30 µg)	TE (30 µg)	SXT (25 µg)	F (300 µg)
E. coli N=91	S	62 (68.1%)	69 (75.8%)	74 (81.3%)	65 (71.4%)	67 (73.6%)	72 (79.1%)	75 (82.4%)	54 (59.3%)	47 (51.6%)	72 (79.1%)
	I	3 (3.3%)	4 (4.4%)	6 (6.6%)	7 (7.7%)	5 (5.5%)	4 (4.4%)	12 (13.2%)	18 (19.8%)	25 (27.5%)	4 (4.4%)
	R	26 (28.6%)	18 (19.8%)	11 (12.1%)	19 (20.9%)	19 (20.9%)	15 (16.5%)	4 (4.4%)	19 (20.9%)	19 (20.9%)	15 (16.5%)
K. pneumoniae N=43	S	1 (2.3%)	4 (9.3%)	4 (9.3%)	24 (55.8%)	10 (23.3%)	6 (14%)	16 (37.2%)	15 (34.9%)	13 (30.2%)	21 (48.8%)
	I	4 (9.3%)	10 (23.3%)	5 (11.6%)	3 (7%)	2 (4.6%)	24 (55.8%)	3 (7%)	26 (60.5%)	27 (62.8%)	4 (9.3%)
	R	38 (88.4%)	29 (67.4%)	34 (79.1%)	16 (37.2%)	31 (72.1%)	13 (30.2%)	24 (55.8%)	2 (4.6%)	3 (7%)	18 (41.9%)
Proteus spp. N=18	S	3 (16.7%)	10 (55.5%)	7 (38.9%)	9 (50%)	8 (44.4%)	13 (72.2%)	3 (16.7%)	4 (22.2%)	5 (27.8%)	7 (38.9%)
	I	11 (61.1%)	5 (27.8%)	8 (44.4%)	5 (27.8%)	7 (38.9%)	3 (16.7%)	13 (72.2%)	7 (38.9%)	10 (55.5%)	4 (22.2%)
	R	4 (22.2%)	3 (16.7%)	3 (16.7%)	4 (22.2%)	3 (16.7%)	2 (11.1%)	2 (11.1%)	7 (38.9%)	3 (16.7%)	7 (38.9%)

S. aureus N=30	S	8 (26.7%)	14 (46.6%)	8 (26.7%)	17 (56.7%)	4 (13.3%)	13 (43.3%)	15 (50%)	15 (50%)	20 (66.7%)	15 (50%)
	I	7 (23.3%)	8 (26.7%)	8 (26.7%)	9 (30%)	8 (26.7%)	6 (20%)	8 (26.7%)	5 (16.7%)	4 (13.3%)	7 (23.3%)
	R	15 (50%)	8 (26.7%)	14 (46.6%)	4 (13.3%)	18 (60%)	11 (36.7%)	7 (23.3%)	10 (33.3%)	6 (20%)	8 (26.7%)
S. faecalis N=18	S	8 (44.4%)	7 (38.9%)	3 (16.7%)	13 (72.2%)	2 (11.1%)	10 (55.5%)	4 (22.2%)	4 (22.2%)	5 (27.8%)	11 (61.1%)
	I	5 (27.8%)	8 (44.4%)	10 (55.5%)	2 (11.1%)	5 (27.8%)	5 (27.8%)	7 (38.9%)	3 (16.7%)	4 (22.2%)	3 (16.7%)
	R	5 (27.8%)	3 (16.7%)	5 (27.8%)	3 (16.7%)	11 (61.1%)	3 (16.7%)	7 (38.9%)	11 (61.1%)	9 (50%)	4 (22.2%)

S–susceptible, I=intermediate, R= resistant

4. Discussion

This study aimed to identify the microbial species responsible for urinary tract infections among various groups at the Tashafi Center Medical Laboratory, Al Balsam Medical Laboratory for Medical Analysis, and Al-Amal Specialized Clinic in Mesallata, Libya, as well as to assess their antibiotic sensitivity. The overall prevalence of urinary tract infections in analyzed urine specimens was 86.6%. The prevalence in the present study exceeded that documented in prior research conducted in Tripoli, Libya (55.00%); Sobrata, Libya (63%); and Algmel, Libya (56.69%) **[Ben Ashur *et al.*, 2021; Fatnasa *et al.*, 2013],** respectively.

In this study, urinary tract infections (UTIs) were more prevalent in females (153 out of 200; 76.5%) compared to males (47 out of 200; 23.5%). This outcome was anticipated due to women's shorter urethras and closer proximity to the anus, which facilitates the entry of pathogens into the urinary tract, rendering them more susceptible to urinary tract infections. The findings of multiple prior studies [**Ben Ashur *et al.*, 2021; Salem & Ahmed, 2018; Mohammed *et al.*, 2016]** corroborate this revelation.

Several factors may explain this higher prevalence among females. Sexual activity is recognized as a key risk factor **(Salim *et al.*, 2017)**, while disturbances in vaginal microflora can promote colonization by coliform bacteria, increasing the likelihood of infection **(Hooton and Stamm, 1997)**. Inadequate personal hygiene, such as wiping the perineal area from back to front, may also contribute to the introduction of bacteria into the urinary tract **(Modarres and Oskoii, 1997)**. Conversely, males appear less prone to UTIs, likely due to the longer urethral length and the protective antimicrobial properties of prostatic fluid **(Kausar *et al.*, 2013)**.

According to the present study, people between the ages of 30 and 39 had the highest prevalence of urinary tract infections (UTIs). This result might be explained by the fact that this age group engages in sexual activity more frequently, which is a known risk factor for UTIs. Those between the ages of 20 and 29 had the second-highest prevalence, with youngsters between the ages of 1 and under 10 accounting for 19.2% of instances. On the other hand, older people 60 years of age and older had the lowest infection rates. These findings are mostly in line with other research that has shown that adults had a greater prevalence of UTIs than other age groups **(Salem & Ahmed, 2018; Mohammed *et al.*, 2016)**.

However, contradictory findings have been reported elsewhere. For instance, **Magliano *et al.*, (2012)** found the highest incidence among elderly individuals (58.7%), followed by adults (36.2%) and children (5.1%). Such discrepancies may stem from variations in study populations, geographic settings, levels of health awareness, hygiene practices, and diagnostic methods. Additionally, differences in sample size and the clinical criteria used for defining UTIs may influence reported prevalence rates.

Regarding the causative uropathogens In the present study, gram-negative bacteria were identified as the predominant causative agents of urinary tract infections (UTIs). Escherichia coli was the most frequently isolated organism, accounting for 45.5% of cases, followed by Klebsiella pneumoniae at 21.5%. In contrast, Streptococcus faecalis and Proteus spp. were less prevalent, each accounting for 9% of isolates (Table 1).

These findings are generally consistent with global trends, where *E. coli* is typically the leading uropathogen. However, the relative proportions of isolates vary across different regions. For instance, a study conducted in Libya by **Ben Ashur *et al.*, 2021** reported *E. coli* as the most common isolate (55.68%), followed by *K. pneumoniae* (20.46%). Similarly, **Mohammed *et al.*, 2016** in a study conducted in Messalata, Libya, found *E. coli* at 55.6% and *K. pneumoniae* at 16.3% . In Misurata City, libya a similar pattern was observed, with *E. coli* accounting for 50% and *K. pneumoniae* for 23% of UTI cases **(Salim *et al.*, 2017)**.

Data from Tripoli, Libya, revealed a different distribution of uropathogens, with *K. pneumoniae* accounting for 43.6% of isolates, followed by *E. coli* at 33% **(Salem & Ahmed, 2018)**. These regional variations in uropathogen prevalence may be attributed to differences in climate, population demographics, antibiotic usage patterns, and local healthcare practices.

Although the uropathogens isolated in this study exhibited high sensitivity to certain antibiotics, the overall antimicrobial resistance pattern remains a significant concern. The isolates obtained from urinary tract infections (UTIs) demonstrated notable resistance to various classes of antibiotics. Most isolates were resistant to at least two or three antimicrobial agents, indicating the prevalence of multidrug-resistant (MDR) strains among UTI pathogens.

These findings are in agreement with several previously published studies **[Abujnah *et al.*, 2015; Ben Ashur *et al.*, 2021; Mohammed *et al.*, 2016]**, which reported that most UTI-associated isolates exhibited high levels of resistance to antibiotics. This growing resistance emphasizes the urgent need for continuous surveillance and prudent use of antimicrobial agents in clinical practice. It also highlights the importance of performing routine susceptibility testing to guide appropriate and effective treatment strategies.

This observed resistance may be attributed to several factors, including the widespread misuse and over prescription of antibiotics, self-medication, and the lack of routine antimicrobial stewardship programs particularly in developing countries such as Libya, where antibiotics are often freely available without prescription. Furthermore, the genetic adaptability of uropathogens enables them to acquire resistance genes through plasmids and other mobile genetic elements, facilitating the rapid emergence and dissemination of resistant strains within the community and healthcare settings.

The persistence of multidrug-resistant uropathogens poses a serious threat to public health, potentially leading to prolonged illness, increased healthcare costs, and limited therapeutic options. Therefore, it is imperative to implement targeted interventions, such as reinforcing infection control measures, promoting public awareness regarding antibiotic misuse, and developing new antimicrobial agents.

5- Conclusion

In this study, it has been found that:

1- The prevalence of UTI among patients in Mesallata City is 86.6 %.

2- The prevalence of UTIs was high in females than in males because of the obvious anatomical and physiological differences among both sexes.

3- There wasn't a statistically significant relation between gender and the type of urinary tract bacteria, and this is confirmed by P-Value (0.565), which was greater than 0.05.

4- Among the bacterial isolates from the study, Gram-negative bacteria are the commonest organisms isolated from UTI patients among which *E coli* and *Klebsiella species* are the two principal urinary pathogens.

5-the study found that the percentage of bacteria *K. Pneumonie* increases with older age groups, specifically those aged 50 years and older. It was also noted that Staphylococcus aureus and fecal bacteria decreased in the age group of 40 years and older, and *Escherichia coli* bacteria disappeared from the age group of 70 years and older. In addition, *Proteus* bacteria Spp. he disappeared from the age group from 50 to under 60 years.

6- There was a statistically significant relation between Age and type of urinary tract bacteria, since p-value (0.032) which was less than 0.05.

7- Because of highly resistant bacteria to antibiotics, physicians must prescribe appropriate antibiotics depending in appropriate doses and for an appropriate period of time on antibiotics susceptibility results. Otherwise, routine monitoring of antimicrobial resistance among uropathogens must be accomplished to guide the treatment of UTIs in the country.

Therefore, routine surveillance is essential to provide the healthcare professional with expertise on the easiest empirical approach to UTI today .

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