TO COMPARE THE OUTCOME OF PATIENTS WITH URINARY TRACT INFECTIONS BASED ON CLINICAL AND MICROBIOLOGICAL PROFILE IN TERTIARY CARE HOSPITAL

Section A-Research paper

TO COMPARE THE OUTCOME OF PATIENTS WITH URINARY TRACT INFECTIONS BASED ON CLINICAL AND MICROBIOLOGICAL PROFILE IN TERTIARY CARE HOSPITAL

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Abstract

BACKGROUND: Urinary tract infections are bacterial infections, affecting people of all ages and genders, The clinical manifestation of a UTI can vary based on the site of infection. Symptoms of Lower UTIs(cystitis) include lower abdominal pain, burning micturition, dysuria, pyuria, and upper UTI (pyelonephritis) including fever, chills, and rigors. Early diagnosis with urine routine and urine culture with appropriate antibiotics shows better treatment outcomes. Asymptomatic bacteriuria patients not be treated with antibiotics which increases antimicrobial resistance according to IDSA guidelines, so framing and following antibiogram and treating according to guidelines is important.

METHODS: The prospective observational study was conducted in tertiary care hospital in Chennai. A total of 80 patients were recruited in the study, following a six-month observational study, Data includes baseline demographic details, patient clinical profile, microbiological profile, and treatment outcomes. The obtained results were recorded and statistically evaluated using SPSS software version 26 for Windows.

RESULTS: In our study, the prevalence of UTI is more common in females than males, The symptoms were present in 71 patients. Urine routines were sent to all the patients. Urine cultures were sent to 49 patients. The number of patients diagnosed with lower UTI is 40, upper UTI is 31, and asymptomatic bacteriuria is 9. E.coli was the most common pathogen reported (20%). Patients treated with definitive therapy has lesser hospital stay and better outcome when compared with the empirical therapy.

CONCLUSION: Our study concludes that treating patients with empirical therapy shows a gradual increase in their length of stay in the hospital which encourages the emergence of bacterial resistance and results in a deterioration in a patient's outcome. According to IDSA guidelines treating asymptomatic bacteriuria patients have a high chance of resistance. Therefore, following hospital antibiogram policy and taking urine cultures for symptomatic patients and treating patients definitive would result in good treatment outcome.

KEYWORDS: Empirical therapy, IDSA guidelines, antibiotics resistance, urine culture, definitive therapy, asymptomatic bacteriuria

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INTRODUCTION:

Urinary tract infections (UTIs) are among the most prevalent bacterial infections, affecting people of all ages and genders. UTIs can affect various parts of the urinary tract, including the bladder, urethra, ureters, and kidneys, and if left untreated or recurrent, they can have complications in a patient's health [1].

The clinical manifestation of a urinary tract infection can vary based on the site of infection. Lower UTIs primarily affect the bladder and urethra, causing symptoms such as frequent and painful urination, urgency, turbid or bloody urine, and frequency of urination. In addition, upper UTIs involve the kidneys and can result in more severe symptoms, such as flank pain, fever, chills, rigors, and systemic signs of infections [2].

Bacterial pathogens, particularly Escherichia coli followed by Klebsiella pneumoniae, pseudomonas, enterococcus, and proteus organisms are the most common cause of urinary tract infections. UTIs can start in the lower urinary tract (cystitis) and progress to the upper urinary tract (pyelonephritis) If left untreated. Urine culture remains the gold standard diagnostic method, although quick diagnostic techniques, molecular approaches, and point-of-care testing are potential alternatives [3]. UTIs are considered to be appropriately treated with an empiric antibiotic if the antibiotic is prescribed prior to urine culture results and the identified microorganisms fall it should be based on susceptibility testing. If the microorganisms were reported to be susceptible to an antibiotic, treatment with that antibiotic should switch to definitive [4]. Asymptomatic bacteriuria patients should not be treated with antibiotics except to immunocompromised patients and pregnancy patients according to IDSA guidelines because of the increasing prevalence of antibiotic resistance. UTIs are normally treated with antibiotic medication tailored to the specific infection and susceptibility pattern [5] The optimal use of antimicrobial agents in hospitalized patients includes a correct selection of empiric antimicrobials agents and a switch to the targeted agents after urine culture results inappropriate prescribing not only results in poor health-related outcomes but also increases the risk of antimicrobial resistance [6] To know the treatment pattern and patient outcome in UTI we compare the outcome of UTI patients based on clinical symptoms and microbiological profile like urine routine and urine culture with the appropriateness of antibiotics therapy by analyzing the patient's length of stay in the hospital and their outcomes.[7]

AIM & OBJECTIVES:

AIM:

- To assess the outcome of patients with urinary tract infection based on the clinical and microbiological profile in tertiary care hospital.

OBJECTIVES:

PRIMARY OBJECTIVE:

- To evaluate the treatment of empirical and definitive therapy for UTI patients in the public sector hospital.

SECONDARY OBJECTIVE:

- To identify the therapeutic management for asymptomatic and symptomatic urinary tract infection patients

METHODOLOGY:

The prospective observational study was conducted in tertiary care hospital Chennai. A total of 80 patients were recruited in the

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study, following a six-month (September 2022 – march 2023) observational study, baseline demographic details, patient clinical profile, microbiological profile and their treatment outcomes. The obtained results were recorded and statistically evaluated using SPSS software version 26 for windows.

STUDY INSTRUMENT:

Clinical and microbiological data will be collected in google forms and case sheets.

STUDY PROCEDURE:

- ✓ This study will start with participants who are willing to attend and they will be selected and analyzed based on their answers.
- ✓ Participants will be informed about the study objectives, duration, and declaration of confidentiality.
- ✓ After getting proper consent from the participants, the data will be collected from the patient through google forms and case

STATISTICAL ANALYSIS:

After completing the data collection all the study parameters will be recorded on the spreadsheet, and categorical variables will be analyzed using the chi-square test in SPSS version 26 for Windows. P value <0.05 was considered statistically significant.

INCLUSION CRITERIA:

1. Subjects with proven or suspected urinary tract infections.

2. Participants who are under antibiotic therapy.

3. UTI participants who are willing to provide consent for the study.

EXCLUSION CRITERIA:

1. Participants who are not willing to give Consent for the study.

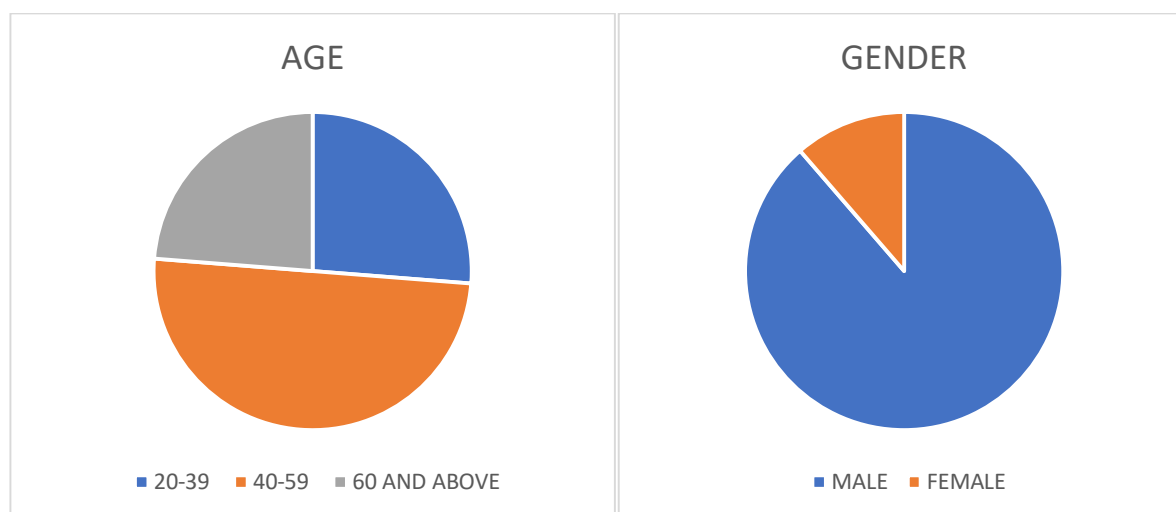2. Pregnancy women and other immunocompromised patients are not included in the study.

EXPECTED OUTCOMES:

1. To emphasize the importance of culture sensitivity for definitive therapy in the management of UTI.

2. An estimation of the usage of antibiotics in the management of asymptomatic cases according to IDSA guidelines

RESULTS AND DISCUSSION:
TABLE: 1 AGE AND GENDER

	VARIABLES	FREQUENCY	PERCENT
AGE	20-39	21	26.3
	40-59	40	50.0
	60 AND ABOVE	19	23.8
GENDER	MALE	25	31.3%
	FEMALE	55	68.8%

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FIGURE 1:

From the study, baseline characteristics grouping among the patient were included.

TABLE 1: The above-mentioned table depicts that 21 participants (26.3%) were between the ages of 20 and 39. Additionally, 40 participants (50%) fell within the age range of 40 to 59 years, followed by 19 participants (23.8%) who were 60 years old or above. The study also revealed that male participants accounted for 25 (31.3%) of the total, while female participants represented the majority at 55 (68.8%). These findings indicate that the number of male patients in this study is lower than that of female patients.
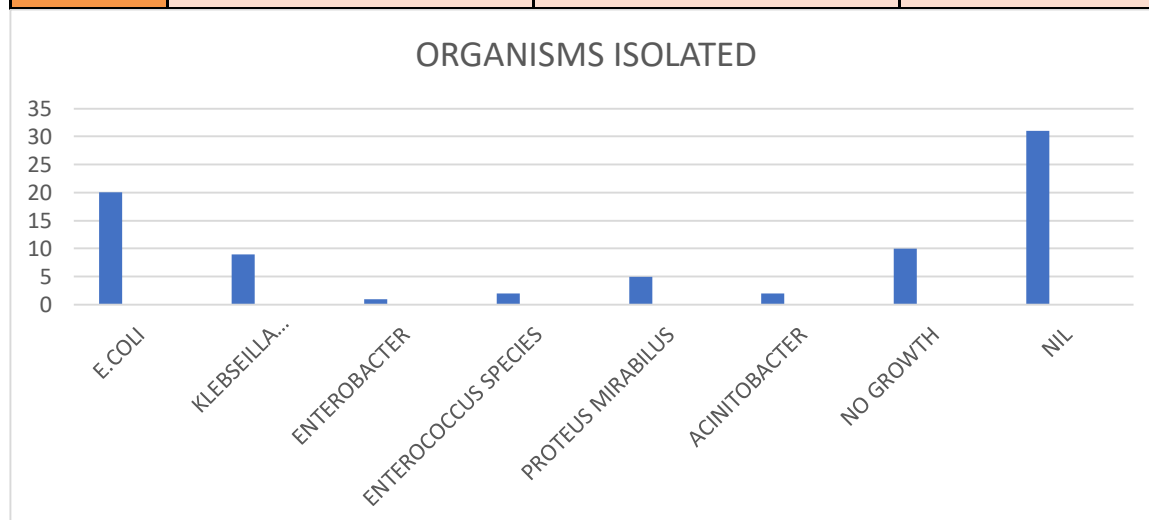
TABLE 2: PATIENTS HISTORY

	VARIABLES	**FREQUENCY (n)**	**PERCENTAGE (%)**
SYMPTOMS	YES	71	88.8%
	NO	9	11.3%
URINE ROUTINE	YES	80	100%
PRESENCE OF PUS CELLS	BELOW 10	34	42.5%
	10 AND ABOVE	46	57.5%
DIAGNOSIS	LOWER UTI	40	50.0%
	UPPER UTI	31	38.8%
	ASYMPTOMATIC BACTERIURIA	9	11.3%
URINE CULTURE TAKEN	YES	49	61.3%
	NO	31	38.8%

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TABLE 2: The depicted table illustrates the symptoms experienced by the patients. It shows that 71 patients (88.8%) had symptoms, while 9 participants (11.3%) did not exhibit any symptoms. The urine routine of all the participants was analyzed, with 80 individuals (100%) having their urine routine examined. Among the urine routine results, the presence of pus cells was observed. Specifically, 34 participants (42.5%) had pus cells below 10, while 46 participants (57.5%) had pus cells present.

The diagnoses of the patients were analyzed and categorized into three groups: upper UTI 31(38.8%), lower UTI 40(50.0%), and asymptomatic bacteriuria 9(11.3%). Based on the symptoms presented by the patients,40(50%) had lower UTI, patient with upper UTI 31(38.8%) and 9(11.3%) are asymptomatic bacteriuria patients. Regarding urine culture, 49 patients (61.3%) had their urine culture sent for analysis, while 31 patients (38.8%) did not have their urine culture sent.

TABLE 3: ORGANISMS ISOLATED

SI NO.	URINE CULTURE TAKEN	FREQUENCY (n)	PERCENTAGE (%)
1.	E.COLI	20	25.0 %
2.	KLEBSEILLA PNEUMONIAE	9	11.3%
3.	ENTEROBACTER	1	1.3%
4.	ENTEROCOCCUS SPECIES	2	2.5%
5.	PROTEUS MIRABILUS	5	6.3%
6.	ACINITOBACTER	2	2.5%
7.	NO GROWTH	10	12.5%
8.	NIL	31	38.8%
	TOTAL	80	100.0%

FIGURE 2:

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TABLE 3: The table depicts the isolated organisms obtained from the urine cultures that were sent. E. coli emerged as the most prevalent pathogen identified across all groups, accounting for 20(25%) of the cases following E. coli, Klebsiella pneumoniae was identified in 9(11.3%) of the cases, Proteus mirabilis in 5(5.3%), enterococcus species in 2(2.5%), Acinetobacter in 2(2.5%), and Enterobacter in 1(1.3%). Additionally, 10 cases (12.5%) showed no growth in the urine culture, while 31 cases (38.8%) did not have their urine culture sent.

TABLE 4: TREATMENT GIVEN AND HOSPITAL STAY

	VARIABLES	FREQUENCY	PERCENT
TREATMENT GIVEN	EMPIRICAL	39	48.8%
	DEFINITVE	41	51.3%
NUMBER OF DAYS IN HOSPITAL	3-5	35	43.8%
	6-10	28	35.0%
	ABOVE10	17	21.3%

Table 4: The above-mentioned table displays the number of patients who were treated empirically and those who were treated definitively. Out of the total, 39 patients (48.8%) received empirical treatment, while 41 patients (51.3%) underwent definitive treatment. Furthermore, the table provides information about the length of stay of patients in hospitals. It reveals that 35 patients stayed in the hospital for 3-5 days, 28 patients stayed for 6-10 days, and 17 patients stayed for 10 days or more.

TABLE 5: COMPARISON OF SYMPTOMS AND ANTIBIOTICS GIVEN FOR UTI PATIENTS

	VARIABLES	ANTIBIOTICS GIVEN (n=80) (FREQUENCY)	P VALUE
SYMPTOMS	YES	71	
	NO	9	0.023

Table 5: The above mentioned table Depicts the comparison of symptoms and antibiotics administered to patients. It demonstrates that all patients, regardless of whether they had symptoms or not, received antibiotics. p-value is 0.023, shows that there were statistically significant.

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TABLE 6: COMPARISON OF URINE CULTURE TAKEN AND PRESENCE OF PUS CELLS

VARIABLES		PRESENCE OF PUS CELLS		TOTAL	P value
		BELOW 10	10 AND ABOVE		
URINE CULTURE TAKEN	YES	17	32	49	0.076
	NO	17	14	31	
TOTAL		34	46	80	

TABLE 6: The above-mentioned table depicts a comparison between the presence of pus cells and the urine culture samples sent. Among the patients with pus cells below 10, 17 of them were sent for urine culture. In contrast, among the patients with pus cells 10 and above, 32 of them were sent for urine culture. Additionally, 17 patients with pus cell counts below 10 and 14 patients with pus cell counts 10 and above were not sent urine cultures. The p-value of 0.076 suggests that there were statistically significant.

TABLE 7: COMPARISON OF URINE CULTURE TAKEN AND PRESENCE OF SYMPTOMS

VARIABLES		SYMPTOMS		TOTAL	P.VALUE
		YES	NO		
URINE CULTURE TAKEN	YES	40	9	49	0.28
	NO	27	4	31	
TOTAL		67	13	80	

TABLE 7: The above-mentioned comparison examines the results of urine culture in relation to the presence of symptoms. It reveals that urine cultures were sent to 40 patients who exhibited symptoms. However, despite the presence of symptoms, urine cultures were not sent for 27 patients. Furthermore, 9 patients without symptoms underwent urine culture testing, while 4 patients without symptoms did not have their urine cultures sent. The p-value of 0.28 shows that there were not statistically significant.

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DISCUSSION:

In this prospective observational study, we observed and compared the outcome of patients with urinary tract infections based on clinical and microbiological profiles as UTI patients are mostly treated with empirical antibiotics. Empirical therapy for complicated and uncomplicated UTI and other infections is selected based on the local epidemiology of antimicrobial resistance in conjunction with antimicrobial stewardship programs within individual hospitals but importantly it should be changed to definitive therapy with proper urine culture with their antibiotic susceptibility [8]. In our study, a total of 80 patients were examined, 71 patients had UTI symptoms, despite 9 patients did not have the symptoms (Asymptomatic bacteriuria) but were treated with antibiotics based on the microbiological report. Of these 80 patients, 41 received definitive treatment, while the remaining 39 received empirical therapy and we analysed their length of hospital stay based on the therapy given.

Karlijn M.J. et al., has concluded that diagnostic and therapeutic adequacy can be improved in UTI patients at high risk for complication, by ordering more culture and giving prescription to antibiotics susceptibility. In our study due to the lack of urine culture, we observed more number of patients treated empirically. [9]

Another study *Rama alkhawaldeh et al.,* concludes that an alarmingly high rate of inappropriate prescribing of empiric antibiotics for treating UTI which increases bacterial resistance that results in deterioration of patient's outcome. Therefore, our study suggests antimicrobial stewardship programs must be applied to optimize antibiotic consumption in hospital settings. [10]

According to IDSA guidelines (2019) treating an asymptomatic bacteriuria patient Unless clinical signs point to a UTI and the concomitant urinalysis shows pyuria (or the patient is neutropenic), urine cultures should not be performed. A urine culture cannot tell the difference between an Asymptomatic bacteriuria (colonizer) and a urinary tract infection, so ordering urine cultures improperly can be threatening. In our study 9 asymptomatic patients were treated with antibiotics that will lead to antimicrobial resistance and unnecessary antibiotics prescription [11].

The predominant number of pathogens reported were Gram-negative bacilli. *E. coli* was the most frequently reported pathogen according to urine cultures, followed by Klebsiella pneumoniae, respectively. This agreed with previous findings in the literature, which indicated that *E. coli* was the most commonly identified Gram-negative bacteria in both hospitalized and outpatient individuals with UTIs. The outcomes of patients in relation to the length of stay in the hospital, we find that patients who are treated with definitive have a significantly shorter length of hospital stay than empirically treated patients. Despite that empirically treated patients have moderately better outcomes, there is still a risk of improving resistance patterns, and recurrence and relapse rates are higher in empirically treated patients [12]. In this study, the number of urine cultures that were sent and our findings show 49 patients had their urine cultures sent, but 31 patients' cultures were not sent despite 14 patients having the presence of pus cells in their urine. Therefore, the current treatment recommendations include collecting a suitable urine sample for sending urine routine. These results support what was previously proposed, namely that the excessive use of antibacterial agents promotes and accelerates the emergence of bacterial resistance [13]

This study has several limitations. Firstly, the patient data were gathered from the database of a single tertiary care hospital in Chennai, which cannot represent patients nationwide, and the results may not be generalizable. Secondly, the study population taken is lower in numbers we

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were unable to continue monitoring the patient after discharge in order to look for recurrence and relapse.

CONCLUSION:

Our study concludes that treating patients with empirical therapy shows a gradual increase in their length of hospital stay which encourages the emergence of bacterial resistance and results in a deterioration in a patient's outcome. According to IDSA guidelines treating asymptomatic bacteriuria patients have a high chance of resistance and recurrent of the infection. Therefore following the hospital antibiogram policy and taking urine culture for symptomatic patients and treating patients definitive would result in good treatment outcome.

CONFLICT OF INTEREST: There is no conflict of interest between authors

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