Section A -Research paper

A COMPARATIVE CROSS-SECTIONAL AND OBSERVATIONAL STUDY ON DRUG SENSITIVITY IN DIABETIC AND NON-DIABETIC PATIENTS SUFFERING FROM UTI.

Dr. Abhijit Patil
Assistant Prof. Department of General Medicine Krishna Institute of Medical Sciences, Krishna Vishwa Vidyapeeth
"Deemed To Be University", Karad – 415110, Maharashtra
Dr. Nitin H. Patil
Assistant Prof. Department of Surgery Krishna Institute of Medical Sciences, Krishna Vishwa Vidyapeeth
"Deemed To Be University", Karad – 415110, Maharashtra

ABSTRACT
Studies have shown that a UTI may impact the G-U system, from the kidneys' cortical renal tissue to the urethral meatus. Studies have also shown that hospital stays,costs, morbidity, and death are affected by the global phenomenon of antibiotic resistance. Therefore, we decided to evaluate and assess urine culture, prevalence, and drug sensitivity for UTI patients with DM and N-DM. We found that women showed a higher risk for UTI than men, regardless of DM status. Species like Klepsiella spp. and E. coli were the most common isolates in our study for both groups. These isolates showed moderate to poor resistance to at least one antibiotic tested. Antimicrobial drugs showed resistance in DM patients. All this suggests that continuous monitoring of bacterial strain sensitivity and resistance is required throughout DM with empirical UTI treatment. Thus, empirical use of nitrofurantoin, fluoroquinolones, and 1st generation cephlos (Cephalexin and Cefadroxil) may be necessary, but culture and sensitivity data are still required. Our study's findings must be confirmed by further longitudinal studies.

Keywords: UTI**,** DM**,** N-DM Klepsiella Spp. , E. Coli, Antibiotic Resistance ,Nitrofurantoin, Fluoroquinolones, 1st Generation Cephlos., Culture And Sensitivity

INTRODUCTION
UTI may harm any part of the genito-urinary system, from the kidney's cortical renal tissue to the urethral meatus. Anatomical anomalies, weakened local defenses, diminishing immunological health, cognitive impairment, and concomitant illnesses including diabetes, cancer, steroid usage, and chronic debility may increase the risk of a urinary tract infection (UTI). The urinary tract structure and reproductive physiology of women make them more susceptible to UTIs. Older women have 50:1 urinary tract infection rates, whereas younger women have 2:1. This shows significant variation. It's about as common for both gram-positive and gram-negative bacteria to cause UTIs. E. coli is the most common cause of

UTIs, and both diabetic and non-diabetic people are susceptible. As well as Proteus, Klebsiella, Enterobacter, and Citrobacter, Pseudomonas, Enterococcus, Streptococcus, Staphylococcus, and Candida albicans have been found. Between 40 and 75 percent of antimicrobial usage, particularly in hospitals, is inappropriate, with UTIs being the most common reason. Widespread and inappropriate antimicrobial usage has always led to antibiotic resistance.[1] The phenomenon of antibiotic resistance has become a matter of worldwide concern, with significant implications for healthcare systems in terms of hospitalization duration, costs, morbidity, and mortality rates.[2] Therefore, our study aim was to compare medication sensitivity in diabetic and non-diabetic patients suffering from uti as well as assess the importance of urine culture.

AIM

The study's objectives were to compare medication sensitivity in diabetic and non-diabetic patients suffering from uti as well as assess the importance of urine culture.

INCLUSION CRITERIA

1. All patients should be greater than 18 years of age .
2. Patients of all episodes of symptomatic & asymptomatic bacteria in both the groups were included in the study.
3. Patient with or without symptoms of UTI with significant Pyuria.
4. Patients with diabetes mellitus will be included if their fasting blood glucose levels are 126 mg/dl or higher, their random blood glucose levels are 200 mg/dl or higher, or their glycosylated HbA1C levels are 6.5% or higher.

EXCLUSION CRITERIA

1. Patient age less than 18 years of age.
2. Patients with Gestational diabetes mellitus.
3. Patients with Immunocompromised states-HIV, patients on steroids, malignancy, transplant recipients.
4. Patieents with any kind of reproductive tract infection.

MATERIAL & METHOD

TYPE OF STUDY : Our study was a cross sectional & observational study.

STUDY SETTING: Our study was conducted at KHMRC, Karad, who had been diagnosed with urinary tract infections throughout the study period of 18 months, whether or not they had a history of type 2 diabetes mellitus, were included in the study.

DURATION OF STUDY: Our study was started from October 2018 ending to March 2020.

ETHICAL CLEARANCE : It was decided to seek the ethical clearance of the college and university committee. Following receiving ethical clearance, it was decided to seek permission from the department head. (2018-2019 Study Protocol 0258).

SAMPLE SIZE: A total of 90 patients were enrolled for our cross sectional-observational study wherin 45 patients each from diabetic & non-diabetic groups

INFORMED CONSENT

The included patients who satisfied the selection criteria were informed about the nature of the study and given a short explanation of its objective after obtaining the participant's written consent.

STASTICAL ANALYSIS

In this, we utilized the IBM SPSS Statistics 23 trial version. After being recorded on a study proforma sheet, the collected data was imported into statistical analysis software. The qualitative data was represented in the form of frequency and percentage. Numerical data were represented using the mean, standard deviation, and median. To do a frequency analysis, the data was organized into tables and graphs. A 'p' value of 0.05 was judged statistically significant using the Chi-square test and student's 't' test.

DATA COLLECTION

Sequential selection was employed to choose patients who met the study's selection criteria. The study employed interviews as a means of collecting data pertaining to the patients' age, gender, presenting symptoms, diagnosis of urinary tract infection with or without diabetes mellitus, and history of any co-morbidities. The results of the clinical evaluation, which encompassed vital signs and systemic assessment, were recorded for these individuals. The aforementioned results were documented on a pre-established and validated form.

INVESTIGATION

1. Blood sugar level (Fasting, Postprandial, Random).
2. Glycosylated haemoglobin (HbA1c)
3. Urine Routine Microscopy
4. Urine Culture & Sensitivity

For fasting blood glucose levels we have asked patients for early morning venous blood samples with 8 hours of no calorie intake were taken with an aseptic precautions in EDTA sodium fluoride vacutainer (1ml). Similarly, samples were collected for 2 hour postprandial and random blood glucose estimation also. Blood sugar levels (fasting, postprandial and random) were calculated by Trinder‘s method (Glucose Oxidase-Peroxidase Method) automatically on EM360 Transasia machine.

For estimation of blood HbA1c levels, venous blood samples were collected in EDTA vacutainer (2ml) with the aseptic precautions and were tested by latex immunoturbidimetric test (automatically) on EM360 Transasia machine. It reflects blood sugar levels over period of past 8 to 12 weeks.

Class	HbA1c Value
Normal	<5.7
Pre-diabetes	5.7-6.4
Diabetes	>6.4

TABLE 1: VALUE OF HbA1c.[3]

A sterile container was used to collect a clean urine sample during the early morning hours for microscopic analysis and urine results. The urine was analyzed using Dx Urine DS 11 reagent strips. Proficient laboratory experts obtained urine samples from patients who had recently urinated and were capable of providing midstream specimens using sterile urine collection containers. A pamphlet was distributed to each participant, detailing the proper procedure for obtaining a midstream urine sample that is free from any pre-collection contamination. The urine samples were subjected to inoculation on three different media,

namely blood agar, MacConkey agar, and CLED agar (Oxoid, Basingstoke, UK), using a calibrated inoculation needle and 10 L of urine. The plates underwent incubation at a temperature of 37 degrees Celsius for a duration of 24 to 48 hours. The Kirby-Bauer method, as outlined by the Committee on Clinical Laboratory International Standards (CLIS, 2014), was employed to conduct antimicrobial sensitivity testing on all isolates present on diagnostic sensitivity test plates. The bacterial inocula were prepared by suspending newly produced bacteria in 5 mL of sterile saline solution. The Mueller-Hinton agar plates were inoculated using a sterile cotton swab. Becton and Dickinson Company (Franklin Lakes, NJ) provided filter paper disks containing a predetermined concentration of antimicrobial drugs.

RESULT

GENDER

Gender	Frequency	Percent
Female	55	61.1%
Male	35	38.9%
Total	90	100.0%

TABLE 2 : GENDER DISTRIBUTION.

X^2= 4.44, DF:1,'p' = 0.035, Significant, [Chi Square test]

In our study we found that, out of a total of 90 cases, 55 (61.1%) were females and 35 (38.1%) were males. The study incorporated a female-to-male ratio of 1.57 to 1, with a statistically significant p-value of 0.035. The number of females affected was notably higher than that of males.

AGE

Age in year	Frequency	Percent
<40	9	10.0%
41 to 50	23	25.6%
51 to 60	33	36.7%
61 to 70	17	18.9%
71 to 80	8	8.9%
Total	90	100.0%

TABLE 3 : AGE DISTRIBUTION.

X^2 = 24.01, DF:4,'p' < 0.001, Significant, [Chi Square test]

In our study we have found that ,out of total number of patients, 33 individuals (constituting 36.7%) were aged between 51 and 60. The subsequent age group consisted of 23 patients (25.6%) aged between 61 and 70 years, followed by 17 cases (18.9%) in the age range of 61 to 70 years. A minority of 9 cases (less than 40% of the total) were younger than 40, while only 8 cases (less than 9% of the total) belonged to the age group of 71 to 80 years. The age

cohorts ranging from 41 to 50 and 51 to 60 exhibited significant impact, as evidenced by a p-value of 0.001.

BLOOD SUGAR VALUE

	Raised	**Normal**	**Total**	**Chi-square Test, df=1**
BSF (126)	41	49	90	X^2 = 0.71, 'p' = 0.399, Not Significant
BSR (200)	28	62	90	X^2 = 12.84,' p' < 0.001, Significant
HbA1c (6.5)	45	45	90	-

TABLE 4 : BLOOD SUGAR VALUE.

In our study we have found that , each patient was divided into 2 groups i.e. 45 patients equally. There were 41 instances where the FBS was elevated and 28 instances where the PBS level was elevated. A statistically significant difference (p 0.001) was observed in the random blood sugar levels of the patients.

URINE WBC

Urine WBC	**Frequency**	**Percent**
Nil	25	27.8%
5-7 cells	28	31.1%
8-10 cells	21	23.3%
>10 cells	16	17.8%
Total	90	100.0%

TABLE 5 : URINE WBC.

X^2 = 3.60, DF:3,'p' = 0.31, Not Significant, [Chi Square test]

The study revealed that the predominant number of cases exhibited 5-7 white blood cells (WBCs) during routine urine examination. Additionally, 25 cases (27.8%) had no WBCs, 21 cases (23.3%) had 8–10 cells, and 16 cases (17.8%) had more than 10 WBCs. There was no statistically significant variation observed in the quantity of leukocytes present in the urine. (p = 0.31).

URINE SUGAR

Urine Sugar	**Frequency**	**Percent**
Nil	29	32.2%
1+	30	33.3%
2+	9	10.0%

3+	12	13.3%
4+	10	11.1%
Total	90	100.0%

TABLE 6 : URINE SUGAR.

X^2 = 24.78, DF:3,'p' < 0.001, Significant, [Chi Square test]

The study revealed that a total of 29 patients (32.2%), exhibited the absence of sugar in their urine. The study observed that among the participants, 33.3% of individuals with elevated urine sugar levels exhibited a +1 level, while 13.3% of cases showed a 3+ level, 11.1% of cases demonstrated a 4+ level, and 10% of cases displayed a 2+ level. A significant disparity in urinary glucose levels was observed among the participants. (p > 0.001).

OI

Organism Isolated	**Frequency**	**Percent**
E. Coli	60	66.7%
Klebsiella spp.	13	14.4%
Enterobacter Spp,	6	6.7%
Coagulase Positive *Staphylococcus*	6	6.7%
Pseudomonas aerogenosa.	5	5.6%
Total	90	100.0%

TABLE 7 : ORGANISM ISOLATED (OI).

X^2 = 124.78, DF:3,'p' < 0.001, Significant, [Chi Square test]

In our study we have found that ,most common OI was E coli in 60 aptients (66.7%) followed by Klebsiella spp.in 13 patients (14.4%), Enterobacter Spp. in 6 patients (6.7%), Coagulase Positive Staphylococcus in 6 patients (6.7%) & Pseudomonas aerogenosa in 5 patients (5.6%). Significant difference was seen between the organism isolated from the participants. (p < 0.001)

TRIMETHOPRIM(T)+ SULFAMETHOXAZOLE(S) SENSITIVITY & RESISTANCE(S&R)

		Diabetic		**Total**
		No	**Yes**	
Trimethoprim + Sulfamethoxazole	Resistant	30	40	70
	Sensitive	15	5	20
Total		45	45	90

TABLE 8 :T+S(S&R).

X2 = 6.43, DF:1,'p' = 0.011, Significant, [Chi Square test]

In our study we have found that ,70 patients (77.8%) were resistant to T + S & 20 patients were showing sensitive (22.2%). Here, 40 patients were DM (57.1%) & rest 30 were N-DM(42.9%). Hence, significant difference was seen between the DM and N-DM with regards to T+S&R. (p=0.011)

AMPICILLIN(A) S&R

		Diabetic		Total
		No	**Yes**	
Ampicillin	Resistant	21	36	57
	Sensitive	24	9	33
Total		45	45	90

TABLE 9: A(S&R).

X^2 = 10.76, DF:1, 'p' = 0.001, Significant, [Chi Square test]

In our study we have found that , total of 57 patients(63.3%) were R to A & 33 patients were S (36.7%). Here, 36 patients were DM (63.2%) & rest 21 were N-DM (36.8%). Further, significant difference was seen between the DM and N-DM were seen with regards to A-R, with DM patients showing more R. (p=0.001)

AMOXICILLIN SENSITIVITY & RESISTANCE (AMOX. S&R)

		Diabetic		Total
		No	**Yes**	
Amoxicillin	Resistant	25	37	62
	Sensitive	20	8	28
Total		45	45	90

TABLE 10 : AMOX. S&R.

X^2 = 7.47, DF:1,'p' = 0.006, Significant, [Chi Square test]

In our study we have found that , 62 patients (68.9%) were R to Amox. & 28 patients were S (31.1%).Furthermore, out of 62 patients R to Amox. 37 patients were DM(59.7%) & rest 25 were N-DM (40.3%). So, significant difference were seen between the DM and N-DM with regards to Amox. R, with DM patients showing more R. (p=0.006)

1st GENERATION CEPHALOSPORIN(Cephlo.) S& R

		Diabetic		Total
		No	**Yes**	
1st generation Cephalosporins	Resistant	13	31	44
	Sensitive	32	14	46
Total		45	45	90

TABLE 11: Cephlo. S & R.

X^2 = 14.41, DF:1,'p' < 0.001, Significant, [Chi Square test]

In our study we have found that , 44 patients (68.9%) showed R to 1st generation Cephlo. & 46 patients were sensitive (31.1%). Out of total 44 patients R to 1st generation Cephlo, 31 patients were DM (70.5%) & rest 13 were N-DM (29.5%). Hence, significant difference showed between the DM and N-DM with regards to Cephlo R, with DM patients showing more R. ($p<0.001$)

NITROFURANTOIN(N) S&R

		Diabetic		**Total**
		No	**Yes**	
Nitrofurantoin	Resistant	4	14	18
	Sensitive	41	31	72
Total		45	45	90

TABLE 12 : N- S&R.

$X2$ = 6.94, DF:1,'p' = 0.008, Significant [Chi Square test]

In our study we have found that, 18 patients (20%) were R to N & 72 patients were S (80%). Further, out of 18 patient , 14 patients were DM (77.8%) & rest 4 were N-DM (22.8%). Hence,significant difference were shown between the DM and N-DM with regards to N-R, with DM patients showing more R. ($p = 0.008$)

FLUOROQUINOLONES(F) S&R

		Diabetic		**Total**
		No	**Yes**	
Fluoroquinolones	Resistant	8	12	20
	Sensitive	37	33	70
Total		45	45	90

TABLE 13 :F-S&R.

X2 = 1.03, DF:1,'p' = 0.31, Not significant [Chi Square test]

In our study we have found that , 20 patients were R to F & 70 patients were sensitive (77.8%). Out of total 20 patients R to F , 12 patients were DM (60%) & rest 8 were N-DM (40%). Hence, there was not any significant difference seen between the DM and N-DM with regards to F R. ($p=0.31$).

PRESENCE OF DM & R to No. Of Drugs

		Diabetic		**Total**
		No	**Yes**	
	All Sensitive	13	3	16
Resistant to number of drugs	1	3	4	7
	2	4	1	5
	3	18	7	25

	4	5	19	24
	5	0	7	7
	6	2	4	6
Total		45	45	90

TABLE 14: PRESENCE OF DM & R to No. Of Drugs.

X^2 = 28.86, DF: 6,'p' < 0.001, Significant [Chi Square test]

In our study we have found that,there was a significant difference between the two (p < 0.001). Out of total 16 patients (17.8%), who were sensitive to all the drugs, 3 patients showed DM (18.8%) while rest 13 showed N-DM (81.2%). Single drug resistance was seen in 7 patients (7.8%), out of which 4 were DM(57.1%) and 3 were N-DM (42.9%). R to 2 drugs were seen in 5 patients, out of which 1 was DM (20%) & rest 4 were N-DM (80%). R to 3 drugs was seen in 25 patients (27.8%), out of which 7 were DM (28%) & 18 were N-DM (72%). R to 4 drugs was seen in 24 patients (26.7%), out of which 19 were DM (79.2%) & 5 were N-DM (20.8%). R to 5 drugs was seen in 7 patients (7.8%), all of them were DM (100%). R to all 6 drugs was seen in 6 patients (6.7%), 4 of them were DM (66.7%) & rest 3 were N-DM (33.3%).

ORGANISM ISOLATED

		Diabetic		**Total**
		No	**Yes**	
Organism Isolated	Coagulase Positive *Staphylococcus*	4	2	6
	E. Coli	32	28	60
	Enterobacter Spp.	4	2	6
	Klebsiella spp.	5	8	13
	Pseudomonas aerogenosa.	0	5	5
Total		45	45	90

TABLE 15: ORGANISM ISOLATED.

X^2 = 2.195, DF: 1,'p' = 0.138, Not significant [Chi Square test]

In our study we have found that ,no significant difference was seen between the organism isolated & presence of DM (p = 0.138). Out of 60 E Coli, 28 showed DM (46.7%) & 32 showed N-DM (53.3%). Out of 13 cases of Klebsiella, 8 showed DM (61.5%) & 5 showed N-DM (38.5%). Out of 6 cases of Coagulase Positive Staphylococcus, 2 showed DM (33.3%) & 4 showed N-DM (66.7%). Out of 6 cases of Enterobacter Spp., 2 showed DM (33.3%)& 4 showed N-DM (66.7%). All 5 patients of Pseudomonas aerogenosa were DM (100%).

ORGANISM S TO NO. DRUGS & PRESENCE OF DM

Diabetic			MDR							Total
			All Sensitive	1	2	3	4	5	6	
No	**ORGANISM ISOLATED**	**Coagulase Positive *Staphylococcus***	1	0	0	1	2	0	0	4
		E.Coli	12	1	3	11	3	0	2	32
		Enterobacter spp.	0	1	0	3	0	0	0	4
		Klebsiella spp.	0	1	1	3	0	0	0	5
	Total		13	3	4	18	5	0	2	45
Yes	**ORGANISM ISOLATED**	**Coagulase Positive *Staphylococcus***	0	0	0	0	1	0	1	2
		E.Coli	3	2	0	6	10	4	3	28
		Enterobacter spp.	0	0	0	0	2	0	0	2
		Klebsiella spp.	0	2	1	0	3	2	0	8
		Pseudomonas aerogenosa.	0	0	0	1	3	1	0	5
	Total		3	4	1	7	19	7	4	45

TABLE 16: ORGANISM S TO NO. DRUGS & PRESENCE OF DM.

In our study we have found that ,there was a significant association between the numbers of drugs an organism is sensitive or resistant to with presence of diabetes. ($p < 0.001$, Significant).Further, out of total 16 patients (17.8%), who were sensitive to all the drugs, 3 patients were DM (18.8%)& 13 were N-DM (81.2%). All 3 DM patients showed E Coli infection (100%), while 13 were N-DM, 12 showed E Coli (92.3%) & 1 showed Staphylococcus (7.7%). Single drug resistance was seen in 7 patients (7.8%), out of which 4 were DM (57.1%) & 3 were N-DM (42.9%). Out of 4 DM, 2 showed E coli (50%) & rest 2 showed Klebsiella spp (50%). Out of 3 N-DM, 1 showed E Coli (33.3%), Enterobacter Spp. (33.3%) and Klebsiella spp. (33.3%). R to 2 drugs were seen in 5 patients, out of which 1 was DM (20%) & 4 were N-DM (80%). 1 DM patient showed Klebsiella (100%) & out of 4 N-DM, 3 showed E Coli (75%) & 1 showed Klebsiella (25%). R to 3 drugs was seen in 25 patients (27.8%), out of which 7 were DM (28%) &18 were N-DM (72%). In 18 N-DM patients, 11 showed E Coli (61.1%), 3 showed Klebsiella (16.7%)& Enterobacter Spp. (16.7%), 1 showed Coagulase Positive Staphylococcus. In 7 DM ,6 patients showed E Coli (85.7%) & 1 showed Klebsiella (14.3%).

R to 4 drugs & above were seen more in DM than N--DM patients.

R to 4 drugs was seen in 24 patients (26.7%), out of which 19 were DM (79.2%) & 5 were N-DM (20.8%). In 19 DM patients, 10 showed E Coli (52.6%), 3 showed Klebsiella (15.8%) & Pseudomonas aerogenosa (15.8%), 2 showed Enterobacter Spp. (10.5%) & 1 one showed Coagulase Positive Staphylococcus (5.3%). R to 5 drugs was seen in 7 patients (7.8%), all of them were DM (100%). 4 of them showed E Coli (57.1%), 2 showed Klebsiella (28.6%) &1 showed Pseudomonas aerogenosa (14.3%). R to all 6 drugs was seen in 6 patients (6.7%), 4 of them were DM (66.7%) & rest 2 were N-DM (33.3%). In 4 DM patients, 3 showed E Coli (75%) & 1 showed Coagulase Positive Staphylococcus (25%). Further,2 N-DM patients, showed E Coli (100%).

DISCUSSION

Urinary tract infections are a severe health risk for individuals of all ages, not just diabetics, as several studies have shown. As a consequence of the widespread usage of antimicrobials, antibiotic resistance has evolved in microorganisms. Because bacterial resistance patterns change over time, monitoring the antibiotic susceptibility patterns of isolated organisms is critical to ensuring the prudent use of antibiotics for the empirical and final treatment of urinary tract infections in vulnerable groups.

AGE &GENDER

Out of the 90 patients, 55 (61.1%) were female & 35 (38.9%) were male. Our investigation revealed that female-to-male ratio was 1.57:1. Furthermore, similar study to that of our study involved total of 182 patients showed that 62.63% (n = 114) were females & 37.36% (n = 68) were males.[3]Further, gender distribution exhibited a ratio of 1.6 females to 1 male, which is consistent with the findings of the our investigation. In contest to our study, another study revealed that female-to-male ratio were 1.28:1, with 288 (56.25%) female participants and 224 (43.75%) male participants.[4]

BLOOD SUGAR VALUE

Our study revealed that 31.11% of cases exhibited postprandial urinary tract infections, while 45.55% of cases exhibited raised fasting blood sugar levels. The findings of our investigation was consistent with those of a prior study carried out by Hamdan HZ et al., wherein it was observed that 54.2% of individuals diagnosed with urinary tract infections exhibited increased levels of fasting blood sugar.[5] The our study also reports a lower prevalence of hyperglycemia compared to a prior investigation conducted by Sharma et al., wherein 96% of cases exhibited elevated fasting sugar levels.[6]

ORGANISM ISOLATED

The study revealed that the most frequently identified bacteria was E. coli, with Klebsiella spp. following closely behind in 13 instances (14.4%). Additionally, Enterobacter spp. were identified in 6 cases (6.7%), Coagulase-positive Staphylococcus in 6 cases (6.7%), and Pseudomonas aerogenosa in 5 cases (5.6%). According to the research conducted by Kumar R, Perswani P, et al., the prevalent microorganisms identified were E. coli in 21 instances (60%), followed by Klebsiella spp. in 6 instances (17.1%), Enterobacter spp. in 3 instances (8.6%), Coagulase-positive Staphylococcus in 2 instances (5.7%), and Pseudomonas aerogenosa in 5 instances (14.3%).[7]

ANTIMICROBIAL DRUG S&R

T+S (S-R)

In our study ,we have found that,70 cases (77.8%) were R to T+S & 20 patients were sensitive (22.2%) in our study out of R cases,40 patients were having DM (57.1%) & rest 30 were having N-DM (42.9%). According to the study from Aswani SM et al., showed T+S R in 38.9% DM cases and 30.2% N-DM cases.[8]

A (S-R)

Our current investigation revealed that out of total 102 patients, 57 (63.3%) exhibited resistance to ampicillin, while 33 (36.7%) were found to be sensitive. Out of the total of 57 cases of ampicillin resistance, 36 (63.2%) were observed in individuals with DM, while the remaining 21 patients were observed in N-DM individuals. Another study revealed that the prevalence of A - R was observed in 16.7% of DM cases and 17% of N-DM cases.[8] Futher studies revealed that the prevalence of ampicillin resistance was 8% among diabetic cases and 15% among non-diabetic cases.[3]

Amox. (S-R)

Our investigation showed that a total of 62 patients (68.9%) were R to Amox., whereas 28 patients (31.1%) were S. Hence, 37 patients of Amox. R were DM (59.7%) & remaining 25 were N-DM (40.3%). Similar to our study, Aswani SM et al., showed Amox. R in 68.5% of DM patients & 31.5% of N-DM patients.

1st Generation Cephlo. S&R

In our study, 46 patients (31.1%) were S and 44 patients (68.9%) were R to first-generation cephlo. Out of a total of 44 patients that were N-DM and R to first-generation cephlo., 31 patients were DM (70.5%) & remaining 13 patients were N-DM (29.5%). Similar study by Akbar Daad et al., had 75% of DM & 25% N-DM which showed R to first-generation cephlo.[3] Another study showed 48.9% of DM patients & 36.4% of N-DM patients showed R to 1st-generation Cephlo.[8]

F (S&R)

In our study, we found that 70 patients showed S (77.8%), and 20 patients (22.2%) were R to F. 12 of 20 patients (60% of the total) were diagnosed as DM, while 8 were diagnosed as N-DM, making the total number of patients R to F. A similar study showed F(R) in 75% of DM and 25% of N-DM patients.[8]

ORGANISM & NO. OF DRUG (R)

E.coli

In our study, 60 patients with E. coli presence were isolated from which 15 were S to all 6 drugs (25%), 3 were R to 1 drug & 2 drugs (5% each), 17 were R to 3 drugs (28.3%), 13 were R to 4 drugs (21.7%) & 9 were R to 5 or more drugs (15%). A similar study showed that sensitivity of E. coli isolates to all drugs in 12.7% of patients. 3 and a half percent were R to 2 drugs, 25% to 2 drugs, 12% to 3 drugs & 12% to 4 drugs. Further, none showed 5 or more drug-R patients.[9]

Klebsiella spp.

In our study, we found that out of 13 Klebsiella spp. isolates, 0% were R to all 6 drugs, 23.1% were R to 1 drug, 15.4% were R to 2 drugs, 3 patients were R to 3 drugs, 23.1% were R to 4 drugs, 2 patients were S to 5 drugs, and 0% were R to all 6 drugs. Furthermore, a

similar study showed S to all drugs in 25% of patients for Klebsiella spp. 55% of the patients were R to 2 drugs, 25% to 3 drugs, and 25% to 5 or more drugs.[9]

Coagulase Positive Staphylococcus

In our study, we found that 1 patient was S to all 6 drugs (16.7%), 1 showed R to 3 drugs (16.7%), 3 were R to 4 drugs (50%), and 1 was R to all 6 drugs (16.7%) among the 6 patients of coagulase-positive Staphylococcus identified in the present study. In 22.2% of patients,similar studies have shown that coagulase-positive Staphylococcus isolates had S to all drugs. Cases found R to 1 or 2 drugs accounted for around 11.1%, patients who found R to 4 drugs accounted for about 22.2%, and cases found R to 5 drugs or more accounted for about 44.4%.[9]

Enterobacter Spp.

In our study, we found that out of the six patients with Enterobacter spp., one was drug-resistant (16.7%), three were drug-resistant (50%), and two were drug-resistant against all four drugs (33.3%). Similar past studies have shown that isolates of Enterobacter spp. show resistance to a single drug.[9]

CONCLUSION

In our study we found that , prevalence of UTI was greater in women than in men for both in the DM & N-DM groups. Of which Klepsiella spp. & E. coli were the most prevalent isolates in our study for both groups. The majority of the isolates analyzed showed moderate to poor R to at least one of the antibiotics employed in study. DM patients showed resistance to antimicrobial drugs when compared to N-DM patients. This suggests that empirical therapy for DM with UTI needs continuous monitoring to gain reliable knowledge about sensitivity & resistance of its bacterial patterns. Hence, we conclude that nitrofurantoin, fluoroquinolones, & 1st generation cephlo. (Cephalexin and Cefadroxil) may be used empirically, although culture and sensitivity data are still needed. Further studies need to be required to state findings of our study.

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