

# PREVALENCE OF BACTERIAL INFECTIONS AMONG DIABETIC PATIENTS IN URINE SAMPLES.

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## ABSTRACT

**Objective:** *There is evidence that patients with diabetes have an increased risk of asymptomatic bacteriuria and urinary tract infections (UTIs). The aim of this study was to detect the prevalence of UTIs among diabetic patients admitted in the hospital and to identify the most frequent bacteria responsible for UTI:*

**Material and methods:** *The study population included 570 diabetic patients suggestive of UTI (847 women and 623 men), from Maharani Laxmi Bai medical college, Jhansi between December 2018 to August 2020. We collected patients' personal history data and performed urine cultures. **Result:** Total number of patients, 158 had urine cultures positive, meaning 10.7%. Out of the total number of 158 UTIs, 124 (78.4%) were asymptomatic bacteriuria. The most frequent bacteria involved in Urinary tract infection was *Escherichia coli* (68.9%). **Conclusion:** Infection of UTI are frequent in diabetic patients Because of the great proportion of asymptomatic forms among diabetic patients, the culture should be performed in all hospitalized admitted patients with diabetes..*

**Keywords** *Urinary tract infection (UTI), Diabetes mellitus, asymptomatic bacteriuria.*

## INTRODUCTION

Urinary tract infections are more common, severe, and its effects are worse in patients with type 2 diabetes mellitus. They are also more often caused by resistant pathogens. The prevalence of diabetes mellitus has increased over the past decades, and now approaching epidemic proportions [1]. Worldwide, 371 million people have affected with diabetes [2] and it is estimated that by 2030 this number will reach to 552 millions people [3]. Changes in lifestyle, aging of the population, prevalence of obesity are responsible for

this dramatic situation [1]. Diabetes is one of the top ten causes of death in the world [4] and this fact is especially due to its complications. Kidney disease in diabetic patient occurs in 45% of patients with diabetes in the United States of America [5] and it is the leading cause of end-stage renal disease [6]. Various impairments in the immune system, poor metabolic control, and other complications such as incomplete bladder emptying due to autonomic neuropathy and high glucose concentration in the urine allow urinary colonization by microorganisms and enhances the risk of urinary tract infections in these patients[9-11].

In diabetic patients, it is generally accepted that infections are frequent causes of morbidity and mortality [9]. There is evidence that patients with diabetes have an increased risk of asymptomatic bacteriuria and urinary tract infections (UTIs) [10,11], UTIs being the most common bacterial infections in diabetic patients [13]

The spectrum of UTI in these patients ranges from asymptomatic bacteriuria (ASB) to lower UTI (cystitis), pyelonephritis, and severe urosepsis. Serious complications of UTI, such as emphysematous cystitis and pyelonephritis, renal abscesses and renal papillary necrosis, are all encountered more frequently among diabetic patients.[12,13]

There is no indication to treat diabetic patients with asymptomatic bacteriuria. Further studies are needed to improve the treatment of patients with diabetes and urinary tract infections.

## MATERIAL AND METHODS

Out of Total 1470 *diabetic patients* hospitalized admitted patients, total 570 *diabetic patients* suspected with UTI. Urine samples were collected for culture from fasting sugar positive patients confirmed by Medicine Department of Maharani Laxmi Bai Medical College, Jhansi from December 2018 to August 2020.

Urine culture was performed in diabetics patients with a suspected UTI (dysuria, urgency, frequency, supra-pubic pain or tenderness, fever) or urinalysis with the presence of nitrite, leukocyte esterase, more than 5 white blood cells per high power field. Samples were further processed after taking patients' history and their consent .

### Identification of Organism:

The urine samples were collected and processed in Microbiology Department, Maharani Laxmi Bai Medical College, Jhansi. The organisms isolated was identified by their colony morphology, staining procedures, motility and other relevant biochemical test as per standard laboratory methods of identification. [Mackie and McCartney & Koneman's Color Atlas]

## Results

In the current study, we measured the frequency of UTI in the diabetic patients . Out of Total 1470 *diabetic patients* hospitalized admitted patients, 158 (10.7%) had UTI. In order to estimate if there is a difference regarding the prevalence of UTI in type 1 and type 2 diabetes patients. 12.8% of type 1 and 10.5% of type 2 diabetic patients had UTI [Table 1].

	<b>Type 1 DM</b>	<b>Type 2 DM</b>	<b>Total</b>
<b>With UTI</b>	16 (12.8%)	142 (10.5%)	158
<b>Without UTI</b>	109 (87.2%)	1203 (89.5%)	1312
<b>Total</b>	125	1345	1470

Out of 158 patients with UTIs, females are higher than male and Out of the total number of 1312 without UTIs, females are also higher than male.[Table 2]

	<b>Women</b>	<b>Men</b>	<b>Total</b>
<b>With UTI</b>	130 (15.3%)	28 (4.5%)	158
<b>Without UTI</b>	717 (84.7%)	595 (95.5%)	1312
<b>Total</b>	847	623	1470

Table 3 shows, a total of 158 patients had bacteruria out of which 109 (68.9%) *E. coli* were isolated, 22 (13.9%) with *Klebsiella species* (spp.) and *Candida* spp. 10 (6.4%), *Proteus* spp. 4 (2.6%), *Enterococcus* spp. 6 (3.8%), *Streptococcus* spp. 2 (1.3%), *Pseudomonas* spp. 1 (0.6%), *Citrobacter* spp. 2 (1.3%), *Acinetobacter* spp. 1 (0.6%), *Staphylococcus* spp.1 (0.6%).

<b>SR.NO</b>	<b>Bacteria isolated</b>	<b>Percentage</b>
1.	E.Coli	109 (68.9%)
2.	E.Coli+ Klebsiella Spp.	22 (13.9%)
3.	Candida Spp.	10 (6.4%),
4.	<i>Proteus</i> spp.	4 (2.6%),
5.	<i>Enterococcus</i> spp	6 (3.8%),
6.	<i>Streptococcus</i> spp.	2 (1.3%)
7.	<i>Pseudomonas</i> spp.	1 (0.6%),
8.	<i>Citrobacter</i> spp.	2 (1.3%),
9.	<i>Acinetobacter</i> spp.	1 (0.6%),
10.	<i>Staphylococcus</i> spp	1 (0.6%)

### **Discussions:**

The bacteria associated with UTI was predominantly *E. coli* and other *Enterobacteriaceae* these findings were similar to those observed by Boyko et al. [11] on 218 diabetic postmenopausal women indicating that the prevalence of *E. coli* was 74.4% and of *Klebsiella*

species. 7%. Another study conducted in New Delhi, India, that evaluated the prevalence of UTI and renal scarring in 155 patients suffered with diabetes, also found that *E. coli* was the most commonly involved organism found (64.3%), followed by *Staphylococcus aureus* (21.4%) and *Klebsiella pneumoniae* (14.3%) [14].

Current study found a high prevalence of UTI caused by fungi (*Candida* species). It is known that diabetes is a predisposing factor for fungal infections of the urinary tract. One of the most important explanations for this predisposition is glycosuria [13]. The majority of UTIs infection caused by fungi are clinically asymptomatic. In our study, 15.3% of diabetic women developed an Urinary tract infection, result that is similar to the one found by Geerlings and coworkers [14] who obtain a prevalence of 20% in women. Our study found that the prevalence of Urinary tract infection in diabetic patients is more higher in women than in men. This important difference can be explained by a variety of men-related factors like as the greater length of the urethra the greater distance between the urogenital meatus and the anus and the properties of antibacterial the prostatic fluid [15].

### Conclusions

UTIs are frequent in patients with diabetes. The most frequent uropathogen is *E. coli*, but fungal infections are also common in diabetic patients. Many UTIs are asymptomatic, especially in women. Because of the great proportion of asymptomatic UTIs among diabetic patients, we suggest that urine culture should be performed in all hospitalized diabetic patients

### AUTHORS' CONTRIBUTIONS

All the authors have contributed equally to the data collection, its interpretation, and preparation of the manuscript.

### CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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