



## **Clinical Profile of Asymptomatic Bacteriuria in Type 2 Diabetes Mellitus: A cross sectional study**

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### **Abstract**

#### **Background**

Geographical variations in microbial patterns and risk variables are associated with asymptomatic bacteriuria (ASB), which is thought to precede symptomatic urinary tract infection (UTI) in people with diabetes mellitus. Krishna Institute of Medical Science statistics are still inadequate, nevertheless. **Material and methods:** In order to (1) estimate the prevalence of ASB and its correlation with age, gender, duration of diabetes, renal and glycemic status, and (2) identify the antibiotic sensitivity pattern of uropathogens as well as assess the usefulness of microbial pattern as a predictor of symptomatic UTI, a cross sectional study involving 80 otherwise healthy type 2 diabetes patients was conducted.

**Results:** In our study, 25.25% of the type 2 diabetic group had ASB. Males said that *Klebsiella* sp. was the most frequent cause. A lengthy history of type 2 diabetes was discovered to be the only risk factor for ASB. Age, gender, or recent glycemic status were not associated. UTI risk was higher in bacteriuric individuals with lower baseline HbA1C levels. The likelihood of acquiring UTI within a year was considerably higher in female diabetes individuals with ASB caused by *Escherichia coli*. **Conclusion:** There will actually be no need to revisit guidelines on screening for ASB caused by *E. coli* in females with long-standing diabetes and poor glycemic control if a large-scale prospective investigation confirms similar findings. These patients can avoid symptomatic UTI by implementing a strict HbA1C reduction plan as soon as possible and by taking steps to enhance genital cleanliness.

**Keywords:** bacteria, DM, bacteriuria

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## **Introduction**

The permissive definition of asymptomatic bacteriuria (ASB), which is commonly used in studies, refers to the presence of a freshly void midstream urine specimen yielding positive cultures (10<sup>5</sup> CFU/ml) of the same bacterium in a patient who does not have any urinary tract infection (UTI) symptoms, such as fever, urinary frequency, urgency, or dysuria. On the other hand, other studies define ASB in females using two positive urine culture samples. It is unclear why the same uropathogens that cause UTI are less virulent in these people [1]. Diabetes may be the cause of this absence of symptoms due to impaired host reactivity and decreased uroepithelial adherence. [2-4] Since symptomatic urinary tract infection (UTI), with a relative risk of 1.65 and a 95 percent confidence range of 1.02-2.67, is thought to precede ASB, it is important to determine the risk. This advice might not be totally applicable in India, where inadequate genital cleanliness is still a problem, particularly for female patients from lower socioeconomic backgrounds. Although there have been two recent studies on ASB in diabetic patients from North[5] and South India[6], there have not yet been any from Eastern India. This work aims to fill that data gap in light of the shifting frequency of ASB, developing treatment resistance, and regional diversity in the drug susceptibility pattern of uropathogens.

**Aim:** to study the clinical Profile of Asymptomatic Bacteriuria in Type 2 Diabetes Mellitus

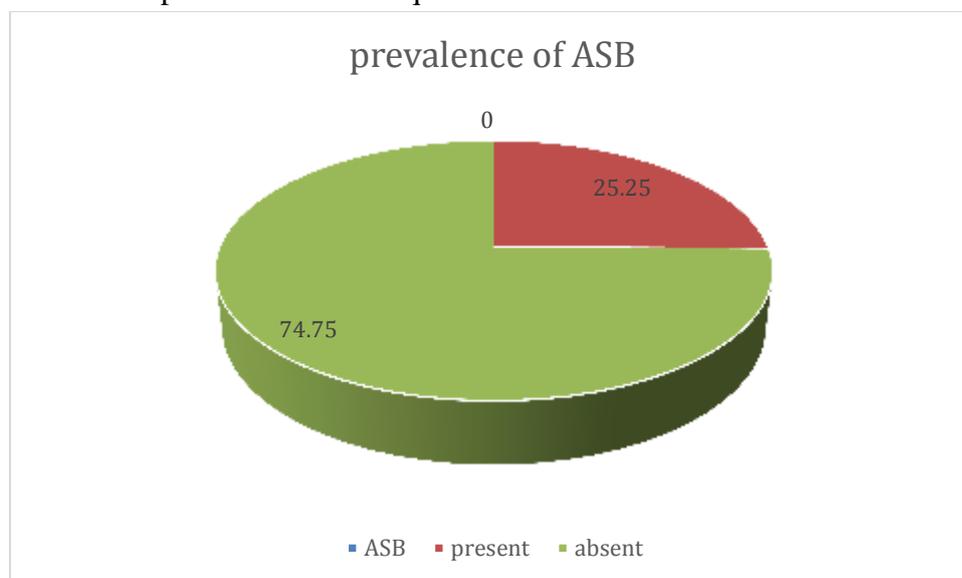
**Material and methods:** In order to (1) estimate the prevalence of ASB and its correlation with age, gender, duration of diabetes, renal and glycemic status, and (2) identify the antibiotic sensitivity pattern of uropathogens as well as assess the usefulness of microbial pattern as a predictor of symptomatic UTI, a cross sectional study involving 80 otherwise healthy type 2 diabetes patients was conducted.

## **Exclusion criteria**

The study excluded women who were pregnant, patients with indwelling urinary catheters and symptoms of UTI, patients who had recently received antibiotic therapy, and patients who had previously used antiseptics prior to collecting urine samples. Patients whose urine samples seemed to be contaminated were indicated by the presence of at least three distinct bacteria in one urine sample, were also disqualified.

80 patients were included in a prospective longitudinal research with a one-year follow-up period after 20 individuals were excluded based on the exclusion criteria. After selecting the first patient at random from a two-digit random number table, patients were enrolled using systemic random sampling. Following the receipt of each person's informed permission, a clinical examination and pertinent investigations were conducted. HbA1c, urea, creatinine, and postprandial blood glucose were all assessed. Using the estimated GFR (eGFR) formula from the Modification of Diet in Renal Disease Study (MDRD) equation, the patient's renal condition was evaluated. Using the sample design, asymptomatic diabetic individuals with bacteriuria were chosen and tested. After properly cleaning the labia in women and the glans penis in males with swabs soaked in clean tap water, one random clean-catch midstream urine sample was obtained. The samples were inoculated onto blood, MacConkey, and nutrient agars and incubated aerobically at 37 degrees Celsius for 18 to 24 hours. All data was collected and analysed using SPSS software.

**Results:** In our study, 25.25% of the type 2 diabetic group had ASB. Males said that Klebsiella sp. was the most frequent cause.



A lengthy history of type 2 diabetes was discovered to be the only risk factor for ASB. Age, gender, or recent glycemc status were not associated. UTI risk was higher in bacteriuric individuals with lower baseline HbA1C levels. The likelihood of acquiring UTI within a year was considerably higher in female diabetes individuals with ASB caused by Escherichia coli. Table 1: Association of Asymptomatic bacteriuria (ASB) with baseline characteristics and Urinary tract infection (UTI)

| Characteristics               | Total (n=80) | ASB (n=17)  | Non-ASB (n=63) | P            |
|-------------------------------|--------------|-------------|----------------|--------------|
| Age                           | 56.91±11.4   | 57.29±10.37 | 55.65±12.5     | >0.05        |
| Male                          | 37 (46%)     | 7 (41%)     | 30 (48%)       | >0.05        |
| Female                        | 43 (54%)     | 10 (59%)    | 33 (52%)       |              |
| Duration of diabetes (years)  | 9.90±6.64    | 13.76±8.89  | 8.65±7.53      | <b>0.018</b> |
| HbA1C (%)                     | 8.62±1.12    | 8.65±1.11   | 8.6±1.14       | >0.05        |
| eGFR (ml/min/m <sup>2</sup> ) | 80.1±33.42   | 75.41±33.62 | 86.62±33.22    | >0.05        |
| UTI on follow up              | 10 (13%)     | 5 (29%)     | 5 (8%)         | <0.05        |

Figure 2: Gender distribution

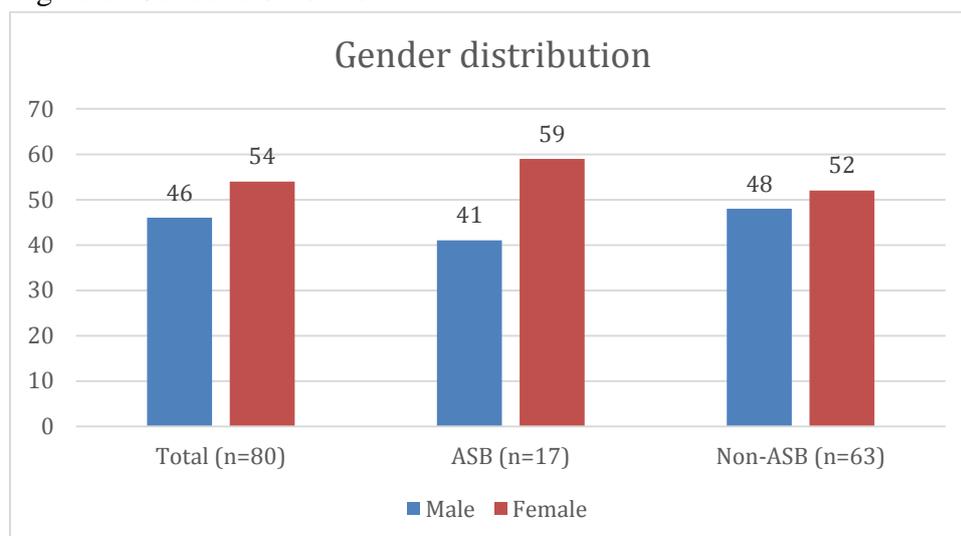
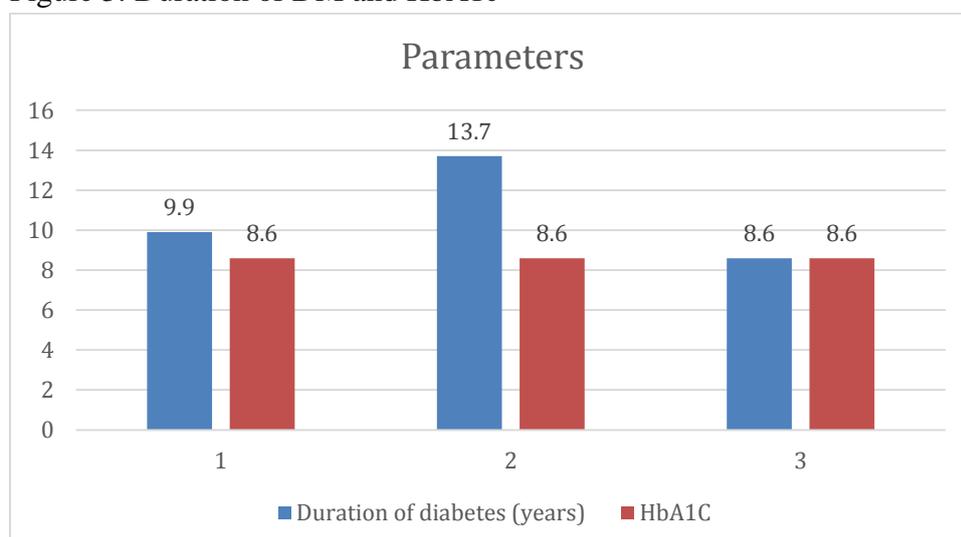


Figure 3: Duration of DM and HbA1c



*E. coli* and *Klebsiella sp.* were the most frequent causes of ASB in the study group, each accounting for 51% of cases. Additionally, there were two instances of *Enterococcus sp.* and one case of coagulase-negative staphylococcus. The most prevalent organism in the male population was *Klebsiella sp.*

### Discussion

Although it was higher than the 12.5% prevalence rate reported in the meta-analysis conducted by Renko et al.[7] and less than the 28-32% prevalence rate reported in recent Indian studies, the prevalence of ASB (21.25%) in this study population was comparable to many studies reporting prevalence estimates ranging from 8-26% [10,11]. [5,6,12]

Numerous investigations on otherwise healthy adults found that the majority of ASB cases occur in people over the age of 40. [13,14,15] Numerous studies [14,15] have shown that the short urethra in females, which is situated near to the warm, moist, vulvar, and perianal regions that are colonised by enteric bacteria, is the reason for their propensity for ASB (23.25% versus 18.91%).

Present study showed that *E. coli* and *Klebsiella sp.* were the most frequent causes of ASB in the study group, each accounting for 51% of cases. Additionally, there were two instances of *Enterococcus sp.* and one case of coagulase-negative staphylococcus. A study by Janda *et al.* [16] similarly showed that most prevalent organism in the male population was *Klebsiella sp.*

### **Conclusion**

We recommend ASB screening for female patients in our group who have had long-term diabetes since UTIs are considerably more common in female patients with ASB caused by *E. coli*. These patients can avoid UTI by implementing stringent glycemic control early on and taking steps to enhance their genital cleanliness.

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