

Original Research

Asymptomatic bacteriuria among diabetic females

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ABSTRACT:

Background: This study was conducted to evaluate asymptomatic bacteriuria among diabetic females. **Material and methods:** 50 females between the ages of twenty-five and sixty-five years who met the American Diabetes Association's (ADA) definition of DM were enrolled in the study overall. Each subject was enrolled in the study after receiving written informed consent and approval from the institutional ethics committee. Patients with symptomatic UTIs, renal failure, obstructive uropathy, indwelling catheters, pregnant women, those with impaired immune systems, and people who had recently taken antibiotics were all excluded from the trial. HbA1C was performed on all individuals in addition to customary biochemical tests such as complete blood count, blood urea, serum creatinine, fasting blood sugar, and viral indicators. All patients provided clean, midstream urine samples that were collected and processed in accordance with industry standards. **Results:** Overall, 50 females aged from 25–65 years, had been involved. Out of these, 36 females were found to be ASB positive, and 14 were ASB negative. The most frequent micro-organism isolated from ASB-positive patients was *E. coli*, taking into account for 19 out of 36 instances (52.7%), followed by *Candida* in 11 cases (30.5%), *Pseudomonas aeruginosa* (*P. aeruginosa*) in 3 (8.3%), 2 (5.5%) positive for *Klebsiella pneumoniae* (*K. pneumoniae*) and 1 (2.7%) positive for *Citrobacter freundii* (*C. freundii*). **Conclusion:** Patients with type 2 diabetes frequently experience ASB, and having poor glycemic control is a major risk factor for its occurrence. This demonstrates how crucial strict glycemic control is for preventing ASB.

Keywords: bacteriuria, asymptomatic, diabetes.

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INTRODUCTION

Diabetes mellitus is a group of metabolic diseases characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Metabolic abnormalities in carbohydrates, lipids, and proteins result from the importance of insulin as an anabolic hormone. Low levels of insulin to achieve adequate response and/or insulin resistance of target tissues, mainly skeletal muscles, adipose tissue, and to a lesser extent, liver, at the level of insulin receptors, signal transduction system, and/or effector enzymes or genes are responsible for these metabolic abnormalities. The severity of symptoms is due to the type and duration of diabetes. Some of the

diabetes patients are asymptomatic especially those with type 2 diabetes during the early years of the disease, others with marked hyperglycemia and especially in children with absolute insulin deficiency may suffer from polyuria, polydipsia, polyphagia, weight loss, and blurred vision. Uncontrolled diabetes may lead to stupor, coma and if not treated death, due to ketoacidosis or rare from nonketotic hyperosmolar syndrome.¹⁻³

Asymptomatic bacteriuria is the presence of bacteria in the properly collected urine of a patient that has no signs or symptoms of a urinary tract infection. Asymptomatic bacteriuria is very common in clinical

practice. While few infants and toddlers have asymptomatic bacteriuria, the incidence increases with age. The incidence is up to 15% or greater in women and men age 65 to 80 years and as high as 40% to 50% after age 80. ⁴ Hence, this study was conducted to assess asymptomatic bacteriuria among women having diabetes mellitus.

Material and methods

50 females between the ages of twenty-five and sixty-five years who met the American Diabetes Association's (ADA) definition of DM were enrolled in the study overall. Each subject was enrolled in the study after receiving written informed consent and approval from the institutional ethics committee. Patients with symptomatic UTIs, renal failure, obstructive uropathy, indwelling catheters, pregnant women, those with impaired immune systems, and people who had recently taken antibiotics were all excluded from the trial. HbA1C was performed on all individuals in addition to customary biochemical tests such complete blood count, blood urea, serum creatinine, fasting blood sugar, and viral indicators. All patients provided clean, midstream urine samples that were collected and processed in accordance with industry standards.

Gram-stained urine samples were examined for the presence of pus cells and bacteria. Following the recommendations of the Clinical Laboratory Standards Institute (CLSI), antibiotic susceptibility testing was performed on patients with severe bacteriuria. Two consecutive specimens with isolation of the same species in quantitative counts of at least 100,000 colony forming units (CFUs)/mL of urine were taken into consideration for the diagnosis of ASB in females.

Results

Overall, 50 females aged from 25–65 years, had been involved. Out of these, 36 females were found to be ASB positive, and 14 were ASB negative. The most frequent micro-organism isolated from ASB-positive patients was *E. coli*, taking into account for 19 out of 36 instances (52.7%), followed by *Candida* in 11 cases (30.5%), *Pseudomonas aeruginosa* (*P. aeruginosa*) in 3 (8.3%), 2 (5.5%) positive for *Klebsiella pneumoniae* (*K. pneumoniae*) and 1 (2.7%) positive for *Citrobacter freundii* (*C. freundii*). The prevalence of ASB was discovered to be higher among subjects having poor glycemic control having HbA1C more than seven percent. Among the 36 ASB-positive patients, 24 (66.66%) were found to have HbA1c more than seven percent and 12 patients (33.33%) had HbA1c less than or equal to seven percent.

Table 1: Prevalence of asymptomatic bacteriuria.

AFB staining	Number of subjects	Percentage
Positive	36	72%

Negative	14	28%
Total	50	100%

Table 2: Micro-organisms isolated from ASB+ subjects

Micro-organisms	Number of subjects	Percentage
<i>E. coli</i>	19	52.7%
<i>Candida</i>	11	30.5%
<i>Pseudomonas aeruginosa</i>	03	8.3%
<i>Klebsiella pneumoniae</i>	02	5.5%
<i>Citrobacter freundii</i>	01	2.7%

Discussion

The association of diabetes mellitus and urinary tract infections is increasingly being reported. Asymptomatic bacteriuria is common among diabetic patients and may lead to serious complications if not properly managed.⁵ ASB has been identified as a risk factor for acquiring symptomatic UTIs especially in diabetic women.⁶ UTIs are more severe in diabetic patients involving life-threatening complications such as emphysematous pyelonephritis and renal papillary necrosis.⁵ Despite the importance of bacteriuria in diabetics; there is paucity of information on the relationship between UTI and diabetes especially in sub-Saharan Africa. Reports on the prevalence and aetiology of ASB appear contradictory especially in developing countries. Therefore, the present study was aimed to determine the prevalence and spectrum of microorganisms responsible for asymptomatic bacteriuria in diabetics.

In this study, overall, 50 females aged from 25–65 years, had been involved. Out of these, 36 females were found to be ASB positive, and 14 were ASB negative. The most frequent micro-organism isolated from ASB-positive patients was *E. coli*, taking into account for 19 out of 36 instances (52.7%), followed by *Candida* in 11 cases (30.5%), *Pseudomonas aeruginosa* (*P. aeruginosa*) in 3 (8.3%), 2 (5.5%) positive for *Klebsiella pneumoniae* (*K. pneumoniae*) and 1 (2.7%) positive for *Citrobacter freundii* (*C. freundii*).

The prevalence of ASB was discovered to be higher among subjects having poor glycemic control having HbA1C more than seven percent. Among the 36 ASB-positive patients, 24 (66.66%) were found to have HbA1c more than seven percent and 12 patients (33.33%) had HbA1c less than or equal to seven percent.

Various studies have confirmed the role of the female sex as a risk factor for ASB in diabetics, like study by Turan et al., where 77.2% of females were positive for ASB.⁷ Results from the studies by Jha et al., (70%) and Alebiosu et al., (72.7) reported similar results as well, while Banerjee et al., reported a lower frequency (59%).^{8,9} Bissong et al., and Matteucci et al., however

recorded higher percentages of women in their studies at 86.4% and 86% respectively, and thus concluding that the female gender was a positive risk factor for ASB.^{10,11} The high prevalence of women in our study population can be since most of the women have undergone postmenopausal changes (the mean age of women in this study was 61.54 ± 13.86).¹²

A study conducted in Sudan showed the growth of *E. coli* (56.4%), *K. Pneumoniae* (23.0%), and *E. faecalis* (12.8%) in the urine culture.¹³ *Klebsiella pneumoniae* (42.4%), *E. coli* (21.2%), and *E. faecalis* (12.1%) were isolated from the study in Nigeria¹⁴, while *E. coli* (67%), *Enterococcus* (9%), *Klebsiella* (14%) were found in the study conducted in Southern India.¹⁵ Odetoyin et al., performed a study where the isolated organisms were *Staphylococcal aureus* (80.9%), *Klebsiella* (9.5%), *Enterococcus faecalis* (4.8%), and *E. coli* (4.8%).¹⁶

Conclusion

Patients with type 2 diabetes frequently experience ASB, and having poor glycemic control is a major risk factor for its occurrence. This demonstrates how crucial strict glycemic control is for preventing ASB. Additionally, *E. coli*, which most frequently causes ASB in diabetics, is also the most susceptible to imipenem and NFT. It is really concerning that so many antibiotics are now resistant to them. Primary care physicians can assist in resolving ASB-related issues in diabetics by carefully monitoring glycemic status, regularly screening diabetics for ASB, and prudently using antibiotics.

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