

Original Article

Study the asymptomatic bacteriuria in females suffering from type 2 diabetes mellitus

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ABSTRACT:

Background: The present study was conducted for assessing asymptomatic bacteriuria (ABU) in females suffering from Type 2 Diabetes Mellitus. **Materials & methods:** A total of 100 diabetic females were analysed. Random sampling was done. All participating women were interviewed and screened for the presence of ABU. In all participants, fasting blood glucose, HbA(1c) and renal function was measured. Mid-stream urine samples were collected and sent within 1hr for processing. Final results were analysed by SPSS software. **Results:** ABU was seen in 28 percent of the subjects. Mean HbA1c concentration among subjects with and without ABU was 10.1% and 8.3% respectively (p-value < 0.05). Mean duration of diabetes among subjects with and without ABU was 13.4 years and 8.1 years respectively (p-value < 0.05). **Conclusion:** The prevalence of asymptomatic bacteriuria in type-2 diabetic women is considerably high. The major risk factors observed are duration of diabetes, and Hyperglycemia.

Key words: Asymptomatic, Bacteriuria, Diabetes

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INTRODUCTION

The word Diabetes mellitus is derived from the Greek word Diabetes, which literally means siphon - to pass through. However; in Latin language, it means sweet. In recent years, the prevalence of diabetes, as well as prediabetes, has significantly increased in India. A recent Indian Council of Medical Research sponsored study suggests the widespread seriousness of this condition across rural and urban areas with some areas showing prevalence as high as 13%.^{1,2}

DM is broadly classified into three types by etiology and clinical presentation, type 1 diabetes, type 2 diabetes, and gestational diabetes (GDM). Type 2 diabetes mellitus (T2DM) accounts for around 90% of all cases of diabetes. In T2DM, the response to insulin is diminished, and this is defined as insulin resistance. 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.^{3,4}

The etiology of asymptomatic bacteriuria has not been conclusively determined. Asymptomatic bacteriuria

(ABU) is more common among women than among men probably because of the shorter female urethra, which gives bacteria from the urethral meatus and the perineum a shorter distance to the bladder. In fact, most women have transient bacteriuria after sexual intercourse, but few of these women will develop symptomatic infections because the body's normal defense mechanisms prevent symptomatic infection in most cases. In the elderly, it is thought that incomplete bladder emptying contributes to the increased incidence of asymptomatic bacteriuria.^{5,6} Hence; the present study was conducted for assessing asymptomatic bacteriuria in females suffering from Type 2 Diabetes Mellitus.

MATERIALS & METHODS

The present study was conducted for assessing asymptomatic bacteriuria in females suffering from Type 2 Diabetes Mellitus. A total of 100 diabetic females were analysed. Random sampling was done. All participating women were interviewed and screened for the presence of ABU. In all participants, fasting blood glucose, HbA(1c) and renal function

was measured. Mid-stream urine samples were collected and sent within 1hr for processing. Final results were analysed by SPSS software. Chi-square test, student t test and Mann Whitney U test were used for evaluation of level of significance.

RESULTS

Table 1: Prevalence of ABU

Parameter	Number of patients	Percentage
Asymptomatic bacteriuria	28	28
Total patients	100	100

Table 2: Correlation of HbA1c and ABU

HbA1c (%)	ABU positive	ABU negative
Mean	10.1	8.3
SD	1.7	1.9
p- value	0.001 (Significant)	

Table 3: Correlation of duration of diabetes and ABU

Duration of diabetes (years)	ABU positive	ABU negative
Mean	13.4	8.1
SD	4.3	3.6
p- value	0.003 (Significant)	

DISCUSSION

Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. It is associated with decrease in production and utilization of insulin, resulting in body's inability to utilize nutrients properly. The worldwide prevalence of DM has risen dramatically over the past two decades, from an estimated 30 million cases in 1985 to 382 million in 2013. Based on the current trends, the International Diabetes Federation projected that 592 million individuals will have diabetes by the year 2035. The rising incidence of DM and the sheer number of people with DM living in India have given this country the dubious distinction of being the "Diabetes Capital" of the world. The reason for greater frequency of infections in DM patients include incompletely defined abnormalities in cell-mediated immunity and phagocyte function associated with hyperglycemia as well as diminished vascularization. Pneumonia, urinary tract infections (UTIs), and skin and soft tissue infections are all more common in the diabetic population. UTIs (either lower urinary tract or pyelonephritis) are the result of common bacterial agents such as *Escherichia coli*, although several yeast species (*Candida* and *Torulopsis glabrata*) are also commonly observed to cause UTI in diabetics. Bacteriuria occurs frequently in individuals with diabetic cystopathy. Poor glycemic control is a common factor in individuals with these infections. Diabetes has been recently associated with urinary tract infections. The mechanism of pathogenesis for this association is not fully elucidated, however, it is suggested that high glucose concentration in urine

In the present study, a total of 100 diabetic females were analysed. Mean age of the subjects was 51.7 years. ABU was seen in 28 percent of the subjects. Mean HbA1c concentration among subjects with and without ABU was 10.1% and 8.3% respectively (p-value < 0.05). Mean duration of diabetes among subjects with and without ABU was 13.4 years and 8.1 years respectively (p-value < 0.05).

may favour the growth of pathogenic microorganisms. Asymptomatic bacteriuria is a form of UTI characterized by the presence of significant amount (>10⁵ cfu/ml) of bacteria in urine. Since the concept of significant bacteriuria was introduced, the reported data on the prevalence of asymptomatic bacteriuria (ASB) among patients with diabetes appear to be conflicting. Many UTIs are asymptomatic, especially in women.⁷⁻¹⁰ Hence; the present study was conducted for assessing asymptomatic bacteriuria in females suffering from Type 2 Diabetes Mellitus.

In the present study, a total of 100 diabetic females were analysed. Mean age of the subjects was 51.7 years. ABU was seen in 28 percent of the subjects. In a previous study conducted by Ranjani et al, prevalence of ABU among female diabetic patients was found to be 22.56%. A prevalence of ASB of 26% in a group of 378 women with diabetes has been reported, with a diagnostic criterion for ASB of 1–2 urine specimens with $\geq 10^5$ unit-forming colonies per mL of urine (Geerlings SE et al).^{10, 11} The 2 largest studies on outpatient women with diabetes were evaluated—showed ASB rates ranging from 7.9% to 9.5% (Nicolle LE et al, Zhanell GG et al). The variations have been attributed to differences in the screening test, geographical region and ethnicity.^{12, 13} In the present study, Mean HbA1c concentration among subjects with and without ABU was 10.1% and 8.3% respectively (p-value < 0.05). Mean duration of diabetes among subjects with and without ABU was 13.4 years and 8.1 years respectively (p-value < 0.05). In a previous study conducted by Reddy AS et al, 24.24 percent of the patients with ABU had duration of diabetes of more than 10 years. In another

study conducted by Ranjani et al, 21.6 percent of the patients with ABU had duration of diabetes of more than 10 years. Bonadio et al reported that patients with and without ABU had mean duration of diabetes of more than 13.1 years and 10.9 years respectively. Few studies have also revealed that duration of diabetes tends to increase the risk for ABU (Zhanell GG et al, Schmitt JK et al).^{4, 10, 13-15} Banerjee M et al in 2019 estimated the prevalence of ASB and its association with age, gender, duration of diabetes, and renal and glycemic status. ASB was prevalent in 21.25% of type 2 diabetes population in our study. *Klebsiella* sp emerged as the commonest cause among males. The only risk factor for ASB was found to be long-standing type 2 diabetes. There was no association with age, gender, or recent glycemic status. Bacteriuric patients with worse baseline HbA1C values were at greater risk of UTI. Female diabetic patients with ASB due to *Escherichia coli* had significantly greater risk of developing UTI within one year. Early adoption of stringent HbA1C lowering strategy and measures to improve genital hygiene can help prevent symptomatic UTI in these patients.⁶

CONCLUSION

The prevalence of asymptomatic bacteriuria in type-2 diabetic women is considerably high. The major risk factors observed are duration of diabetes, and Hyperglycemia.

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