DOI: https://doi.org/10.53350/pjmhs211592782

ORIGINAL ARTICLE

A study on Asymptomatic Bacteriuria in Women with Diabetes Mellitus

KASHIF ALI SAMIN[1], MUHAMMAD IKRAM SHAH[2], GOHAR ALI KHAN[3], NASIR MAHMOOD[4], MUHAMMAD BILAL[5], MUAZZAM FUAAD[6]

[1]*Assistant Professor Family Medicine, Khyber Medical University, Peshawar*
[2]*Assistant Professor Medicine, Jinnah Medical College, Peshawar*
[3]*Senior Registrar General Medicine, Qazi Hussain Ahmad Medical Complex, Nowshera*
[4]*Associate Professor Medicine, Aziz Fatimah Medical and Dental College, Faisalabad*
[5]*Assistant Professor General Medicine, Pak International Medical College Hayatabad, Peshawar*
[6]*Assistant Professor Medicine, Rai Medical College, Sargodha*
Corresponding Author: Dr. Gohar Ali khan, Senior Registrar General Medicine, Qazi Hussain Ahmad Medical Complex, Nowshera, Email: goharalikhan715@yahoo.com, Cell No: +92 332 9884081

ABSTRACT

Background: Diabetes is the common predisposing factor for Urinary Tract Infection. In diabetic patients, asymptomatic bacteriuria is more prevalent in females compared to male patients. Bacteria count for similar species over 10^5 per ml in urine specimen of mild stream clean catch without urinary infection is known as Asymptomatic bacteriuria (ASB). Asymptomatic bacteriuria appears to be incurable, recurring in diabetic patients.

Aim: The current study aim to determine the outcomes of asymptomatic bacteriuria in patients with diabetes mellitus.

Materials and Methods: This cross-sectional study was carried out on 85 women of diabetes mellitus in the department of General Medicine, Qazi Hussain Ahmad Medical Complex Nowshera and Jinnah Medical College Peshawar for duration of six months from June 2020 to December 2020. Detailed and follow-up histories of all the patients were studied, compared, and reported. Individuals who met the inclusive criteria were enrolled in this study. Women on steroid therapy, with immunodeficiency, and incomplete follow-up history were excluded. The outcome of symptomatic and asymptomatic patients was followed for positive culture in a time span of 3 and 6 months. SPSS version 20 was used for data analysis purposes.

Results: The mean age of the patients was 57+15.3. Of the total, 13 (15.3%) UTI were symptomatic women with diabetes, and UTI in asymptomatic patients was 72 (84.7%). In symptomatic cases, the prevalence of hypertension, Macroalbuminuria, and Microalbuminuria were 7 (53.4%), 3 (23.3%), and 3 (23.3%) respectively. HbA1C and eGFR (ml/min/1.732) level was 8.5+0.85 and 92.07+10.3 respectively.

Conclusion: Our study concluded that urinary culture detected significant bacteriuria without symptoms such as fever, painful micturition, and urgency, frequent micturition, flank pain, burning micturition, and suprapubic pain. Symptomatic and asymptomatic bacteriuria is more common in females. Also, asymptomatic bacteriuria appears to be incurable, recurring in diabetic females.

Keywords: Asymptomatic, Bacteriuria, Diabetes mellitus

INTROUCTION

Diabetes mellitus is a chronic, widespread, non-communicable, and multi-organs disease. In Pakistan, it is generally referred to as a sugar problem. In diabetes, blood glucose levels rise due to affected pancreas insulin activities. Generally, the patient's insulin level becomes inactive or reduced. The increasing prevalence of diabetes among the Pakistani population is due to various factors such as aging, obesity, urbanization, lack of physical activities, and population growth. It is estimated that diabetes disease could reach 366 million prevalence by 2030 [1]. The recent proportion of diabetes is about 180 million worldwide [2]. Diabetic Mellitus patients usually have more chances of urinary tract infection development compared to non-diabetic patients [3, 4]. Basically, diabetes is a multi-organ disease. It has been reported that a number of complications such as urinary infections, soft tissue infections, ear infections, respiratory infections, and abdominal problems are caused by diabetes. In non-diabetic patients, these complications hardly appear [5].

Diabetes mellitus had severe impacts on the human organ system [6]. A study conducted on diabetes patients reported that urinary tract infections were found among 18% of diabetes mellitus patients [7]. Also, there is a higher chance of asymptomatic UTI development in diabetes mellitus patients [8]. The urinary tract infections vary from asymptomatic bacteriuria to cystitis or lower UTI, severe urosepsis, and pyelonephritis. UTI serious complications are encountered more frequently in type 2 diabetes compared to general populations. These UTI complications are renal papillary necrosis, pyelonephritis, renal abscesses, and emphysematous cystitis [9, 10]. Type 2 diabetes is a risk factor not only for community-acquired UTI but also for health-care-associated UTI [8, 9], catheter-associated UTI[10], and post-renal transplant-recurrent UTI[11]. Furthermore, fluoroquinolone-resistant uropathogens, vancomycin-resistant Enterococci, carbapenem-resistant Enterobacteriaceae, and extended-spectrum-lactamase-positive Enterobacteriaceae make it susceptible to resistant pathogens.

Type 2 diabetes is also a risk factor for fungal UTI, which is most commonly caused by Candida. 21 Diabetes is also linked to poorer UTI outcomes, such as longer hospitalizations and increased mortality. The present study was carried out on the outcomes of asymptomatic bacteriuria in diabetes mellitus women.

MATERIAL AND METHOD

This cross-sectional study was carried out on 85 women of diabetes mellitus in the department of General Medicine, Qazi Hussain Ahmad Medical Complex Nowshera and Jinnah Medical College Peshawar for duration of six months from June 2020 to December 2020. Ethical approval was taken from the institutions ethical committee. Detailed and follow-up histories of all the patients were studied, compared, and reported. Individuals who met the inclusive criteria were enrolled in this study. Women on steroid therapy, with immunodeficiency, and incomplete follow-up history were excluded. During data collection and compilation, confidentiality was maintained. A predesigned and pretested semi structured questionnaire was used to collect information such as medical history, age, socioeconomic status, and duration of diabetes. During data collection, UTI-related complications were recorded, along with any necessary follow-up. The outcome of symptomatic and asymptomatic patients was followed for positive culture in a time span of 3 and 6 months.

Inclusive Criteria

- Patient follow-up history for 3rd and 6th months
- Women only
- Age 10-80 years
- Culture showed positive history in records

Exclusive Criteria

- Patients on immunodeficiency, steroid therapy or immune modulator drugs.
- Without complete follow up history.

RESULTS

The mean age of the patients was 57+15.3. Of the total, 14 (16.5%) UTI were symptomatic women with diabetes, and UTI in asymptomatic patients was 72 (84.7%). In symptomatic cases, the prevalence of hypertension, Macroalbuminuria, and Microalbuminuria were 9 (10.6%), 3 (3.5%), and 6 (7%) respectively. HbA1C and eGFR (ml/min/1.732) level was 8.5±0.85 and 92.07±10.3 respectively. Outcome of asymptomatic bacteriuria in women after 3 months follow-up as shown in Table 1 and Figure 1. Table 2 demonstrate the glycated hemoglobin HbA1C and eGFR value.

Table 1. Outcome of symptomatic bacteriuria in women after 3 months follow-up

Outcomes	Value
Symptomatic UTI	3
Hypertension	2
Microalbuminuria	2
Macroalbuminuria	1

Table 2. Glycated haemoglobin and estimated glomerular filtration rate (eGFR) after 3-months

Variable	Value
HbA1C	(8.1±0.8)
eGFR (ml/min/1.732)	92.9±13.97

The outcome of symptomatic bacteriuria in women and Glycated haemoglobin and estimated glomerular filtration rate (eGFR) after 6-months are shown in Table 3, Figure 2 and Table respectively.

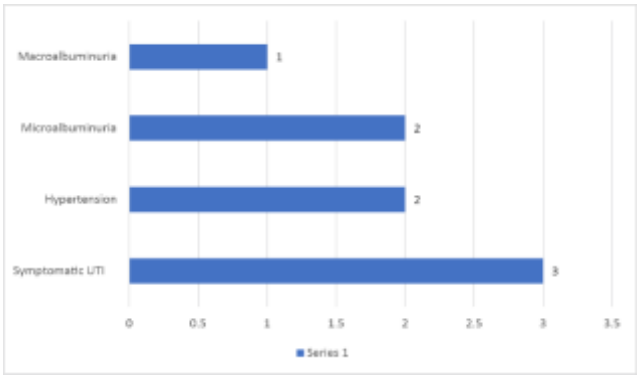

Figure 1. Symptomatic Bacteriuria outcomes after 3-months follow-up

Table 3. Outcome of symptomatic bacteriuria in women after 6 months follow-up

Outcomes	Value
Symptomatic UTI	11
Hypertension	7
Microalbuminuria	4
Macroalbuminuria	2

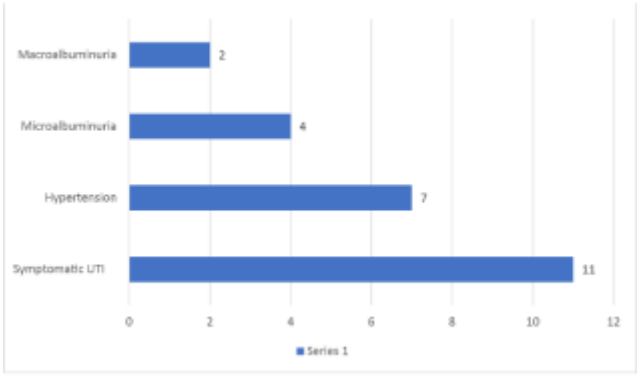

Figure 2. Symptomatic Bacteriuria outcomes after 6-months follow-up

Table 4. Glycated haemoglobin and estimated glomerular filtration rate (eGFR) after 6-months

Variable	Value
HbA1C	(8.1±0.8)
eGFR (ml/min/1.732)	92.9±13.97

DISCUSSION

Diabetic patients and urinary tract infections are associated with each other. It is always predisposed to urinary infections. Diabetic patients are more susceptible to the asymptomatic bacteriuria occurrence [12]. The prevalence of urinary tract infections is high in females compared to the male population. The common reasons might be the lack of symptoms, urinary infections, and complications in females[13,14]. The UTI may vary from lower colonization to the perinephric abscess, pyelonephritis, emphysematous cystitis, and renal abscess. Another study concluded that parameters such as neutrophil or immunity or lymphocyte dysfunction cause urinary infections in diabetic patients

[15]. Peripheral neuropathy, macro-albuminuria, and longer disease duration are the reasons for asymptomatic bacteriuria in diabetes mellitus patients. Kidney structure damage due to macro-albuminuria raises the chances of bacterial attacks which develop asymptomatic bacteriuria [16].

Another study reported asymptomatic bacteriuria prevalence is often higher in diabetic females compared to non-diabeticone (25% versus 6%). E. coli percentage was lower (42%) in diabetic patients compared to non-diabetic (77%) patients [17]. While one study studied the asymptomatic bacteriuria (ABS) the rate in both diabetic and non-diabetic patients. A similar rate of ABS was observed in diabetics (18.8%) and (18.6%) [18]. the disease duration, ASB presence, and micro vascular diseases were correlated among type 1 and type 2diabetic Mellitus by another research [19]. Longstanding complications come from disease longer duration. These complications could be either peripheral vascular disease or peripheral neuropathy.

Infections episodes and vascular complications chances increased with alteration of PMN function in diabetic patients [20]. Another investigator follow-up the diabetic patients for three years and found that in 9 months bacteriuria prevalence declined to 50% and remained in that position till the third year [21]. About 20% of patients reported no alteration in the organism of bacteriuria infection takes place during observations. However, a potential outcome appears in quarter patients with a one-year evaluation that needs antibiotic therapy for urinary infections. Persistent bacteriuria was found more likely in infected women of a gram-negative organism. In some patients, repetition of bacteriuria occurs after a follow-up of initial bacteriuria in many women [22]. Asymptomatic bacteria recurrence occurs in women with diabetes and asymptomatic bacteria. Bacteriuria is a harmless condition that is rarely permanently eradicated.

CONCLUSION

Our study concluded that urinary culture detected significant bacteriuria without symptoms such as fever, painful micturition, and urgency, frequent micturition, flank pain, burning micturition, and suprapubic pain. Symptomatic and asymptomatic bacteriuria is more common in females. Also, asymptomatic bacteriuria appears to be incurable, recurring in diabetic females.

REFERENCES

1. Laway BA, Nabi T, Bhat MH, Fomda BA. Prevalence, clinical profile and follow up of asymptomatic bacteriuria in patients with type 2 diabetes-prospective case control study in Srinagar, India. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2021 Jan 1;15(1):455-9.
2. DrAmrut BR, MirvazZulfikar M. OUTCOMES OF ASYMPTOMATIC BACTERIURIA IN PATIENTS WITH DIABETES MELLITUS. European Journal of Molecular & Clinical Medicine. 2021 Jan 21;7(9):2646-50.
3. Asghar MS, Akram M, Singh M, Yasmin F, Yaseen R, Ahmed N, Siddiqui M, Hassan M, Rasheed U, Ali A. Characteristics of Asymptomatic Bacteriuria in Diabetes Mellitus Patients: A Retrospective Observational Study. Cureus. 2021 Feb;13(2).
4. Tauseef A, Zafar M, Syyed E, Thirumalareddy J, Sood A, Mirza M. Asymptomatic Bacteriuria (ASB) in diabetic patients: Treat or not to treat: A prospective, observational study conducted at a tertiary care hospital. Journal of Family Medicine and Primary Care. 2021 May 1;10(5):1963.
5. Diabetes Prevalence Survey of Pakistan (DPS-PAK): prevalence of type 2 diabetes mellitus and prediabetes using HbA1c: a population-based survey from Pakistan. Aamir AH, Ul-Haq Z, Mahar SA, et al. *BMJ Open.* 2019;9:0.
6. Frequency, risk factors, and responsible pathogenic microorganisms of asymptomatic bacteriuria in patients with type 2 diabetes mellitus. Turan H, Serefhanoglu K, Torun AN, Kulaksizoglu S, Kulaksizoglu M, Pamuk B, Arslan H. https://pubmed.ncbi.nlm.nih.gov/18503181/ Jpn J Infect Dis. 2018;61:236–238.
7. Asymptomatic bacteriuria in women with diabetes: influence of metabolic control. Bonadio M, Boldrini E, Forotti G, Matteucci E, Vigna A, Mori S, Giampietro O. Clin Infect Dis. 2014;38:0.
8. Asymptomatic bacteriuria in diabetes mellitus patients in Southwest Cameroon. Bissong ME, Fon PN, Tabe-Besong FO, Akenji TN. Afr Health Sci. 2013;13:661–666.
9. Urinary tract infections and antimicrobial sensitivity among diabetic patients at Khartoum, Sudan. Hamdan HZ, Kubbara E, Adam AM, Hassan OS, Suliman SO, Adam I. Ann Clin Microbiol Antimicrob. 2015;14:26.
10. Clinical profile of asymptomatic bacteriuria in type 2 diabetes mellitus: an eastern India perspective. Banerjee M, Majumdar M, Kundu PK, Maisnam I, Mukherjee AK. *Indian J Endocrinol Metab.* 2019;23:293–297
11. Asymptomatic bacteriuria in postmenopausal women with diabetes mellitus. Kasyan G, Berketova TY, Rogozin AK, Pushkar DY. Cent European J Urol. 2013;66:320–326.
12. Asymptomatic bacteriuria among the patients of type 2 diabetes mellitus. Bharti A, Chawla SPS, Kumar S, Kaur S, Soin D, Jindal N, Garg R. J Family Med Prim Care. 2019;8:539–543.
13. Prevalence, risk factors and microorganisms of urinary tract infections in patients with type 2 diabetes mellitus: a retrospective study in China. He K, Hu Y, Shi JC, Zhu YQ, Mao XM. Ther Clin Risk Manag. 2018;14:403–408.
14. Prevalence of asymptomatic bacteriuria in type 2 diabetic subjects with and without microalbuminuria. Papazafiropoulou A, Daniil I, Sotiropoulos A, et al. BMC Res Notes. 2010;3:169.
15. Microbiologic profile and clinical practices in urinary tract infections in a tertiary care center in Southern India. Kiranmala K, Johnson R, Savio J, Idiculla J. J Family Med Prim Care. 2019;8:2888–2892.
16. Prevalence of uropathogen and their antibiotic resistance pattern among diabetic patients. Nigussie D, Amsalu A. Turk J Urol. 2017;43:85–92.
17. Infections in patients with diabetes mellitus: a review of pathogenesis. Casqueiro J, Casqueiro J, Alves C. Indian J Endocrinol Metab. 2012;16:0.
18. Consequences of asymptomatic bacteriuria in women with diabetes mellitus. Geerlings SE, Stolk RP, Camps MJ, Netten PM, Collet JT, Schneeberger PM, Hoepelman AI. Arch Intern Med. 2001;161:1421–1427.
19. Colgan R, Jaffe GA, Nicolle LE. Asymptomatic Bacteriuria. American family physician. 2020 Jul 15;102(2):99-104.
20. Gogulamudi PR, Deepanjali S, Mandal J, Pallam G. Asymptomatic bacteriuria among medical inpatients: Data from an Indian teaching hospital. Tropical Doctor. 2021 Apr 13:00494755211006990.
21. Wiley Z, Jacob JT, Burd EM. Targeting asymptomatic bacteriuria in antimicrobial stewardship: the role of the microbiology laboratory. Journal of clinical microbiology. 2020 Apr 23;58(5):e00518-18.
22. Eun SJ, Kim MS, Jung SI, Choi HJ, Chung HS, Hwang EC, Kwon DD. Rates and Risk Factors of Bacteriuria in Patients with Bladder Cancer Who Underwent Treatment with Bacillus Calmette-Guérin. Urogenital Tract Infection. 2020 Aug 31;15(2):47-53.