

AGE AND GENDER SPECIFIC RISK OF URINARY TRACT INFECTION IN DIABETES PATIENTS: A CASE CONTROL STUDY

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ABSTRACT

Diabetes is a chronic health condition which, if not kept under control will lead to severe complications that could affect the quality of life and lead to other diseases or even death. A case-control study was carried out among in-patients having Type 2 DM and those aged above 18 years who were tested for UTI in the laboratory. This study was conducted by analyzing the data that were extracted from the lab information system, hospital information system, and prescription orders carried out in BCMCH for 6 months. The study showed that urinary tract infections among diabetic patients are more common in females than in males. Similarly, diabetes patients aged above 40 years were more prone to UTI. Patients with a prescription for Lower UTI were more likely to have confirmed UTI compared to those without symptoms. Among the drugs that could cause UTI as an ADR, drugs causing metabolic disturbances had a higher risk of having UTI than those with anticholinergics, Immuno-suppressants, and SGLT2i. By having a strict diabetic control and diet plan the risk for UTI can be reduced.

KEYWORDS: Type 2 Diabetes Mellitus, Urinary Tract Infections, Complications, Adverse Drug Reaction, Sodium-glucose Cotransporter – 2 Inhibitor.

INTRODUCTION

According to the National Institutes of Health, UTIs occur more frequently in diabetic patients. Diabetes mellitus (DM) is a metabolic disorder characterised by abnormally high blood glucose levels. Type 1, type 2, gestational diabetes, newborn diabetes, maturity-onset diabetes of the young (MODY), and secondary causes resulting from endocrinopathies, steroid use, etc. are among the various kinds of diabetes mellitus. Type 1 diabetes mellitus (T1DM) and Type 2 diabetes mellitus (T2DM) are the two primary subtypes of diabetes mellitus (DM). T1DM and T2DM are primarily caused by faulty insulin production and/or action, respectively. While T2DM is expected to affect middle-aged and older adults who have chronic hyperglycemia as a result of poor dietary and lifestyle choices, T1DM is thought to manifest in children or teenagers. Because T1DM and T2DM have very diverse pathophysiologies, there are differences in their etiologies, presentations, and treatments.^[1]

Urinary tract infections, which impact over 40% of women at some point in their lives, are among the most prevalent bacterial illnesses. Though most infections are not as serious, UTIs can result in potentially fatal sepsis. However, UTIs are linked to substantial medical and

social expenses and cause great discomfort to the sufferer. Every year, UTIs cause 7 million clinic visits in the USA, costing more than \$1.6 billion. Most UTIs are caused by bacteria, although they can also be caused by fungi, viruses, or parasites. The most common urinary tract infection (UTI) causes cystitis, however, other urinary tract infections can result in pyelonephritis, urethritis, and prostatitis. The presence of bacteria in the urinary tract does not always result in symptoms, and bacteriuria without symptoms is a frequent observation.^[2]

OBJECTIVES

To estimate the risk of the following factors associated with UTI in Type 2 DM:

a) Demographic factors such as age and gender

MATERIALS AND METHODS**STUDY DESIGN**

A hospital - based Retrospective Case Control study.

STUDY SITE

The study was conducted in Believers Church Medical College Hospital (BCMCH), Thiruvalla.

STUDY PERIOD

The study was carried out for a period of 6 months (November 2022 to April 2023).

SAMPLE SIZE

All patients who meet the inclusion and exclusion criteria within 6 months will be included. Asper hospital statistics sample size is 2713.

Calculating Proportion

where,
 P= Prevalence (from previous studies)
 Q= 100-P
 d= allowable error (5-20% of P)

STUDY APPROVAL

The study was approved by Institutional Review Board of Believers Church medical College Hospital, Thiruvalla.

STUDY POPULATION

The study population consist of 2713 people with Type 2 diabetes who were tested for UTI at Believers Church Medical College. N=4PQ/d2

STUDY CRITERIA

Inclusion criteria:
 Patients admitted during the study period. Patients aged > 18 years.
 Patients of both genders.

Exclusion criteria

NIL.

SOURCES OF DATA

- Data collection form
- Questionnaire

STUDY PROCEDURE

The data collected from Believers Church Medical College Hospital of all patients who were tested for UTI in the laboratory of BCMCH will be extracted from the Lab Information System(LIS). Their HbA1c level will also be noted from the LIS. Their demographic factors will be extracted from the Hospital Information System (HIS). Their drug history will be extracted from the prescription orders. DM status, comorbid conditions, and complications of DM will be determined based on prescriptions.

STATISTICAL ANALYSIS

The data collected were entered in Microsoft Excel-2021 version, statistical analysis was done and result were obtained.

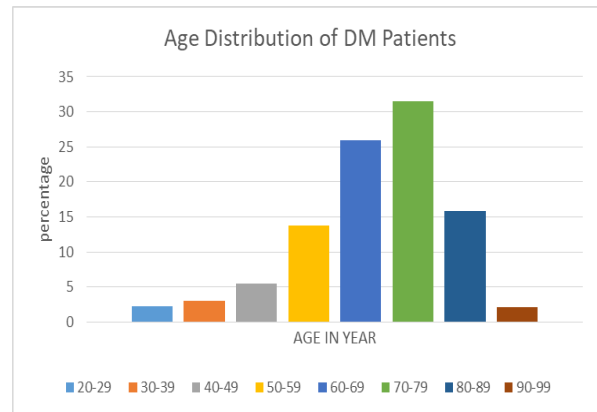
RESULTS

In the study conducted at a multispeciality hospital, a total of 2713 samples were taken from the hospital information system. The study mainly focuses on the comparison between patients having urinary tract

infection (case) and non-urinary tract infection (control) in diabetic populations. To obtain this objective the results were divided into two sets of data using a statistical approach.

Table 1: Age Distribution of DM Patients.

AGE	FREQUENCY	PERCENTAGE (%)
20-29	61	2.2
30-39	73	3
40-49	151	5.5
50-59	375	13.8
60-69	707	26
70-79	855	31.5
80-89	434	15.9
90-99	57	2.1
TOTAL	2713	100



As shown in Table 1 and Figure 1, the age distribution of DM subjects with UTI were higher in age group of 70-79 years. And this difference was highly significant (p<0.0001). However, most of the UTI patients were 40 years and above.

Table 2: Distribution of Diabetic Patients by Gender.

Sl no	Gender	Frequency	Percentage
1	Male	1545	57%
2	Female	1168	43%

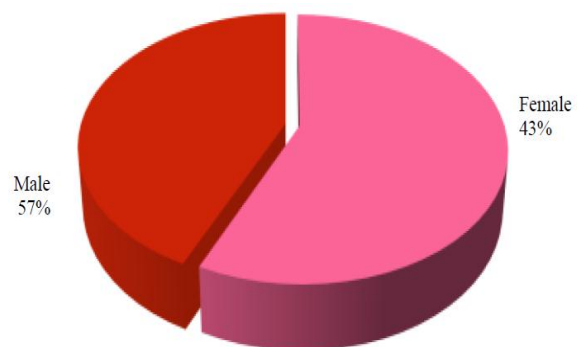


Figure 2: Distribution of Diabetic Patients by Gender.

As shown in Table 2, Among the 2713 DM population, 1545(57%) are males and 1168(43%) are females.

Figure 2, the distribution of male DM subjects are more compared to female DM subjects.

DISCUSSION

AGE DISTRIBUTION OF DM PATIENTS

In our study it shows that as the age progresses the chance for diabetes is found to be higher. It was found that people aged between 70-79 years (33%) had more chances of having diabetes. This is similar to the study conducted by Ketut Suastika et al. inferred that in the age group of 20-44 years, it was estimated about 3.7% of people had diabetes; while in the age group 45-64 years the number increased to 13.7%, and the highest percentage of 26.9% was found in the age group of ≥ 65 years.^[3] Another study conducted by Pramod Kumar Jha et al. inferred that the occurrence of UTI in diabetics was observed more frequently in subjects between the age of 31 and 40 years followed by the age group 41-50 years which is similar to our study.^[4] Another study which is contradictory to our study was conducted by Khalid A. Al-Rubeaan et al. inferred that age did not influence the incidence of UTI. In the present study, 46.9 % (469) of diabetic patients were males and 53.1 % (531) were females. The average age of all the patients was 51.9 ± 15.9 . The diabetics with and without UTI were similar in their age (52.3 ± 15.3 vs 51.8 ± 16). There was no significant risk of UTI in patients aged above 60 years (RR = 1.054, CI: 0.841– 1.321).^[5]

DISTRIBUTION OF DIABETIC PATIENTS BY GENDER

In our study, it shows that males (57%) have more chances of being diabetic than females (43%). This is similar to the study conducted by Anna Nordstrom et al. inferred that the prevalence of type 2 diabetes was 14.6% in men and 9.1% in women ($P < .001$).^[6] Another study conducted by Tangying Li et al. inferred that men had slightly higher T2DM cases (N= 93) compared to women (N = 128) out of 1579 participants in which 567 were men and 1012 were women.^[7]

CONCLUSION

Diabetes is a long-term medical condition, and the likelihood of developing it varies with age, gender, comorbidities, and complications. Getting a recurrent UTI is one of the main consequences of diabetes. Antibiotics should be used to treat bacteria that cause urinary tract infections (UTIs) in order to prevent the spread of drug-resistant pathogens across society and to lower the morbidity and mortality rates of diabetic people who get UTIs. Multi-drug-resistant microorganisms pose a threat to human society. The use of medications, uncontrolled diabetes, and demographic variables can raise the risk of urinary tract infections. In this study, it shows that in DM subjects, the chances of getting UTI increase with age. Female DM subjects are more prone to UTI than males.

LIST OF ABBREVIATIONS

- UTI – URINARY TRACT INFECTION
- SGLT2i – SODIUM - GLUCOSE COTRANSPORTER-2 INHIBITORS
- DM – DIABETES MELLITUS
- T2DM – TYPE 2 DIABETES MELLITUS
- T1DM – TYPE 1 DIABETES MELLITUS
- ADR – ADVERSE DRUG REACTION
- MODY- MATURITY ONSET DIABETES OF THE YOUNG

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