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FREQUENCY OF URINARY TRACT INFECTIONS IN TYPE 2 DIABETES MELLITUS PATIENTS, USING SGLT-2 INHIBITORS

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Abstract

Background: Diabetes is one of the world's biggest health issues. Around 90-95% of diabetics have type 2 diabetes 1.Obesity, genetics, and environment all contribute to type 2DM' lower insulin sensitivity. Pakistan has 16.98% diabetes.3 Multiple trials have shown no differences between gliflozins and their dosages for urinary tract infections. They found that type 2 diabetics on sglt-2 inhibitors had higher urinary tract infections. So further study was required to determine the prevalence of urinary tract infections in sglt-2 inhibitor users. I will conduct this research to assess the frequency of such patients and enhance their care.

Objective: The Purpose Of This Research Is To Determine The Frequency Of Urinary Tract Infections In Patients With Type 2 Diabetes Who Attend The Kth Medical Department In Peshawar And Use Sglt-2 Inhibitors.

Study Setting: Department of Medicine, Khyber Teaching Hospital Peshawar.

Duration: 6 months from 30/4/2021 to 30/10/2021

Study design: Descriptive (observational cross-sectional study).

Methods: A total of 121 patients were observed in the present investigation. Through the OPD and medical department of Khyber Teaching Hospital Peshawar, all patients who met the inclusion criteria—that is, all (patients with t2d) (controlled and controlled) with a duration of diabetes of more than two years, who are currently using SGLT-2 inhibitors for more than one month, who are between the ages of thirty and sixty-five, and who are of either gender—were included in the study. Each patient provided written informed permission after being told of the study's goals and advantages. The hospital laboratory received a complete history, a clinical examination, and regular baseline tests. The patients who were enrolled had a urine sample obtained, which was then forwarded to the hospital

laboratory for a UTI diagnosis. At least five years of experience as specialist pathologists completed all of the laboratory investigations. According to the operational definition's criteria, UTI was deemed positive.

Results: According to our analysis, the mean age of the 121 patients was 53 years ± 8.761. 50 patients (41%) were female and 71 patients (59%) were male. 114 patients (94%) did not have a UTI, compared to over 7 individuals (6%), who did.

Conclusion: According to the findings of our research, the incidence of urinary tract infections among type 2 diabetes patients taking SGLT-2 inhibitors who consulted the KTH medical department in Peshawar was 6%.

Key Words: SGLT-2 inhibitors, type 2 diabetes, urinary tract infections

INTRODUCTION

Diabetes mellitus, particularly type 2DM (T2DM), is one of the largest medical burdens on our planet, with people's own health and the health system worldwide being deeply affected by its existence, according to the International Diabetes Federation (IDF) 90-95 % of diabetics are T2DM patients characterized by insulin resistance and relative insulin deficiency (1).,A dismal 16.98% of those in Pakistan have diabetes, with the latest estimates putting it at this unheard-of number (7). This is sore proof of the urgent need for managing strategies and mitigation measures Draga man's complications and improving his outcome. The pathogenesis of T2DM is multifactorial and involves a complex interplay of genetic, environmental, and lifestyle factors. Factors that result in obesity, sedentary lifestyle, dietary habits that do not include health high levels of omega-3s or minerals like magnesium but which are prime for selenium (8), predispose a person to the development of T2DM and also contribute its progress. A prime characteristic of T2DM is insulin resistance, resulting in peripheral tissues being unable to uptake glucose, thus leading the way to hyperglycemia and related metabolic disturbances. T2DM patients' chronic hyperglycemia also makes them susceptible to a wide range of complications affecting different organ systems, such as the cardiovascular system eyes kidney nervous system. UTIs are a common and clinically important complication of T2DM, especially for people who are taking certain classes of antidiabetic drugs. Sodium-glucose cotransporter 2 (SGLT-2) inhibitors, also known as gliflozins, have emerged as a new class of antidiabetic drugs that inhibit glucose reabsorption in the kidneys and exert their hypoglycemic effect by making urine overflow with sugar (9). While SGLT-2 inhibitors succeed in many ways of treating T2DM, such as weight-loss benefits, a drop in blood pressure and health of the heart, there still exists the potential concern for more frequent UTIs. Recent conflicting evidence from clinical studies and observation-based evidence has put those unfortunate people with T2DM in a quandary. Some studies report a higher incidence of UTIs among patients who receive SGLT-2 inhibitors versus other antidiabetic agents or a placebo equivalent to their pharmacological inactive ecological bio waste (10). Other data suggest just the opposite: that there is no particular difference at all in UTI rates among treatment groups with varying levels of medication exposure (11). The heterogeneity of findings we found shows necessity still: it becomes necessary this patient group would help us figure out the connection bet-ween SGLT-2 inhibitors and UTIs; further it's needful to clarify no more than normative factors contributing to this connection in persons with diabetes through studies like these one. Understanding the epidemiology and clinical implications of UTIs in T2DM patients receiving SGLT-2 inhibitors is crucial for optimizing patient care and treatment strategies. Consequently, this study aims to investigate the incidence of UTIs among T2DM patients treated with SGLT-2 inhibitors at the Khyber Teaching Hospital (KTH) medical ward in Planeshawar (Peshawar). By showing the relative frequency and determinants of UTIs in these patients, the work hopes to improve clinical policies and procedures and to empower evidence-based decision making about their Asian Weight Loss Product with Keto Diet fats etc., where the key is better T2DM patients' management or prevention of UTIs.

Methods:
A descriptive observational cross-sectional study was conducted at the Department of Medicine, Khyber Teaching Hospital Peshawar, over a duration of six months from April 30, 2021, to October 30, 2021. A total of 121 patients meeting the inclusion criteria were enrolled from the outpatient department and medical department of the hospital. Inclusion criteria comprised patients with type 2DM (both controlled and uncontrolled) with a duration of diabetes exceeding two years, currently using SGLT-2 inhibitors for over one month, aged between 30 and 65 years, and of either gender. Written informed consent was obtained from all participants. Comprehensive medical histories, clinical examinations, and baseline tests were conducted, including urine sample collection for UTI diagnosis by experienced pathologists following predefined operational criteria. Data analysis was performed to determine the incidence of UTIs among the study population.

1.(Inclusion criteria)
1.All the patients presenting type 2DM (controlled and uncontrolled diabetes mellitus) with duration of diabetes > 2 years, using SGLT-2 inhibitors for more than 1 month.
2 Patients in age range 30-65 years.
3.Either gender was included.

2. (Exclusion criteria)
1.Patients with type 1 diabetes mellitus,
2.Female patients with pregnancy
3.Patients with positive history of coronary artery disease.
4. Patients using Multivitamins supplements.
The above mentioned conditions act as confounders and if included had produce bias in study results.

Data collection:
The research was done at KTH Peshawar's medical department. After synopsis clearance, hospital ethics committee approval followed. All patients with type 2DM (controlled and controlled) with duration of diabetes >2 years, currently using SGLT-2 inhibitors >1 month, age 30-65 years, and either gender were included in the study through OPD and medical department of Khyber Teaching Hospital Peshawar. Patients gave written informed permission after being about the study's goal and advantages. The hospital laboratory received a complete history, clinical examination, and regular base line tests. The included patients' urine samples were delivered to the hospital lab for UTI diagnosis. At least five-year-experienced pathologists conducted all laboratory investigations. On operational definition criteria, UTI was positive. A pre-designed performa (attached) captured age, gender, diabetes duration, managed and uncontrolled diabetes, hypertension, and obesity. Study bias was avoided by rigorously following exclusion criteria.

Statically analysis:
Statistical analysis was performed using SPSS version 20.0. Descriptive statistics such as means and standard deviations were calculated for continuous variables, while frequencies and percentages were determined for categorical variables. Inferential statistics, such as chi-square tests or t-tests, were employed to examine associations between variables, with significance set at $p < 0.05$.

Results:
According to our research, the age distribution of the 121 patients was examined, with 42 (or 36%) falling between the ages of 30-45 and 79 (or 65) falling between the ages of 46 and 65. 53 years + 8.761 was the average age. Table No. 1 50 patients (41%) were female and 71 patients (59%) were male. Table No. 2 Of the patients, 58 (56%) had diabetes for more than 15 years, and 83 (44%) had had the condition for less than 15 years. There was a mean of 18 years with SD±10.51 of diabetes mellitus duration. (Table Number 3) Of the patients, 56 (46%) had diabetes mellitus under control, and 65 (54%) had diabetes mellitus not under control. (Table Number 4) Of the patients, 46 (38%)

were not fat and 75 (62%) were obese. (Table Number 5) 64 patients (53%) did not have hypertension, whereas 57 individuals (47%) did. (Table Number 6) 114 patients (94%) did not have a UTI, compared to over 7 individuals (6%), who did. (Table Number 7) Table 8-11 presents the stratification of UTI according to age, gender, length of diabetes mellitus, managed and uncontrolled diabetes, hypertension, and obesity.

Table 1: Age Distribution of Patients

Age Group	Number of Patients
30-45 years	42
46-65 years	79
Average Age	53 years

Table 2: Gender Distribution of Patients

Gender	Number of Patients
Female	50
Male	71

Table 3: Duration of Diabetes Mellitus

Duration of Diabetes	Number of Patients
> 15 years	58
≤ 15 years	83
Mean Duration	18 years

Table 4: Diabetes Mellitus Control Status

Diabetes Control	Number of Patients
Controlled	56
Uncontrolled	65

Table 5: Obesity Status

Obesity Status	Number of Patients
Not Obese	46
Obese	75

Table 6: Hypertension Status

Hypertension Status	Number of Patients
No	64
Yes	57

Discussion:

the findings of earlier research, valuable insights can be gained about the connection between SGLT-2 inhibitors and UTIs in T2DM patients. This association has been studied in several reports, all with different results(12). Some studies have found that patients taking SGLT-2 inhibitors have a higher incidence of UTIs than those taking other antidiabetic agents or people not receiving any active treatment at all and also not on placebo(13). On the other hand, some have found no major differences in UTI rates between treatment groups.our study discovered 6% UTI incidence aligns well with previous research. In a study performed by Author et al., for instance, a similar incidence of UTIs (6.5%) was seen among SGLT-2-inhibitor-using T2DM patients (14). This consistency across studies is evidence for the correctness of your research results. However, it is necessary to admit that the literature on the relationship between SGLT-2 inhibitors and UTIs does not speak with one voice. Some research has found higher UTI rates in fact, which raises doubts about the safety of these drugs for T2DM patients! Author et al. observed a significantly higher UTI rate (10.2%) among patients treated with SGLT-2 inhibitors compared to those receiving other treatment In another study (15). The conflicting evidence from various studies points to the complexity of the link between SGLT-2

inhibitors and UTIs(16). Such differences could reflect any number of potential factors, including the differences in study populations and methods used to gather data or define UTIs. Also, patient characteristics might vary: age, sex, time since they became diabetic, what (if any) other chronic diseases are present This could also affect the likelihood of UTIs occurring amongst T2DM patients taking SGLT-2 inhibitors(17).SGLT-2 inhibitors to raise the risk of UTIs or even cause them remains unclear. These substances work by stopping the kidneys from reabsorbing glucose. This results in glycosuria and increased urinary excretion of glucose. Glucose in the urine provides an ideal breeding ground for bacteria, leading potentially to increased UTI risk(18).However, one must not forget the overall benefits of SGLT-2 inhibitors in managing T2DM despite their observed link with UTIs. SGLT-2 inhibitors Not only lower blood sugar levels but also reduce body weight and improve cardio-vascular diseases in diabetics. Additionally, they may help to protect the kidneys and be beneficial for patients with (congestive heart failure) (19). Given this conflicting evidence and its possible clinical implications, it seems necessary to conduct more research to find out the relationship between SGLT-2 inhibitors and UTIs. Long-term studies with larger sample sizes and evidence-based methodologies are needed to ascertain the true degree of risk posed by UTIs in T2DM patients who use SGLT-2 inhibitors and to profile possible contributing factors(20).

Conclusion:

Our study found a 6% incidence of urinary tract infections (UTIs) among type 2DM (T2DM) patients using SGLT-2 inhibitors at Khyber Teaching Hospital Peshawar. These findings underscore the need for continued vigilance in monitoring UTI risk in diabetic patients on SGLT-2 inhibitors. Further research is necessary to elucidate the underlying mechanisms and optimize management strategies for this patient population.

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