Original Article

Compliance in Type 2 Diabetic Patients Treated with SGLT2 Inhibitors in a Tertiary Care Hospital Peshawar Pakistan

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ABSTRACT

Objective: To evaluate the adherence to treatment in type 2 diabetic patients using SGLT2 inhibitors.

Study Design:

Place and Duration of Study: This study was conducted at the Department of Medicine, Khyber Teaching Hospital Peshawar from August 2018 to January 2019.

Materials and Methods: Total 260 diabetic patients, with mean age of 47±1.26 years, were enrolled in the study by non–probability consecutive sampling. After taking informed consent and recording the demographic profile of the patients,SGLT2 inhibitors were given for the treatment of T2DM. Necessary data was collected regarding the compliance of patients to these drugs after 2 months. The statistical analysis was done using SPSS version 20.0 and graph were constructed with graphpad prism software.

Results: In total 260 patients, 182 (70%) were male and78 (30%) were female. Poor compliance (adherence to therapy) was recorded in 60 (23.07%) of patients, while in 200 (76.93%) patients shows good drug compliance. No significant association was observed in patients' compliance with different age group. Similarly, gender makes no difference in compliance to treatment however, female patients shows slightly increase noncompliance as compared to males with OR, 95%CI 1.07(0.55-2.08). Polyuria was the main adverse event for noncompliance of the patient to SGLT-2 inhibitors.

Conclusion: Compliance to SGLT-2 inhibitors in our study in 76.93% which may be increased by proper counselling the patients. Furthermore, multiple studies may be conducted with large sample size to further strengthen our findings and to identify other adverse events as well.

Key Words: Type-2 Diabetes Mellitus, SGLT 2 inhibitors, drug compliance

INTRODUCTION

Type-2 diabetes mellitusisa multifactorial disorder, which account for more than 93% of cases worldwide. Either insulin deficiency or insulin resistance causes it but in majority of cases both of these mechanism may be involved[1]. DM is considered as the mother of all metabolic disease.

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Robust research is going on the treatment strategies for the management of diabetes mellitus and different drugs option are used so for either alone or in combination with other drugs and even insulin. Most of these drugs are using the body insulin for their final action, which may be either increasing its secretion or increasing its sensitivity.

The new anti-diabetic drugs, which have been used for a few years around the world and recently marketed in Pakistan, are sodium-glucose co-transporter 2 (SGLT-2) inhibitors. SGLT-2 inhibitors, which are also called as gliflozine, include Dapagliflozine (Dapa), Empagliflozine (Empa) and Canagliflozine (Cana)[2,3]. We have used Dapa and Empa in our patients. These drugs basically inhibit the absorption of glucose from the glomeruli by blocking SGLT-2 transport system in the glomeruli[4,5]. By this mechanism, its decrease the blood glucose level by increasing its removal in urine. By this mechanism, these drugs also improve blood pressure and congestive state in CCF patients[6,7]. At the same time, it increases the frequency of urine, which is also one of the most bothersome symptoms of diabetes mellitus itself[8,9]. This increase frequency of micturition, recurrent urinary tract infection and so many other adverse effects make it comparatively bad option for many patients, especially young working slot[7,8]. And

most of the time compliance issue occurs with continuation of these drugs[10,11].

In spite of these significant adverse effects of SGLT-2 inhibitors, little is known about the compliance related to these drugs on both national and international level. To fill this gap, this study was conducted to know about the compliance of these drugs.

MATERIALS AND METHODS

This study was mainly conducted in the department of internal medicine, KMC/KTH Peshawar. Duration of study was 6 months, starting from August 2018 to January 2019. Total 260 patients, having T2DM were selected. The group age were 35 and plus years, comprising 70%(182)males and 30%(78) females patients. To avoid any confounders, all Patients with heart failure, ascites, and chronic renal and liver diseases were excluded from the study. The study design was descriptive- cross sectional.

Data Collection: After getting approval from ethical committee KMC/KTH and informed consent from the patients, total 260 patients with T2DM, which were fulfilling the criteria for inclusion/exclusion, were enrolled in a consecutive manner. All cases were documented from the medical outdoors department of KTH Peshawar. Demographic information like names, gender and age were recorded. All these patients were prescribed SGLT-2 inhibitors for their T2DM. They were followed for two months and information regarding adherence to the use of these drugs were recorded.

Data Analysis: SPSS version 20.0 was used to analyze the data. Chi-square test was done to determine any possible association between categorical values. Similarly, univariate analysis was done to determine age related difference in compliance. P-value <0.05 was considered significant. The graphs were constructed using graph pad prism version 6.0.

RESULTS

In these 260 studied cases, there were 182 (70%) male and 78 (30%) female, having mean age of 47±1.26 years with minimum age of 35 years. Out of these 260 patients, n=52(20%) patients were in age group 35-45 years old, n=104(40%) patients were in 45-55 years old, n=78(30%) patients were in 55-65 years old, n=26(10%) patients were in above 65 years of age group. The results are summarized in table 1.

Among these 260 patients analyzed, poor compliance was observed in n=60(23.07%) of the patients, while n=200(76.93%) of patients having good compliance as shown in table 2.

In order to find out any possible association between patient compliance with different age groups, univariate analysis was carried out revealing p-value and OR with 95% CI for age group 45-55years, 56-65 years and above 65 years is 0.24, 1.7(0.78-3.6), 0.84, 1.17(0.53-2.5) and 0.42, 1.7(0.54-5.3) respectively. Table 3 shows the respective association results.

No statistical association was observed between gender and compliance of medication (p-value=0.96) however, female patient are more prone to non-compliance with OR, 95%CI 1.07(0.55-2.08) as mentioned in table 4.

Table No.1: Age distribution among different patients

Age	Frequency	Percentage
35-45 Years	52	20%
45-55 Years	104	40%
55-65 Years	78	30%
> 65 Years	26	10%
Total	**260**	**100%**

Table No.2: Compliance observation in study population

Poor compliance	Frequency	Percentage
Observed	60	23.07%
Not observed	200	76.93%
Total	**260**	**100%**

Table No.3: Association of Compliance with different age groups

Age group	Poor compliance	Good compliance	p-value	OR (95%CI)
35-45 Years	15	37	Reference	Reference
46-55 Years	20	84	0.24	1.7(0.78-3.6)
56-56 Years	20	58	0.84	1.17(0.53-2.5)
>65 years	5	21	0.42	1.7(0.54-5.3)

Table No.4: Association of compliance with gender

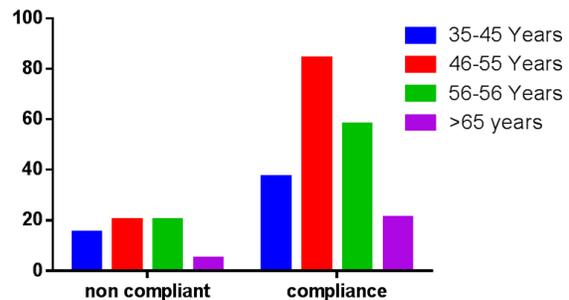| Poor compliance	Male	Female	p-value	OR (95%CI)
Observed	46	16		
Not observed	136	44	0.96	1.07 (0.55-2.08)
Total	**182**	**60**		

Figure No.1: Patient compliance with different age groups

DISCUSSION

T2DM is a chronic metabolic disease, which is affecting almost every organ of the body. The number of patient is increasing day by day, but at the same time new drugs is continuously adding in the therapeutic armamentarium against diabetes. SGLT-2 inhibitors are

the new drugs, recently added to the treatment regimen against T2DM[13, 14].

In our study 23.07% of patients presented with non/poor compliance when treated with SGLT-2 inhibitors with complain of polyuria while 76.93% patients do not complain about any side effects related to the stated drugs. The poor compliance was high in the age group of 46-55 years followed by age group >65years and 56-65 years respectively. In a study conducted United States by Jennifer Cai, Victoria Divino et al, in 2107, where 23702 patients were evaluated for drug compliance, who were using different anti diabetes medication. Out of 23702 patients, 9633 were on SGLT-2 inhibitors. Poor compliance was observed to SGLT-2 inhibitors in these patients, which was slightly more for DAPA than CANA[15].

SGLT-2 inhibitors facilitate the removal of glucose in urine by inhibiting sodium-glucose transporter 2 in glomeruli. These drugs cause a number of adverse effects, in which polyuria and UTI are the most commonly reported especially females are more prone to develop UTI[12] as compared to males and this is one of the reasons that females may shows noncompliance when treated with SGLT-2 inhibitors with OR, 95%CI 1.07(0.55-2.08).

Due to polyuria and UTI, strict compliance is difficult for most of the patients especially working group but patient counselling may be helpful to further reduce noncompliance because patient with hyperglycemia are exposed to micro and macro vascular complications thus drugs that enhances glucuresis are helpful to balance hyperglycemia and prevent the patients from long term micro-macro vascular complications[3].

CONCLUSION

SGLT-2 inhibitors are good choice to treat T2DM and manage hyperglycemia. Besides its adverse effects the drugs also has long term beneficial role in delaying macro vascular complications. The non-compliance reported in our study may be reduced, by proper counseling of the patients in other studies with large sample size.

Author's Contribution:

Concept & Design of Study:	Jamaluddin, Manzoor khan
Drafting:	Nizamuddin
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Revisiting Critically:	Manzoor Khan
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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