

Original Research Article

Prospective study of prescribing pattern in patients with T2DM and hypertension

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Abstract: Rational drug utilization must be promoted in patients with type 2 diabetes mellitus (T2DM) as it is emerging as one of the major health related issue leading to increase in rate of morbidity and mortality. The present study was a drug utilization study which was done to assess the prescribing pattern of antidiabetic drugs in patients with diabetes with or without hypertension. In present prospective study, a total 75 patients were studied in the Department of Medicine, Mayo Institute of Medical sciences, Barabanki from January 2016 to May 2016. The history and the details about the prescription medicine were recorded. In present study all were T2DM patients; out of that 26.66% were having only diabetes whereas 73.33% were having diabetes with hypertension. The most commonly prescribed drug was metformin (95%) followed by glimepiride (80%) and gliptins (70%). In present study insulin was the least used drug. Triple drug therapy (40%) was most common followed by dual therapy (29.33%). Use of SGLT2i was more in patients with hypertension as compared to patients with diabetes only ($p=0.0006$). Telmisartan (67.27%) was the most commonly used antihypertensive drug. Still, among physician OHAs are the drug of choice for the treatment of T2DM, and metformin was the most commonly prescribed drug followed by glimepiride. For hypertension ARB was the preferred choice in diabetics.

Keywords: prescribing pattern, glimepiride, metformin, gliptins

INTRODUCTION

In a developing country like India, diabetes mellitus (DM) is one of the major health related issue. Different drug utilization studies focusing anti-diabetic drugs have been performed in various parts of country, which advocated the rational use of the drug in patients with DM. Such studies provide perception on current prescribing practices by the physician and also help to identify the irrational prescription practice [1].

Irrational prescription can lead to non-adherence to medications which may lead to diabetes related complication due to poor glycaemic control. It may also increase the drug and health care costs. Such drug utilization studies can help in making necessary changes in prescribing practices to the physician, policy maker and national and international bodies to recommend rational use of antidiabetic medicine [1].

Latest data published by International Diabetes Federation revealed that there are around 69.1 million patients living with diabetes in India [2]. DM is a chronic disorder and one of the major reasons of the

increasing rates of mortality and different morbidity [3]. Poorly managed diabetes can be the reason for different diabetes related complications [4]. Hence, present study was performed to evaluate the prescribing pattern of physicians for the management of T2DM.

MATERIALS AND METHODS

A prospective study on 75 diabetic patients was done in the Department of Medicine, Mayo Institute of Medical Sciences, and Barabanki from January 2016 to May 2016. A written Informed consent from all patients and Institutional Ethics Committee approval was obtained before starting the study.

After recording patient's detailed history and physical parameters, prescribing pattern of all the patients diagnosed as T2DM with or without hypertension was assessed. All the statistical analysis was performed using IBM SPSS ver. 20. Mean and standard deviations were calculated for time varying variables and percentages were calculated for categorical variables. P value <0.05 was considered as significant.

RESULTS

Out of 75 patients, 20 (26.66%) were having only diabetes whereas 55 (73.33%) were having

diabetes along with hypertension. Different patient's characteristic of study population is depicted in table 1.

Table 1: Patients characteristic between cohort of diabetes mellitus (DM) and hypertensive diabetics (DM+HTN)

Characteristics	DM + HTN (N= 55)	DM (N = 20)	P Value
Age (years)	55.82±9.15	45.20±9.02	<0.0001
Height (Mtr)	1.62±0.009	1.63±0.08	NS
Weight (Kg)	73.55±13.28	65.17±9.24	0.014
BMI (kg/m ²)	28.10±4.14	24.51±3.51	0.0009
FBS (mg/dl)	136.45±35.74	138.78±39.69	NS
PPBS (mg/dl)	216.29±69.41	214.44±60.17	NS
SBP (mmHg)	154.15±21.89	132.20±17.64	<0.0001
DBP (mmHg)	84.76±9.01	81.50±7.45	NS
DD (years)	5.40±2.84	4.00±1.78	0.012
HbA1c (%)	7.86±1.48	8.98±2.12	0.038
ABG (mg/dl)	179.98±44.71	208.94±59.52	0.033

Data is expressed as mean ± standard deviation (SD), DM; diabetes mellitus, HTN; hypertension, FBS; fasting blood sugar, PPBS; post prandial blood sugar, SBP; systolic blood pressure, DBP; diastolic blood pressure, DD; duration of diabetes, HbA1c; glycated hemoglobin, ABG; average blood glucose (calculated with reference to HbA1c), p<0.05 considered as statistically significant computed by unpaired t-test. There was more incidence of neuropathy and nephropathy in the diabetic hypertensive patients [17 (31.48%) and 4 (7.41%) respectively] as compared with only 1 (5%) in the diabetes patients (p=0.0017).

In present study, the most common drug prescribed to diabetes patients without hypertension was metformin [19 (95%) followed by glimepiride which was prescribed to 16 (80%) and gliptins was prescribed to 14 (70%) while similar trend was observed with hypertensive diabetes patients; Metformin being the most common [43 (78.18%)] followed by Glimepiride [38 (69%)] and Gliptins [35(63.63)] (p>0.05).

Other drug like Pioglitazone, Voglibose and SGLT2i were given to 3 (5.45%), 4 (7.27%), and 6 (10.90%) patients who were having hypertension with diabetes patients. There was more usage of statins in the diabetic hypertensive patients (66.27%) as compared to the diabetes alone (21.05%). (p=0.0006).

In present study, 9 (16.36%) patient were on basal insulin and 4 (20%) patients were taking bolus insulin as a therapy. Among hypertensive drug Telmisartan [37 (67.27%)] was the most commonly

prescribed drug followed by Amlodipine which was prescribed to 23 (41.81%).

In present study most of the patients were on triple drug therapy [30 (40%)] followed by dual therapy [22 (29.33%)]. Nine (12%) patients were on OADs along with Insulin. The most common triple combination was Glimepiride with Metformin and Gliptins [23 (76.66%)].

Among 19 patients who received Metformin, 2 g was the most common prescribed dose [6 (31.38%), followed by 1 g which was prescribed to 5 (26.32%) patients with diabetes whereas to hypertensive diabetes patients most common Metformin dose prescribed was 1 g [14 (32.55%) followed by 2 g which was prescribed to 12 (27.90%) patients (p>0.05).

The most common concentration of Glimepiride prescribed to hypertensive diabetics 4 mg [18 (33.33%)] whereas 2 mg [8 (42.11%)] was most commonly prescribed to patients with only diabetes (p>0.05). The only concentration of Pioglitazone which was prescribed to study population was 30 mg. In present study voglibose was the least preferred drug, but 0.2 mg [2 (3.77%)] was most commonly used by patients with both hypertension and diabetes (p>0.05).

The most commonly used gliptin was 100 mg Sitagliptin [14 (25.93%)] for hypertensive diabetes patients whereas both 100mg Sitagliptin [6 (31.58%)] and 20 mg Teneligliptin [6 (31.58%)] were prescribed equally to patients with diabetes only. In SGLT2i category 25 mg of Empagliflozin [6(11.11%)] was

prescribed to those patients who were suffering from both diabetes and hypertension.

DISCUSSION

Analysis of prescription pattern is believed to be the most productive method to evaluate the prescribing attitude of physicians [5]. It is also required to look at the recommendations of international agencies on diabetes mellitus that assist to improve clinical standard and prescribing practice of physician. Such study furnishes the feedback from physician and assists to promote rational use of medicines [6].

Patel *et al.*; studied 114 patients to study pattern of antidiabetic agents in T2DM patients, they reported hypertension (70.2%) as the most common co-morbid condition among diabetic population which is very consistent with the present study finding (73.33% diabetics were hypertensive) [7]. In present study average number of drugs prescribed was high in hypertension with diabetes group which is in accordance with the Patel *et al.*; [7] Reports have shown that diabetic patients with additional co-morbid condition like hypertension require more medications [8].

Metformin was the most commonly oral hypoglycaemic agents prescribed in the present study in line with the finding of Patel *et al.*; Dutta *et al.*; Dashputra *et al.*; Alam *et al.*; and Goelet *et al.*; [1, 7, 9, 10, 11]. But study done by Agarwal *et al.*; on 100 diabetes patients reported Sulfonylureas being the most prescribed drug class followed by Biguanides [12].

The probable reason for current finding may be due to the fact that Metformin is viewed as the safer and affordable option as compared to other oral hypoglycaemic agent [7, 9]. Metformin being most prescribed drug in present study also complies with the fact that it is recommended as the first line therapy by current clinical guidelines such as American Diabetes Association and International Diabetes Federation [7, 13]. Most of the patients were on triple drug therapy in present study which is in consistence with the study done by different authors [1, 9, 11].

In present study, the second most common drug prescribed was Glimepiride followed by gliptins which is consistence with the study done by Dutta *et al.*; they performed the study on 312 patient's prescription and reported metformin being the most prescribed drug followed by glimepiride and pioglitazone [9]. Glimepiride being the second generation sulphonylurea is the most potent and most superior compared to first generation and also possess less hypoglycaemia, these are the reason for being prescribed at second position in the present study [14, 15]. Glimepiride also possess less hypoglycaemia.

In present study gliptins were the third most commonly prescribed drug. Now a day's gliptins have come out as important option for the treatment of T2DM. It selectively inhibits the DPP-4 enzyme which in turn enhance the action of glucagon like peptide-1 and glucose dependent insulinotropic peptide. It offers very less hypoglycaemia and has neutral effect on patient's weight [10].

Dashputra *et al.*; did a similar study on 300 prescriptions and reported metformin as the most commonly prescribed drug followed by glimepiride which is consistent with the present study data [10]. In present study among metformin, glimepiride, gliptins, pioglitazone and voglibose choices 2 g, 4 mg, 100 mg, 30 mg and 0.2 mg was the most prescribed strength among all.

Johnson *et al.*; performed the similar study to analyze the prescribing pattern of antihypertensive; he reported that ACE or ARB were the most commonly prescribed class followed by thiazide or loop diuretics similar pattern was observed in present study where telmisartan was the frequently prescribed drug followed by amlodipin which is a CCB [16].

In present study, there was a low percentage of insulin injection utilization. It was because present study has included all T2DM patients which were taking mainly OHAs. Insulin is mainly used when glycaemic targets are not achieved with OHAs combinations. The sample size of the present study was low; a large randomized clinical trial is required to confirm the present study findings.

CONCLUSION

In present study, OHAs were the most preferred antidiabetic class as compared to insulin. Among OHAs metformin was the mostly prescribed drug followed by glimepiride and gliptins. Most of the patients were on combination therapy, among which triple drug therapy was the most commonly prescribed. Use of SGLT2i was significantly high in patients with hypertension as compared to patients with diabetes only. Telmisartan was the most commonly used antihypertensive drug.

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