Original Research Article

A prospective study of evaluating the prescribing pattern of antidiabetic drugs in patients with type 2 diabetes mellitus

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Abstract

Background: Type 2 diabetes mellitus (T2DM) has emerged as a major health issue, leading to an increase in morbidity and mortality rates, and this must be addressed by promoting rational drug use. **Aims and objectives:** To study drug utilization to assess the prescribing pattern of antidiabetic drugs in patients with diabetes and hypertension. **Materials and methods:** In the present prospective study, 75 patients were studied in the Department of Medicine and endocrinology, Gandhi Medical College, Bhopal, Madhya Pradesh, from January 2020 to May 2021. After recording the patient's detailed history and physical parameters, prescribing pattern of all the patients diagnosed either as T2DM or hypertension was assessed. **Results:** Metformin (95 %) followed by glimepiride (80%) and gliptins (70%) were the most commonly prescribed drugs. Insulin was found to be the least commonly used drug in this investigation. The most common treatment was triple-drug therapy (40%), followed by dual therapy (29.33 %). SGLT2i use was significantly higher (p=0.0006) than in patients with diabetes only. The most commonly prescribed antihypertensive medication was telmisartan (67.27%).**Conclusion:** Still, physician OHAs is the drug of choice for treating T2DM as metformin was the most commonly prescribed drug, followed by glimepiride.

Keywords: oral hypoglycemic agents, diabetes mellitus, hypertension, metformin.

Introduction

Diabetes mellitus is a chronic non-communicable disease that has spread worldwide and has developed into a significant global public health burden requiring lifetime treatment[1]. Approximately 8.8 percent of the adult population has diabetes, with men having slightly higher rates (9.6% than women (9.0%)[2]. Diabetes and impaired glucose tolerance (IGT), a pre-diabetic condition, affect an estimated 463 million and 374 million people, respectively, worldwide. According to the World Health Organization (WHO), by 2045, the number of people with diabetes and impaired glucose tolerance (IGT) will rise by 51%[3]. India is home to 77 million diabetics, the second-highest globally. Currently known therapeutic options for diabetes include stimulating endogenous insulin production, improving insulin action at target tissues, suppressing dietary starch and fat breakdown, and insulin replacement[4,5].These medications function by lowering unusually high blood glucose levels, a hallmark of endocrine system disorders. However, in the management of diabetes, the selection of antidiabetic medications is a significant health concern in medical practice due to the large number of antidiabetic medicines available. Pharmacists and prescribers are placed in difficulty when it comes to selecting medications for specific patients, resulting in poor therapy, unnecessary prescriptions, and 50% wastage of antidiabetic drugs, all of which add to the economic burden on developing countries[6-8] Additionally, it is unknown if prescribers' prescriptions adhere to current research and clinical standards for diabetes therapy in each nation[9].The data collected by this study may be utilized as a reference point by health care professionals to reduce morbidity and mortality, optimize antidiabetic medicine prescribing patterns, and evaluate their management and provision of excellent health care to diabetic patients. Thus, this study investigated the pattern of antidiabetic medicine prescriptions for type 2 diabetes mellitus (T2DM).

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Materials and methods

A prospective study on 75 diabetic patients was done in the Department of Medicine and Department of endocrinology, Gandhi Medical College and Hamidia Hospital Bhopal, Madhya Pradesh, from January 2020 to May 2021. Written Informed consent from all patients and Institutional Ethics Committee approval was obtained before starting the study. After recording the patient's detailed history and physical parameters, prescribing pattern of all the patients diagnosed either as T2DM or hypertensive 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.

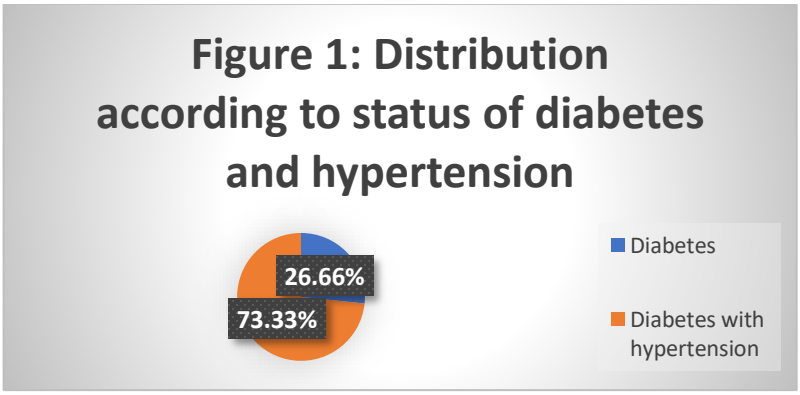
Results

Out of 75 patients, 20 (26.66%) had only diabetes, whereas 55 (73.33%) had diabetes along with hypertension (figure 1) Table 1 shows the patients characteristic between cohort of diabetes mellitus and hypertensive diabetes.

Patients with diabetic hypertension had a significantly higher rate of neuropathy and nephropathy (31.48%) and a considerably lower rate (5%; p=0.0017) than patients with diabetes.

Metformin was the most commonly prescribed drug for diabetes patients without hypertension in this study, followed by glimepiride and gliptins, which were prescribed to a total of 19 (95%) and 14 (70%), respectively. In comparison, glimepiride was prescribed to a total of 38 (69%) and gliptins to a total of 35 (63.63) (p>0.05).

Only 2 (10%), 3 (5.45%), none and 4 (7.27 %), none and 6 (10.90 %) of the diabetic and hypertensive patients were given pioglitazone, voglibose and SGLT2i respectively (p>0.05).



Diabetes patients used statins at a rate of 36.7% compared to just 21.5% in the diabetic hypertensive group (p=0.0006).

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

Characteristics	DM + HTN (N= 55)	DM (N = 20)	P value
Age (year)	59.62±8.15	45.20±9.02	<0.0001
Height (meter)	1.63±0.08	1.63±0.08	NS
Weight (kg)	72.45±13.28	65.17±9.24	0.014
BMI (kg/m2)	27.10±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 (year)	5.40±2.84	4.00±1.78	0.012
HbA1c (%)	7.86±1.48	8.98±2.12	0.038

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. p<0.05 considered as statistically significant computed by unpaired t-test.Basal insulin therapy was used by 9 (16.36%) of the patients in this study, while bolus insulin therapy was used by 4 (20%). Telmisartan (37.27%) was the most frequently prescribed hypertensive drug, followed by amlodipine (41.81 %). In the current study, 30 (40%) patients were on triple-drug therapy, followed by 22 (29.33%) on dual-drug treatment. Nine (12%) patients used OADs and insulin. Glimepiride, metformin, and gliptins were the most frequently prescribed three-drug regimen [23 (76.66%)].When it comes to metformin, 2 g was prescribed to 6 of the 19 patients, followed by 1 g to 5 of the patients with diabetes, and 2 g prescribed to 12 patients with hypertensive diabetes.In patients with hypertension, the most common dose of glimepiride was 4 mg [18 (33.3 %)], whereas the most common dose in those with diabetes alone was 2 mg [8 (42.11%)] (p>0.05).The only dose of pioglitazone prescribed to the study's participants was 30 milligrams. Voglibose was the least preferred drug in this study, but patients with hypertension and diabetes most commonly used 0.2 mg [2 (3.77%)] (p>0.05).For hypertensive diabetes patients, the most commonly prescribed gliptin was sitagliptin 100 mg [14 (25.93%)], while both sitagliptin 100 mg [6 (31.58%)] and 20 mg Teneligliptin [6 (31.58%)] were equally prescribed to patients with diabetes. Patients with diabetes and hypertension were the most likely to be prescribed Jardiance [6 (11.11%)] in the SGLT2i category of 25 mg Jardiance.

Discussion

Doctors' prescribing attitudes can be assessed most effectively by examining prescription patterns[10]. To improve physicians' standard of care and prescribing practices, one needs to look at international recommendations on diabetes. In this study, doctors' feedback helps to promote the rational use of medicines[11].Hypertension (70.2 percent) was found to be the most common co-morbid condition among people with diabetes in a study by Patel et al. (114 patients), which is very consistent with the current study finding (73.33 percent were hypertensive diabetics).The average number of medications prescribed in the hypertensive diabetes group was high in this study, consistent with Patel et al[12]Patients with diabetes and a co-morbid condition, such as high blood pressure, need to take more medication[13]According to the findings of Patel et al, Dutta et al., Dashputra et al., Alam et al., and Goel et al. metformin was the most commonly prescribed oral hypoglycemic agent in their study. A study by Agarwal et al. on 100 patients with diabetes found that sulfonylureas and biguanides were the most frequently prescribed medication classes[12-18]Compared to other oral hypoglycemic agents, metformin is likely the reason for the current finding because of its perceived safety and affordability. According to the results of this study, the American Diabetes Association and the International Diabetes Federation both recommend Metformin as a first-line treatment for people with type 2 diabetes.The majority of patients in this study received triple-drug therapy, consistent with previous research[14-17]Metformin was the most commonly prescribed drug, followed by glimepiride and pioglitazone in the current study, which is consistent with Dutta et al., who studied 312 patient prescriptions found that glimepiride and pioglitazone were the most commonly prescribed medications. According to the results of this study, Glimepiride, a second-generation sulphonylurea, was prescribed in second place because it is more potent and superior than the first generation and has less hypoglycemia. There is less hypoglycemia in Glimepiride as well. Gliptins were the third most frequently prescribed drug in this study. Gliptins have recently emerged as an essential treatment option for type 2 diabetes. A glucagon-like peptide-1 and glucose-dependent insulinotropic peptide (GIP) enhancer selectively inhibit the DPP-4 enzyme. Hypoglycemia is minimal, and weight gain is unaffected. (Dashputra AV 2014)

According to a previous study by Dashputra et al., which looked at 300 prescriptions, metformin was the most commonly prescribed medication, followed closely by glimepiride[15].Metformin, glimepiride, gliptins, pioglitazone, and voglibose were all most commonly prescribed in this study. Johnson and colleagues did the same research to examine the prescribing patterns of antihypertensives; he found that ACE or ARB was the most commonly prescribed class, followed by thiazide or loop diuretics. The same pattern was observed in this study, where telmisartan was the frequently prescribed drug, followed by amlodipine, a CCB[20]

Because all T2DM patients in this study were taking mainly OHAs, there was a low percentage of insulin injection use. Insulin is primarily used when OHAs combinations fail to meet glycemic targets.A large randomized clinical trial is needed to confirm the findings of this study, which had a small sample size.

Conclusion

Compared to insulin, metformin was the most commonly prescribed antidiabetic drug in this study, followed by glimepiride and gliptins. Most patients prescribed combination therapy, with triple-drug treatment being the most common. Patients with hypertension were more likely to use SGLT2i than those with diabetes alone. The most commonly prescribed antihypertensive medication was telmisartan.

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