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Prescribing pattern in patients with type 2 diabetes mellitus and hypertension: a prospective study

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Abstract
Background: 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.
Aims and Objective: To study drug utilization to assess the prescribing pattern of antidiabetic drugs in patients with diabetes and hypertension.
Materials and Methods: In present prospective study, a total 75 patients were studied in Department of Medicine and Department of Pharmacology, L N Medical College and research center Bhopal, Madhya Pradesh from January 2016 to May 2016. After recording patient's detailed history and physical parameters, prescribing pattern of all the patients diagnosed either as T2DM or hypertensive was assessed.
Results: 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 significantly high in patients with hypertension as compared to patients with diabetes only (p=0.0006). Telmisartan (67.27%) was the most commonly used antihypertensive drug.
Conclusion: Still, among physician OHAs are the drug of choice for the treatment of T2DM as metformin was the most commonly prescribed drug followed by glimepiride.

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 anitidiabetic 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 for India revealed that there are around 69.1 million patients living with diabetes [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 and Department of Pharmacology, L N Medical College and research center Bhopal, Madhya Pradesh 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 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. 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 diabetes (DM+HTN)

Characteristics	DM + HTN (N= 55)	DM (N = 20)	P Value
Age (years)	59.62±8.15	45.20±9.02	<0.0001
Height (Mtr)	1.63±0.08	1.63±0.08	NS
Weight (Kg)	72.45±13.28	65.17±9.24	0.014
BMI (kg/m^2)	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 (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 glimiperide [38 (69%)] and gliptins [35(63.63)] (p>0.05).

Other drug like pioglitazone, voglibose and SGLT2i was given to 2 (10%) and 3 (5.45%), none and 4 (7.27%), none and 6 (10.90%) to diabetes and hypertensive diabetes patients respectively (p>0.05).

There was more usage of statins in the diabetic hypertensive patients 37 (66.27%) as compared with only 12 (21.05%) in the diabetes patients (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 Amlodipin 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 concentration [6 (31.38%) prescribed followed by 1 g which was prescribed to 5 (26.32%) patients with diabetes whereas to hypertensive diabetes patients most common metformin concentration 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 diabetes was 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 100 mg [6 (31.58%)] and 20 mg Teneligliptin [6 (31.58%)] were prescribed equally to patients with diabetes only. In SGLT2i category 25 mg Jardiance [6 (11.11%)] was mostly 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% were hypertensive diabetic) [7]. In present study average number of drugs prescribed was high in hypertensive 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 Goel *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 also recognized 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 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 days gliptins have came 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 vogbibose 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.

References

1. Alam MS, Aqil M, Qadry SAS, Kapur P, Pillai KK. Utilization Pattern of Oral Hypoglycemic Agents for Diabetes Mellitus Type 2 Patients Attending Out-Patient Department at a University Hospital in New Delhi. Pharmacology & Pharmacy 2014; 5:636-45.
2. International Diabetes Federation. diabetes atlus. Sixth edition. 2015. 5-153. http://www.idf.org/sites/default/files/EN_6E_Atlas_Full_0.pdf. Accessed on 1 June 2016.
3. Abdi SAH, Churi S, Kumar YSR. Study of drug utilization pattern of antihyperglycemic agents in a South Indian tertiary care teaching hospital. Indian J Pharmacol 2012; 44(2):210-4.
4. Zimmet P, Alberti KG, Shaw J. Global and societal implications of the diabetes epidemic. Nature 2001; 414:782-7.
5. Beg MA, Dutta S, Varma A, Kant R, Bawa S, Anjoom M, *et al*. Study on drug prescribing pattern in hypertensive patients in a tertiary care teaching hospital at Dehradun, Uttarakhand. Int J Med Sci. Public Health, 2014; 3:922-6.
6. Tiwari H, Kumar A, Kulkarni SK. Prescription monitoring of antihypertensive drug utilization at the Panjab University Health Centre in India. Singapore Med J. 2004; 45:117-20.
7. Patel B, Oza B, Patel KP, Malhotra SD, Patel VJ. Pattern of antidiabetic drugs use in type-2 diabetic patients in a medicine outpatient clinic of a tertiary care teaching hospital. Int. J Basic Clin. Pharmacol, 2013; 2:485-91.
8. Good CB. Polypharmacy in elderly patients with diabetes. Diabetes Spectrum. 2002; 15(4):240-8.
9. Dutta S, Beg MA, Anjoom M, Varma A, Bawa S. Study of prescribing pattern in diabetes mellitus patients in a tertiary care teaching hospital at Dehradun, Uttarakhand. Int. J Med Sci. Public Health, 2014; 3:1351-4.
10. Dashputra AV, Badwaik RT, Borkar AS, Date AP, Kalnawat NR. Pattern of Antidiabetic Drugs used in Outpatient and Hospitalized Patients in a Tertiary Health Institute of Central India. J Cont. Med A Dent, 2014; 2(3):48-54.
11. Goel M, Rawat N. Investigation of Outpatients Prescribing Pattern of Antidiabetic Drugs in Type -2 Diabetic Patients- A Study Conducted At A Tertiary Care Hospital. Journal of Pharmacy and Biological Sciences (IOSR-JPBS) 2015; 10 (2 Ver. IV): 26-30.
12. Agarwal AA, Jadhav PR, Deshmukh YA. Prescribing pattern and efficacy of anti-diabetic drugs in maintaining optimal glycaemic levels in diabetic patients. J Basic Clin Pharma 2014; 5:79-83.
13. American Diabetes Association. Approaches to Glycemic Treatment. Diabetes Care. 2016; 39(Suppl. 1):S52-9.
14. Tripathi KD. Insulin, oral hypoglycaemic drugs and glucagan. In: Essentials of Medical Pharmacology, 7th ed. Jaypee Brother's Medical Publishers (P) Ltd, New Delhi; 2013: 258-281.
15. Riddle MC. Oral pharmacological management of type 2 diabetes. Am Fam Physician 1990; 60: 2613-20
16. Johnson ML, Singh H. Patterns of Antihypertensive Therapy among Patients with Diabetes. J Gen Intern Med 2005; 20:842-6.