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Original Research Article

Drug utilization study of anti-diabetic drugs in patients attending medicine outpatient department at a tertiary care hospital in Western Maharashtra

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ABSTRACT

Background: Studies on antidiabetic drug utilization are important for the optimization of drug therapy and rational prescription of drugs. The aim of the present study was to understand the trends in prescription pattern of oral anti-diabetic drugs among type 2 diabetes mellitus (T2DM) patients attending medicine outpatient department of tertiary care hospital of Western Maharashtra.
Methods: A prospective observational study was conducted at Medicine OPD of Government Medical College and Hospital, Miraj. All adult patients (≥18 years) diagnosed with T2DM and willing to give informed consent to participate in the study, were enrolled. The study was approved by Institutional Ethics Committee. The data was computed using MS excel and results were expressed as counts and percentages.
Results: Out of 72 T2DM patients enrolled, male population (58.33%) had higher prevalence than females (41.67%). Biguanides (63.16%) were the most commonly prescribed class of oral antidiabetic drugs followed by sulfonylureas (35.09%). Metformin (63.16%) was the most commonly prescribed oral antidiabetic drug followed by glimepiride (30.70%). Combination of oral antidiabetic drugs (OADs) were prescribed in 52.78% and 47.22% patients were prescribed single drug. 'Metformin and glimepiride' was the most commonly prescribed combination.
Conclusions: In a chronic disease like diabetes mellitus, constant follow up for successful management is a must. It also demands active participation by the patients. Continuing education for the clinicians to keep themselves abreast of the latest development will also contribute in the effective management of diabetes mellitus and rational prescription of antidiabetic drugs.

Keywords: T2DM, Biguanides, Sulfonylurea

INTRODUCTION

Diabetes mellitus (DM) is the most common metabolic disorder affecting people all over the world. Globally, in 2010, approximately 285 million people worldwide had DM, and it is estimated that more than 438 million people will have DM by 2030.[1] It is estimated that the number of people with diabetes in India was about 69.2 million in 2015 and will increase to 123.5 million in 2040.[2]

The major complications of diabetes are both acute and chronic. Acute complications include dangerously elevated blood sugar; abnormally low blood sugar due to diabetes medications, chronic is related to diseases of both small and large blood vessels, which can damage the heart, kidneys, nerves and eyes.[3]

DM can cause both morbidity and mortality and requires appropriate treatment to improve the quality of life.[1] Pharmacological management of type 2 DM includes a

wide range of oral antidiabetic drugs (OADs) and insulin. The drugs OADs used for the treatment of type 2 DM are sulfonylureas, biguanides, newer drugs such as alpha glucosidase inhibitors, thiazolidinediones, meglitinides and the most recently introduced glucagon-like peptide analogs and dipeptidyl peptidase inhibitors and sodium glucose co-transport 2 (SGLT-2) inhibitor.[4]

Optimal glycemic control still is the best strategy to manage the diabetes disorder. The currently anti-diabetic drugs are effective, but a lot of factors such as education related to diabetes, lifestyle modification, medication costs, regimen complexity and irrational prescription are the challenges for patient compliance and therapy adherence which will lead to poor glycemic control and increase the morbidity and mortality.[5,6] Study on anti-diabetic drug prescribing pattern provides useful insights into the current prescribing evaluation, and it eventually leads to achieve rational drug therapy, optimal glycemic control and reduce health-care cost for patients and society in large scale.[2]

The aim of the study was to determine the trends of prescription pattern of oral anti-diabetic drugs among type 2 diabetes mellitus patients attending medicine outpatient department of government teaching tertiary care hospital.

METHODS

It was a prospective observational study conducted at medicine OPD of government medical college and hospital, Miraj over a period of 3 months.

Inclusion criteria

All adult patients (≥18 years) diagnosed with type 2DM and willing to give informed consent to participate in the study was enrolled.

Exclusion criteria

Pregnant women and patients declining to give informed consent would be excluded from the study.

Plan of the study

A total of 72 patients, satisfied inclusion and exclusion criteria, were enrolled in the study. Patient's details such as name, age, sex, height, weight, complaints, diagnosis, biochemical parameters such as FBG, PPBG, HbA1c and treatment details were collected. The data was computed using MS excel and results were expressed as counts and percentages.

RESULTS

Most of the patients diagnosed with type 2 DM were of the age group of 61-70 years (45.83%) followed by 51-60 years (27.78%) age groups. Male population (58.33%) had higher prevalence of type 2 DM than females (41.67%). 50% of the patients belong to over weight- obese category (Table 1). The mean fasting blood glucose (FBG) was 142.5±38.14 mg/dl, post prandial blood glucose was 242.6±56.78 mg/dl and mean HbA1c was 8.68 ± 1.93 (Table 1). The majority of patients (51.39%) had diabetic history of less than 5 years (Figure 1). Biguanides (63.16%) were the most commonly prescribed class of oral antidiabetic drugs followed by sulfonylureas (35.09%) (Table 2). Metformin (63.16%) was the most commonly prescribed oral antidiabetic drug followed by glimepiride (30.70%) (Table 3). In TDM patients, combination of oral antidiabetic drugs were prescribed in 52.78% and 47.22% patients were prescribed single drug. 'Metformin and glimepiride' was the most commonly prescribed combination (Figure 2).

Table 1: Demographic characteristics of study population.

Sr. no.	Characteristics		N=72	%
1	Age (years)	30-40	2	2.78
		41-50	11	15.28
		51-60	20	27.78
		61-70	33	45.83
		71-80	6	8.33
2	Gender	Male	42	58.33
		Female	30	41.67
3	BMI (kg/m^2)	Normal weight	36	50
		Over weight	24	33.33
		Obesity	12	16.67
4	FBG (mg/dl)	Mean±SD	142.5±38.14	
		Range	64-224	
5	PPG (mg/dl)	Mean±SD	242.6±56.78	
		Range	96-380	
6	HbA1C	Mean±SD	8.681±1.927	
		Range	6.1-13.8	

Table 2: Prescribing patterns of different class of oral antidiabetic drugs in study population.

Class of OHGA	N	%
Biguanides	72	63.16
Sulfonylureas	40	35.09
Thiazolidinediones	1	0.88
Alpha glucosidase inhibitors	1	0.88

Table 3: Prescribing frequency of different antidiabetic drugs in study population.

Oral antidiabetic drug	N	%
Metformin	72	63.16
Glimepiride	35	30.70
Glibenclamide	2	1.75
Gliclazide	1	0.88
Glipizide	1	0.88
Pioglitazone	1	0.88
Miglitol	1	0.88

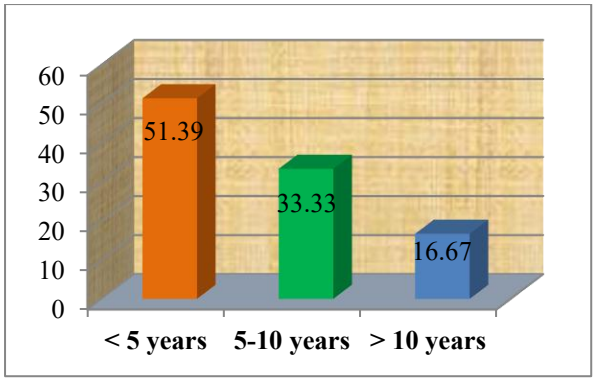

Figure 1: Details of duration of type 2 diabetes mellitus in the study population.

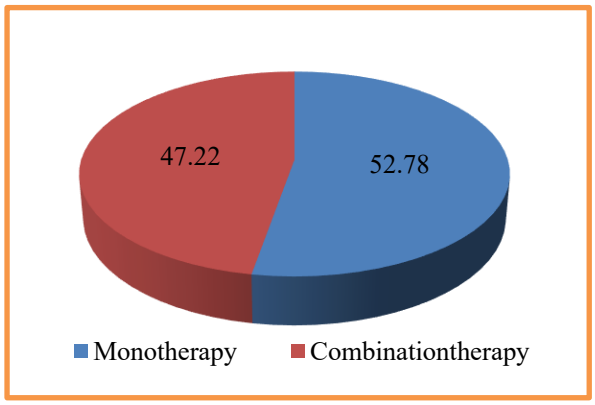

Figure 2: Prescription pattern of antidiabetic drugs based on therapy.

DISCUSSION

The studies on prescription pattern serve as a tool of investigation for clinical pharmacology and as source of suggestive information for epidemiology. The study of drug utilization or prescribing patterns is a component of medical audit, which seeks monitoring, evaluation and necessary modifications in the prescribing practices to achieve rational and cost effective pharmacotherapy. Studies on antidiabetic drug utilization are important for the optimization of drug therapy and drug control.[7]

In the present study, 72 patients satisfying inclusion and exclusion criteria were enrolled as study population. Most of the patients diagnosed with type 2 DM were belong to the age group of 61-70 years (45.83%) followed by 51-60 years (27.78%) age groups. Upadhyay et al study reported the higher incidence of diabetes in elderly patients with a high incidence in age group 41-65 years.[8] Greater prevalence of type 2 DM in this age group may be due to change in life style, lack of exercise and stress.

In the present study, male population (58.33%) had higher prevalence of type 2 DM than females (41.67%). Table 1 which is similar to the results of other studies conducted in India, indicating that men predominated over women.[9-11]

According to the body mass index, 33.33% of the patients belong to overweight category followed by 16.67% belonging to obese category (Table 1). Similar results were reported by Haghighatpanah et al in that36.3% were overweight and 22.1% patients were obese.[2] So we recommend, physician should advise such type 2 DM patients about diet modification, yoga, brisk morning walk or exercises to increase insulin sensitivity.

In the present study, most of the patients had poor glycemic control as the mean HbA1c was found to be 8.68±1.93. Similar results were found in study by Haghighatpanah et al were mean HbA1c was 8.6±2.2. It suggests that antidiabetic treatment which study population receiving was not optimum.[2]

Duration of the disease plays an important role in patients suffering from longtime. A firm glycemic control results in lesser incidence of complications but complications like retinopathy was related to duration of diabetes but not based on its severity. In the present study, majority of patients (51.39%) had duration of type 2 DM for less than 5 years (Figure 1). Similar results were reported in a study by Abbasi et al.[12] Nearly two-third of the patients had a diabetic history of less than 5 years. Patients with a long duration of diabetes are at a higher risk of developing complications. So we recommend physicians to control HbA1c levels strictly to reduce or prevent future complications due to long standing type 2 DM.

The choice of OADs depends on the type of patients, their concurrent illness, cost factors, aswell as the availability of medicines. In the present study, biguanides (63.16%) are the most commonly prescribed class of OADs followed by sulfonylureas (35.09%) (Table 2). Similar results were found in previous studies. But few studies reported that sulfonylureas (33%) are the most commonly prescribed class of drugs followed by biguanides (20%).[3] This reflects that sulfonylureas and biguanides are still the choice of most physicians in the treatment of DM. Few studies also reported that newer classes of drugs were also prescribed, α-glucosidase inhibitors (4.8%), dipeptidyl peptidase-4 (DPP-4) inhibitors (4%), and glitazones (1.1%).[3] The reason could be lack of regular supply of these classes of drugs in the government tertiary care hospital.

In the present study, metformin (63.16%) was the most commonly prescribed OAD followed by glimepiride (30.70%) and glibenclamide (1.75%) (Table 3). In a study by Venkateswaramurthy et al also reported metformin (42.25%) as most commonly prescribed OAD followed by glimepiride.[13]

Metformin is the drug of choice for overweight and obese patients with type 2 diabetes. Metformin is a peripheral sensitizer of insulin and has beneficial effects on insulin resistance, it's an important factor in pathogenesis of type 2 diabetes.[14] Accordingly, metformin was reported as the first drug of choice for most of the patients with type 2 diabetes mellitus. Metformin does not promote weight

gain and has beneficial effects on several cardiovascular risk factors.[13]

Several new OADs have certain advantages like high glucose-lowering efficacy that include injectable glucagon-like peptide-1 agonists and DPP-4 inhibitors. These agents offer a low risk of hypoglycemia combined with sustained weight loss. Hence we recommend physician to prescribe newer OADs in combination.[13]

In the present study, combination of oral antidiabetic drugs was prescribed in 52.78% and monotherapy was given in 47.22% (Figure 1). In previous study by Abbasi et al collectively, combination therapy was prescribed in 58.63% of the patients.[12] The combinations of OADs are prescribed more to achieve a better glycemic control in order to avoid long term complications.

Limitations

Limitations of the study were, data was collected at a given time. So no record of subsequent treatment was noted. The study was done for a short period of time and the number of patients studied was low. Hence similar studies covering large number of patients at multiple centers are needed to confirm the results of the study.

CONCLUSION

The study has shown metformin as the predominantly prescribed oral antidiabetic drug both as monotherapy as well as combination therapy. Glimepiride and metformin combination was the most commonly prescribed combination. The pattern of antidiabetic drug prescription was rational and largely comply with NICE (National Institute for Health and Clinical Excellence) guidelines. To maintain the clinical standard of prescribing, a constant effort is mandatory for every physician to follow the guidelines recommended by various International bodies. Newer oral antidiabetic agents like GLP-1 receptor agonists and DPP-4 inhibitors were hardly prescribed in the present government teaching tertiary care hospital even though they offer advantages like high glucose-lowering efficacy, low risk of hypoglycemia with sustained weight loss. So we recommend government authorities to maintain regular supply of these drugs for the benefit of patients. In a chronic disease like diabetes, day to day management and adjustment of treatment, constant follow up for successful management and extra treatment added or withdrawn in the face of complications is a must. It also demands active participation by the patients in adherence to treatment, questionnaire based interview regarding awareness to achieve therapeutic goal in type II diabetes mellitus, hence, counseling and educating the patient on the importance of diet and exercise in the management of type II DM are of vital importance. Continuing education for the clinicians to keep themselves abreast of the latest development in the field of type II diabetes mellitus treatment would also contribute in the effective management of diabetes mellitus.

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