ABSTRACT

Objectives: The aim of the study was to assess the prescribing pattern of antidiabetic drugs in Type 2 diabetes outpatients visiting to Diabetes Centre, Chennai.

Methods: A prospective study was carried out by evaluating 115 prescriptions of antidiabetic drugs over the period of 4 months to assess the prescribing pattern of antidiabetic drugs and also drugs used for other complications of Type 2 DM.

Results: Totally, 115 patients were evaluated, 58 were of male and 57 were of female. An average number of drugs per encounter were found to be 4.47. An average number of antidiabetic drugs were found to be 2.56. In this study, the most commonly prescribed oral hypoglycemic drug class as single-drug regimen was that of alpha-glucosidase inhibitors (16.32%), dipeptidyl peptidase-4 (DPP-4) inhibitors (16.62%), biguanides (12.9%), thiazolidine diones (9.8%), sulfonyl urea (7.82%) and meglitinides (2.38%), and in multi drug regimen metformin + alpha-glucosidase inhibitors (11.56%) were commonly prescribed.

Conclusion: Most commonly used drug was alpha-glucosidase inhibitors, followed by DPP-4 inhibitors and biguanides. All the patients received combination therapy to achieve the glycemic control.

Keywords: Antidiabetic drugs, Oral hypoglycemic drug, Prescribing pattern.

INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by disturbances in the metabolism of carbohydrate, fat, and protein due to varying degrees of insulin secretion either hyposecretion or insulin insensitivity, in which there are high blood sugar levels over a prolonged period that requires lifelong medical treatment and ongoing patient self-management and support to prevent acute complications and to reduce the risk of morbidity and mortality [1,2]. In India, 2000, the prevalence of diabetes was estimated to be 31.7 million, followed by China (20.8 million) and in the United States (17.7%). It is predicted in India that the diabetes population may rise up to 79.4 million individuals by 2030 [3,4]. Prevention and treatment involves a healthy diet, physical exercise, avoid tobacco, and being a normal body weight. Drug utilization studies are important to optimize the drug use, and it serves as an important tool those are in need of receiving medication and cost-effective treatment. The main aim of the diabetes management study is to prevent the development of microvascular complications and reduction in patient financial cost.

METHODS

This was a prospective study carried out in outpatients of the Aruna Diabetes Centre, Chennai. Permission from Institutional Human Ethics Committee (Ref: IEC/PHD/2015/2016/01), Vels University, Chennai, was obtained to conduct the study at Aruna Diabetes Centre, Chennai. The sample size for this study was 115 patients with the duration of 4 months (July 2016 to October 2016). Type 2 DM patients of 18 years and above receiving antidiabetic drugs of new and existing cases were selected for participation after fulfilling the inclusion and exclusion criteria. We excluded Type 1 diabetes patients, pediatric and pregnant women, and patients not willing to participate in this study. After obtaining the informed consent, socio demographic data along with the details of antidiabetic therapy, duration of treatment was recorded.

Type 2 diabetes patients receiving only one active ingredient defined as monotherapy, whereas patients receiving medication with more than one active ingredient were defined as combination therapy.

RESULTS

The prospective study involving 115 prescriptions of patients with Type 2 DM is visiting to Aruna Diabetes Centre, Chennai. Patients were divided into four groups on the basis of ages: Less than 40 years, 41-60 years, above 61-80 years, and above 80 years. The demographic characteristics of the patients were studied: Gender, age, duration of diabetes, and comorbidities. Out of 115 prescriptions analyzed, male were 58 (50.43%), female were 57 (49.56%), and the mean age of the sample was 54.73±12.43 years (Table 1).

Out of 115 prescriptions, the total number of drugs prescribed to be 5.15. In which, 57.09% were antidiabetic drugs, whereas 42.91% prescribed for diabetic complications and for hypertension, hypercoagulation, and peripheral neuropathy and thyroid disorders. During this study, Type 2 diabetes patients receiving a number of antidiabetic drugs vary from one of eight drugs. An average number of drugs received per patient were found to be 4.47. The average number of antidiabetic drugs received per individual was found to be 2.56. The study found a higher incidence of diabetes among adult patients, with a high incidence in the age group of 41-60 years (58.56% of the total) followed by the age group above (28.7% of the total) (Table 2). The average duration of diabetes was 11.44±7.11 (mean±standard deviation [SD]) (Table 3).

In this study, in single-drug regimen and multidosage regimen the most commonly prescribed oral hypoglycemic drug class was that of alpha-glucosidase inhibitors (18.3%) DPP-4 inhibitors (14.62%), biguanides (12.95%), thiazolidine diones (9.8%), sulfonyl urea (7.82%), meglitinides (2.38%), sodium glucose transport, or inhibitors (1.02%).
were prescribed. In multi-drug regimen, biquanides + alpha-glucosidase inhibitors (11.6%) biquanides + sulfonyl urea (10.5%), biquanides + DPP-4 inhibitors (6.46%), biquanides + meglitindes (1.7%), sulfonyl urea+ alpha-glucosidase inhibitors (0.68%), sulfonylurea+thiazolidine dione (0.34%) were prescribed. In three drug combination, biquanides + sulfonyl urea + alpha-glucosidase inhibitors (0.34%) and biquanides + thiazolidine dione+ alpha-glucosidase inhibitors (0.34%) were prescribed. Insulin injection was prescribed to 2.52% of the total drug population (Tables 4 and 5).

Duration of diabetes plays an important role in patients suffering from a long time. A firm blood glucose control results in lesser incidence of complications such as nephropathy were related to the duration of diabetes. In this study, majority of patients fell under the category of 11-15 years (26.08%), 6-10 years (25.17%) followed by 5-10 years (20%), and new case (4.3%) (Table 3). In our study, minimum of 2 drugs prescribed to 6.07% patients, majority of prescriptions with 4 drugs (27.83%) and 5 drugs (25.22%) were prescribed and maximum of 8 drugs prescribed to 3.48% of prescriptions (Table 6). Cardio vascular complications were reported in 29.56% of patients and they were treated with various lipid-lowering drugs such as rosuvastatin (2.92% of total drugs), atorvastatin (1.28% of total drugs). Aspirin (1.28% of total drugs), clopidogrel (1%), and finofibrate (1 in number) were also prescribed to prevent heart-related problems. Out of 115 patients, 78 patients (68.3%) had a family history of diabetes.

In this study, hypertension (42.6%) was the common comorbidity observed. Of the total study population, 53% of patients were having coexisting illness, in which hypertension was the predominant. Hypertension was frequently associated with increased stiffness of large arteries, which often precedes macrovascular events.

Microvascular complications were detected in patients with neuropathy 15 (1.3%), they were treated with alpha lipoic acid, benfotiamine, mecobalamin, folic acid, pyridoxine combination of drugs, gabapentin, pregabalin, and epalrestat. Nephropathy detected in 31 patients (26.95%), they were treated with angiotensin II receptor blockers such as olmesartan (5 in numbers), losartan (5 in numbers), telmisartan (10 in numbers) were given to the patient and 3 numbers, ramipril (1 in number). Retinopathy detected in 19 patients (16.52%) identified by fundoscopy 3 nethra.

In the present study, voglibose was the most commonly prescribed monotherapy, second commonly prescribed drug was metformin, pioglitazone and vildagliptin. Metformin was the only one anti-diabetic drug prescribed commonly in both single-drug regimen and multidrug regimen.

### DISCUSSION

In this drug utilization study, an attempt has been made to describe the current prescribing pattern of anti diabetic drugs of Type 2 diabetes patients at the general private diabetes center, Chennai, was prescribed almost equally to men (50.4%) and women (49.56%). The prevalence of Type 2 DM was maximum in the age group of 41-60 years (58.56%). Similar studies were carried out in India in Indore city where the maximum patients are in the age group of 51-60 and 41-50 years [5]. The mean age of the patient was 52.84±1.0. The average number of anti-diabetic drugs per prescription was 2.6. In our study, 67% of drugs prescribed as single-drug regimen and 33% as single drug regimen and multi-drug regimen. In other studies conducted in India were performed in five private clinics of a locality of Hyderabad, 74.5% prescribed as monotherapy, and 24.5% as combination therapy [6].

The average duration of diabetes was 11.44±7.11 (mean±SD). The duration of diabetes plays an important role in the management of diabetes. Patients who have <5 years could generally be managed with monotherapy while the patients having more than 5 years are required combination therapy. In our present study, only 24.3% of patients were present <5 years and 25.17% had the duration of more than 5-10 years, and the majority of the patients received 4 and 5 drugs in our study (Table 6). Another study carried out in India in the year 2015-16 by Haghighatpanah et al., patients <5 years, 5-10 years and >10 years of diabetes duration were 21.9%, 24.4%, and 53.7%, respectively. The above study indicates that the majority of the patients (79%) had 1-2 anti-diabetic drugs and 20.7% prescribed with 3-4 anti-diabetic drug [7]. In our study, hypertension (42.6%) was the common comorbidity observed. A similar study was conducted by Brian and Charles, hypertension (42.2%) was the highest common comorbidity observed in Type 2 DM in Nigeria, and the average number of drugs prescribed were 4±1.6 [8].

In this present study, highly prescribed single-drug regimen was alpha-glucosidase inhibitors 16.326% of total drug prescribed. Voglibose was predominantly prescribed in this category. Treatment with alpha-
Among all the anti-diabetic drugs, class of alpha-glucosidase inhibitors, metformin combinations played an important role in the maintenance of glycemic levels in Type 2 diabetes patients. We could see the decrease in the use of sulfonyl ura; it causes weight gain and increases in the risk of cardiovascular complications. All the prescriptions, receiving a single-drug regimen as well as multiple drug regimen. All the prescriptions were dispensed with minimum 2 and maximum of 8 drugs. The number of drugs prescribed to patients increased due to their complications and existing comorbidities. Further investigation is needed to study the patient compliance and educations regarding diabetes, and lifestyle modification is also important to achieve the optimal glycemic control.

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