Original Article

UTILIZATION PATTERN OF ORAL ANTIHYPERGLYCEMIC DRUGS IN TYPE 2 DIABETES MELLITUS IN DIABETIC OUTPATIENT CARE: A DESCRIPTIVE STUDY

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ABSTRACT

Aim: The Aim of the present study is to analyze prescription pattern of the antihyperglycemic drugs in patients with type 2 diabetes mellitus (T2DM). **Methodology:** The study included 620 T2DM out patients aged between 31 to 60 years. Sociodemographic data included mean age, educational status, marital status, duration of diabetes mellitus and BMI. **Results:** Women (54.8%) shared higher percentage in study population. Metformin (44.1%) was prescribed significantly in higher cases than other antihyperglycemic drugs. Glimepiride (30%) is second most common drug prescribed in monotherapy followed by glibenclamide (9.3%), gliclazide (6.6%) in treatment of T2DM. **Conclusion:** The prescription pattern study of antihyperglycemic drugs in T2DM can serve as a guide to clinicians to select the monotherapy drug, combination drugs and insulin preparations. The findings of current study also help to the pharmaceutical companies to understand the percentage of utilization of antidiabetic drugs before developing and marketing any new drug.

KEYWORDS: Antihyperglycemic drugs; Type 2 Diabetes Mellitus; Monotherapy; Gender differences.

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is found in 85% of individuals with diabetes in India. It is estimated that 1 in every 15 individuals in India is suffering with diabetes [1]. Total 4.3% of the global population is affected with diabetes, which is expected to reach 5.4% in 2025 [1, 2]. It is a chronic disease, also considered as an epidemic disease which will cost major burden to the developing nations. In 1985, 30 million people had diabetes in worldwide which was estimated by the World Health Organization (WHO, 2006) and this number increased to 135 million by 1995 and reached 217 million in 2005. WHO has predicted that by the year 2030 this number will increase to at least 366 million [2-4].

Diabetes is a chronic and complex disease caused by the inability to secrete or respond to the pancreatic hormone insulin that regulates blood glucose levels [5]. Diabetes occurs when there is low or no insulin production or improper use of insulin. Higher blood glucose levels may trigger the microvascular and macrovascular complications in human body [6]. Blood glucose levels should be monitored carefully in T2DM patients, since it can prevent complications of higher glucose levels. If these levels remain high, despite the introduction of lifestyle measures such as weight control, physical activity and oral antihyperglycemic medications, insulin treatments can be used in people with T2DM [7,8]. Detailed literature survey reveals the prescription of antihyperglycemic drugs in world wide. The costs of antihyperglycemic medications were described by some authors with overall maintenance cost of T2DM [9].

The prevalence of type 2 diabetes mellitus is increasing in both developing and developed country [10]. Various classes of antidiabetic drugs including oral hypoglycemic agents (OHA) and insulin are commonly prescribed for the treatment of diabetes. Each individual drug may act by different mechanism to reduce the blood glucose levels to maintain optimal glycemic control [11].

Monitoring of drug utilization among the respective patients is the evaluation of drug use in given healthcare against programmed criteria and standards to measure the relevance of drug therapy. Therefore, the goals of the present study were to analyze the prescription pattern of antihyperglycemic drugs and to find the modern prescribing pattern of anti-diabetic drugs in type 2 diabetes (T2DM) patients treated 2016.

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MATERIALS AND METHODS

Study design: An observational descriptive study

Ethics approval: Informed consent was taken from the patients before collecting the prescription data.

Study location: conducted in Pune, Maharashtra

Study duration: 10 months from 1st March 2016 to 31st December, 2016.

Sample size: Total 620 T2DM patients in clinic were analyzed in the study period.

Inclusion criteria: The study was performed by using the prescriptions of outpatient which contained at least one antidiabetic agent, suffering from grater that 1 year were selected for the study.

Exclusion criteria: Newly diagnosed and patients not interested to participate were excluded.

Methodology: The sociodemographic status of study population like Mean age, educational status, marital status, duration of diabetes mellitus, BMI, frequency, prescribed different antihyperglycemic drug classes, pattern of different antihyperglycemic drugs as monotherapy, combination therapy and distribution of antihyperglycemic drugs combination were noted.

Statistical analysis: Data tabulated and presented as % for drugs

RESULTS

Total 620 T2DM patients were studied to analyse the prescribing pattern of antihyperglycemic drugs.

Out of which 45.2% (n=280) were males and 54.8% (n=340) were females. The mean age of patients was 47.16±1.25, 49.26±1.10 in men and women respectively. Figure I shows the frequency of different classes of antihyperglycemic drugs prescribed for T2DM out patients. The Sulfonylurea (48%) prescribed in higher number of cases followed by biguanides in 25.8% cases. Figure 2 displays the percentage of utilization pattern of different antihyperglycemic drug therapy (Monotherapy), it is interesting to note that metformin (44.1%) is prescribed to higher population even though sulfonylurea are prescribed in higher cases.

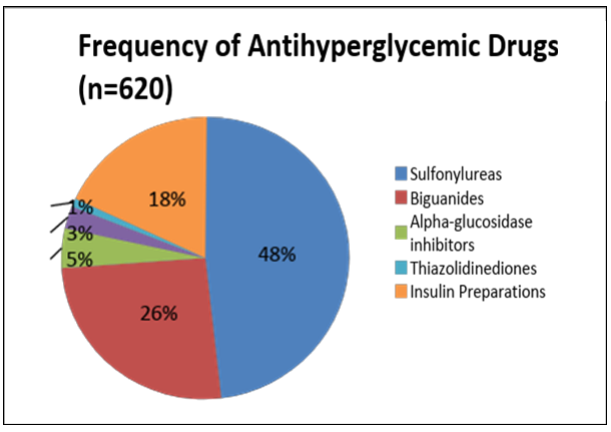

Fig 1. The frequency of different antihyperglycemic drug classes prescription for T2DM outpatients

Table 1. Sociodemographic characteristics of study population

Parameter	Male (n=280)	Female (n=340)
Mean age (years)	47.16±1.25 (SEM)	49.26±1.10 (SEM)
Educational status		
Primary school	Nil	11.7%
Secondary school	32.1%	47.0%
Graduate and above	67.8%	41.1%
Marital status		
Married	75%	87.6%
Single	7.14%	2.9%
Widowed	17.8%	9.4%
Duration of diabetes mellitus		
1-5 years	30.3%	25.6%
5-10 years	40.3%	29.5%
> 10 years	29.2%	44.7%
BMI		
Normal (18.5-24.9)	14.2%	14.7%
Overweight (25-29.9)	50%	58.8%
Obese (above 30)	35.7%	36.4%

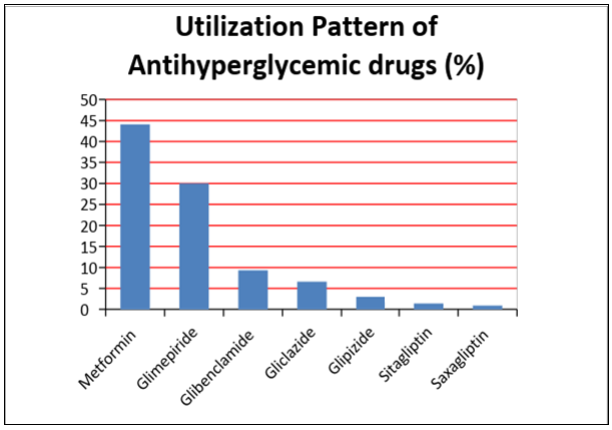

Fig 2. The Utilization pattern of different antihyperglycemic drug therapy (Monotherapy)

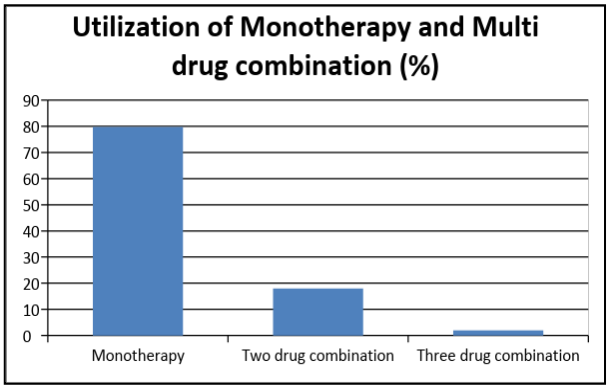

Fig 3. The Utilization pattern of Monotherapy and combination therapy of antihyperglycemic drugs prescribed in T2DM patients

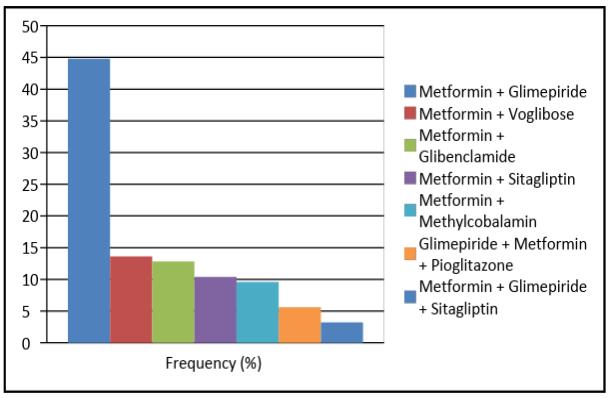

Fig 4. The distribution of antihyperglycemic drugs combination (n=125)

DISCUSSION

The current study revealed that total frequency of prescriptions of antidiabetic medications in T2DM outpatients was significantly higher in females (54.8%) than in males (45.2%). The prescription pattern in present study is similar in both men and women, results are in agreement with those previously reported in different studies. However, number of studies reported frequency of prescriptions of antihyperglycemic medications is higher in men [9, 10].

All the drugs were prescribed in the prescription by brand names (100%) and the number of antihyperglycemic drugs per prescription varied from one to three. In addition to antihyperglycemic medications, 52% of prescriptions were showed vitamin supplement and hyperlipidemic drugs were also prescribed (47%) in some of the cases. The adverse drug reactions reported by the patients were mild to moderate hypoglycemia (4%).

In this study, Sulfonylureas (48%) were the most frequently prescribed class followed by biguanides (25.8%) for treating T2DM. The results of our study are in agreement with some previous studies [9, 10, 11]. The sulfonylureas and biguanides are still the choice of drugs for most physicians in the treatment of T2DM. The most frequently prescribed monotherapy drug is Metformin (biguanides category) followed by glimepiride (sulfonylurea category) which is in accordance with some previous reports. Glimepiride, glibenclamide are the second – generations sulfonylureas most widely used in worldwide [3,12]. Sulfonylurea is the most commonly prescribed drug category, but the Metformin (biguanide) was the most common individual antihyperglycemic drug to be prescribed. The biguanide category is at second place in overall drug classes prescription but the percentage of metformin is high in individual drug category is due to the only drug of its class to be prescribed. Similar observations reported by Khan [13], Hussain et al [14], Adikari and Pai [15]. Sridevi and Ganesh [16] reported the sulfonylureas were the most commonly prescribed oral antidiabetic drug. Davidson JA [17] reported that there had been a 100% increase in the average cost for antidiabetic medication. The overall cost of the antidiabetic medications may differ depends on regional, awareness, individual social disparities.

In our study, insulin preparations were used for controlling in T2DM in 18% cases. As mentioned by Devi and George [18], an insulin preparation was preferred over oral antihyperglycemic medication in patients with diabetic nephropathy. Several studies reported that prescribing of insulin was highly recommended than oral antihyperglycemic drugs to prevent long term diabetic complications.

Among all the antidiabetic drug classes the combination of Metformin and glimepiride (44.8%) was most frequently prescribed. Our results are in agreement with survey by Abidi et al [19] and Yada et al [20]. Three drug combinations Glimepiride, Metformin and Pioglitazone are prescribed in 5.6% of the cases in present study.

The gender differences were not found in Diabetes mellitus prevalence. However, lifestyle modifications such as healthy dietary choices, avoiding smoking and alcohol consumption, overweight and sedentary lifestyle reduce the risk of the disease. Regular physical activity improves body response to insulin by decreasing insulin resistance.

The present study has its limitations because the data was collected from prescriptions of outpatients attending diabetic/medicine departments. Moreover, the data presented in the current study gives an opportunity to the clinicians and pharmaceutical companies for analyzing the utilization of different classes of drugs for T2DM treatment. Furthermore, it gives an idea for carrying out future studies about prescription patterns by adding more parameters to provide feedback to prescriber and to motivate rational prescription of various classes of anti-diabetic drugs.

CONCLUSION

The metformin was most prescribed antidiabetic drugs followed by glimepiride. Multidrug combination was also observed in the present study. The drug category thiazolidinediones (pioglitazone) also utilized in the combination drug therapy. The study summaries that oral antihyperglycemic agents are still market leading preparation in the management of T2DM, but shifting trend towards the use of insulin preparations are observed in most of the cases

Suggestions: The study suggests that the importance of continuous education on anti-diabetics drug prescription, insulin preparations and knowledge on newer drugs which can lead to the promotion of rational drug therapy and effective treatment tailoring that eventually can help to achieve proper maintenance of T2DM and optimal glycemic control. The wise knowledge on

utilization of antidiabetic drugs in diabetic mellitus treatment can reduce the morbidity and mortality in diabetic patients.

Conflict of interest: None to declare.

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