Research Article

Drug utilization pattern of antidiabetic drugs among indoor diabetic patients in a tertiary care teaching hospital, Jorhat

Gautam Sahu, Swapnanil Gohain, Angelene Brahma

Department of Pharmacology, Jorhat Medical College & Hospital, Jorhat, Assam

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Corresponding author: **Swapnanil Gohain**. Email: drswapnanil20@gmail.com**ABSTRACT**

Introduction and Aim: Diabetes is an opportunistic killer. Approximately 77 million people in India suffer from diabetes. A person develops diabetes due to genetic predisposition, family history, obesity, lack of physical activity, diet low in fruits and vegetables. Modification of life style and pharmacotherapy of diabetes are often indicated to control diabetes and emergence of complications. Therefore, the present study was undertaken to evaluate the prescription pattern of antidiabetic drugs among indoor patient with adherence to WHO core prescribing indicator.

Materials and Methods: A retrospective observational study was conducted for a period of six months and 140 case sheets of indoor diabetic patients admitted in Medicine department were collected from MRD office after prior approval from IEC. The data were analysed using descriptive statistics.

Results: The study showed male preponderance of 75.71% in comparison to female 24.29%. The pattern of antidiabetic prescribed showed highest prescription rate of various preparations of insulin (68.57%) with regular insulin most commonly prescribed preparation (64.58%). Among oral antidiabetic drugs metformin (42.86%) was most commonly used. The percentage of drug prescribed in generic name was 36.36% and the percentage of drugs prescribed from National List of Essential Medicines (NLEM) was found to be 69.7%.

Conclusion: The study provided substantial information about the prescribing practices of physicians and also paved a way to formulate prescribing policies at our institution.

Keywords: Prescription pattern; diabetes; antidiabetic drugs; indoor patients

INTRODUCTION

The term diabetes mellitus is described as metabolic cum vascular syndrome of multiple etiology, characterized by chronic hyperglycaemia with disturbances of carbohydrate, lipid and protein metabolism, resulting from defects in insulin secretion, action or both leading to changes in both small blood vessels (microangiopathy) and large blood vessels (macroangiopathy; 1).

According to the 9th edition of the International Diabetes Federation (IDF) atlas 2019, there are about 463 million adults, of which one third is people older than 65 years of age, estimated to have diabetes globally. India ranks 2nd, with 77 million people with diabetes, while China leads the chart with 116.4 million people diabetes population (2).

The reasons for the explosive increase in the prevalence of diabetes in India have been the subject of much study. While a high level of genetic predisposition does play a role, it is unlikely that the genetic makeup of the population has changed so drastically in the past 30 years as to account for the alarming increase in the prevalence of diabetes. More likely, increasing prosperity and urbanization have led to wholesale changes in lifestyle which causes diabetes to manifest in individuals who already have a genetic predisposition to the disease (3, 4).

Risk factors for diabetes mellitus are – overweight, obesity, sedentary life habits, hypertension, low levels of high density lipoprotein (HDL-C) cholesterol, elevated triglycerides (insulin resistance), smoking and dietary indiscretion. Lifestyle changes are aimed to achieve and maintain normal body weight. It can be achieved by physical exercise for 30-40 minutes and dietary regulation which includes reduction in fat intake, increased fruit & vegetable consumption (5).

The management of diabetes is complex often requiring polypharmacy. The existence of other co-morbidities further increase the economic burden on patients. This often leads to non-adherence to antidiabetic therapy by most of the patients which further leads to various complications. Drug utilization studies provide information about the existing prescribing practice among the physicians and economic impact of the therapy in terms of cost of medications and loss of work and wages.

The objective of this study was to evaluate the prescribing pattern of antidiabetic drugs in indoor diabetic patients and adherence to WHO core prescribing indicators.

MATERIALS AND METHODS

A retrospective observational study was conducted for a period of six months i.e. from June 2018 to

November 2018, in Jorhat Medical College & Hospital, a tertiary care teaching hospital in Jorhat, Assam. Approval of the Institutional Ethics Committee was obtained prior to the commencement of the study (IEC approval letter no. SMEJ/JMCH/MEU/841/Pt-1/2011/5340).

Inclusion criteria

Prescriptions of diabetic patients of both the sexes admitted in Medicine indoor ward having the following characteristics were included in the study.

Age: 20 years and above.

Both type 1 and type 2 diabetes patients with or without co-existing illnesses or complications.

Exclusion criteria

Undiagnosed patients and those with incomplete case record sheets were excluded from the study. The data were collected from case sheets of indoor diabetic patients of Department of Medicine from the Medical Records Department (MRD), Jorhat Medical College & Hospital. A total number of 140 case sheets were included in the study. The patient's details such as demographic characteristics and co-morbid conditions were recorded. The percentage of antidiabetic drugs prescribed both as individual or in combination were recorded. The data collected were analyzed using modified WHO core drug prescribing indicators (6).

The prescribing indicators that were measured included

- Average number of drugs per encounter = Total number of drugs prescribed / total number of encounters
- Percentage of drugs prescribed by generic name = (Number of drugs prescribed by generic name / Total number of drugs prescribed) x100
- Percentage of encounter with antibiotics prescribed = (Number of patients encounters with antibiotics / Total number of drugs prescribed) x100
- Percentage of encounters with injectable drug prescribed = (Number of patients encounters with injections / Total number of drugs prescribed) x100
- Percentage of drugs prescribed from NLEM, 2015 (7) = Number of drugs prescribed from NLEM 2015/ Total number of drugs prescribed) x 100

Each prescription was also analyzed for percentage of fixed drug combination usage.

The data were computed using MS Excel and the data were analyzed by using descriptive statistics. The results were expressed in percentage.

Fig. 1: Sex distribution (Pie chart)

Table 1: Age distribution

Age in years	N	Frequency %
20 - 40	26	18.57
41 -60	74	52.85
61 -80	38	27.14
≥81	2	1.42

Table 2: Individual drugs

Class of drug	No. of Prescriptions	Prescription rate (%)
Gliclazide	2	1.42
Glimepiride	38	27.14
Metformin	60	42.85
Pioglitazone	8	5.71
Acarbose	2	1.42
Teneligliptin	16	11.42
Insulin (Various preparations)	96	68.57

RESULTS

A total number of 140 prescriptions of diabetic patients were evaluated. Male preponderance of 75.71% was observed as compared to female (24.29%; Fig.1). Most of the patients affected were of the age group of 41 to 60 years (52.85%), followed by the age group of 61 to 80 years (27.14%; Table.1).

Table 2 shows the pattern of antidiabetic drugs prescribed both in oral and injectable forms, with the highest prescription rate of insulin in various preparations (68.57%). Among the oral antidiabetic drugs, metformin (42.86%) was the most common drug prescribed followed by glimepiride (27.14%) and teneligliptin (11.43%).

Table 3: Various insulin preparation

Insulin preparations	Frequency	(%)
Insulin mixtard 30/70	24	25.0
Insulin regular	62	64.58
Insulin lantus	18	18.75
Insulin Aspart	2	2.08
Insulin Lispro	2	2.08

Table 4: Coexisting illnesses

Comorbidity	n	%
Hypertension	48	34.28
CVA	24	17.14
COPD	18	12.86
Neuropathy	16	11.43
UTI	12	8.57
Nephropathy	10	7.14
Seizure disorder	10	7.14
Sepsis	8	5.71

Table 3 shows various insulin preparations prescribed, with regular insulin as the most commonly used preparation (64.58%), followed by insulin mixtard (25%) and lantus (18.75%).

Various co-morbidities like hypertension, cerebrovascular accidents (CVA), chronic obstructive pulmonary disease (COPD), neuropathy, urinary tract infections, nephropathy, seizure and sepsis were observed among the studied patients. Hypertension (34.28%) was the most common co-morbid condition, followed by CVA (17.14%), COPD (12.80%) and neuropathy (11.43%; Table 4)

Table 5: WHO core indicators

Average number of drugs prescribed per prescription	4.71
Percentage of drugs prescribed by generic name	240 (36.36%)
Percentage of encounters with antibiotic prescribed	142 (21.5%)
Percentage of encounters with injectable drug prescribed	214 (32.42%)
Percentage of drugs prescribed from NLEM	460 (69.7%)
Percentage of encounters with Fixed drug combination	128 (19.39%)
Total number of drugs prescribed (n) = 660	

Table 5 shows adherence to WHO drug prescribing indicators, which were modified according to the study objective. The total number of drugs prescribed in 140 prescriptions was 660. Therefore, the average number of drugs per encounter was found to be 4.71. The percentage of drugs prescribed in generic name was 36.36%, and the percentage of antibiotics and injectable drugs were found to be 21.5% and 32.42% respectively. The percentage of drugs prescribed from Essential drug list was 69.7%. Fixed dose combinations of various drugs in the prescriptions studied was found to be 19.39%.

DISCUSSION

Considering the status of diabetes mellitus in India and the hospital admission rate related to the disease, there is often a wide variability in the management. Drug utilization study is often the most effective method to evaluate the prescribing practices of physicians.

In the present study, it was found that, the prevalence of diabetes was higher in males (75.71%) as

compared to females (24.29%). This is attributable to an unhealthy lifestyle and work related stress. This finding is in accordance with the study conducted by Ramachandran *et al.*, (8).

In our study, the incidence of diabetes is high in the age group of 41-60 years (52.85%) followed by the age group of 61 to 80 years (27.14%). The higher incidence in the middle aged group is probably due to rapid urbanization and a sedentary lifestyle. Similar findings have also been observed in a study conducted by Venkateswaramurthy *et al.*, (9).

Our study showed that, the patients that were admitted in Medicine ward, were mostly prescribed insulin either as mono-therapy or in combination with oral antidiabetic agents. Among the insulin preparation, regular insulin was the most commonly prescribed preparation (64.58%), followed by insulin mixtard (25%). Mahmood *et al.*, found a similar result in their study (10). Metformin was the most frequent drug prescribed (42.85%) followed by glimepiride (27.14%). Similar findings were also observed in various other studies conducted across the nation (9-11). The higher rate of prescription of insulin, particularly regular insulin is due to the fact that the patients who were admitted in the indoor wards with existing co morbidities, often require insulin for its safety profile and faster onset of action. This also reduces the burden of drug interactions and improves the glycaemic control of the admitted patients.

In our study, it was found that hypertension was the most commonly associated comorbidity (34.28%), followed by CVA (17.14%) and COPD (12.86%). Similar findings have also been observed in a study conducted by Ramachandran *et al.*, (8).

In our study, we have tried to use modified WHO core indicators and observed the compliance with the same. The average number of drugs prescribed per prescription was 4.71. This figure is much higher than the derived standard value for WHO core indicator (1.6-1.8 ; 6). The findings in our study are in accordance with the findings of a study conducted by Ramachandran *et al.*, (5.15; 8). The probable reasons for such higher figure are attributable to polypharmacy due co morbid conditions accompanying diabetes.

Drugs prescribed by generic name in our study was 36.36%, which is low as compared to standard WHO ideal value of 100%. But other similar studies conducted across the sub-continent found variable results i.e. Tripathy *et al.*, (68%; 12), Hazra *et al.*, (46.2%; 13), Ashar *et al.*, (5.40%;14), Ragam *et al.*, (1.53%;15). Lack of motivation and physician's trust on branded drugs might be the contributing factors leading to such practice.

The percentage of encounters with an antibiotic prescribed in our study was 21.5%, and found to be

in accordance with the standard value for WHO prescribing indicators (20-26.8%; 6). The percentage of encounters with injections in our study was 32.42%, which is higher than the derived standard value for WHO (13.4-24.1%; 6). The reasons for such higher encounter might be due to existing co morbidities and to prevent nosocomial infection.

The percentage of drugs prescribed from National List of Essential Medicines (NLEM) found in our study was 69.7%, which is less than the derived standard to serve as ideal (100%; 6). The findings of our study are comparable to the findings of the study conducted by Ramachandran *et al.*, (73.30%; 8).

Fixed drug combinations usage found in our study was 19.39%, which is comparable to the findings from studies conducted by Ragam *et al.*, (29.12%; 15). Most of the fixed drug combinations encountered in our study were a combination of Metformin and Glimepiride.

Limitations

Since our study was a retrospective study based on indoor patients, the sample size was smaller. Moreover, we could not evaluate important aspects like adverse drug reactions and treatment outcomes.

CONCLUSION

Our study provided significant information about the prescribing pattern of antidiabetic drugs in indoor patients and adherence to standard WHO core indicators. As most of the diabetic patients admitted in indoor wards had various comorbidities, the practice of polypharmacy and higher percentage of injectables were observed in our study. The observations from the study will help us to formulate prescribing policies at our institution. Similar studies can also be done at primary and secondary health care centres to get a clear picture about antidiabetic drug prescribing patterns in this part of the country at large.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

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