



A PROSPECTIVE STUDY ON PRESCRIBING PATTERN IN TYPE 2 DIABETES MELLITUS OUTPATIENTS IN A TERTIARY CARE INSTITUTION

Nitika Hans¹, Parminder Kaur²

^{1,2} MD Pharmacology, Working as Senior Resident in Department of Pharmacology, GMC Amritsar

Conflicts of Interest: Nil

Corresponding author: Parminder Kaur

Abstract:

Introduction

Study of prescribing pattern is a component of medical audit that does monitoring and evaluation of the prescribing practice of the prescribers. Glycemic control remains the major therapeutic objective for prevention of target organ damage and other complications arising from diabetes. Poor glycemic control in diabetes mellitus can be prevented by rational use of anti-diabetic drugs.

Material and methods

The study was conducted in the medicine outpatient department at Guru Nanak Dev hospital attached to Government Medical College, Amritsar for three months. Two hundred type 2 diabetes mellitus patients were enrolled in the study according to the specific inclusion and exclusion criteria after taking informed consent. Prescription of these patients were analyzed for age of patients, percentage of males and females, percentage of patients with or without family history of diabetes, percentage of one/two/three drug combination and most frequently prescribed anti-diabetic drug. Also, prescriptions were audited for irrational Fixed Dose Combinations (FDCs) as per American Diabetes Association 2019 recommendations for combination therapy and whether the drugs were prescribed with generic nomenclature.

Results

Average number of drugs per prescription was found to be 2.03. Majority (70%) of the patients were on combination therapy. As monotherapy, metformin constituted 60%, glimepiride 20%, teneligliptin 15 % and insulin 5% of prescriptions. In two drug combination, metformin and glimepiride was most (53.3%) prescribed whereas metformin and insulin combination was least (6.6%) prescribed. In triple drug combination, metformin, glimepiride and teneligliptin combination was used in 80% patients and metformin, glimepiride and pioglitazone combination was given to 20% of patients. All drugs were prescribed by trade names and 15% FDCs used were irrational.

Conclusion

Metformin was the most prescribed drug. In combination, majority of patients received metformin and glimepiride. Prescribing by trade names and using irrational FDCs should be discouraged to improve the overall health care.

Key words: anti-diabetic drugs, diabetes mellitus, drug utilization, prescribing pattern, rational use

Introduction

Diabetes has emerged as a major healthcare problem in India. According to Diabetes Atlas (DA) published by the International Diabetes Federation (IDF), there is a marked rise in progression of disease from 40 million in 2007 to 70 million by 2025 in India and every fifth person with diabetes will be an Indian. The urban population in developing countries is projected to double between 2000 and 2030.¹ The World Health Organization predicted a 50% increase in deaths from diabetes over next 10 years, and by 2030, diabetes is projected to be the seventh leading cause of death.²

Type 2 diabetes mellitus, once called non-insulin dependent diabetes, is the most common form of diabetes, affecting 90% to 95% of population which are chiefly associated with insulin resistance syndrome. Type 2 diabetes mellitus occurs when a diabetogenic lifestyle (excessive calories, inadequate exercise and obesity) is

superimposed upon a susceptible genotype. Most patients are obese and with reduced insulin sensitivity of tissues.³

Diabetes is managed using anti-diabetic agents including insulin and Oral Hypoglycemic Agents (OHA).⁴ As, it is a chronic condition which requires lifelong treatment, continuous monitoring and adjustments in drug therapy is crucial to maintain optimal glycemic control.⁵ Poor Glycemic control in diabetes mellitus can sometimes be prevented by rational use of anti-diabetic agents and evaluation of their prescribing pattern with drug utilization studies.^{6,7}

Therefore, this study was carried out to find the current prescribing pattern of anti-diabetic drugs in diabetic patients attending a tertiary care hospital in Amritsar with an aim to provide these drugs rationally and highlight the lacunae, which in turn will help in formulation of treatment guidelines in future for overall improvement in patient health care.

Material and Methods

A prospective drug utilization review was conducted in Type 2 diabetes mellitus patients attending medicine outpatient at Government Medical College, Amritsar for three months from October 2019 to December 2019. A total of 200 diabetic patients were included in the study after their informed consent, according to the following inclusion and exclusion criteria:

Inclusion Criteria:

Type 2 diabetic patients of either gender, with age above 20 years who were on anti-diabetic agents for more than a year

Exclusion Criteria:

- Patients who refused to participate and had incomplete medical records.
- Newly diagnosed diabetic patients
- Patients enrolled in clinical trials or on treatment with any of the investigational drugs.

The prescriptions were copied and data obtained was entered in Microsoft excel spread sheet. The data collected from these patients included age, gender, family history of diabetes mellitus, whether receiving mono-therapy, two drug combination therapy and three drug combination therapy. Prescriptions were also audited for rationality of Fixed Dose Combinations (FDCs) used and whether these drugs were prescribed as per their generic name. The results were represented in the form of percentage for each parameter.

Results

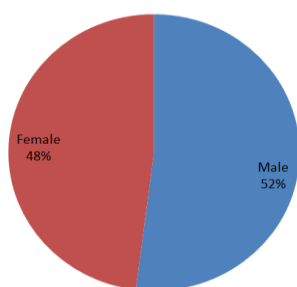


Figure 1: Distribution of the diabetic patients according to gender

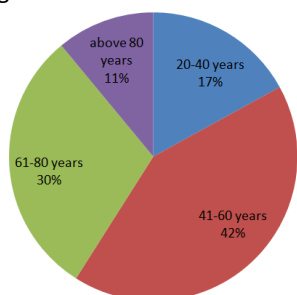


Figure 2: Distribution of diabetic patients according to age

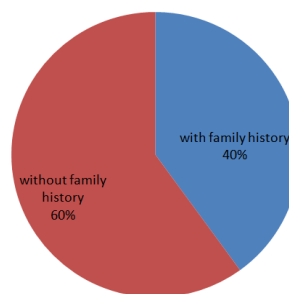


Figure 3: Distribution of diabetic patients according to family history

Table 1: Distribution of the diabetic patients according to utilization pattern

Drugs	No. of patients (N= 200)	Percentage (%)
Monotherapy	60	30
Two drug combination	105	52.5
Three drug combination	35	17.5

Table 2: The utilization pattern of anti-diabetic drug therapy (monotherapy)

Drugs	No. of patients (n= 60)	Percentage (%)
Metformin	36	60
Glimepiride	12	20
Teneligliptin	9	15
Insulin	3	5

Table 3: The utilization pattern of anti-diabetic drug therapy (two drug combination)

Drugs	No. of patients (n= 105)	Percentage (%)
Metformin + Glimepiride	56	53.3
Metformin + Teneligliptin	28	26.6
Metformin + Pioglitazone	14	13.3
Metformin + Insulin	7	6.6

Table 4: The utilization pattern of anti-diabetic drug therapy (three drug combination)

Drugs	No. of patients (n= 35)	Percentage (%)
Metformin + Glimepiride+ Teneligliptin	28	80
Metformin + Glimepiride + Pioglitazone	7	20

Table 5: The utilization pattern of irrational Fixed Dose Combinations:

Irrational Fixed Dose Combinations in:		
Patients on 2 drug combination n=105 (%)	Patients on 3 drug combination n=35 (%)	Total n=140 (%)
14(13.3%)	7 (20%)	21(15%)

This study involved 200 prescriptions of patients with Type 2 diabetes. Out of 200 diabetic patients, 104 (52%) were males and 96 (48%) females. (Fig.1). The study found a higher incidence of diabetes in the age group of 41-60

years (42%), which was followed by age group 61-80 years (30%). The incidence was lower (17%) in 20- 40 years age group and least (11%) in above 80 years. (Fig.2). Out of 200 patients, 80 patients (40%) had a family history of diabetes. Drugs were prescribed as monotherapy in 30% patients. Two drug combinations were prescribed to 52.5% patients and three drug combinations were prescribed to 17.5% patients (Table 1). In terms of monotherapy, metformin had the highest prescriptions (60%), followed by glimepiride (20%). Teneligliptin was given to 15% patients wherein insulin was given to 5% of patients (Table 2). In two drug combination, a combination most commonly prescribed was of metformin and glimepiride (53.3%). While, metformin and teneligliptin were given to 26.6% patients, metformin along with pioglitazone and metformin with insulin were given to 13.3% and 6.6% patients respectively. (Table 3) Among the three drugs combination prescribed, while metformin, glimepiride and teneligliptin combination was used in 80% patients, metformin, glimepiride and pioglitazone combination was given to 20% of patients (Table 4). Around 15% of drugs prescribed as Fixed Dose Combinations were irrational and not in accordance with the recommendations from The International Diabetes Federation.¹⁵ Moreover, each drug was prescribed by its brand name rather than generic name.

Discussion

As there is a strong epidemic rise in diabetes in India, the present study was carried out to assess the prescribing pattern of anti-diabetic drugs which are used in the management of type 2 diabetes mellitus patients in Amritsar. This study revealed that diabetes was common in males as compared to females; a similar study was reported by Agrawal et al.⁸ The results revealed that, maximum numbers of patients were in the age group of 41-60 years which was in accordance to a study published by the Quazi et al.⁹ The family history of diabetes was positive in 60% of patients in this study which has been explained by G Vijayakumar et al who has reported that there is always an association of diabetes with family history.¹⁰

In the present study, metformin was the most prescribed drug, both as monotherapy (60%) and in combination. Other anti-diabetic drugs used as monotherapy were glimepiride (20%), teneligliptin (15%) and insulin (5%) (Table 2). In two drug therapy, a combination of metformin and glimepiride was prescribed to 53.33%, metformin and teneligliptin to 26.66%, metformin and pioglitazone to 13.33% and metformin and insulin to 6.66% patients (Table 3). In triple drug treatment, 80% patients received metformin, glimepiride and teneligliptin combination whereas 20% were given metformin, glimepiride and pioglitazone (Table 4).

A study from Taiwan reported Sulfonylureas as the most common drug class followed by Biguanides. A similar finding was made by Yuen et al and Quaziet al.⁹ In general, Metformin is considered as the safest drug in terms of better glycemic control and less risk of hypoglycemia, hence preferred in our set-up. The study also identified that Metformin and Glimepiride are the most common drugs of choice. Similarly results were correlated with Upadhyay DK et al.¹¹ Amongst Thiazolidinedione group of drugs, Pioglitazone was the only drug used with Metformin. Since one year this combination of drugs has been banded in India due to new FDA guidelines, as Pioglitazone increases the risk of bladder cancer.¹² These results revealed that, Metformin is the most preferred drug of choice for the treatment of type 2 diabetes mellitus. Among the Sulfonylureas, second generation sulfonylurea- Glimepiride was the most preferred drug of choice for the treatment of type 2 diabetes mellitus during the study period. Similar patterns of preference of Metformin and Glimepiride has been reported by SudhaVengulekaret al.¹³ The study of Mishra S reported low prescribing rate of newer OHAs (thiazolidinedione and DPP 4 inhibitors). Newer OHAs were used in combination of other OHAs to achieve better glycemic control, same observation is also recorded in to previous studies.¹⁴ All the drugs were prescribed by their brand name and 15% of drugs given as combination therapy were irrational fixed dose combinations¹⁵. Although FDCs offer advantage of better compliance and cost effective treatment, understanding whether FDCs are rational or irrational is necessary for the safety of the patients. The major limitation of the present study was that it was conducted on a small sample and no intervention was done to apprise clinicians of rational prescribing. Also, patient centric approach was missing in the management and lifestyle modifications was not emphasized in any of the prescriptions. Larger studies for longer duration with planned intervention are required to improve the prescribing pattern in diabetes.

Conclusion

The study revealed that, among the different approaches of treatment, combination therapy was found to be the most preferred choice of treatment and in general Metformin was the most preferred drug. More studies and frequent audits should be done to discourage clinicians from prescribing drugs by brand name and using irrational FDCs.

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