

Study of anti-diabetic drug prescription pattern for diabetic patients with cardiovascular problems

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ABSTRACT:

Objective:

To study prescribing pattern anti-diabetic drugs for diabetic patients with cardiovascular complications.

Method:

This drug utilization study has been conducted by out-patient department in a number of government & private hospital. The prescriptions of patients of diabetic mellitus with or without complications were collected and analysed.

Result

Prescriptions of diabetic patients (n=540) were noted. Metformin (38.76%) was the most prescribed drug. Prescriptions of Insulin alone were 24% and 3.40% in combination with oral anti diabetic drugs. Hypertension was found in association with DM in 44 % of cases. The drug prescription by generic name were only 6.2% and by Brand names were 93.8%.

Conclusion

This study shows a rising trend of Anti diabetic monotherapy. This cross sectional study of prescribing pattern of ant diabetic drugs showed metformin as the most commonly prescribed anti diabetic drug. All insulin preparations were human insulin. Hypertension was most common associated co-morbidity.

Keywords: Diabetes mellitus, drug utilization study, Prescribing patterns, anti-diabetic drugs

I. INTRODUCTION

Diabetes mellitus (DM) is one of the globally increasing chronic disorder and it is also considered as a major health problem in India. Millions of people are affected by diabetes are at risk factors for cardiovascular disease, stroke, and kidney failure. According to WHO prediction,

diabetes will be the 7th leading cause of death in 2030 with estimated prevalence of 7.8% ^[1].

Diabetes mellitus is characterized by the body's inability to produce or respond to the pancreatic hormone insulin that controls blood glucose levels, which further classified into Type I, Type II, and Gestational diabetes ^[1].

1. Type I DM is also known as insulin dependent diabetes mellitus (IDDM), caused by an deficiency of insulin production due to autoimmune destruction of β cells.
2. Type II DM is also known as non-insulin dependent diabetes mellitus (NIDDM), which is caused by the presence of insulin resistance with poor compensatory growth of insulin secretion, and steadily declining insulin production over time. People with type 2 diabetes have higher risk of cardiovascular disease, cerebrovascular disease, and renal disease than the general population.
3. Gestational diabetes mellitus (GDM) is defined as glucose intolerance that is first recognized during pregnancy. GDM complicates approximately 7% of all pregnancies ^[2].

Type 1 diabetes can start at any age. But it often starts during childhood or teen years. Type 2 diabetes, the more common type, can develop at any age. Type 2 diabetes is more common in people older than 40. The presence of symptoms including polyuria, polydipsia, and unexplained weight loss frequently point to the clinical diagnosis of diabetes ^[3].

NEED FOR THE STUDY

Prescription analysis helps to improve the rational use of drugs, knowing the errors and improper prescribing & other major problems identified in hospitals these days. We intended to

study diabetic patients with a focus on "How the anti-diabetic drugs are being prescribed," which helps in understanding various factors like increased use of more expensive, newer medications, particularly human analogue insulin, and over- and underconsumption of certain older, less expensive medications. With increase in prevalence of Diabetes, there may be increase in associated complications and co-morbidities which leads to increase in the number of drugs in the prescription which in turn leads to irrational drug use as a result of polypharmacy^[4].

II. METHOD

This study was conducted by using questionnaires based on literature review. The prescriptions pattern also reviewed to see of antidiabetic drugs used in outpatient and hospitalized patients in Bhusawal city. In this study prescriptions of patients who were diagnosed with DM with or without cardiovascular complications were included. Around 540 patients of various age group with different types of diabetes have been selected for this study. The study was conducted at a government and private hospitals of Bhusawal, from August to November 2022. All prescribing physicians who had at least one year of experience prescribing antidiabetic agents were considered eligible for participating in the study^[5]. The patient's data was obtained from the out-patient department of Pharmacy. Drugs prescribed mainly for diabetes and other complications were noted and represented in the form of table. Patient's data like name, age and gender also collected. Prescribed drugs details include name of drug, dosage form, route of administration, frequency, duration of administration and most prescribed drug were noted.

Selection of subject:

The patients or the subjects were selected on the following criteria;

- Patients of both sexes irrespective of age.
- Patients diagnosed with diabetes Mellitus.
- Patients with Diabetes along with other cardiovascular complications were selected.
- Patients with DM on treatment with oral hypoglycaemic agents and insulin therapy.
- Laboratory investigations.

Patients without Diabetes mellitus and other emergency conditions such as poisoning and accident cases were excluded from study. Patients with Gestational Diabetes are also excluded from study.

Area of study

We focused on some general and specialized government or private hospitals. Our major attention was mainly on the outpatient of cardiac and diabetes department.

Questionnaire

A standard questionnaire was prepared on a sheet in an approved manner, containing 16 different questions to conduct survey. Our total patients were 540 from cardiac diabetes department of hospitals. The information collected from this survey by using questionnaire was related to the patient demographic data such as which type of diabetes they have, age and gender. The part of questionnaire include duration since they were diagnosed with diabetes, time interval to check their glucose level in a year, whether the patient has been diagnosed with any cardiovascular complications along with diabetes and for how long. Moreover, this also involved questions about use of insulin injections by patients in the past weeks or months.

This questionnaire data was collected from the potential participants by visiting them in-person in government hospitals and healthcare centers, and private hospitals and healthcare centers.

DATA PROCESSING AND GRAPHICAL REPRESENTATION

Finally all the collected raw data were processed and represented to various aspects through MS-Excel. The results were expressed as percentages.

III. RESULT AND DISCUSSION

To assess prescription pattern of the Diabetic patients with or without co-morbidities, the data has been collected from 540 patients and the observations are as follows

TABLE 1: PATIENT WITH TYPE I & TYPE II DIABETES

Type of DM	Number of patients	Percentage
Type I	28	5.18%
Type II	512	94.81%

TABLE 2: GENDER & AGE WISE DISTRIBUTION OF DIABETIC PATIENTS

Family history	No. of patients	Percentage %
Yes	224	42%
No	282	52%
Not significant	34	6%

TABLE 3: DIABETIC PATIENT WITH FAMILY HISTORY

TABLE 4: PREVALENCE OF CARDIOVASCULAR COMPLICATIONS IN DM (N=540)

Complications	Total No. of patients	Percentage %
Hypertension	237	44%
Hyperlipidemia	208	38%
Other complications	95	18%

TABLE 5: PERCENTAGE OF ANTI-DIABETIC DRUGS PRESCRIBED BY ORALLY OR PARENTERALLY.

OAD	72%
Parenteral antidiabetic drugs	28%

PERCENTAGE OF DRUGS PRESCRIBED

TABLE 6: ORAL HYPOGLYCEMIC THERAPY

Drug Name	No. of patients	%
Metformin	210	38.76
Glimepiride	34	6
Metformin+ Glimepiride	65	12
Sitagliptin + Metformin	54	10
Glimepiride+Metformin+ Pioglitazone	15	2
Voglibose	8	1.47
Voglibose +Metformin+ Pioglitazone	7	1.37
Repaglinide	4	1

TABLE 7: INSULIN AND COMBINATIONS PER PRESCRIPTION

Drug Name	No. of patients	%
Rapid acting Insulin	126	24
Insulin+ Oral	17	3.40

Age group (years)	Male	Female	Percentage %
≤30	3	2	1
31-40	26	6	6
41-50	140	64	38
51-60	153	89	45%
61-70	24	18	7
>70	8	7	3

Hypoglycemic Agents

TABLE 8: PERCENTAGE OF ANTI-DIABETIC DRUG PRESCRIBED BY THEIR GENERIC OR BRAND NAME

Antidiabetic drug	Percentage%
By Generic Name	6.2%
By brand Name	93.8%

From August 2022 to November 2017, 540 diabetic patients, with or without co-morbidities, were included in the study in several wards of public and private hospitals in Bhusawal.

Male patients are more prevalent than female ones, according to the results. Their altered social behaviors and lifestyle choices can be partially responsible for this. There are 94.81% patients who have Type II DM and 5.18% patients have Type I DM. The study shows that the people between the ages of 51 and 60 have a significant prevalence of diabetes. It indicates that these individuals experience DM during their most productive years of life as a result of lifestyle changes, an increase in stress levels, and various physical changes to the body. Thus, this age group also has a high risk of developing a number of other chronic diabetes problems^[6].

Diabetes patients have a significant rate of hypertension (44%) in their population. It might be as a result of insulin's metabolic function, which indirectly influences the body's metabolism. Diabetes and hypertension are unrelated conditions that each have their own distinct causes of cardiovascular disease. Report of this observational study shows that, family history is not a main cause of developing Diabetes. Patient's altered social behaviors and lifestyle choices can be partially responsible for this^[7].

The pharmacotherapy for both types of diabetes has undergone a significant modification in recent years. There are now a number of new drug classes. Depending on their needs,

symptomatically treated individuals have received a range of insulin kinds and oral hypoglycemic medication. In our study, oral hypoglycemic medications or insulin were administered as monotherapy to the majority of the diabetic patients. The majority of patients have been given metformin as an oral treatment and, rapid-acting insulin. Additionally, this drug does not cause weight gain and therefore can be prescribed in obese patients and has lesser chance of hypoglycemic episodes compared to sulfonylurea^[8]. In addition to this, metformin may reduce the incidence of diabetes-related complications. In the newly diagnosed obese patients sulfonylurea and insulin are more effective than their lifestyle modifications. Due to various co-morbidities antihypertensive, cardiovascular and various antibiotic drugs have been prescribed. The most commonly used antihypertensive drugs are angiotensin receptor blockers and diuretics combinations^[9]. It showed that monotherapy with antihypertensive drugs was more common compared to combination therapy. Telmisartan is the most commonly used antihypertensive drug in this observational study. Aspirin is mostly used drug for cardiovascular disorders as primary prevention anti-platelet therapy, and is recommended for cardiovascular complications in diabetes patients^[10].

According to the report collected from this observational study majority of the patients are with co-morbidities and is on polypharmacy. Frequent monitoring can benefit the patient for a better outcome by helping to prevent unreasonable drug use. Branded drugs (93.8%) were prescribed more than that of the generic drugs (6.2%) in study. Due to polypharmacy there is a chance of drug interactions and this can be avoided by maintaining a time gap between the administrations of drugs. There were adverse drug reactions with Insulin and metformin. These can be reduced with use of drugs like GLP-1 agonists and Sodium-glucose transport inhibitors, a novel class of agents in treatment of DM.

IV. CONCLUSION

With a special objective of identifying the current trend of anti-diabetic medications, the current study tried to analyze the prescription patterns of diabetes patients with or without comorbidity. According to the report obtained from the study, it was seen that male patients are more prone to diabetes than that of females. Type II

diabetes is widely observed. The diabetes patients were in the age group of 51-60 years. Hypertension (44%) is the most common cardiovascular complication seen in patients. The drugs pattern of oral hypoglycemic is also based upon the National list of essential medicines and monotherapy with metformin is widely prescribed among the patients. The polypharmacy was high in the above study; it's due to various co-morbidities in the diabetic patients. The high occurrence of polypharmacy may result in a rise in prescription costs. By purchasing generic medications rather than brand names, the cost of the prescription can also be reduced.

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