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Prescription Pattern: Diabetes Mellitus in a Tertiary Care Hospital

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ABSTRACT

Diabetes mellitus is a diverse group of metabolic disorders characterised by hyperglycemia as a result of type 1 or type 2 diabetes mellitus. The purpose is to assess the prescription pattern in diabetic patients with co-morbid diseases, as this could result in disease progression and an increased risk of complications. Diabetic patients' specific and general characteristics, such as available dose forms, unanticipated delivery of medicines to patients, observed drug interactions, and prevalent co-morbidities, all contribute to the problems faced by the practitioner who treats them. As a result of the preceding, the study aimed to reduce prescription errors, provide safe dosage regimens, educate patients by closely monitoring their glycemic control and other reactions to medication, and lastly encourage the prudent and reasonable use of pharmaceuticals. This is a six-month prospective observational study that used questionnaires as a tool. The research is being carried out at Global Hospital LB Nagar's Medicine Ward. Patients admitted to the hospital's Medicine ward and those who visited OP between October 2016 and March 2017 are eligible. Patients who meet the following requirements will be accepted. In the following study, the gender distribution was males (64.20 percent) and females (34.80 percent), and the age distribution was 25-35 years (4 percent), 35-45 years (12 percent), 45-55 years (54 percent), 55-65 years (35 percent), 65-75 years (17 percent), and 75-85 years (8 percent). The co-morbid conditions discovered in the 98 cases enrolled were hypertension (76), hypothyroidism (16), chronic kidney disease (15), urinary tract infections (11), and coronary artery disease (10).

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INTRODUCTION

Diabetes mellitus refers to a collection of metabolic illnesses marked by hyperglycemia as a result of either type 1 or type 2 diabetes. Diabetes affects more than 346 million people globally, according to the World Health Organization [1]. Without action, this number is expected to treble by 2030 [2]. Diabetes is a disease that is tough to control. The goal of this study is to assess the role of clinical pharmacists in the care of diabetic nephropathy, a leading cause of early morbidity and mortality. Diabetic nephropathy is a leading cause of early morbidity and mortality in diabetic patients, accounting for 40% of all dialysis patients in the United Kingdom (insulin dependent). Within 10 years, 10% of patients with diabetes mellitus (IDDM) will develop nephropathy, and 30% will get it within 20 years [3]. Nephropathy is associated to a substantially increased risk of cardiovascular disease in diabetics under the age of 50, accounting for around 20% of mortality. Furthermore, it develops

over a shorter period of time in type I (non-insulin-dependent) diabetes mellitus (NIDDM). As a result, the need for effective therapeutic intervention to delay or, better still, prevent the beginning of renal failure has become a high priority, and the benefits of antihypertensive medicine in slowing the rate of decline of renal function have long been recognised. The latest outcomes with angiotensin converting enzyme (ACE) inhibitors, on the other hand, have been extremely outstanding. It's still unclear if ACE medications can stop the progression of incipient illness with microalbuminuria to over nephropathy [4, 5].

Classification of Diabetes

Type 1 diabetes is defined by an absolute lack of insulin, whereas type 2 diabetes is characterised by insulin resistance and an insufficient compensatory increase in insulin secretion.

Epidemiology

India has the larger number of diabetic subjects all over the world, gaining the dubious title of "diabetes capital of the world [6]." The major concerning swing is the recent inclination in the age of beginning of diabetes to adolscents. This could have long-term negative consequences for the country's health and economy. Early detection of at-risk persons utilising simple screening measures such as the Indian Diabetes Risk Score (IDRS) and proper lifestyle modification will considerably aid in eradicating or delaying the onset of diabetes, as a result, the burden on the community and the country as a whole is reduced [7, 8].

Etiology

Type 2 diabetes develops when the body becomes resistant to insulin or when the pancreas stops generating adequate insulin. The specific aetiology is unknown, but genetics and environmental factors including obesity and inactivity appear to have a role [9, 10].

Clinical Manifestations

It's possible to go years without realising you've got type 2 diabetes. Increased thirst and urination, as well as increased hunger, are warning signals to watch out for.

Getting in shape, Fatigue, The vision is hazy. Darkened skin areas [11, 12], Sores that take a long time to cure or become infected regularly [13].

Risk Factors

The following are risk factors: weight, fat distribution, inactivity, family history, race, age, prediabetes, gestational diabetes, and polycystic ovarian syndrome [14–16].

Treatment

Pharmacological Therapy for type 2 DM

In type 2 diabetes, early pharmacologic treatment is linked to better glycemic control and fewer long-term problems [17]. Table 1 lists the drug classes that are used to treat type 2 diabetes.

Insulin therapy was previously designated for type 2 diabetic patients who could not manage their blood sugars with oral drugs and lifestyle changes [18, 19]. However, there is growing evidence that administering insulin earlier in the course of diabetes can help to improve overall diabetes control while also preserving the pancreas' ability to produce insulin.

Insulin Therapy

Insulin therapy is also required for certain persons with type 2 diabetes. Insulin therapy was once considered as a last choice, but because of its benefits, it is now frequently recommended earlier [20]. Insulin must be taken by mouth since regular digestion interacts with it. Depending on your needs, your doctor may prescribe a combination of insulin types to use throughout the day and night. Insulin treatment for type 2 diabetes is often started with a single long-acting dosage at night [21].

Insulin injections are given with a thin needle and syringe or with an insulin pen injector, which looks like an ink pen but has an insulin cartridge instead of ink [22, 23]. Insulin is available in a variety of forms, each of which performs a different purpose [24]. Among the possibilities are:

1. Insulin glulisine (Apidra)
2. Insulin lispro (Humalog)
3. Insulin aspart (Novolog)
4. Insulin glargine (Lantus)
5. Insulin detemir (Levemir)
6. Insulin isophane (Humulin N, Novolin N)

METHODOLOGY

Study Site

Study conducted in the General Medicine department of Gleneagles Aware Global Hospital LB. Nagar.

Study Duration

The research takes place over a six-month period, from October 2017 to March 2018.

Study Design

It is a prospective observational study conducted on the diabetes mellitus patients.

Table 1: Oral Agents for the Treatment of type 2 Diabetes mellitus

Class	Primary Mechanism of Action	Agent(s)	Market Name
Sulfonylureas	Initial effects include an increase in beta cell insulin secretion, as well as a decrease in hepatic glucose production and an increase in insulin receptor sensitivity.	Acetohexamide Chlorpropamide Tolazamide Tolbutamide Glipizide Glyburide Glimepride	Dymelor Diabinese Tolinase Orinase Glucotrol DiaBetaMicronase Amaryl
Short-acting insulin secretogogues	Binds K+ channels on beta islet cells, increasing insulin production. Reduces hyperglycemia after a meal. The amount of insulin released is determined by the current glucose level.	Nateglinide Repaglinide	Starlix Prandin
Thiazolidinediones	Improves insulin target-cell responses; reduces hepatic gluconeogenesis; action is dependent on the presence of insulin.	Pioglitazone Rosiglitazone	Actos Avandia
Sodium-glucose cotransport-2 (SGLT-2) inhibitor	Inhibitor of sodium-glucose transporter-2 (SGLT2) that is selective	Dapagliflozin	Farxiga
Amylin analogue	Glucagon secretion should be reduced. Gastric emptying takes time. Increase your feeling of fullness.	Pramlintide	Symlin
a-Glucosidase inhibitors	Delay the absorption of carbohydrates from the gut.	Acarbose Miglitol	Precose or generic Glyset
Glucagon-like peptide-1 (GLP-1) receptor agonists (Injectable drugs)	GLP-1 is an incretin-like peptide that stimulates insulin production, suppresses glucagon, and slows stomach emptying.	Exenatide Liraglutide	Byetta Victoza
Biguanides	Reduce the HGP. Muscle glucose uptake should be increased.	Metformin	Glucophage or generic
Bile acid sequestrant	Reduce HGP Elevate levels of incretin	Colesevelam	WelChol
DPP-4 inhibitors	Elevates the secretion of insulin that is glucose-dependent. Glucagon secretion should be reduced.	Alogliptin Linagliptin Saxagliptin Sitagliptin	Nesina Tradjenta Onglyza Januvia
Dopamine-2 agonist	Activates the dopaminergic receptors	Bromocriptine	Cycloset, Parlodel

Study Criteria

The following study is carried out using the following factors,

Inclusion Criteria

1. Patients with diabetes for at least 1 year.
2. Patients with diabetic complications.
3. Patients with other co-morbid conditions.

Exclusion Criteria

Pregnant women and nursing mothers.

Source of Data

Case report forms of Type II Diabetes Mellitus patients.

Rationality of the Study

The available dose forms, unanticipated administration of drugs to patients, observed drug interactions, and prevalent co-morbidities encountered in diabetes patients all add to the difficulties faced by the practitioner who treats them. Because of the foregoing, the study was created to aid in the reduction of prescription errors, the provision of safe dosage regimens, patient education through thorough monitoring of glycemic control and other responses to medication, and lastly, the promotion of judicious and sensible drug usage.

Study Procedure

This is a prospective observational study that carried out for six months. Study conducted in the General Medicine department of Gleneagles Aware Global Hospital LB. Nagar. The study included patients admitted to the hospital's Medicine ward and those who visited the OPD during the six-month period from October 2017 to March 2018. Diabetic patients who see an endocrinologist are evaluated, diagnosed, and given treatment recommendations. A well-designed data collection form is used to collect patient demographics, prescription charts, lab data, progress charts, medical records, doctor's notes, and nursing notes.

RESULTS AND DISCUSSION

The research was carried out at the Diabetology and General Medicine IPDs of a tertiary care hospital. This study comprised type 2 diabetic patients who had been diagnosed for at least a year and were between the ages of 25 and 85 years old, regardless of gender. Patients beyond the age of 85 were eliminated due to the increasing occurrence of other co-existing illness conditions. Data was collected from the profile sheets of 98 diabetes patients who visited the OPD and IPD for six months between October 2017 and March 2018, during the study period. Patients' demographics, blood glucose/glycosylated haemoglobin (HbA1C) levels, diagnosis, and medicines prescribed are all retrieved from records. The patients' glycaemic control was determined by blood glucose levels/HbA1C, and they were divided into two groups: controlled fasting blood sugar (FBS) 110 mg/dL/HbA1C 7) and uncontrolled diabetics (FBS >110 mg/dL/HbA1C >7). The prescribing trends of medicines in both controlled and uncontrolled diabetics with other co-morbid illnesses were discovered by a descriptive analysis of data.

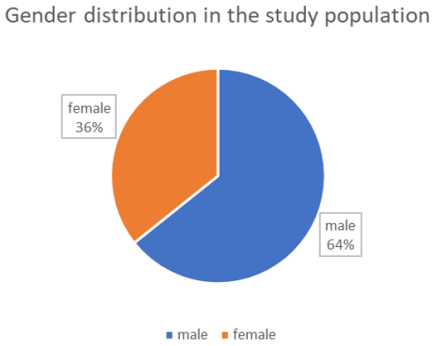

Figure 1: Based on Gender

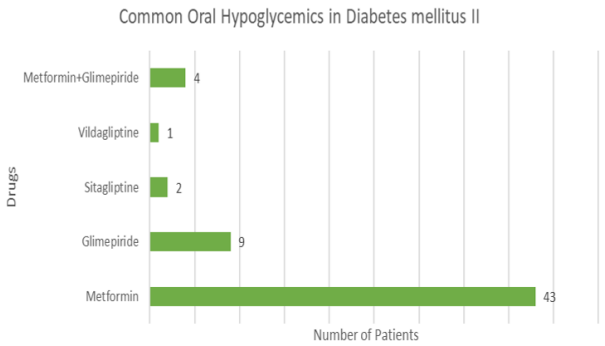

Figure 2: Based on Common Oral Hypoglycemics

Figure 1 shows that out of 98 patients, 63 (64.3%) were males and 35 (35.7%) were females, with mean ages of 58.06 11.13 and 57.08 12.58 years, respectively. Table 2 shows the age distribution of the patients. In our study, 39 patients had diabetes that was under control and 59 had diabetes that was uncontrolled. The mean duration of type 2 diabetes in the treated group was 5.57 2.98 years, while it was 7.18 5.8 years in the uncontrolled group. With a prevalence of 78.6 percent, systemic hypertension was the most frequent cardiovascular co-morbidity among diabetic patients, as shown in Table 3.

Table 2: Based on Age

Age	No of patients	Percentage
25-35	4	4.00%
35-45	12	12.00%
45-55	23	24.00%
55-65	34	35.00%
65-75	17	17.00%
75-85	8	8.00%

Table 3: Based on Common Co-morbidity

S.No	Common Co-morbidity	No of Patients
1.	Hypoglycemia	2
2.	UTI	11
3.	RTI	2
4.	CAD	10
5.	CVA	3
6.	Hypothyroidism	16
7.	CKD	15
8.	HTN	76

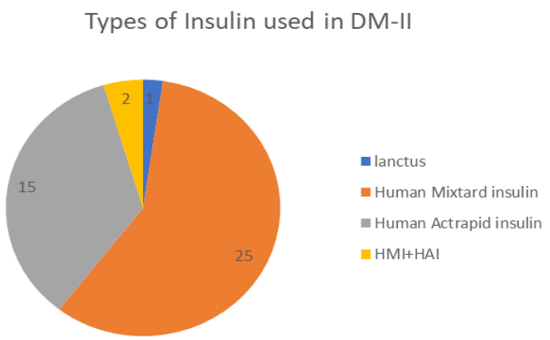

Figure 3: Based on Types of Insulin Used in Type 2 DM

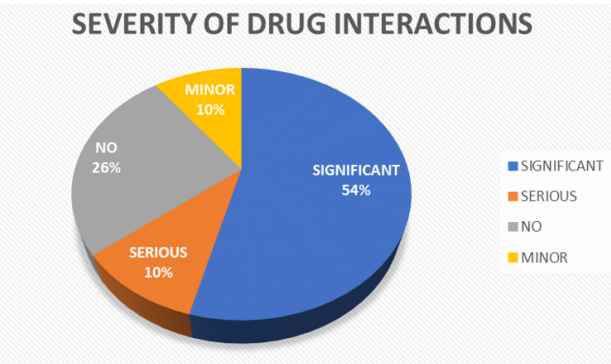

Figure 4: Based on Severity of Drug Interaction

Furthermore, aspirin was given to 4.1 percent of IHD patients, while clopidogrel and aspirin were given to 5.1 percent of patients. Statins were prescribed to all of the dyslipidaemia patients. CCBs were prescribed more frequently in diabetes individuals who were under control. Patients with uncontrolled diabetes were more likely than those with controlled diabetes to use combination antihypertensive medications. Only patients with uncontrolled diabetes were prescribed AT1receptor blockers. Clopidogrel was prescribed more frequently in individuals with uncontrolled diabetes, but aspirin was prescribed more frequently in people with controlled diabetes.

Controlled diabetics had a mean number of cardiovascular medicines of 1.12 0.58, but uncontrolled diabetics had a mean number of 1.52 1.10. The increased number of diabetic patients who are uncontrolled could be due to poor adherence to therapy, a lack of awareness, or a lack of education. This may necessitate the use of additional medications or combinations to treat co-morbid diseases. During the research period, 464 medications were prescribed. Anti-diabetics were prescribed in 102 cases (22%), anti-hypertensives in 72 cases (15.5%), multivitamins in 59 cases (12.72%), anti-platelets in 46 cases (9.9%), statins in 20 cases (4.31%), and miscellaneous medications in 165 cases (35.5%). Figure 2 depicted prescribing based on common oral hypoglycemics, while Figure 3 depicted prescribing based on insulin type. In Figure 4, the drug interactions developed were char-

acterised based on their severity, which included substantial interactions, serious interactions, moderate interactions, and no interactions.

The increased number of diabetic patients who are uncontrolled could be due to poor adherence to therapy, a lack of awareness, or a lack of education. This may necessitate the use of additional medications or combinations to treat their co-morbid diseases.

CONCLUSION

A total of 98 patients with "Diabetes Mellitus Type II" as their primary ailment were included in the final report. The most common co-morbid condition found in the study population was Hypertension (76 instances). Ca+2 channel blockers (22.45 percent usage) e.g. Amlodipine, -Blockers (15.31 percent) e.g. Metoprolol, Biguanides (43 percent) e.g. Metformin, and Human Mixtard Insulin (25 percent) were the typical therapies that showed good management for the condition Diabetes + Hypertension.

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Conflict of Interest

The authors declare that there is no conflict of interest for this study.

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