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Research



Study of prescription pattern of drugs in diabetes mellitus in tertiary care hospital

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	Abstract
Published on: 11 Dec 2024	<p>Diabetes mellitus is a heterogeneous group of metabolic disorders characterized by hyperglycemia due to type-1 or type-2 diabetes mellitus. This study is aimed to assess the prescription pattern in DM patients with comorbid condition, because prescription pattern could lead to worsening of disease and increased risk of complications. The specific and general aspects of diabetic patients including the available dosage forms, unexpected administering of medicines to patients, drug interactions observed and common co morbidities seen in diabetic patients, all add to difficulties facing by the practitioner who treats them. Due to the above reasons the study was designed to help minimize the prescription errors, render safe dosage regimen, educating the patients by carefully monitoring the patient's glycemic control and other responses towards therapy, finally promoting the judicial and rational use of drugs. Of the total 98 cases enrolled the comorbid conditions found were Hypertension (76), hypothyroidism (16), chronic kidney disease (15), urinary tract infections (11), coronary artery disease (10).</p>
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INTRODUCTION

Diabetes mellitus is a heterogeneous group of metabolic disorders characterized by hyperglycemia due to type-1 or type-2 diabetes mellitus. W.H. O estimates that more than 346 million people worldwide have DM This number is more likely to be doubled by 2030 without any intervention. here are seven essential "self-care behaviors" in people with diabetes which predict good outcomes namely (i) healthy eating, (ii) being physically active, (iii) monitoring of blood sugar levels, (iv) compliant with medications, (v) good problem-solving skills, (vi) healthy coping skills and (vii) risk reduction behavior. This can be achieved by pharmacist's intervention through patient education, doctor's appointment reminders, refill alerts, reporting adverse drug reactions, intensive individual counseling or organizing a group counseling for diabetic patients. Diabetic nephropathy is an

important cause of premature morbidity and mortality in patients with diabetes mellitus cause of renal failure in 40% of all patients requiring dialysis in the U.K. (1). Of the patients developing type 1 (insulin dependent) Diabetes mellitus (IDDM) approximately 10% develop nephropathy within 10 years and 30% within 20 years (2, 3). Nephropathy accounts for approximately 20% of deaths in diabetics below the age of 50 years (3-5) and is also associated with a significantly increased risk of cardiovascular disease (6). Furthermore, it develops over a shorter period of time in type II (non-insulin dependent) diabetes mellitus (NIDDM). the results obtained recently with angiotensin converting enzyme (ACE) inhibitors have been particularly impressive.

Diabetes Mellitus

Diabetes mellitus is a group of metabolic disorders having the feature of hyperglycemia which results from either defect in insulin secretion, insulin action, or both. The diagnosis of diabetes is established by elevation of plasma glucose by any one of three criteria:

1. A random plasma glucose concentration of 200 mg/dl or higher, with classical signs and -symptoms.
2. A fasting glucose concentration of 126 mg/dl or higher on more than one occasion, or
3. An abnormal oral glucose tolerance test (OGTT), in which the glucose concentration is 200 mg/dl or higher 2 hours after a standard carbohydrate load (75 gm of glucose).

Classification Of Diabetes

The vast majority of diabetic patients are classified into one of two broad categories: type 1 diabetes caused by an absolute deficiency of insulin, or type 2 diabetes defined by the presence of insulin resistance with an inadequate compensatory increase in insulin secretion. Women who develop diabetes because of the stress of pregnancy are classified as having gestational diabetes.

Type 1 diabetes

This form of diabetes results from autoimmune destruction of the β cells of the pancreas. Although this form of diabetes usually occurs in children and adolescents, it can occur at any age. Younger individuals typically have a rapid rate of β -cell destruction and present with ketoacidosis, whereas adults for many years, which is often referred to as LADA.

Type 2 diabetes

This form of diabetes is characterized by insulin resistance and a relative lack of insulin secretion, with progressively lower insulin secretion over time. Most individuals with type 2 diabetes exhibit abdominal obesity, which itself cause insulin resistance. This clustering of abnormalities is referred to as the insulin resistance syndrome or the metabolic syndrome. Because of the abnormalities (patients with type 2 diabetes are at increased risk of developing macrovascular complications.

Gestational Diabetes Mellitus

GDM is defined as glucose intolerance that is first recognized during pregnancy Gestational diabetes complicates approximately 7% of all pregnancies.

Other Specific Types of Diabetes

Genetic defects MODY is characterized by impaired insulin secretion with minimal or no insulin resistance. Genetic inability to convert proinsulin to insulin results in mild hyperglycemia and is inherited in an autosomal dominant pattern.

Type A insulin resistance refers to the clinical syndrome of acanthosis nigricans, virilization in women, polycystic ovaries, and hyperinsulinemia. In contrast, type B insulin resistance is caused by auto -antibodies to the insulin receptor. Leprechaunism is a pediatric syndrome with specific facial features and severe insulin resistance because of a defect and severe insulin resistance because of a defect in the insulin receptor gene.

Epidemiology

India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the "diabetes capital of the world" According to the Diabetes Atlas 2006 published by the International Diabetes Federation, the number of people with diabetes in India currently around 40.9 million is expected to rise to 69.9 million by 2025. Even though the prevalence of microvascular complications of diabetes like retinopathy and nephropathy are comparatively lower in Indians, the prevalence of premature coronary artery disease is much higher in Indians compared to other ethnic groups. The most disturbing trend is the shift in age of onset of diabetes to a younger age in the recent years. Early identification of at-risk individuals using simple screening tools like the Indian Diabetes Risk Score (IDRS) and appropriate lifestyle intervention would greatly help in preventing or postponing the onset of diabetes and thus reducing the burden on the community and the nation as a whole.

Aetiology

Type 2 diabetes develops when the body becomes resistant to insulin or when the pancreas stops producing enough insulin. Exactly why this happens is unknown, although genetics and environmental factors, such as excess weight and inactivity, seem to be contributing factors.

Aim And Objectives

To study the prescription pattern of drugs used in diabetes mellitus in tertiary care hospital. The study will be conducted in accordance with the following objectives. To study the prescription pattern of drugs used in diabetes mellitus in a tertiary care hospital. To assess the prescription pattern of drugs used in diabetes mellitus with comorbidities. To assess the Drug Interactions. To assess the Efficacy of Combinational drugs. To find out the epidemiology of co- morbid condition. To Improve the quality of life.

MATERIALS & METHODS

Source of data: Case report forms Of Type II Diabetes Mellitus patients.

Method and collection of data:

Study site: Study conducted Hospitals, Vijayawada. at Medicine ward of Andhra Study duration: the study is conducted during a six month period from October 2019to March 2020.

Study design: it is a prospective observational study conducted on the diabetes mellitus patients.

Study criteria: The following study is carried out using the following factors,

Inclusion criteria

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

Exclusion criteria

Pregnant women and nursing mothers.

Procedure

This is a prospective observational study conducted over a period of six months. The study was conducted at Medicine ward of ANDHRA HOSPITAL. Patients who admitted to the Medicine ward of the hospital and those visiting OPD during a six-month period from October 2019 to March 2020 are enrolled. Diabetic patients visiting the endocrinologist are evaluated, diagnosed and prescribed with suitable therapy. Using a suitable designed data collection form, the following details collected are patient demographics, prescription chart, lab data, progress chart, medical records, doctor's notes, nursing notes.

Demographic Details Of Study Population

Table 1: Demographic details of study population

S.No	Ip. No	Age	Sex	Reasons For Admission
1.	1828064	67	M	Unresponsive state, not moving limbs.
2.	1826612	78	M	SOB on exertion, cough with sputum, edema on both legs.
3.	1828083	38	M	Fever with chills, General body pains, Headache.
4.	1828535	54	F	Recurrent attacks of pyelonephritis.
5.	1827989	61	F	Fever, chest pain, lower back pain, vomitings, Right cheek swelling.
6.	1827575	65	M	SOB.
7.	1829900	60	F	Fever, cough, weakness, headache, LOC.
8.	1827745	60	M	Fever, SOB, Sleep disturbance.
9.	1827705	53	M	pain in abdomen, radiating to right loin, vomiting 2 episodes.
10.	1826604	71	M	cough with sputum,pain in lower abdomen.
11.	1826661	68	M	Difficulty in breathing.low abdominal pain, dark stools
12.	1887733	52	M	fever, swelling of feet, generalised weakness, loss of appetite.
13.	1814714	54	M	Giddiness, swing while walking. History of vomiting and fall.
14.	1826304	66	F	fever with chills, burning micturation, abdominal pain.
15.	1826876	68	F	History of recurrent falls, irritability, irrelevant speech, insomnia.

Drug Interactions

177922	Aspirin+Glimepiride	increases effect of glucose by unknown mechanism	Significant
1726661	Levofloxacin +Metformin	increases the effect of metformin by PD synergism	Significant
1728357	Oflxacin + Metformin	increases the effect of metformin by PD effect	Significant
1728043	Metformin+Furosemide	decreases the level of Furosemide by unspecified mechanism	Minor
1828344	Octreotide+Ondansetron	both increases QT interval	Serious
1828635	Metformin+Furosemide	decreases the level of furosemide by unknown mechanism	Minor
1726661	Ramipril+Glimeperide	increases the effect of glimepirides by PD synergism	Significant

RESULTS

This study was conducted in the IPDs of Diabetology and general medicine of a tertiary care hospital. Type 2 diabetic patients of at least 1 year duration; between 25 and 85 years of age of either in the study. Considering the increased prevalence of other co-existing disease conditions, the patients above 85 years were excluded. Data were collected from ing profile sheets of Octodiabetic patients who had visited the OPD & IPD for six months study period. Data collected from records includes their demographics of patients, their blood glucose/glycosylated haemoglobin (HbA1C) levels, diagnosis and drugs prescribed. The blood glucose levels/HbA1C was used to identify the glycemic control of the patients and they were classified as controlled fasting blood sugar (FBS) ≤ 110 mg/dL/HbA1C ≤ 7) and uncontrolled diabetics (FBS >110 mg/dL/HbA1C >7). A descriptive analysis of data was done to find the prescribing pattern of drugs in controlled and uncontrolled diabetics with other co morbid conditions. Out of 98 patients, 63(64.3%) were males and 35(35.7%) were females with a mean age of 58.06 ± 11.13 and 57.08 ± 12.58 years respectively. In our study population, 39 patients had controlled diabetes and 59 patients had uncontrolled diabetes. The mean duration of type 2 diabetes in controlled population was 5.57 ± 2.98 years whereas in uncontrolled group, it was 7.18 ± 15.8 years. Systemic hypertension was the most common cardiovascular comorbidity among the diabetic patients with a prevalence of 78.6%. Among these patients, 21% had coexisting IHD and 3% had dyslipidemia. Systemic hypertension was followed by IHD (48%) and dyslipidemia (20%). 20% of patients have CKD & 17.35% have hypothyroidism.)

Various drugs prescribed for diabetic patients with hypertension, ischemic heart disease, and dyslipidemia

Co-morbidity	Drugs prescribed	Total drug usage (%)	Co-morbidity Hypertension (%)	Uncontrolled diabetic patients (%)
Hypertension	CCBs	22.45	30.1	17
	B-Blockers	15.31	15.38	15.25
	ATI-antagonists	20.41	15.4	23.73
	ACE inhibitors	03.06	5.13	1.7
	a-Antagonist	03.06	5.13	1.7
	Combinations	9.18	10.26	8.5
IHD	Clopidogrel	13.3	10.3	13.56
	Aspirin	4.1	7.7	1.7
	Combinations	5.1	5.13	5.085
Dyslipidemia	Statins	20.4	23.08	18.64

CCBs were prescribed more in the controlled diabetic patients. The usage of combined antihypertensive drugs was more in the patients with uncontrolled diabetes than in the controlled diabetes. ATI receptor blockers were prescribed only in the patients with uncontrolled diabetes. Clopidogrel was prescribed more among uncontrolled diabetes patients whereas aspirin was prescribed more in the controlled diabetic patients. The mean numbers of cardiovascular drugs in the controlled diabetics were found to be 1.12 ± 0.58 whereas in uncontrolled diabetics it was 1.52 ± 1.10 . The higher number of uncontrolled diabetic patients may be a reflection of their poor adherence to therapy, low awareness and lack of education. This may lead to the need of more drugs or combinations to manage their comorbid conditions. A total of 464 drugs were prescribed during the study period. 102 (22%) antidiabetics, 72 (15.5%) antihypertensives, 59(12.72%) multivitamins, 46 (9.9%) antiplatelets, 20(4.31%) statins and 165(35.5%) miscellaneous drugs were prescribed. 44 (43.14%) were prescribed metformin, 9(8.83%) were prescribed glimepiride, 2(1.96%) were prescribed Sitagliptin, 1 (0.98%) were prescribed Vildagliptin, and 43 (42.16%) patients were prescribed Insulin. Most commonly prescribed FDC was Metformin + Glimepiride (4, 3.9%).

Table 2: Drug Prescribing Pattern

Drug prescribing pattern		
Items	Drugs	%
Drug Groups	Antidiabetic	22%
	Antihypertensives	15.5%
	Multivitamins	12.72%
	Antiplatelet	9.9%
	Statins	4.31%
	Miscellaneous category	35.5%
Anti Diabetic Drugs	Metformin	43.14%
	Glimepiride	8.83%
	Vildagliptin	0.98%
	Sitagliptin	1.96%
	Insulin	42.16%
Fixed Combinations (Fdc) Dose	Metformin + Glimepiride	3.9%

DISCUSSIONS

The gender distribution found in the following study was males (64.20%) and females (34.80%), the age distribution was found to be 25-35 yrs (4%), 35-45yrs (12%), 45-55 (54%), 55-65yrs (35%), 65-75 yrs (17%), 75-85 yrs (8%). Of the total 98 cases enrolled the comorbid conditions found were Hypertension (76), hypothyroidism (16), chronic kidney disease (15), urinary tract infections (11), Coronary artery disease (10). A total of 464 drugs were prescribed during the study period. 102(22%) antidiabetics, 72(15.5%) antihypertensives, 59(12.72%) multivitamins, 46(9.9%) antiplatelets, 20(4.31%) statins and 165(35.5%) miscellaneous drugs were prescribed. The antidiabetics included were 44(43.14%) were prescribed with metformin, 9(8.83%) were prescribed with glimepiride, 2(1.96%) were prescribed with Sitagliptine, 1(0.98%) were prescribed with Vildagliptine, and 43 (42.16%) patients were prescribed with Insulin. Most commonly prescribed FDC was Metformin + Glimepiride (4,3.9%)

Moreover, 4.1% of the IHD patients received aspirin and 5.1% of the patients received both clopidogrel and aspirin. All the patients with dyslipidemia were prescribed statins. Clopidogrel was prescribed more among uncontrolled diabetes patients whereas aspirin was prescribed more in the controlled diabetic patients. CCBs were prescribed more in the controlled diabetic patients. The usage of combined antihypertensive drugs was more in the patients with uncontrolled diabetes than in the controlled diabetes. AT Receptor blockers were prescribed only in the patients with uncontrolled diabetes. The higher number of uncontrolled diabetic patients may be a reflection of their poor adherence to therapy, low awareness and lack of education. This may lead to the need of more drugs or combinations to manage their comorbid conditions. The Drug interactions developed were classified based on the severity which includes the follows, the significant interactions were 53, serious interactions were 10, minor interactions were 10 and no interactions were observed in 25 patients of study population.

CONCLUSION

The final report drawn from a total of 98 cases with the primary condition "Diabetes Mellitus Type -II" the major co-morbid condition found was HYPETENSION (76 cases) in the study population. The standard therapy which showed good control for the condition Diabetes + Hypertension given was: a) Ca²⁺ channel blockers (22.45% usage) eg. Amlodipine. b) B-Blockers (15.31%) eg. Metoprolol. c) Biguanides (43%) eg. Metformin.

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