

PRESCRIPTION TREND OF ANTI DIABETICS AMONG PHYSICIANS AND THEIR SELECTION ACCORDING TO LAB INVESTIGATIONS AND PHYSICAL PARAMETERS

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Abstract

While writing this article we observed 300 prescriptions of patients suffering from a number of different diabetic complications. Patients were from different family backgrounds but most of them belonged to Middle-class. We go through from the prescriptions and also analyzed them from their laboratory values and physical parameters. In the laboratory Investigations, we basically gave importance to Cholesterol level, ALT, Hba1c and creatinine levels. We asked from patients either they are taking their recommended medicines regularly, we also asked them about the effect of medicines they observed. Most of the people were taking their medicines regularly but some were skipping their doses. After completing our survey we analyzed our data from different perspectives. We determined the generics mostly prescribed and then rank them according to their percentage of usage. After that we analyzed the change in trend of prescriptions due to disturbance in any of the above mentioned lab values. We also observed the changing trend of prescriptions according to their Body Mass Index (BMI). In the end we gave it a conclusion that some of the classes of anti-diabetics are being prescribed in specific conditions and the rest of them are rarely used.

Keywords: Anti-diabetics, laboratory investigations, Physical parameters, Diabetic complications, Prescription Trend

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INTRODUCTION

Diabetes mellitus is defined as a group of metabolic diseases characterized by hyperglycemia that is resulting from defects in insulin action, insulin secretion or both. Chronic hyperglycemia of diabetes is associated with long term damage, dysfunction and failure of various sensitive body organs especially the nerves, kidneys, eyes, blood vessels and heart [1]. Diabetes mellitus can be classified into two main classes, primary and secondary diabetes. Primary diabetes is considered when there is no associated disease present. It is further sub

divided into Type 1 (autoimmune) and Type 2 (Non-autoimmune) diabetes mellitus. In secondary category some recognizable conditions causes a diabetes syndrome to develop [2].

According to a study diabetes mellitus is emerging as one of the greatest threats to the health of population worldwide in 21st century. Estimation has been made that the number of individuals with diabetes will increase from 171 million in 2000 to 366 million in 2030. By 2030, it is estimated that the number of people with diabetes > 64 year of age will be > 82 million in

developing countries and > 48 million in developed countries [3]. Commonly diabetes occurs in urban areas. The prevalence of diabetes in rural areas was estimated to be one-quarter than that of the urban areas in Bangladesh, Bhutan, India, Nepal, Maldives and Sri Lanka. In the 10 countries estimated to have the highest numbers of people with diabetes in 2000 and 2030 the “top three” countries are same as those identified for 1995 (India, China and U.S), Bangladesh, Brazil, Japan, Indonesia and Pakistan also appear in the lists for both 2000 and 2030 [4]. Urban populations are more likely to have the disease than rural inhabitants. About one fourth of all diabetic patients are having insulin dependent diabetes mellitus (type 1) while three fourth of them have non insulin dependent diabetes (type2). In a published study by Aga Khan University the prevalence of known diabetes in the wealthy population was 4.5% that is significantly higher than 1.8% in the poor area. A maximum prevalence of 25% was seen in the affluent community aged 55-64. Diabetes was more common in females in both populations [5].

Diabetes mellitus spares no organ or system of body and produces both acute and chronic complications including peripheral vascular disease, retinopathy, cerebrovascular accidents, cardiac diseases, diabetic nephropathy leading to renal failure with the passage of time, autonomic and peripheral neuropathy and amputation of extremities. Diabetes mellitus also associated with increased risk of macro vascular diseases including cerebrovascular disease, peripheral vascular disease and coronary heart disease [6].

An association between the foot problem and diabetes had been developed years ago. An English surgeon, described a diabetic patient who first developed peripheral neuropathy and latter developed ulcer on the plain surface of his feet. Then he concluded that “Diabetes may by itself be able to cause a perforating ulcer”.

Diabetic ulcers are the most common foot injuries leading to the exclusion of lower extremities. Patient education is considered necessary to reduce the risk of injury that leads to foot ulcer. Patient should be educated about the foot hygiene, nail care and proper foot ware to reduce the risk of injury leading to ulcer. Collective effort of physician and patient may ultimately lead to a reduction in lower extremity amputations related to diabetes [7].

Among all the diabetic complications foot infection is major health problem that is responsible for longer stay in hospital. It revealed that diabetic foot problem is account for 20% of all diabetic admission in hospital in the United Kingdom and United State, and the mean duration of hospitalization that revealed by a study it was 27 days.

The term *HbA1c* refers to glycated haemoglobin. It develops when haemoglobin, a protein within red blood cells that carries oxygen throughout your body, joins with glucose in the blood, becoming 'glycated'. HbA1c is also referred to as haemoglobin A1c or simply A1c. Red blood cells live for about 3 months, so the test shows the average level of glucose in your blood for the past 3 months. HbA1c can indicate people with prediabetes or diabetes: Normal (Below 42 mmol/mol), Prediabetes (42 to 47 mmol/mol), Diabetes (mol/mol or over). People with diseases affecting hemoglobin, such as anemia, may get misleading results with this test. Other things that can affect the results of the hemoglobin A1c include supplements such as vitamins C and E and high cholesterol levels.

Kidney disease and liver disease may also affect the test [8]. Diabetic nephropathy (kidney disease) caused by high blood glucose levels and high blood pressure, is the leading cause of kidney failure in the United States. Creatinine is a chemical waste product in the blood that passes through the kidneys to be filtered and eliminated in urine. The chemical waste is a by-

product of normal muscle function. The more muscle a person has, the more creatinine they produce. Levels of creatinine in the blood reflect both the amount of muscle a person has and their amount of kidney function. Most men with normal kidney function have approximately 0.6 to 1.2 milligrams/deciliters (mg/dL) of creatinine. Most women with normal kidney function have between 0.5 to 1.1 mg/dL of creatinine [9]. Women usually have lower creatinine levels than men because women, on average, have less muscle than men. When there is kidney damage or kidney disease, and the kidneys are not able to filter waste efficiently, there will likely be a rise in creatinine levels in the blood. Dialysis is needed whenever kidney function is too low to maintain health. However, creatinine is just one of many factors considered when deciding whether or not to recommend dialysis treatment [10]. The higher the level of LDL cholesterol in your blood, the GREATER your chance is of getting heart disease. The higher the level of HDL cholesterol in your blood, the LOWER your chance is of getting heart disease. Diabetes tends to lower "good" cholesterol levels and raise triglyceride and "bad" Cholesterol is a waxy, fat-like substance that's found in all cells of the body. People who have high blood cholesterol have a greater chance of getting coronary heart disease also called coronary artery disease. Cholesterol level which increases the risk for heart disease and stroke. This common condition is called diabetic dyslipidemia [11].

METHODOLOGY

Study Design

This report was based on the evaluation of the prescription. A prospective observation study was carried out for a period of 8 weeks in the month during February 2017 to April 2017. During this period, 300 prescriptions were collected from the diabetic patient suffering from diabetic complications such as

nephropathy, diabetic foot, neuropathy, retinopathy etc.

Study Population

This study was done based on the survey of prescribed medications to find out the prescription trend of anti diabetics. We conducted a survey on 300 diabetic patients having diabetic complications of different levels. We conducted our research at Faisalabad Diabetic Center where we consulted to Dr. Altaf ur Rehman Awan PhD Diabetology Central America.

Data Collecting Procedure

After collection of prescription at first the patients were categorized according to their age groups, then we extract the data about brands and generics prescribed in particular disease. We experienced different patients having different backgrounds. Most of the patients belonged to middle class background. We requested them to show their prescriptions to us. There were some patients who came for the first time there and the rest were coming for a follow up. Majority of the patients were adults but few were child [5].

Data Analysis

After that on the basis of age, percentage of particular disease, in both the genders was found out. Then the patients were categorized according to the selection of medication in relation to their lab investigation, BMI. Then data obtained was analyzed by using graphical method [5].

RESULTS

Among those 300 patients 106 were female and the rest 194 patients were male.

In table 1 among 300 patients only 4 were being given Sitagliptin alone, 10 patients were recommended Metformin, 11 Of 300 patients were given Sitagliptin and Metformin in combination, 61 were using Glimiperide, and the 31 were using Glimiperide and Metformin in combination, 26 were using Gliclazide, 88 patients were using different types of Insulin.

Table 1: Generics-wise prescription percentage.

Generics	Percentage (%)
Sitagliptin	1.33
Metformin	3.33
Sitagliptin+Metformin	3.6
Glimiperide	20.3
Glimiperide+Metformin	10.3
Gliclazide	8.6
Insulin	29.3

In Fig 1, 33 patients out of 300 had creatinine level above **1.1mg/dl** so they were recommended Repaglinide. The glycated haemoglobin (HbA1C) of just 5 patients was 7% (154mg/dl), 6 patients had below 7% (<154mg/dl) and the rest 289 patients had above 7%. Body Mass Index (BMI) of 64 patients were under 25 (healthy patients), 5 of 300 patients had BMI below 18 (underweight). 236 patients had BMI above 25. 33 patients had Alanine Amino Transferase (ALT) above 40mg/dl. Cholesterol level of 83 patients were between 200-300 mg and 6 patients had above 300mg.

DISCUSSION

During our survey 64% of patients were male and 36% were female. Only 3.6% of patients had HbA1c value less than or equal to 7%. Creatinine level of 11% patients was above 1.1mg/dl so they were showing abnormality. BMI of just 21% of the patients was under 25 means that were consider healthy and the rest 79% of patients had Body Mass Index above 25 means they were either overweighth or obese. 30 % of the patients had their cholesterol level above 200mg/dl. 30% of the patients were using Insulin in combination with oral anti-diabetics and the rest of patients were given oral anti-diabetics alone. 20% of the patients were given Glimiperide, 9% of the patients were using Gliclazide. Sulfonyl ureas are used as first line treatment in non-obese type 2 diabetic patient. First generation sulfonylurea such as

Chlorpropamide, Tolbutamide and Talazamide are rarely used Second Generation Sulfonylurea such as Glibenclamide, Gliclazide and Glipizide are commonly used.

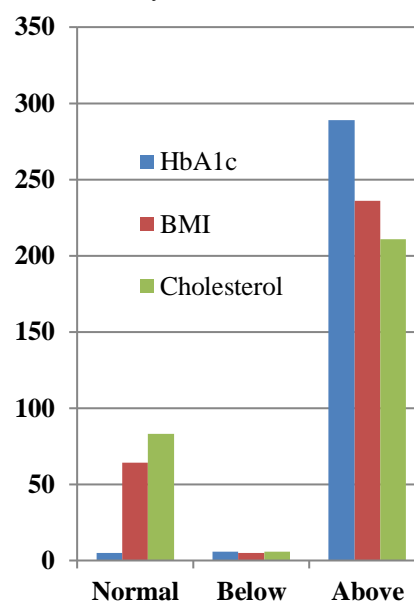


Figure 1: Number of patients with normal, below and above plasma values.

Third Generation Sulfonylureas such as Glimepride are more frequently used now a days. This results in a 1-2% reduction in HbA1c in long term. These are not used in renal impaired patients who have creatinin >1.4mg/dl. In Biguanides Metformin is one of the first line therapy in obese type 2 diabetic patients and it is also used in some insulin-treated, Insulin-resistant, overweight subjects to reduce Insulin requirements. 1-2 kg weight loss is initially seen by Metformin [12]. With long term use a 0.8-2% reduction in HbA1c. α -Glucosidase Inhibitors Acarbose is used in those patients who have inadequate control on diet or other oral agent alone. The adding Acarbose to other therapies resulted in a further 5% drop in HbA1c. Among Thiazolidinediones mostly pioglitazone is recommended. It is used in combination with Metformin or a Sulfonylureas and there is 1% decrease in HbA1c either when used alone or in Combination with other oral agent [13]. But

these are not 1st choice treatment in diabetic patients due to Hepatotoxicity and CVS disorders. They are also not used in Hyperlipidemic patients because they act on adipose tissues and increase the total cholesterol. In Female it is also avoided because it causes polycystic ovary syndrome (PCOS). Maglutinides contains Repaglinide, this agent has the specific indication in those patients diabetic patient having renal impairment due to its fast onset of action and short half life (1hr). It is used as Monotherapy or in combination with begunides [14]. Dipeptidylpeptidase Inhibitors (DPP4) Sitagliptin and vildagliptin are the most Commonly used anti diabetics now a days. They are more potent than other anti diabetics. They reduce the HbA1c up to 2%.Sometime Insulin therapy may be necessary in type 2 diabetic patients when diet and oral hypoglycemic have failed [15]. However, there are a number of situations in which the patient must be on insulin particularly in Gestational diabetes mellitus, Serious deterioration of degenerative phenomena

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such as renal insufficiency, painful neuropathy or ketoacidosis, situation of stress, surgery, serious infections, myocardial infarction, administration of hyperglycemic drugs such as corticoids, oral contraceptives etc, Type 1 diabetic patients should always be treated with Insulin. The main problems with all insulin regimens are weight gain and hypoglycemia [16].

CONCLUSION

It is concluded from found prescription trend in our society that Glimipereide is mostly prescribed drug for diabetic patients that increase the insulin secretion from beta cells. Control of diabetes is necessary for a healthy society. So heath care providers must use to prescribe more effective and suitable medicines with cost effective brands to the users. However the prescription trend running in our society is effective and efficacious to stabilize the patients bearing diabetes. Moreover, there should be the conduction some awareness programs for general society to prevent from diabetes.

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