An Overview of Patient Counselling on Diabetes Mellitus: A Review Article

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Abstract: Diabetes mellitus is a chronic disease caused by a high level of blood glucose in our body. Diabetes is a fast-growing problem in developing countries. In 2019, there were 77 million cases reported in India (approximately 57% of cases are still undiagnosed). Diabetes commonly occurs when the body can't use the glucose present in the body or is caused by a high level of glucose in the body. The pharmacists play an important role in decreasing diabetes by conducting programs, providing counselling, and giving relevant information about the disease and their medication. Type 1 diabetes is caused by auto-immune deficiency, which causes insulin deficiency due to the destruction of beta cells in the body. Type 2 diabetes is caused by insulin resistance or by a decrease in insulin secretion. Symptoms include frequent urination, excessive thirst, weight loss, extreme fatigue, blurring vision, and increased hunger. Patient counselling is a process that improves the patient's ability to deal with their disease and medication, and through this, the patient gets motivated to change their dietary habits and lifestyle, which may be harmful to their current health status. Therefore, patient counselling is the responsibility of the pharmacists by providing them with suitable, understandable, and useful information about the medication they use.

Index terms: Diabetes mellitus, Patient counselling, Steps in Patient counselling, Diabetic management.

I. INTRODUCTION

Diabetic mellitus is a chronic metabolic disease that is caused by a disturbed or elevated level of blood glucose in the body. Diabetes mellitus causes serious problems in heart, blood vessels, eye, kidney, and nerves. Diabetes is a fast-growing disease. Developing countries are more prone to the disease. In 2019, there were 77 million cases reported in India. Approximately 57% of cases are still undiagnosed. In the future, it will be doubled. The number of cases of diabetes in adults will almost reach nearly 380 million in 2025. India, China, and the USA are the most affected countries. [1]

❖ Types of Diabetes mellitus

Different types of Diabetes mellitus are:

➢ Type 1 Diabetes mellitus.
➢ Type 2 Diabetes mellitus.
➢ Gestational Diabetes.

1. *Type 1 diabetes mellitus*: Type 1 diabetes is the most common type of diabetes. It gets mostly affected in children, which may be caused by the deficiency of insulin, genetic variations, or by an auto-immune response. Most types of diabetes are caused by genetic and environmental factors that destroy pancreatic beta cells. In 2015, more than 70,000 children in India were affected by type 1 diabetes and about 10% of people were diagnosed with type 1 diabetes.

2. *Type 2 diabetes*: Type 2 diabetes is mostly affecting adults. Type 2 diabetes is caused by insulin resistance in the body, which is caused by hereditary factors, an inactive lifestyle, and obesity. It is caused mainly by decreasing insulin secretion and by insulin resistance. In 2019, more than 77 million cases were reported in India. Nine out of 10 people are affected by type 2 diabetes.

3. *Gestational Diabetes*: Gestational diabetes is caused during pregnancy. The high amount of blood sugar present in pregnant women without any previous diabetic history leads to gestational diabetes. It is caused by glucose intolerance during pregnancy. Approximately 16% of pregnant women, mainly those who have a family history of diabetes, are more susceptible. Gestational diabetes is caused by blocking the pregnancy hormone by the insulin receptor, which leads to a high blood glucose level. Type 2 diabetes has a high risk for children whose mothers have gestational diabetes. [2]

❖ Etiology of Diabetes Mellitus

Type 1 Diabetes mellitus: It is caused by the autoimmune destruction of beta cells by T cells and thus leads to decreased secretion of insulin from the pancreas. As a result, the pancreas produces little or no insulin. Some other factors for type 1 diabetes mellitus are,

- Endocrine diseases.
- Autoimmune diseases such as Grave's disease, Addison's disease, Hashimoto's thyroiditis, etc.

- Hereditary Predisposition: It involves multiple genes responsible for the inheritance of diabetes. There is a substantial genetic correlation between type 1 diabetes and HLA on chromosome.
- Unfavourable environmental factors like geographic and seasonal variation can also induce Type 1 diabetes.
- Viral infections and exposure to chemicals. Ex: Mumps, measles Coxsackie B virus, Cytomegalovirus.
- Use of alloxan induces experimental diabetes, streptozocine, and pentamidine, which are used in the treatment of trypanosomiasis and leishmaniasis.
- Stress and
- Obesity

Type 2 diabetes mellitus: It occurs as a result of impaired insulin secretion, insulin secretion, or both.

- Genetic factors.
- Identical twins have an 80% chance of getting type 2 diabetes if one of them has this disease.
- If parents are suffering from type 2 diabetes, then offspring will be at 40% more risk of having type 2 DM.
- Increased hepatic glucose synthesis.
- Metabolic syndrome, such as insulin resistance.
- Hypertension
- Long-term use of certain medications, like corticosteroids.
- Hormonal disorders like Cushing syndrome and hypothyroidism.
- Stress
- Lack of quality sleep
- Obesity and
- Smoking.

Gestational diabetes mellitus: It is caused due to,

- Family history
- Obesity
- Advanced maternal age and
- Complications from a previous pregnancy.

❖ **Pathophysiology of Diabetes Mellitus**

Type 1 Diabetes mellitus: is characterized by the destruction of insulin-producing beta cells in the islets of Langerhans, leading to metabolic abnormalities. The most likely cause of this condition is that combined genetic, immunological, and possibly environmental factors contribute to cell destruction. In addition, the function of pancreatic alpha cells is also abnormal and exhibits excessive glucagon secretion. Insulin deficiency causes uncontrolled lipolysis and increased levels of plasma free fatty acids, which inhibit peripheral tissues' ability to metabolize skeletal muscle. Type 1 diabetes is the most prevalent metabolic and endocrine disorder affecting children, so-called "juvenile diabetes." Type 1 diabetes is partially hereditary; the risk of the disease is known to be influenced by a number of genes, including specific HLA genotypes. Among dietary factors, gluten may lead to type 1 diabetes.

Type 2 diabetes mellitus: This is a type of adult-onset and non-insulin-dependent. There are two main problems related to type 2 diabetes. The first is insulin resistance, a condition in which insulin does not bind with the special receptor on the cell surface, and impaired insulin secretion. In the early stages of type 2 diabetes, the predominant abnormality is reduced insulin sensitivity. Multiple factors, including genetic and environmental factors, affect beta cell function and insulin sensitivity. [4]

❖ **Normal Ranges of Diabetes mellitus**

Condition	Fasting blood sugar	Post prandial
Normal	Below 110	Below 140 mg/dl
Pre-diabetic	Between 110 and 126	140–200 mg/dl
Diabetic	Above 126	Above 200 mg/dl

❖ **Signs and Symptoms**

Polyurea, Polydipsia, Polyphagia, Blurred vision, Weight loss, Drowsiness, Dry, itchy skin, Slow healing of cuts and sores., Extreme fatigue, Numbness or tingling in the hands or feet., Frequent infections, Irritability and, Red, Swollen, Tender gums are the various signs and symptoms of Diabetes mellitus. [4]

❖ **Complications**

Acute diabetic complications,

1. Hyperosmolar hyperglycaemic state (HHS): It mainly affects Type 2 DM patients and occurs when blood sugar levels are very high (over 600 mg/dl).

2. Diabetic ketoacidosis: This mainly affects people with Type 1 diabetes or undiagnosed diabetes.

Long-term complications,
Coronary artery disease, Heart attack, Stroke, Atherosclerosis.
Other complications include:
Diabetic Neuropathy, Nephropathy, which leads to kidney failure, Diabetic Retinopathy, Increased risk of infections, Delayed wound healing, Diabetic-related foot conditions, Sexual dysfunction.

❖ **Diagnosis of Diabetes mellitus**
Diagnosing diabetes mellitus involves several criteria and tests. They are,
1. *Random blood glucose test*: A random blood glucose level of 200 mg/dl or more indicates hyperglycaemia.
2. *Fasting plasma glucose (FPG) test*: This measures the blood glucose level after an overnight fasting for at least 8 hours. The normal level of fasting plasma glucose is between 70 and 100 mg/dl. A level of 126 mg/dl or higher indicates diabetes.
3. *HbA1c (Glycosylated Haemoglobin)*: The HbA1c test measures average blood glucose levels over the past 2 to 3 months. This test measures the percentage of Hb that has glucose attached to it. An HbA1c level of 6.5% or higher indicates diabetes.
4. *Oral glucose tolerance test (OGTT)*: This involves a fasting blood glucose test followed by meals, with glucose checked after 2 hours. A result of 200 mg/dl or higher indicates diabetes.

❖ **Treatment of Diabetes mellitus**
Treatment for type 1 diabetes mellitus- It typically involves a combination of insulin therapy, blood glucose monitoring, healthy eating, physical activity, and regular medical checkups.
Types of insulin include short-acting insulin, rapid-acting insulin, intermediate-acting insulin, and long-acting insulin. Blood sugar is monitored by self-monitoring (using a glucometer) and continuous glucose monitoring.
Emphasize a balanced diet with a variety of nutrient-rich foods such as whole grains, fruits, vegetables, lean proteins, and healthy fats.
Engage in regular physical activity, which improves overall health.
Other medications may also be included for people with type 1 diabetes. They are hypertensive medications, cholesterol-lowering drugs, thyroid medications, aspirin, etc.
Treatment of type 2 diabetes mellitus- It involves lifestyle modifications such as diet and exercise and can be highly effective. However, many individuals may require additional interventions like diabetes medication and insulin therapy to maintain their blood glucose level.
Metformin is often the first-line medication, and other oral medications like sulfonylurea, meglitinide, thiazolidinediones, DPP-4 inhibitors, SGLT2 inhibitors, and GLP-1 receptor agonists may be used alone or in combination to lower blood sugar levels.
Maintaining weight through a combination of diet and regular physical activity can improve insulin sensitivity and blood sugar control.

❖ **Patient Counselling**
Patient counselling can be defined as a sympathetic relationship between the pharmacist and the patient in which the pharmacist educates the patient about the disease and its management.

❖ **Stages of Patient Counselling**
1. *Counselling Introduction-* Review the patient's records prior to counselling. A counselling introduction includes introducing yourself and identifying to whom you are speaking. Explain the purpose of the counselling session and obtain the medication history of patients, which includes present and past medication, OTC drugs, drug allergies, etc.
2. *Counselling content items-* Tell the patient the name, indication, and route of administration of the medication. Inform the patient about the dosage regime. Ask the patient if he or she will have a problem taking the medication as prescribed. Tell the patient how long it will take for the drug to show an effect. Explain how to administer the drug, especially for eye or ear drops. Discuss how to close and store the opened drug properly. Tell the patient how long he or she needs to take the medication. Emphasize the benefits of the medication and discuss the major side effects of the drugs. Point out the drug-drug and drug-food interactions. Explain to the patient what to do if he or she misses the dose. Tell the patient when he or she is due back for a refill.
3. *Counselling conclusion-* Verify the patient's understanding through feedback. Summarize by emphasizing the points of information and providing an opportunity for final concerns or questions. Help the patient plan follow-up and the next steps. [8]

II. MATERIALS AND METHODS
The main aim of a pharmacist during interaction with a patient is to provide detailed information about their disease. The pharmacist helps to get the patients better health-improvement plans for successfully managing diabetes mellitus. The patient should first understand their disease condition, and the patient counsellor should provide a well-planned health-improvement schedule like exercise, a diet chart, and proper medication and treatment.
Always maintaining a strong pharmacist-patient interaction promotes communion between pharmacist and patient and helps to improve patient's compliance with the treatment schedule. Always, the pharmacist should interact with a patient empathetically. Showing compassion and care is the main part of patient counselling.

Pharmacist's Methods for Counselling Patients
• *Self-introduction*: and Developing Mutual Trust: Before starting counselling, the pharmacist should introduce themselves, like their name and title, always interacting with empathy.
• *Assessing the patient's medical history*: By reviewing them, we could understand the disease condition, diet plan, medications, disease improvements, and their current and past disease states.

- *Measuring the disease knowledge of the patient*: By asking some open-ended and closed-ended questions, the pharmacist should understand the patient's knowledge about the medications, doses, and their disease conditions.
- *Glucose Monitoring*: Pharmacists should demonstrate how to work a blood glucose monitor, when and how to analyse blood sugar levels, and the safe ranges.
- *Explaining About Medicines*: Pharmacists should explain the doses of medicine, their adverse effects, uses, precautions, opening and storing of medicines, and should help the patients identify the medicines by their shape and colour for those with less education. They should also make sure to explain the use of medicines for controlling diabetes mellitus.
- *Lifestyle modifications*: discussing diet, exercise, stress control, personalized nutrition, and meal planning help patients maintain normal blood sugar levels, which is important in managing diabetes mellitus.
- *Injection demonstration*: The pharmacist should demonstrate the techniques of using injectable medications, like the site of injections and their storage conditions.
- Educate patients about drug-related complications and their prevention by using medications long-term, and help patients minimize and control diabetes through proper management and alternative health check-ups.
- *Subsequent evaluation*: The pharmacist should schedule the next appointment to analyse the patient's progress, adjust the treatment plan based on the improvement, and clear their doubts. For follow-up, giving visiting cards also helps.
- *Visual resource*: charts, diagrams, or illustrations of diabetes mellitus related to anatomy or diet charts.
- Always interact and use materials during counselling with patients in an open, simple way. Use language that is understandable to patients. (9)

III. CONCLUSION

Therefore, the studies mentioned above clearly suggest that the health-related quality of life can be improved by patient counselling and by providing patient counselling aids. Patient counselling will help in the timely intake of medicine, provide knowledge of its side effects, and control weight and other lifestyle modifications, which have a major role in diabetic patients managing their disease. The patient themselves admitted that counselling motivates them to increase medication on time as well as makes them evaluate their regular blood glucose monitoring. Hence, the studies regarding the management of diabetes and the impact of patient counselling have a greater impact, and more research is to be done in the future. Lawton-Brody scale scoring techniques were used in the study. During the study, it was found that patient counselling aids are more effective, especially for elderly diabetic patients. These studies also suggest that pharmacists have a better role in counselling and may have an impact on improving perceptions about disease, diet, and lifestyle changes, thereby improving blood glucose levels and preventing various complications of diabetes.

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