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Assessment of diabetes treatment, screening and associated health care problems in a referral hospital

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Abstract
There is rapid increase in the incidence of Diabetes Mellitus (DM) in India, as in other countries. Diabetes is an autoimmune disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood, it also have severe long term complications like retinopathy, neuropathy, nephropathy, it also have increased evidence of cardiovascular diseases. The Glycated haemoglobin levels should be monitored for every 3 months to see if their levels are staying within range.
This study is a prospective observational study in which the diabetic patient was observed for symptoms, social history, medication, family history, and other clinical conditions. The study duration was of 1 year from 1st January 2020 to 1st January 2021. The evidence indicate there is increase range of HbA1C levels in majority of patients due to which chances for complications increase and only few achieve the recommended Glycemic control from the treatment. All of these issues are discussed in brief.

Keywords: Diabetes, retinopathy, neuropathy, nephropathy, screening test, HbA1c, glycemic control, treatment

Introduction
Diabetes is a disease that occurs when your blood glucose, also called blood sugar, is too high. Blood glucose is your main source of energy and comes from the food you eat. Insulin is a hormone produced by pancreas, helps glucose from food get into your cells to be used for energy. Sometimes your body doesn't make enough or any insulin or doesn't use insulin well. Glucose then stays in your blood and doesn't reach your cells.

Over time, having too much glucose in your blood can cause health problems. Although diabetes has no cure, you can take steps to manage your diabetes and stay healthy.

People call diabetes "sugar" or "borderline diabetes." These terms suggest that someone doesn't really have diabetes or has a less serious case, but every case of diabetes is serious.

The most common types of diabetes are type 1, type 2, and gestational diabetes.

Pre-diabetes (The condition in which blood glucose is high but not high enough to be type 2 diabetes).

Based on the Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study conducted in 15 states, the overall prevalence of diabetes and pre-diabetes was 7.3% (95% CI: 7.0, 7.5) and 10.3% (10.0, 10.6), respectively. 21% [WHO criteria], 39.5% [ADA criteria]. Given the high prevalence rates of pre-diabetes in our country.

Type 1 diabetes
If you have type 1 diabetes, your body does not make insulin. Your immune system attacks and destroys the cells in your pancreas that make insulin. Type 1 diabetes is usually diagnosed in children and young adults, although it can appear at any age. People with type 1 diabetes need to take insulin every day to stay alive.

Type 2 diabetes
If you have type 2 diabetes, your body does not make or use insulin well. You can develop type 2 diabetes at any age, even during childhood. However, this type of diabetes occurs most often in middle-aged and older people. Type 2 is the most common type of diabetes.

Gestational diabetes

Develops in some women when they are pregnant. Most of the time, this type of diabetes goes away after the baby is born. However, if you've had gestational diabetes, you have a greater chance of developing type 2 diabetes later in life. Sometimes diabetes diagnosed during pregnancy is actually type 2.

Long term complications of diabetes include retinopathy with potential loss of vision; nephropathy leading to renal failure; autonomic neuropathy causing gastrointestinal, genitourinary and cardiovascular symptoms and sexual dysfunction. Patients with diabetes have an increased incidence of atherosclerotic cardiovascular, peripheral arterial and cerebrovascular disease.

The prevalence of diabetes is increasing throughout the world because of changes in lifestyle.

Objective

Assessment of diabetes treatment, screening and associated health care problems in a referral hospital.

Methodology
Study protocol

The study protocol was prepared based on essential information extracted from primary, secondary and tertiary and other resources. It contained background, objectives and literature review with few references given in brief.

The retrospective review of charts of 100 patients who were admitted in Bhaskar General Hospital over a year-period (1/1/2020-1/1/2021).

The study variables included demographic data, long term complications, the provided screening practices measurements of glycated hemoglobin HbA1c, Blood Pressure, obesity, family history, social history, therapy.

Study site

The study was conducted in Bhaskar General Hospital, Moinabad.

Study design and study period

The study was prospective observational study in which the diabetic patient was observed for symptoms, social history, medication, family history, and other clinical conditions. The study duration was of 1 year from 1st January 2020 to 1st January 2021.

Study procedure

Investigators collected data individual by asking their consent. The data is noted in a suitable designed patient data collection form.

Results

The total number of diabetic patients in study (n = 90).

Table 1: The gender of number percentage

Gender	Number/percentage
Male	54 (60%)
Female	36 (40%)

Table 2: Age details participants (n = 90)

Age category	Number/percentage
Adolescents (12-18)	3 (3.3%)
Adults (19-60)	66 (73.3%)
Geriatrics (more than 60)	21 (23.3%)

Table 3: Patients suffering from blood pressure (n = 90)

Patients with blood pressure	42 (46.7%)
Patients with no blood pressure	48 (53.3%)

Table 4: Patients with obesity (n = 90)

Obese patients	36 (40%)
Non obese patients	54 (60%)

Table 5: Patients with family history of diabetes (n = 90)

Patients with family history of Diabetes	42 (46.7%)
Patients without family history of Diabetes	48 (53.3%)

Table 6: Patients with history of smoking tobacco and drinking alcohol (n = 90)

Patients with social history	35 (38.9%)
Patients without any social history	55 (31.1%)

Table 7: Hba1c levels of patients (n = 90)

Range	Number/percentage
6 - 7% (Near normal glycemia)	13 (14.4%)
7 - 9.0% (Good control)	22 (24.4%)
9.0 - 10% (Fair control)	39 (43.3%)
>10% (Poor control)	16 (17.8%)

Table 8: Patients on oha/oha + insulin therapy (n = 90)

Patients on (OHA) oral hypoglycemic agents	74 (66.6%)
Patients on (OHA) oral hypoglycemic agents + Insulin therapy	16 (14.4%)

Treatment chart for Diabetes Mellitus patients in hospital
Oral medication

Metformin hydrochloride (Biguanides)
Pioglitazione, thioglitazone (Thiozolinediones)
Tolbutamide, Glimpridine, Glicalazide (Sulphonyl Ureas)
Acrabose (alpha glucosidase inhibitors)
Vidagliptin, Linagliptin (DPP-4 inhibitors)
Nateglinide (Meglitinides)

Insulin therapy

Rapid acting insulin: Humalog (insulin lispro), apidra (insulin glucine)
Short acting insulin: Actrapid, humulin R
Intermediate acting insulin: Humulin NPH, protaphane
Long acting insulin: Lantus
Mixed insulin: Humalog, Mix 50%, rapid 50%, humalog, Mix 25%, rapid 75%
Short acting: Mixtard

Discussion

It was found that

- Majority of the patients are adults (i.e.) 66% patients, geriatric 21% patients and adolescence 3.3% patients.
- 46.7% patients are suffering with hypertension more than 140/90 mmhg is linked to an increased risk of diabetes.
- 40% patients are obese. The more fatty tissue, the more resistant your cells to insulin.
- 46.7% patients are having family history of diabetes.
- Majority of the patients were prescribed oral hypoglycemic agents like metformin hydrochloride in combination with insulin or other oral hypoglycemic agents (oha) like glimpiridine, glicalazide etc.
- Only about 38.8% of patients achieve the recommended glycemic control.

- About 66.6% of our patients were on oha and 14.4% were on oha and insulin, which shows that complex treatment regimens were essential.
- We found that 14.4% have near normal glycemia i.e. between 6-7 hba1c levels, 24.4% have good control of glycemia i.e. between 7-9 hba1c levels, 43.3%have fair control of glycemia i.e. between 9-10 hba1c levels, 17.8% have poor control of glycemia i.e. above 10 hba1c levels.
- Patients suffering with diabetes should go for screening of hba1c every three months and follow up with the advice of the doctor to reduce long term complications like retinopathy; nephropathy; autonomic neuropathy, genitourinary, cardiovascular symptoms and sexual dysfunction, peripheral arterial and cerebrovascular disease.
- The prevalence of diabetes is increasing throughout the world because of changes in lifestyle.
- Treatment given to patients should be standards of diabetic care as given in the ada (American Diabetic Association) guidelines. And also the patient should adhere to medical advice given during their follow-up to regulate their hba1c levels.

Conclusion
Results of this study indicate that suitable measures must be introduced in order to improve and provide adequate care to diabetic patients. This could be done through
a. Better education about standards of care to health care providers.
b. By giving the treatment according to ADA guidelines.
c. Increasing the (HbA1c) screening test frequency and patient full support for regular visit/ follow up to prevent further complications.

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