Study of diabetes disorder, symptoms and risk analysis

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ABSTRACT
India has huge health care burden of managing more than 61 million diabetic persons, which is bound to increase further due to rapid urbanization and lifestyle changes occurring in the country. India faces several challenges in diabetes management, including a rising prevalence in urban and rural areas, lack of disease awareness among the public, limited health care facilities, high cost of treatment, suboptimal glycemic control and rising prevalence of diabetic complications. Several barriers related to patients, society and health care system exist, which need to be addressed by the government and health care providers. India has to take drastic and urgent steps to develop an integrated national system for early detection and prevention of the disease. National capacity for management of the disease has to be enhanced by training large number of medical and paramedical personnel and by creating a network of governmental and nongovernmental units working towards the goal of better management of non communicable diseases.

Keywords: Diabetes, symptoms, analysis, treatment, etc.

INTRODUCTION
Diabetes is defined as a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, protein and fat metabolism resulting from defects in insulin secretion, insulin action, or both. Diabetes is a group of diseases characterized by high levels of glucose in the blood resulting from defects in insulin production, insulin action, or both. Diabetes is associated with serious complications, but timely diagnosis and treatment of diabetes can prevent or delay the onset of long-term complications (damage to the cardiovascular system, kidneys, eyes, nerves, blood vessels, skin, gums, and teeth). The clinical diagnosis of diabetes is often indicated by the presence of symptoms such as polyuria, polydipsia, and unexplained weight loss, and is confirmed by measurement of abnormal hyperglycaemia. New management strategies are helping children with diabetes live long and healthy lives. Diabetes is one of the most common diseases in school-aged children.

TYPES OF DIABETES

1) Type 1 diabetes
The body does not produce insulin. Some people may refer to this type as insulin-dependent diabetes, juvenile diabetes, or early-onset diabetes. People usually develop type 1 diabetes before their 40th year, often in early adulthood or teenage years. Type 1 diabetes is nowhere near as common as type 2 diabetes. Approximately 10% of all diabetes cases are type 1. Patients with type 1 diabetes will need to take insulin injections for the rest of their life. They must also ensure proper blood-glucose levels by carrying out regular blood tests and following a special diet.

2) Type 2 diabetes
The body does not produce enough insulin for proper function, or the cells in the body do not react to insulin (insulin resistance). Approximately 90% of all cases of diabetes worldwide are type 2. Some people may be able to control their type 2 diabetes symptoms by losing weight, following a healthy diet, doing plenty of exercise, and monitoring their blood glucose levels. However, type 2 diabetes is typically a progressive disease - it gradually gets worse - and the patient will probably end up have to take insulin, usually in tablet form. Overweight and obese people have a much higher risk of developing type 2 diabetes compared to those with a healthy body weight. People with a lot of visceral fat, also known as central obesity, belly fat, or abdominal obesity, are especially at risk. Being overweight/obese causes the body to release chemicals that can destabilize the body's cardiovascular and metabolic systems. Being overweight,
physically inactive and eating the wrong foods all contribute to our risk of developing type 2 diabetes. The scientists believe that the impact of sugary soft drinks on diabetes risk may be a direct one, rather than simply an influence on body weight.

![Fig. 1: Measuring the glucose level in blood](image1)

3) Gestational diabetes

This type affects females during pregnancy. Some women have very high levels of glucose in their blood, and their bodies are unable to produce enough insulin to transport all of the glucose into their cells, resulting in progressively rising levels of glucose. Diagnosis of gestational diabetes is made during pregnancy. The majority of gestational diabetes patients can control their diabetes with exercise and diet. Between 10% to 20% of them will need to take some kind of blood-glucose-controlling medications. Undiagnosed or uncontrolled gestational diabetes can raise the risk of complications during childbirth. The baby may be bigger than he/she should be. Scientists from the National Institutes of Health and Harvard University found that women whose diets before becoming pregnant were high in animal fat and cholesterol had a higher risk for gestational diabetes, compared to their counterparts whose diets were low in cholesterol and animal fats.

![Fig 2: Symptoms of diabetes](image2)
OTHER FORMS OF DIABETES

Other types of diabetes result from specific genetic conditions (such as maturity-onset diabetes of youth or latent autoimmune diabetes in adults), surgery, medications, infections, pancreatic disease, and other illnesses. Such types of diabetes account for 1% to 5% of all diagnosed cases.

Symptoms

These are the basic symptoms of Diabetes:

i. **Disproportionate thirst:** If you are urinating more than usual, you will need to replace that lost liquid. You will be drinking more than usual. Have you been drinking more than usual lately?

ii. **Intense hunger:** As the insulin in your blood is not working properly, or is not there at all, and your cells are not getting their energy, your body may react by trying to find more energy - food. You will become hungry.

iii. **Weight gain:** This might be the result of the above symptom (intense hunger).

iv. **Unusual weight loss:** This is more common among people with Diabetes Type 1. As your body is not making insulin it will seek out another energy source (the cells aren't getting glucose). Muscle tissue and fat will be broken down for energy. As Type 1 is of a more sudden onset and Type 2 is much more gradual, weight loss is more noticeable with Type 1.

v. **Increased fatigue:** If your insulin is not working properly, or is not there at all, glucose will not be entering your cells and providing them with energy. This will make you feel tired and listless.

vi. **Irritability:** Irritability can be due to your lack of energy.

vii. **Blurred vision:** This can be caused by tissue being pulled from your eye lenses. This affects your eyes' ability to focus. With proper treatment this can be treated. There are severe cases where blindness or prolonged vision problems can occur.

viii. **Cuts and bruises don't heal properly or quickly:** Do you find cuts and bruises take a much longer time than usual to heal? When there is more sugar (glucose) in your body, its ability to heal can be undermined.

ix. **More skin and/or yeast infections:** When there is more sugar in your body, its ability to recover from infections is affected. Women with diabetes find it especially difficult to recover from bladder and vaginal infections.

x. **Itchy skin:** A feeling of itchiness on your skin is sometimes a symptom of diabetes.

xi. **Gums are red and/or swollen - Gums pull away from teeth:** If your gums are tender, red and/or swollen this could be a sign of diabetes. Your teeth could become loose as the gums pull away from them.

Complications Linked To Badly Controlled Diabetes: Below is a list of possible complications that can be caused by badly controlled diabetes:

a) **Eye complications** - glaucoma, cataracts, diabetic retinopathy, and some others.
b) **Foot complications** - neuropathy, ulcers, and sometimes gangrene which may require that the foot be amputated
c) **Skin complications** - people with diabetes are more susceptible to skin infections and skin disorders
d) **Heart problems** - such as ischemic heart disease, when the blood supply to the heart muscle is diminished
e) **Hypertension** - common in people with diabetes, which can raise the risk of kidney disease, eye problems, heart attack and stroke
f) **Mental health** - uncontrolled diabetes raises the risk of suffering from depression, anxiety and some other mental disorders
g) **Hearing loss** - diabetes patients have a higher risk of developing hearing problems
h) **Gum disease** - there is a much higher prevalence of gum disease among diabetes patients
i) **Gastroparesis** - the muscles of the stomach stop working properly
j) **Ketoacidosis** - a combination of ketosis and acidosis; accumulation of ketone bodies and acidity in the blood.
k) **Neuropathy** - diabetic neuropathy is a type of nerve damage which can lead to several different problems.
l) **HHNS (Hyperosmolar Hyperglycemic Nonketotic Syndrome)** - blood glucose levels shoot up too high, and there are no ketones present in the blood or urine. It is an emergency condition.

m) **Nephropathy** - uncontrolled blood pressure can lead to kidney disease

n) **PAD (peripheral arterial disease)** - symptoms may include pain in the leg, tingling and sometimes problems walking properly

o) **Stroke** - if blood pressure, cholesterol levels, and blood glucose levels are not controlled, the risk of stroke increases significantly

p) **Erectile dysfunction** - male impotence.

q) **Infections** - people with badly controlled diabetes are much more susceptible to infections

r) **Healing of wounds** - cuts and lesions take much longer to heal

**Management**

The basic elements of type 1 diabetes management are insulin administration (either by injection or insulin pump), nutrition management, physical activity, blood glucose testing, and the development of strategies to avoid hypoglycemia and hyperglycemia that may lead to DKA. Algorithms are used for insulin dosing based on blood glucose level, food intake, physical activity, and illness, if present. All people with diabetes are advised to avoid "liquid carbs (carbohydrates)" such as sugar-containing soda, sports or energy drinks, juices (including 100 percent fruit juice), and regular pancake syrup. These liquid carbs raise blood glucose rapidly, contain large amounts of sugars in small volumes, are hard to balance with insulin, and provide little or no nutrition. Children receiving fixed insulin doses of intermediate- and rapid-acting insulins must have food given at the time of peak action of the insulin. They need a consistent meal plan that aims for a set amount of carb grams at each meal (e.g., 60 grams of carbs at lunch) and snack since they do not adjust their mealtime insulin for the amount of carb intake. Children receiving a long-acting insulin analogue or using an insulin pump receive a rapid-acting insulin analogue just before meals, with the amount of pre-meal insulin based on carb content of the meal using an insulin to carb ratio and a correction scale for hyperglycemia. Carb counting involves calculating the number of grams of carbohydrate, or choices of carbohydrate, the youth eats. One carb choice equals 15 grams of carbohydrate. Sources of carbs include starches (breads, crackers, cereal, pasta, rice), fruits and vegetables, dried beans and peas, milk, yogurt and sweets. In addition to the amount of insulin needed to cover the carbs (called the carb dosage), extra insulin might be needed if the youth’s blood glucose is above the target range before a meal or snack. Further adjustment of insulin or food intake may be made based on anticipation of special circumstances such as increased exercise and intercurrent illness. Children on these regimens are expected to check their blood glucose levels routinely before meals and at bedtime. Physical activity is a critical element of effective diabetes management. In addition to maintaining cardiovascular fitness and controlling weight, physical activity can help to lower blood glucose levels. To maintain blood glucose levels within the target range during extra physical activity, students will need to adjust their insulin and food intake. They also may need to check their blood glucose levels more frequently to prevent hypoglycemia while engaging in physical activity. Families need to work with their health care team to set target blood glucose levels appropriate for the child.

Care of children and teens with diabetes requires integration of diabetes management with the complicated physical and emotional growth needs of children, adolescents, and their families, as well as consideration of teens’ emerging autonomy and independence. Diabetes presents unique issues for young people with the disease. Simple things, such as going to a birthday party, playing sports, or staying overnight with friends, need careful planning. Checking blood glucose, making correct food choices, and taking insulin or oral medication can make school-age children feel "different" from their classmates and this can be particularly bothersome for teens. For any child or teen with diabetes, learning to cope with the disease is a big task. Dealing with a chronic illness such as diabetes may cause emotional and behavioral challenges, sometimes leading to depression. Talking to a social worker or psychologist may help young people and their families learn to adjust to the lifestyle changes needed to stay healthy. Family Support. Managing diabetes in children and adolescents is most effective when the entire family gets involved. Diabetes education should involve family members. Families can be encouraged to share concerns with physicians, diabetes educators, dietitians, and other health care team members to get their help in the day-to-day management of diabetes. Extended family members, teachers, school nurses, counselors, coaches, day care providers, and others in the community can provide information, support, guidance, and help with coping skills. These individuals also may be knowledgeable about resources for health education, financial services, social services, mental health counseling, transportation, and home visits. Diabetes is stressful for both the children and their families. Parents should be alert for signs of depression or eating disorders or insulin omission to lose weight and seek appropriate treatment. While all parents should talk to their children about avoiding tobacco, alcohol, and other drugs, this is particularly important for children with diabetes. Smoking and diabetes each independently increase the risk of cardiovascular disease and people with diabetes who smoke have a greatly increased risk of heart disease and circulatory problems. Binge drinking can cause hyperglycemia acutely, followed by an increased risk of hypoglycemia. The symptoms of intoxication are very similar to the symptoms of hypoglycemia, and thus, may result in delay of treatment of hypoglycemia with potentially disastrous consequences.
PREVENTIVE MEASURES FOR DIABETES

Get plenty of fiber: Foods high in fiber include fruits, vegetables, beans, whole grains, nuts and seeds. It's rough, it's tough — and it may help you:

- Reduce your risk of diabetes by improving your blood sugar control
- Lower your risk of heart disease
- Promote weight loss by helping you feel full

Go for whole grains

Although it's not clear why, whole grains may reduce your risk of diabetes and help maintain blood sugar levels. Try to make at least half your grains whole grains. Many foods made from whole grains come ready to eat, including various breads, pasta products and many cereals. Look for the word "whole" on the package and among the first few items in the ingredient list.

Lifestyle management

Modification of adverse lifestyle factors is an important aspect of the management of all types of diabetes. In particular, appropriate management of cardiovascular risk factors such as smoking, physical inactivity and poor diet is important for the prevention of macro vascular disease. Micro vascular complications may also be affected by adverse lifestyle factors, e.g. smoking. However, helping patients to modify certain behaviors should take account of other factors such as the patient’s willingness to change, their perception of their diabetes, and factors which may be indirectly related to their diabetes, such as depression and adverse effects on quality of life. This section of the guideline has been divided into the following areas: delivery of lifestyle interventions, structured education, self monitoring of glycemic control, and the specific areas of smoking, obesity, physical activity, healthy eating and alcohol. Some recommendations in these areas are supported by evidence extrapolated from large studies conducted in the general population and these recommendations have been graded accordingly.

Self Monitoring Of Glycaemia

Self monitoring of glycaemia is a commonly used strategy for people with diabetes to manage glycemic control. Self monitoring of blood glucose (SMBG) is accepted standard practice for people with type 1 diabetes. Self monitoring of blood glucose for people with diabetes can guide adjustment of insulin or other medication for patients and health professionals as part of a comprehensive package of diabetes care encourage self-empowerment and promote better self-management behaviors. Conversely self monitoring may fail to improve diabetes control and has been associated with negative psychological outcomes. Other methods of self monitoring include self monitoring of urine glucose (SMUG) and measurement of blood or urine ketones. Continuous monitoring of interstitial glucose (CMG) is an alternative for people with diabetes who have persistent problems with glycaemic control.
Get a Perfect Night’s Rest

There’s a sleep sweet spot when it comes to preventing diabetes. A Yale University study of 1,709 men found that those who regularly got less than 6 hours of shut-eye doubled their diabetes risk; those who slept more than 8 hours tripled their odds. Previous studies have turned up similar findings in women. “When you sleep too little—or too long because of sleep apnea—your nervous system stays on alert,” says lead researcher Klar Yaggi, MD, an assistant professor of pulmonary medicine at Yale. This interferes with hormones that regulate blood sugar. A Columbia University study found that sleeping less than 5 hours also doubled the risk of high blood pressure. For a good night’s rest, avoid caffeine after noon, leave work at the office, and skip late-night TV. Oversleeping may be a sign of depression or a treatable sleep disorder, so talk with your doctor.

Exercise and Physical Activity

Physical activity is defined as any skeletal muscle movement which expends energy beyond resting level (e.g. walking, gardening, stair climbing). Health-enhancing physical activity is physical activity conducted at a sufficient level to bring about measureable health improvements. This normally equates to a moderate intensity level or above and can generally be described as activity that slightly raises heart rate, breathing rate and core temperature but in which the patient is still able to hold a conversation. Exercise is a subset of physical activity which is done with the goal of enhancing or maintaining an aspect of fitness (e.g. aerobic, strength, flexibility, balance). It is often supervised (e.g. in a class), systematic and regular (e.g. jogging, swimming, attending exercise classes).

Assessment of Physical Activity

Physical activity is a very difficult behavior to measure since it incorporates mode of activity, duration, frequency and intensity. There is no gold standard and techniques range from heart rate monitoring to motion counters and self reports. Self report is the easiest format but there is often an over reporting of minutes spent in activity. The Physical Activity Questionnaire is an example of oneself report format that has known validity and reliability for assessing moderate activity. As with smoking cessation, it is important in assessing what kind of support a patient needs for increasing or maintaining physical activity. A rate of perceived exertion scale is useful for estimating exercise intensity, particularly in people with autonomic neuropathy who have reduced maximal heart rate.

Effects of Physical Activity and Exercise on the Prevention of Diabetes

Regular physical activity is associated with a reduced risk of development of diabetes. This risk reduction is consistent over a range of intensity and frequency of activity, with a dose related effect. Greater frequency of activity confers greater protection from development of diabetes and this is valid for both vigorous- and moderate-intensity activity. The length of time to confer the effect is a minimum of four years. Several randomized trials have determined the effects of lifestyle interventions, including physical activity and exercise, on the progression from IGT to diabetes over a period ranging from three to six years.
CONCLUSION

In this paper the author has studied and identified that about 1 million people 18 years and older in India have type 2 diabetes and do not know it. Often type 1 diabetes remains undiagnosed until symptoms become severe and hospitalization is required. Left untreated, diabetes can cause a number of health complications. That’s why it’s so important to both know what warning signs to look for and to see a health care provider regularly for routine wellness screenings.

REFERENCES


[7]. American Diabetes Association, Type 2, accessed 18 September 2015.