Natural Management Modalities in a Newly Diagnosed Diabetic Patient: A Review

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ABSTRACT

Background and aims: In the world, Diabetes Mellitus (DM), which is extremely common, significantly increases morbidity and mortality. Traditional treatments include dietary changes, pharmaceuticals used orally and insulin administered subcutaneously. Recent research indicates that natural DM therapy may support existing treatments to further regulate blood sugar levels. Here, we examine the research supporting a number of all-natural DM treatment options. We outline the pathophysiology of diabetes and its problems, give a summary of current pharmacologic therapies, and then talk about all-natural methods of managing diabetes. We will concentrate on recent, high-quality research and highlight the effectiveness of diet, exercise and common natural products in the treatment of newly diagnosed cases of DM. Each therapy's potential interactions and side effects will be addressed as needed.

Keywords: Diabetes mellitus; Diet; Herbal supplements; Interval training; Natural; Pharmacological agents

INTRODUCTION

Diabetes Mellitus (DM) is a clinical illness characterised by persistent hyperglycemia brought on by relative insulin resistance, insufficiency or both. Diabetes is caused by a number of pathologic mechanisms, from defects that lead to resistance to insulin action to autoimmune destruction of the pancreatic B-cells, which results in insulin shortage. In order to maintain a normal blood glucose level, insulin resistance appears to occur irst and is followed by increased insulin

secretion [1]. However, in those who are susceptible, the pancreatic B cells are unable to keep up with the increased demand for insulin and an insulin deficit slowly worsens over time. Although the root cause of insulin resistance is still unknown, current research is heavily focused on this issue. Usually, a phase of hyperinsulinemia, which treats insulin resistance, comes before insulin shortage. Postprandial hyperglycemia is caused by the early abnormalities in insulin secretion, which include loss of first phase insulin release. Fasting hyperglycemia manifests clinically as insulin secretion continues to drop and does not adequately control hepatic glucose production [2].

Diabetes is a chronic condition brought on by either insufficient insulin production by the pancreas or inefficient insulin use by the body. A hormone called insulin controls blood sugar levels. Uncontrolled diabetes frequently causes hyperglycemia, also known as high blood glucose or raised blood sugar, which over time can seriously harm many different bodily systems, including the neurons and blood vessels. 8.5% of persons who were 18 years of age and older had diabetes in 2014 [3]. A total of 1.5 million deaths in 2019 were directly related to diabetes and 48% of these deaths occurred in those under the age of 70.

Diabetes contributed to an additional 460 000 renal disease deaths and high blood glucose is responsible for 20% of cardiovascular fatalities. Age-standardized diabetes mortality rates increased by 3%between 2000 and 2019 [4]. Diabetes-related death rates rose 13% in lower-middle income nations. In contrast, between 2000 and 2019, there was a 22% global decline in the likelihood of dying from any of the four major non communicable diseases (cancer, chronic respiratory diseases, diabetes or cardiovascular diseases) between the ages of 30 and 70 [5].

LITERATURE REVIEW

Additionally, adipose tissue secretes a number of chemicals (steroids like cortisol and a variety of peptides referred to as adipokines) that act on particular receptors to affect the sensitivity of other tissues to insulin. Due to the fact that visceral adipose tissue drains into the portal vein, central obesity may have a particularly strong impact on the liver's sensitivity to insulin, which could have a negative impact on gluconeogenesis and hepatic lipid metabolism. Another crucial factor affecting insulin sensitivity is exercise.

Inactivity may lead to an increase in FFA buildup in skeletal muscle and a down-regulation of insulin sensitive kinases [6]. Therefore, those who are sedentary and have the same level of obesity are more insulin resistant than those who are active. Additionally, exercise permits glucose uptake into muscle that is not insulin-dependent, which lowers the pressure on the pancreatic B cells to produce insulin (Figure 1).

Figure 1: Prevalence of diseases.

What Happens in Diabetes?

The cells cannot take up glucose from the blood. Energy is attempted to be provided from "fat" and "protein" since the cells are unable to meet their energy needs. When 'fat' is used as the energy source, the body's ketone levels rise [7]. The patients experience fatigue and sluggishness when protein is used as an energy source. Patients start to urinate more frequently as a result of the kidneys' attempts to flush out excess blood glucose when it is too high. The patients experience thirst as a result and they begin to drink a lot. On the other hand, patients still lose weight despite eating frequently and in large amounts. There is often a long pre-symptomatic phase before the diagnosis of type 2 diabetes. The duration of glycemic burden is a strong predictor of adverse outcomes (Figure 2) [8].
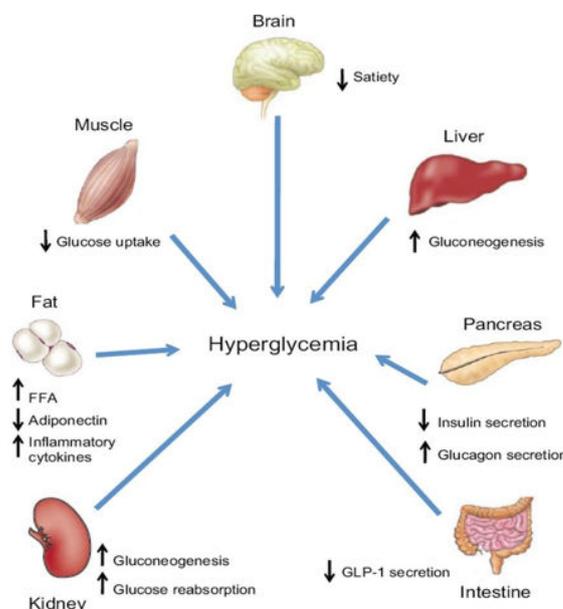

Figure 2: Multi organ and tissue pathophysiology of type-2 diabetes.

Types of Diabetes

Type 1 diabetes: Type 1 diabetes is usually diagnosed in children and young adults. Only 10% of people with diabetes have this form of the disease. In type 1 diabetes, the body does not produce insulin. 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.

Type 2 diabetes: The body does not produce enough insulin for proper function or the cells in the body do not react to insulin. Approximately 90% of all cases of diabetes worldwide are of this type. 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 having to take insulin.

Gestational diabetes: GDM is diabetes that is first diagnosed in the second or third trimester of pregnancy. Test for undiagnosed diabetes at the first prenatal visit in those with risk factors, using standard diagnostic criteria [9].

The OGTT should be performed in the morning after an overnight fast of at least 8 hours.

• The diagnosis of GDM is made if any of the following criteria are met.
• Fasting plasma glucose ≥ 92 mg/dl 1-hour plasma glucose ≥ 180 mg/dl 2-hour plasma glucose ≥ 153 mg/dl.

At 24-28 weeks of gestation, pregnant women who have never been diagnosed with diabetes should get tested for gestational diabetes mellitus. At 4 to 12 weeks postpartum, using the oral glucose tolerance test and clinically relevant non-pregnancy diagnostic criteria, examine women with gestational diabetes mellitus for persistent diabetes. Lifelong screening for the onset of diabetes or prediabetes should be performed at least every three years in women who have a history of gestational diabetes mellitus [10,11].

How are Diabetes and Pre-Diabetes Diagnosed?

Blood tests are used to diagnose diabetes and pre-diabetes. Lab analysis of blood is needed to ensure test results are accurate. Glucose measuring devices used in a health care provider's office, such as finger-stick devices are not accurate enough for diagnosis but may be used as a quick indicator of high blood glucose.

Tests for blood glucose levels:

• Normal blood, results: A1C less than 5.7%; FPG less than 100 mg/dl; oral glucose tolerance test OGTT less than 140 mg/dl
• Pre-diabetes blood results: A1C 5.7% to 6.4%; FPG 100 mg/dl to 125 mg/dl; OGTT 140 mg/dl to 199 mg/dl
• Diabetes blood results: A1C 6.5% or higher; FPG 126 mg/dl or higher; OGTT 200 mg/dl or higher (**Figures 3 and 4**).

Figure 3: Test for blood glucose levels.

Figure 4: Testing for prediabetes.

Why do we Worry about Diabetes?

Diabetes is typically irreversible and acute metabolic decompensation can cause death. Long-term metabolic derangement is frequently accompanied by functional and structural alterations in the body's cells, as well as secondary harm to numerous organ systems, particularly the kidneys, eyes, nerves and blood vessels (**Figure 5**) [12].
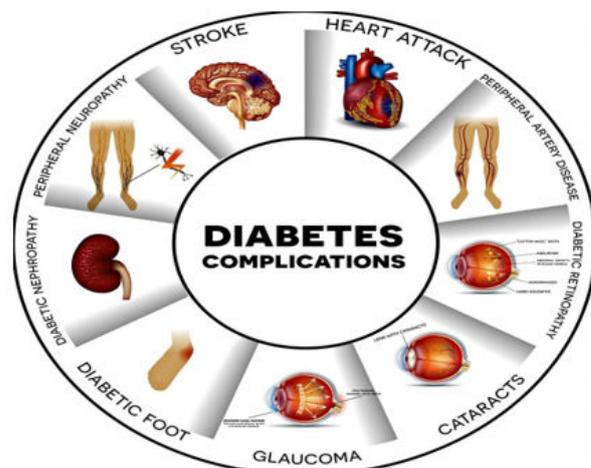

Figure 5: Complications in Diabetes.

DISCUSSON

Categories of Increased Risk for Diabetes

Testing for prediabetes and risk for future diabetes in asymptomatic people should be considered in adults of any age who are overweight or obese (BMI ≥ 25 Kg/m^2 or ≥ 23 Kg/m^2 in Asian Americans) especially who have one or more of the following risk factors:

• First degree relative with diabetes. High risk race.
• History of CVD. Hypertension: ≥ 40/90.
• HDL cholesterol level less than 35 mg/dl Triglyceride level more than 250 mg/dl Women with polycystic ovary syndrome Physical inactivity.

Patients with prediabetes (A1C, IGT and IFG) should be tested yearly. Women who were diagnosed with GDM should have lifelong testing at least every 3 years. For all other patients testing should begin at age 45 years.

If results are normal, testing should be repeated at a minimum of 3-year intervals, with consideration of more frequent testing depending on initial results and risk status. At least annual monitoring for the development of diabetes in those with prediabetes is suggested. Patients with prediabetes should be referred to an intensive behavioral lifestyle intervention program modeled on the diabetes prevention program [13].

How Can You Help Reduce Your Risk of Diabetes Naturally?

Lifestyle interventions: Intensive lifestyle intervention can reduce the incidence of type 2 diabetes by 58% over 3 years. The two major goals of lifestyle intervention are to achieve and maintain a minimum of 7% loss of initial body weight and increase moderate- intensity physical activity (such as brisk walking) to at least 150 min/week.

Healthy diet plan: Daily nutritional needs should be taken frequently but in small portions. Reducing caloric intake is of paramount importance for those at high risk for developing type 2 diabetes. The quality of fats consumed in the diet is more important than the total quantity of dietary fat. Healthy low calorie eating patterns should be encouraged. The current standard diet for diabetic patients is a weight reducing low fat low glycemic index diet with a reduction in sodium content, however this needs to be modified according to the individual state (body weight, ethnicity, diabetes therapy and economic state). Carbohydrate intake monitoring with carbohydrate counting or experience-based estimation have been shown to improve glycemic control. Nutrition advises specific to cardiovascular risk reduction, avoidance of trans and saturated fats, increased intake of fiber, intake of five or more servings of fruits and vegetables daily and reduction of salt intake. This advice should be provided to all patients. Smoking cessation is critically important for persons with diabetes (**Figures 6 and 7**) [14].
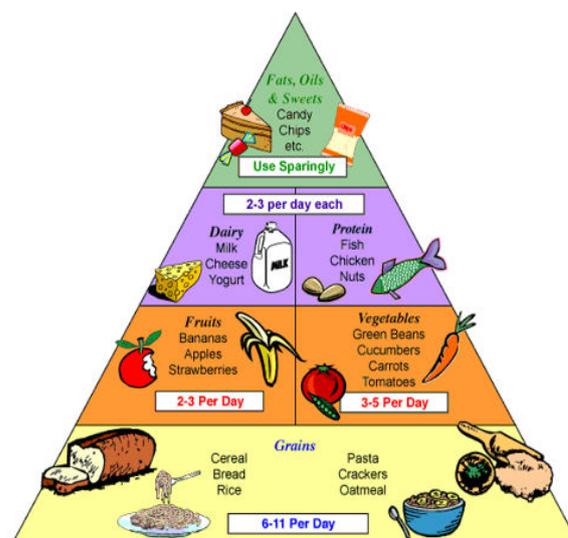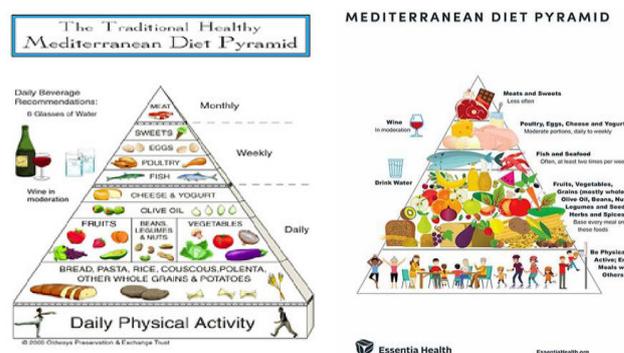

Figure 6: Food pyramid.

Figure 7: Daily physical activity a nd mediterranean diet pyramid.

Weight reduction: Weight loss is recommended for all overweight or obese individuals who have or are at risk for diabetes. Weight loss has been shown to reduce insulin resistance. Moderate weight loss (7% body weight) and regular physical activity (150 min/week) with dietary strategies are effective in reducing the progression from prediabetes to diabetes.

Physical exercise: T2 DM patients should be encouraged to perform moderate intensity aerobic exercise at least 150 min. per week (50% to 70% of maximum heart rate) and resistance training 3 times/week in the absence of contraindications. Health care providers should assess the level of physical activity in diabetic patients and provide encouragement to reach the target of exercise weekly. Physical limitations should be addressed and alternative exercise programs developed as needed (**Figure 8**) [15].
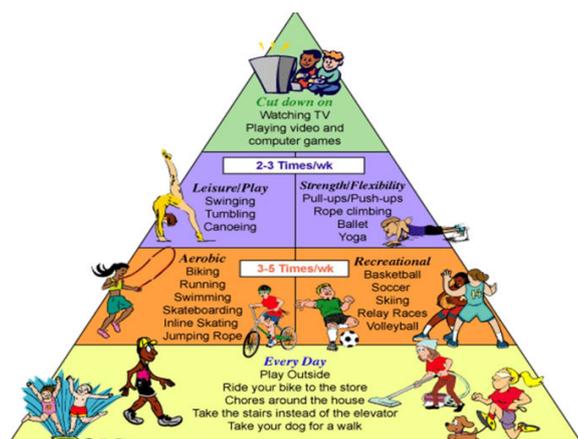
Figure 8: Physical activity pyramid.

Advantages of exercise:

- Benefits of glycemic control
- Improves insulin sensitivity
- Builds physical fitness
- Optimizes body weight
- Gives psychological wellbeing

Disadvantages:

- Carry some risk
- Strains the compromised CVS
- Injuries to musculoskeletal system
- Predisposes to hypoglycemia
- May exacerbate complications

Contraindications:

- Diabetic ketosis
- Diabetic retinopathy
- Renal dysfunction
- CVS disease
- Foot ulcers

Precautions:

- Choose suitable footwear
- Comfortable loose clothes
- Close foot inspection every day
- Snacks as protection from hypoglycemia
- Select the proper exercise program

Patients should be able to carry out a normal conversation while exercising without getting breathlessness.

Diabetes at school:

- Brochures and films should be prepared to inform the students about diabetes.
- Students should be informed about the importance of healthy eating and doing exercises.
- School canteens should be controlled to sell healthy food and healthy drinks rather than fast food and fizzy drinks.
- Students should be informed about not eating fast food.

- Parents should be informed about healthy nutrition and the importance of homemade food in children's bags.
- Teachers should observe their students and their health problems. If they have some symptoms of any diseases, they should contact the parents.
- They also should inform the students about the importance of their health [16].

CONCLUSION

People with type 1 diabetes should be treated with multiple daily injections of prandial and basal insulin or continuous subcutaneous insulin infusion. Prefer to use rapid acting insulin analogs to reduce hypoglycemia risk. Consider educating adult individuals on matching prandial dose of insulin according to meal, premeal blood glucose level and if performing physical activity. Your body needs the right fuel to help it work well. Get moving, find something you enjoy.

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