

Diet and Exercise Effect on Diabetes Mellitus for Healthy Life



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Abstract

Diet and exercise help to maintain optimum blood sugar level in diabetic patient by balancing insulin in the blood. The objective of the study was to measure percentage of diabetic patients doing diet, exercise and percentage of impact of diet and exercise. The results support that diet and exercise have great impact on diabetic patient to control the disease with healthy lifestyle. This also shows that healthy lifestyle can enhance life and maintain insulin level in body. It means that precautions and healthy life is better than the use of insulin and drugs to control on diabetes.

Keywords: Diet; Diabetes mellitus; Exercise

Introduction

Diabetes Mellitus having hyperglycemia in characteristics and it is group of metabolic disorders. Insulin secretion, insulin action or both results in high blood sugar (hyperglycemia). Damage or failure of human organs such as eyes, kidneys, nerves, blood vessels and heart are complications of Diabetes Mellitus which is caused by chronic hyperglycemia. Symptoms of high blood sugar are fatigue, headache, blurred vision, frequent urination and increased thirst. Diabetes Mellitus diagnosed in clinic by random plasma glucose test or fasting plasma glucose test. When high blood sugar symptoms are present then fasting or random plasma glucose test is performed. If fasting plasma glucose test shows 126mg/dl value or 200mg/dl in random plasma glucose test value is indicated, then Diabetes Mellitus is diagnosis is confirmed. If Doctor have problem in confirmation of diagnosis of Diabetes Mellitus from random or fasting plasma glucose test, then another test is used name as Oral glucose tolerance test. In oral glucose tolerance test, mixture of water and 75g of anhydrous glucose (sugar) drink by patient and 2-hour value 200mg/dl made the diagnosis confirmed. Oral tolerance test is more commonly used in type-2 Diabetes Mellitus [1,2].

Diabetes Mellitus type-1 can affect any age group but it commonly present in children and young adults. After years later from destruction of beta cells of pancreas symptoms of Diabetes Mellitus type-1 appear but these symptoms have short period. Frequent urination, most of the time feeling thirsty, always feeling hungry, weight loss, blurred vision and fatigue

are symptoms of Diabetes Mellitus type 1. If Diabetes Mellitus type-1 misdiagnosed or diagnose late or not treated with insulin then its leads to condition known as Diabetes Ketoacidosis, in this condition patient go into coma even have life threat. Most clinical studies show effects of plasma glucose through exercise [3]. According to many studies, Diabetes Mellitus type-1 is also treated with physical activity because it increases absorption of insulin [4]. The cause of this is still unknown but many researches said that it is because of increase temperature or blood pressure in periphery during physical activity.

Diabetes mellitus type-2 affects more people than any other type of diabetic mellitus. Insulin resistance exists in Diabetes Mellitus Type-2. Insulin resistance means insulin can't work properly in the body but body can produce enough insulin. The cause of insulin resistance is unknown. After many years insulin production also decreases. Like Diabetes mellitus type-1, type 2 of diabetes mellitus also build up glucose in the blood and body fails to use its main source of energy. Risk factors of Diabetes mellitus type-2 are family history of diabetes mellitus, previous gestational diabetes mellitus history, old age, obesity and lack of physical exercise. Overweight is main risk factor for Diabetes mellitus type-2 and 80% of patients of diabetes mellitus type-2 are obese. Unlike diabetes mellitus type-1 symptoms, Diabetes Mellitus type-2 symptoms are increases gradually. Unusual thirst increase urination, weight reduce, slow healing of sores, blurred vision and infections frequently are commonest symptoms of

diabetes Mellitus type-2. Some people don't develop symptoms [1,2,5].

For type-1 diabetic patient regulation of plasma glucose is challenging, and exercise is addition in it. Plasma insulin concentration is decrease when proper physical exercise is performs which increases glucose uptake in working muscles and also maintain release of glucose from liver to control on hemostasis of glucose. Glucose level is drops up to mark when prolonged physical activity is perform because of decrease production of liver glucose. It is mandatory to develop a model that can predict glucose at rest and during activity for the long-term goal of a close loop insulin delivery system working under physiological changes [6]. Diabetic treatment has physical exercise as an important factor in it. Variety of different exercise effects glycaemia in different ways. In Diabetes Mellitus type 2, performing exercise is difficult for reduction of weight, but performing regular exercise plays a vital role in diabetic management.

Diabetic patients can increase glucose hemostasis, increase susceptibility of cells of insulin and can reduce medicine doses from performing proper, selected and regular physical exercise [7]. The uptake of glucose is directly proportional to the physical load and intensity of exercises, and it increases during exercise. When exercise is performed it will increase uptake of glucose with insulin stimulation and also balancing cell immunity to insulin [8]. Diabetes Mellitus patients can perform anaerobic and aerobic exercises. Swimming, weightlifting and short distance running are examples of anaerobic exercises. Anaerobic exercises are suggested to perform for 2 minutes for Diabetes mellitus patients. In anaerobic exercises, cells take carbohydrates from accumulated glucagon in muscles and ATP from sebum. Examples of aerobic exercises are long distance running and other sports field exercises. Exercise that lasts more than 2 minutes is aerobic form of exercise [9].

Worldwide health sector have Diabetes Mellitus as major challenge. Prevalence of Diabetes Mellitus is really very high. 382 million people were suffering from Diabetes Mellitus globally in 2013. It is predict that 592 million people will effective from Diabetes Mellitus in 2035. Developing countries like Pakistan have high ratio of diabetic patients than developed countries. According to IDF, Pakistan is on tenth number for having diabetic population and it will become fourth in 2025. Pakistanis who is suffering from diabetes are 6.6 million in number and this number will increase to 14.5 million in 2025 [10]. Pakistan have lack of counseling programs, awareness for Diabetes Mellitus and management of Diabetes Mellitus, these factors increases ratio of diabetic population day by day in Pakistan. Pakistan has few centers that provide education in diabetic population, one of these centers is Baqai institute of endocrinology Karachi [11]. Pakistan has no national level awareness for Diabetes Mellitus.

According to annual report of national diabetes advisory board in 1993, one ounce of education saves one pound of

treatment [12]. The critical role of diabetes education in quality of diabetes care is studied by American association [13]. Study conducted by DAWN2 which involves 17 countries in 4 continents, data is collected from similar countries like Pakistan and India who have almost same environment and socio-economic conditions. The purpose of this study by DAWN2, was spread awareness for management of diabetes mellitus by different ways. Patients of Diabetes must have family and person center of care, this is important factor for managing disease [14].

Thow J & Johnson et al, [15] studied about concentration of the blood glucose. According to them blood glucose is regulated through many mechanisms in the human body. Specific organs releases blood glucose and uptake it through metabolites and hormones directly. Autonomic nervous system plays indirect role in release of and uptake of glucose from organs of the body. Exercise plays vital role in management of the diabetic patient. Increase insulin sensitivity, good cardiorespiratory health, increase psychosocial health, improves glycemic control can maintain through regular exercise. Glycogenolysis is the mechanism that takes place during exercise for the fulfillment of calorie need. Body oxygen consumption is increases to 20-fold during exercise and greater demand in to muscle activity. Skeletal muscles also fulfill its need from triglycerides, glycogen and from free fatty acids from breakdown of adipose tissue and glucose [15].

Susstrunk et al, [16] studied about injected insulin. According to them injected insulin is more rapid and muscle uptake of glucose is increases during exercise, this helps to regulate glycemic control in diabetes. High intensity and prolong exercise causes low plasma glucose level. Nervousness, palpitations and sweating are the symptoms of low plasma glucose level [16]. Svitra D & her colleagues [17] studied about low blood sugar level. Hypoglycemia is common in type1 diabetic patients during or after exercise than type2 diabetic patient. Exercise lowers blood glucose level with the help of insulin or another mechanism in which glucose uptake take place with or without presence of insulin.

Valletta JJ et al. [18] conducted a study on treatment of type1 diabetes mellitus. According to their work, treatment of type1 diabetes mellitus is difficult than management of type2 diabetes mellitus. Insulin pump with the artificial pancreas, continuous glucose monitor (CGM), and insulin algorithm used for the treatment of type1 diabetes mellitus [18]. Dunn Henriksen & Iozzo et al, [19] conducted study on plasma glucose in type1 diabetes mellitus with the exercise. Increase in insulin absorption in type1 during physical activity is also explains by many studies [19]. Some studies considered that cause of increase of insulin absorption is increase in temperature of peripheral area of the body. But many researches consider that cause of increase in insulin absorption is unknown any unclear. Some researches explain after subcutaneous injection, local massage and hot bath increases insulin absorption [20]. Glucose

dynamics during exercise increases maybe due to changes in insulin through pharmacokinetic or through pharma dynamic limits or it is unrelated to increase in the concentration of insulin [21].

Jennings et al, [22] studied-on interval exercises which cause insulin sensitivity to increase through glycogen consumptions in muscles after active activity. Prolonged and heavy exercises cause blood glucose level fall. During exercise, hypoglycemia causes when insulin is not performing its function because of this glycogen level drops rapidly [22]. Waris Qadwai [23] conducted study on Type1 and type 2 diabetes mellitus prevalence is increase day by day. Obesity, sedentary lifestyle, improper and unhealthy diet, lack of awareness and smoking are main factors in increasing diabetic population. According to the survey, Pakistan has newly diagnosed 5.1% men and 6.8% women in urban areas, 5.0% men and 4.8% women in rural areas. 6.3% men and 14.2% women in urban areas are suffering from impaired glucose tolerance. 6.2% men and 10.9% women are suffering from impaired glucose tolerance in rural areas of Pakistan.

In ancient times type2 diabetes mellitus was considered the disease of old age but know researches prove that this was misconception. Now it is considered that type2 diabetes mellitus can affect young age too. Developing countries like Pakistan has young age patients of type2 diabetes mellitus. Decreased physical activity and unhealthy diet contribute causes type2 diabetes at young age group. Obesity and sedentary lifestyle helps in developing type2 diabetes mellitus. 19.35% adolescents are obese and living unhealthy life which makes them at risk of developing type2 diabetes mellitus. Complication of diabetes mellitus includes blindness, amputation, renal failure, diabetic foot and depression. These complications cause financial burden on the society and country.

Results and Discussion

Barbara A Bowman [24] conducted study on treatment of diabetic patients with diet, exercise and combination of diet and exercise. 557 individuals were participated in her research. 31% patients control Diabetes through diet, 46% control Diabetes Mellitus through exercise and 42% patients control Diabetes Mellitus through combination of diet and exercise. In this study, 59.11% patients control Diabetes Mellitus with the help of diet, 35.84% do exercise to control Diabetes Mellitus and 61.63% have combine impact of diet and exercise in order to control Diabetes Mellitus [24].

Elizabeth and her companions conducted a study on impact of diet and exercise on diabetic patients. Study includes 157 patients and questionnaires were distributed to them. 22% patients reported they eat according to diet recommendations while 17% patients reported that they control high blood sugar level with exercise. In this study 59.11% take help from diet to control Diabetes mellitus and 35.84% do exercise regularly

[25]. In the past impact of diet on controlling Diabetes Mellitus was studied by G Rafique & SI Azam et al, [26] In their study, 199 questionnaires were distributed to the patients. According to their study, 11.4% people take diet according to diet plan to control Diabetes Mellitus. In this study, 59.11% take diet according to diet plan or diet chart to control Diabetes Mellitus [26].

Conclusion

This study concluded that diet and exercise have great impact on diabetic patient to control the disease with healthy lifestyle. This also shows that healthy lifestyle can enhance life and maintain insulin level in body. It means that precautions and healthy life is better than the use of insulin and drugs to control the diseases.

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