

The Impact of Diet and Exercise on Diabetic Patients

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Abstract

Introduction

Lack of insulin secretion or reduced sensitivity of insulin secretion results in impaired carbohydrate, fat and protein metabolism which causes a disorder known as diabetes mellitus. Type1 diabetes mellitus is one of the auto immune diseases. Type2 diabetes mellitus patients are common than any other type of diabetes mellitus. Diet and exercise help to maintain optimum blood sugar levels in diabetic patients by balancing insulin in the blood.

Objective

The objective of the study was to measure the percentage of diabetic patients doing diet, exercise and percentage of the impact of diet and exercise.

Method

A cross-sectional study was used to collecting the data from CMH and Services hospital Lahore. The sample size was 159 using a purposive sampling technique. The questionnaire consists of two sections A and B having 23 questions. Mean and percentage values of different parameters show the impact of diet and exercise in the routine life of diabetic patients.

Results

The mean age of the patients was 48.58 ± 6.67 years (range 20 to 65years). Only 35.84% of the participants in the study do exercise regularly. 53.45% of participants feel the impact of diet plan given by dietitian or diet chart given by Doctor. 61.63% of participants have a good impact on diet and exercise in controlling Diabetes Mellitus.

Conclusion

This study results support that diet and exercise have a great impact on the diabetic patients to control the disease with a healthy lifestyle. This also shows that a healthy lifestyle can enhance life and maintain insulin levels in the body. It means that precautions and a healthy life are better than the use of insulin and drugs to control diabetes.

Keywords: *Diet; Diabetes mellitus; Exercise; Statistical analysis*

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Introduction

Lack of insulin secretion or decreased sensitivity of insulin secretion results in impaired carbohydrate, fat and protein metabolism which causes a disorder known as diabetes mellitus. The word “diabetes” means “run through” and in Greek and Latin the word “mellitus” means “roots of honey”. Mellitus is later added to diabetes. Diabetes mellitus having hyperglycemia in characteristics and it is a group of metabolic disorders. 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 the 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 126 mg/dl value or 200 mg/dl in random plasma glucose test value is indicated then diabetes mellitus diagnosis is confirmed. If the doctor has a problem in confirmation of a diagnosis of diabetes mellitus from random or fasting plasma glucose test then another test is used the name as oral glucose tolerance test. In an oral glucose tolerance test, the mixture of water and 75 g of anhydrous glucose (sugar) drink by the patient and 2-hours value 200 mg/dl made the diagnosis confirmed. Oral tolerance test is more commonly used in type-2 Diabetes Mellitus [1,2]. Diabetes Mellitus has three types, 1) Gestational diabetes mellitus, 2) Diabetes of type-1, 3) Diabetes of type-2.

Diabetes mellitus type-1 makes 10% of diabetic patients and the other 90% are suffering from Diabetes mellitus type-2. The diabetic treatment has physical exercise as an important factor in it. Variety of different exercises effects glycaemia in different ways. In diabetes mellitus type-2, performing exercise is difficult for the reduction of weight, but performing regular exercise plays a vital role in diabetic management. Diabetic patients can increase glucose hemostasis, increase the susceptibility of cells of insulin and can reduce medicine doses from performing proper, selected and regular physical exercise. 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 [3]. Diabetes mellitus patients can perform anaerobic and aerobic exercises. Swimming, weight lifting 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. An exercise that lasts more than 2 minutes is an aerobic form of exercise [4]. A study conducted by DAWN2 which involves 17 countries in 4 continents, data is collected from similar countries like Pakistan and India who have almost the same environment and socio-economic conditions. The purpose of this study by DAWN 2, was to spread awareness for the management of diabetes mellitus in different ways. Patients of diabetes must have family and person centers of care, this is an important factor for managing disease [5].

Material and Method

It was a cross-sectional study. The sample size of this study was 159. The sampling technique was a purposive sample technique. Data was collected from CMH and Services hospital Lahore and analyzed within 4 months. A purposive sample technique was used. Patients of both gender doing diet or exercise or both, ranging from 20-60-years above were included in this study. Whereas, pregnant women, mentally retarded persons, patients with major illness and patients less than 20 years of age were excluded. The structured questionnaire had been used for the collection of data. Following are the strength and weakness of this study,

- This study concluded that diet and exercise have a great impact on diabetic patients to control the disease with a healthy lifestyle. This also shows that a healthy lifestyle can enhance life and maintain insulin levels in the body. Health care professionals need to tell the impact and significance of diet and exercise on controlling diabetes mellitus to the patient. Patients should reduce their weight in order to control diabetes mellitus. The diabetic patient should follow a proper diet plan given by dietitian or proper diet chart given by doctors.
- The duration of the study was short. Research was only conducted in Lahore and the sample size was short. Lack of awareness of patients, regarding the type of disease. Data is collected only on the response of the diabetes patients because the study does not conduct under observation for maintaining the record of insulin values and exercise and diet impact does not measure directly. Most of the people hesitate to give a response and cannot provide data properly.

Results

Table 1 represents age groups of patients and the mean age of the participants was 48.58 ± 6.67 . The maximum range for the age of the diabetic patient was 60 and above and the minimum range for the age of the diabetic patient was 20-30-years. This study had 5 age groups such as 20-30-years of age group, 30-40-years age group, 40-50-years age group, 50-60-years age group and 60 above. 20-30-years age group score was 12(8%), 30-40-years age group score was 21(14%), 40-50-years age group score was 55(34%), 50-60-years age group score was 41(25%) and 60 years or above than 60-years score was 30(19%) it shows 40-50-years age group need to take care of their more than other age groups. Demographic data of patients are represented in table 2, in this study males are 67(42.1%) and females are 92(57.9%) thus it represents diabetes mellitus affects females more than males. This table also includes lifestyle of the patient, 84(52.8%) was living sedentary lifestyle, 30(18.9%) people were doing light exercise in their lives and 45(28.3%) were do moderate-intensity exercises, this shows people living sedentary lifestyle are on risk for developing diabetes hence, exercise and proper diet is important for healthy life. 46(28.9%) individuals had an absent family history of diabetes mellitus and 113(71.9%) individuals had a family history of diabetes mellitus, it shows diabetes mellitus is genetic disease and people having diabetes in their family are on risk for developing of diabetes mellitus. lean patients of diabetes mellitus were 57(35.8%) and obese patients were 113(71.9%), it shows obese patients are at risk of developing diabetes mellitus thus people need to care about their weight which can control through proper diet and regular exercise.

Table 3 and Figure 1 shows the impact of diet and exercise on the human body. 57(35.84%) respondents do exercise and 102(64.16%) did not do exercise regularly, which represents people need to aware of the importance of exercise for controlling diabetes mellitus. Low sugar level after exercise is present in 56(35.22%) whether 103(67.68%) participants did not suffer from low blood sugar lately to exercise, and high blood sugar after exercise observed in 60(37.73%) and did not observe in 99(62.27%), it represents exercise only maintain blood sugar level instead of lowering or raising it at dangerous level. Infections in diabetic patients seen 82(51.57%) and 77(48.43%) did not suffer from infections, infections are common in diabetic patients. People need to aware of the impact of diet and exercise for controlling diabetes mellitus, only 57(35.85%) were aware of the importance of diet and exercise, and 102(64.15%) did not aware of it. 128(81.50%) participants feel lack of exercise affects them and 31(19.41%) individuals did not feel affected by lack of exercise, thus exercise is important for a healthy lifestyle.

The age group of patients		
Age Level	Frequency	Percent
20 to 30 years	12	8%
30 to 40 years	21	14%
40 to 50 years	55	34%
50 to 60 years	41	25%
60 above	30	19%
Mean Value	48.58	
Standard deviation	6.67	

Table 1: Mean and standard deviation of age group.

Variable	Construct	Frequency
Gender	Male	67(42.10%)
	Female	92(57.90%)
Occupation	Housewife	61(38.3%)
	Employed	64(40.2%)
	Unemployed	34(21.5%)
Diabetes mellitus	T1DM	49(30.8%)
	T2DM	110(69.2%)
Duration of diagnosis	0-5 years	73(45.9%)
	5-10 years	43(27%)
	10 years and above	43(27.1%)
Lifestyle and exercise	Sedentary lifestyle	84(52.8%)
	Light intensity exercise	30(18.9%)
	Moderate intensity exercise	45(28.3%)
Diabetes family history	Absent	46(28.95%)
	Present	113(71.9%)
Obesity	Obese	102(64.2%)
	Lean	57(35.8%)

Table 2: Demographic data of patients.

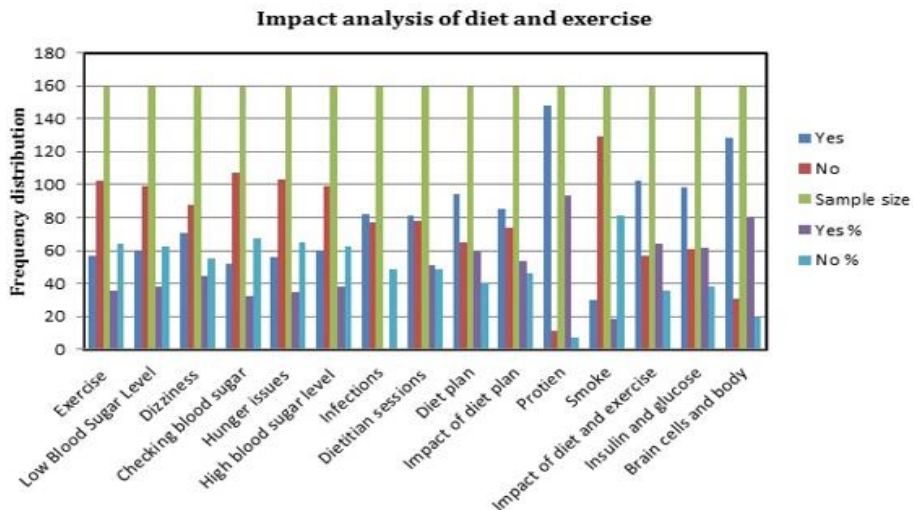


Figure 1: Impact analysis of diet and exercise.

Variables	Construct	Frequency
Exercise	Yes	57(35.84%)
	No	102(64.16%)
Low blood sugar level	Yes	60(37.73%)
	No	99(62.27%)
Dizziness	Yes	71(44.65%)
	No	88(55.35%)
Checking blood Sugar	Yes	52(32.70%)
	No	107(67.30%)
Hunger issues	Yes	56(35.22%)
	No	103(67.68%)
High blood sugar level	Yes	60(37.73%)
	No	99(62.27%)
Infections	Yes	82(51.57%)
	No	77(48.43%)
Dietitian sessions	Yes	81(50.94%)
	No	78(49.06%)
Diet plan	Yes	94(59.11%)
	No	65(40.89%)
Impact of diet plan	Yes	85(53.45%)
	No	74(46.55%)
Protein	Yes	148(93.08%)
	No	11(6.92%)
Smoke	Yes	30(18.86%)
	No	129(81.84%)
Diet and exercise	Yes	102(64.15%)
	No	57(35.85%)
Insulin and glucose	Yes	98(61.63%)
	No	61(38.37%)
Brain and body cells	Yes	128(81.50%)
	No	31(19.41%)

Table 3: Frequency distribution table of diet and exercise impact on human.

Discussion

Diabetes mellitus is a life-long disease. It can only manage through medications, proper diet, and regular exercise. Different past studies also show the impact of diet and exercise on diabetic patients. Barbara A. Bowman conducted a study on the treatment of diabetic patients with diet, exercise and a combination of diet and exercise. 557 individuals participated in her research. 31% of patients control diabetes through diet, 46% control diabetes mellitus through exercise and 42% of patients control diabetes mellitus through a combination of diet and exercise [6]. In this study, 59.11% of patients control diabetes mellitus with the help of diet, 35.84% do exercise to control diabetes mellitus and 61.63% have to combine the impact of diet and exercise in order to control diabetes mellitus. Elizabeth and her companions conducted a study on the impact of diet and exercise on diabetic patients. The study includes 157 patients and questionnaires were distributed to them. 22% of patients reported they eat according to diet recommendations while 17% of patients reported that they control high blood sugar levels with exercise. In this study, 59.11% take help from diet to control diabetes mellitus and 35.84% do exercise regularly [7]. Karam Padma et al. conducted a survey on the treatment of diabetes mellitus through diet and exercise. A total of 117 Diabetic

patients consented and participated in the survey. 61.68% of patients knew about the importance of exercise to control insulin and glucose, 75.21% had familiar with the importance of diet in the treatment of diabetes mellitus. 64% achieved control of insulin and glucose through diet and exercise [8]. In this study, 64.15% of diabetic patients had awareness about the significance of diet and exercise. 61.63 % take diet and exercise as an essential treatment of diabetes mellitus. Naheed Gul conducted a study and 100 questionnaires were distributed to patients, according to her study mean age of the patients was 50 ± 5 years and males are less than females. 61% regularly check the blood sugar levels. 70% of people do smoking and 76% live sedentary lifestyles [9]. In this study, the mean age of the patients was 48.58 ± 6.67 and females were more than males. 32.70% check blood sugar level, 18.86% do smoking and 52.8% live a sedentary lifestyle.

Conclusion

This study concluded that diet and exercise have a great impact on diabetic patients to control the disease with a healthy lifestyle. This also shows that a healthy lifestyle can enhance life and maintain insulin levels in the body. Diabetes mellitus affects obese people more thus to reduce the occurrence of diabetes mellitus people need to reduce their weight and it can manage through diet and exercise. Family history of diabetes mellitus is important so people who have a family history of diabetes mellitus are at risk for developing it thus they should do proper diet and exercise as a precautionary measure for diabetes mellitus. Exercise helps to balance blood sugar levels instead of lowering or raising it from the optimum level, thus people need to aware of it. It means that precautions and a healthy life are better than the use of insulin and drugs to control the disease.

Conflict of Interest

I certify that the information that I have presented here is accurate and complete to the best of my knowledge.

References

1. Guyton AC, Hall JE (2006) Textbook of medical physiology 11th (Edn.). Elsevier Inc.
2. Farman M, Saleem MU, Ahmed MO, et al. (2018) Stability analysis and control of the glucose insulin glucagon system in humans. Chinese Journal of Physics 56(4): 1362-1369.
3. Roy A, Parker RS (2007) Dynamic modeling of exercise effects on plasma glucose and insulin levels. The Journal of Diabetes Science and Technology 1(3): 338-347.
4. Hargreaves M, Meredith I, Jennings GL (1992) Muscle glycogen and glucose uptake during exercise in humans. Experimental Physiology: Translation and Integration 77(4): 641-644.
5. Kalra S, Peyrot M, Skovlund S (2013) Second diabetes attitudes, wishes and needs (DAWN2) study: Relevance to Pakistan. The Journal of Pakistan Medical Association 63: 1218-1219.
6. Prevention P (2004) Primary prevention of type 2 diabetes mellitus by lifestyle intervention: Implications for health policy. Annals of Internal Medicine 140: 951-957.
7. Broadbent E, Donkin L, Stroh JC (2011) Illness and treatment perceptions are associated with adherence to medications, diet, and exercise in diabetic patients. Diabetes Care 34(2): 338-340.
8. Padma K, Bele SD, Bodhare TN, et al. (2012) Evaluation of knowledge and self-care practices in diabetic patients and their role in disease management. National Journal of Community Medicine 3: 3-6.
9. Gul N (2010) Knowledge, attitudes and practices of type 2 diabetic patients. Journal of Ayub Medical College Abbottabad 22(3): 128-131.