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Effects of Aerobics on Type 2 Diabetes

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INTRODUCTION:

diabetes has become a widespread epidemic disease diabetes mellitus (DM), commonly referred to as diabetes, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. Symptoms of high blood sugar include frequent urination , increased thirsts, and increased hunger. If left untreated, diabetes can cause many complications. Acute complications include diabetic keto acidosis etc Serious long-term complications include cardiovascular diseases ,kidney failures and damage to the eyes.

Diabetes is due to either the pancreas not producing enough insulin or the cells of the body not responding properly to the insulin produced.[5] There are three main types of diabetes mellitus:

- Type 1 results from the pancreas's failure to produce enough insulin. This form was previously referred to as "insulin-dependent diabetes mellitus" (IDDM) or "juvenile diabetes". The cause is unknown.
- Type 2 begins with insulin resistance a condition in which cells fail to respond to insulin properly. As the disease progresses a lack of insulin may also develop. This form was previously referred to as "non insulin-dependent diabetes mellitus" (NIDDM) or "adult-onset diabetes". The primary cause is excessive body weight and not enough exercise.
- Gestational diabetes, is the third main form and occurs when pregnant women without a previous history of diabetes develop high blood-sugar levels.

Prevention and treatment involve a healthy diet,physical exercise, maintaining a normal body weight and avoiding use of tobacco. Control of blood pressure and maintaining proper foot care are important for people with the disease. Type 1 DM must be managed with insulin injections.[3] Type 2 DM may be treated with medications with or without insulin.[7] Insulin and some oral medications can cause low blood sugar.[8].gestational diabetes usually resolves after the birth of the baby. In our research we're going to talk about the effects of aerobics on type 2 diabetes.

Aerobic exercise helps your body use insulin better. It makes your heart and bones strong, relieves stress, improves blood circulation, and reduces your risk for heart disease by lowering blood glucose level.

* Usually lowers your blood sugar.
* Improves insulin sensitivity, which means your body's insulin works better. Note: You may need an adjustment in your diabetes medication or insulin dose to help prevent the blood sugar from going too low. Ask your health care provider for advice.
* Reduces body fat.
* Helps to build and tone muscles.
* Lowers your risk for heart disease.
* Improves circulation.
* Preserves bone mass.
* Reduces stress and enhances quality of life.

MATERIALS AND METHOD:

Blood glucose levels of 30 patients having type 2 diabetes were checked before doing aerobics and those values were tabulated. After 60 minutes of aerobic exercise regularly for one month their blood glucose levels were checked again and those values were also tabulated . The blood glucose levels were checked with the help of accu check with the help of an expert. The exercise was done after lunch in the evening .The subjects who participated in the study are of age group 30-40.

RESULTS:

Table representing the difference in the blood glucose level in diabetic patients doing regular aerobics for 60 minutes for 1 month.

S.NO:	Blood sugar level before exercise	Blood sugar level after exercise
1	167 mg/dl	126 mg/dl
2	159 mg/dl	124 mg/dl
3	191 mg/dl	168 mg/dl
4	188 mg/dl	149 mg/dl
5	139 mg/dl	109 mg/dl
6	147 mg/dl	115 mg/dl
7	169 mg/dl	132 mg/dl
8	202 mg/dl	170 mg/dl
9	191 mg/dl	161 mg/dl
10	153 mg/dl	129 mg/dl
11	121 mg/dl	102 mg/dl
12	132 mg/dl	114 mg/dl
13	140 mg/dl	116 mg/dl
14	151 mg/dl	121 mg/dl
15	177 mg/dl	138 mg/dl
16	109 mg/dl	81 mg/dl
17	134 mg/dl	111 mg/dl
18	184 mg/dl	157 mg/dl
19	101 mg/dl	69 mg/dl
20	112 mg/dl	66 mg/dl
21	186 mg/dl	165 mg/dl
22	155 mg/dl	132 mg/dl
23	214 mg/dl	195 mg/dl
24	108 mg/dl	77 mg/dl
25	113 mg/dl	88 mg/dl
26	129 mg/dl	107 mg/dl
27	147 mg/dl	122 mg/dl
28	125 mg/dl	98 mg/dl
29	119 mg/dl	91 mg/dl
30	103 mg/dl	78 mg/dl

FREQUENCY TABLE:

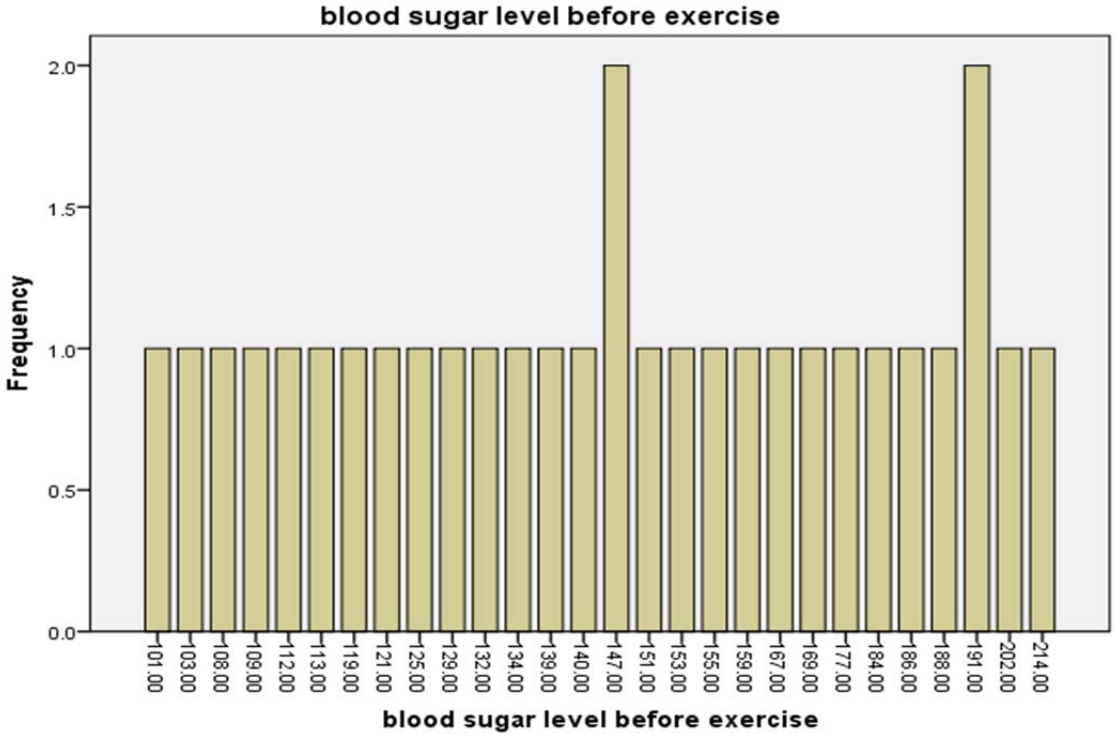
1.Table representing blood glucose level before exercise:

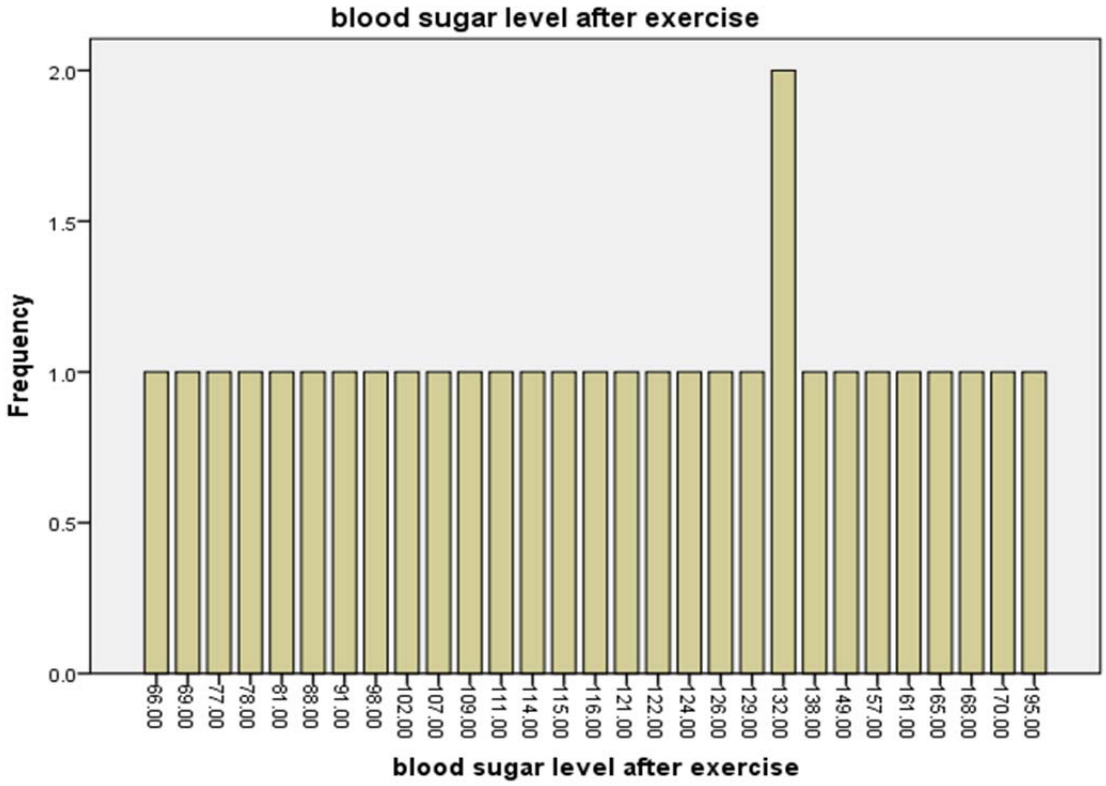
Blood Sugar Level Before Exercise				
Valid	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
101.00	1	3.3	3.3	3.3
103.00	1	3.3	3.3	6.7
108.00	1	3.3	3.3	10.0
109.00	1	3.3	3.3	13.3
112.00	1	3.3	3.3	16.7
113.00	1	3.3	3.3	20.0
119.00	1	3.3	3.3	23.3
121.00	1	3.3	3.3	26.7
125.00	1	3.3	3.3	30.0
129.00	1	3.3	3.3	33.3
132.00	1	3.3	3.3	36.7
134.00	1	3.3	3.3	40.0
139.00	1	3.3	3.3	43.3
140.00	1	3.3	3.3	46.7
147.00	2	6.7	6.7	53.3
151.00	1	3.3	3.3	56.7
153.00	1	3.3	3.3	60.0
155.00	1	3.3	3.3	63.3
159.00	1	3.3	3.3	66.7
167.00	1	3.3	3.3	70.0
169.00	1	3.3	3.3	73.3
177.00	1	3.3	3.3	76.7
184.00	1	3.3	3.3	80.0
186.00	1	3.3	3.3	83.3
188.00	1	3.3	3.3	86.7
191.00	2	6.7	6.7	93.3
202.00	1	3.3	3.3	96.7
214.00	1	3.3	3.3	100.0
Total	**30**	**100.0**	**100.0**	

2.Table representing blood glucose level after exercise:

Blood Sugar Level After Exercise				
Valid	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
66.00	1	3.3	3.3	3.3
69.00	1	3.3	3.3	6.7
77.00	1	3.3	3.3	10.0
78.00	1	3.3	3.3	13.3
81.00	1	3.3	3.3	16.7
88.00	1	3.3	3.3	20.0
91.00	1	3.3	3.3	23.3
98.00	1	3.3	3.3	26.7
102.00	1	3.3	3.3	30.0
107.00	1	3.3	3.3	33.3
109.00	1	3.3	3.3	36.7
111.00	1	3.3	3.3	40.0
114.00	1	3.3	3.3	43.3
115.00	1	3.3	3.3	46.7
116.00	1	3.3	3.3	50.0
121.00	1	3.3	3.3	53.3
122.00	1	3.3	3.3	56.7
124.00	1	3.3	3.3	60.0
126.00	1	3.3	3.3	63.3
129.00	1	3.3	3.3	66.7
132.00	2	6.7	6.7	73.3
138.00	1	3.3	3.3	76.7
149.00	1	3.3	3.3	80.0
157.00	1	3.3	3.3	83.3
161.00	1	3.3	3.3	86.7
165.00	1	3.3	3.3	90.0
168.00	1	3.3	3.3	93.3
170.00	1	3.3	3.3	96.7
195.00	1	3.3	3.3	100.0
Total	**30**	**100.0**	**100.0**	

Bar Chart





The two above tables have been used to present the data and statistics representing the levels of blood glucose before and after exercise. The bar chart shows the variation in the degree of blood sugar levels and frequency. From table1 and table 2 it has been found that the blood glucose level has been reduced due to aerobics. Therefore we can conclude that aerobics is a powerful exercise for both mental and physical health.This also prevents the individual from various cardiac problems.

DISCUSSION :

Aerobic exercise has been the mode traditionally prescribed for diabetes prevention and management. Even 1 week of aerobic training can improve whole-body insulin sensitivity in individuals with type 2 diabetes (1). Moderate and vigorous aerobic training improve insulin sensitivity (2,3,4,5), albeit for only a period of hours to days (6), but a lesser intensity may also improve insulin action to some degree (5). Training can enhance the responsiveness of skeletal muscles to insulin with increased expression and/or activity of proteins involved in glucose metabolism and insulin signalling (7,8,9,10). Moderate training may increase glycogen synthase activity and GLUT4 protein expression but not insulin signalling (7). Fat oxidation is also a key aspect of improved insulin action, and training increases lipid storage in muscle and fat oxidation capacity (11). An individual's training status will affect the use of carbohydrate during an aerobic activity. Aerobic training increases fat utilisation during a similar duration bout of low- or moderate-intensity activity done after training, which spares muscle glycogen and BG and results in a lesser acute decrease in BG (12,13). Type 2 diabetes may be associated with a decrease in lipid oxidation and shift toward greater carbohydrate oxidation at all exercise intensities (14). Resistance exercise training also benefits Blood glucose control and insulin action in type 2 diabetes. The most successful programs for longterm weight control have involved combinations of diet, exercise, and behaviour modification (15). Exercise interventions undertaken with volumes typically recommended to improve Blood Glucose control and reduce CardioVascularDiseases risk (e.g., 150 min/week of brisk walking) are usually insufficient for major weight loss , likely because obese and older people frequently have difficulty performing sufficient exercise to create a large energy deficit and can easily counterbalance expenditures by eating more (14).

CONCLUSION:

Exercise plays a major role in the prevention and control of insulin resistance, pre diabetes, GDM, type 2 diabetes, and diabetes-related health complications. Both aerobic and resistance training improve insulin action, at least acutely, and can assist with the management of BloodGlucose levels, lipids, BloodPressure, CardioVascular risk, mortality, but exercise must be undertaken regularly to have continued benefits and likely include regular training of varying types. Aerobic helps to reduce the blood glucose level in diabetic patients as it reduces the insulin sensitivity which reduces the risk of various cardiac diseases.

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