

**Original Article****Impact of Aerobic Exercises on Fasting Blood Sugar and obesity Among Type II Diabetic Mellitus****S.S.Subramanian, P.Venkatesan**

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ARTICLE INFO**Keywords:**

EET- Endurance Exercise Training

IDF – International

ACSM – American College of Sports Medicine

BMI – Body Mass Index

ABSTRACT

With an increasing prevalence of metabolic syndrome, where the role of aerobic exercises which are feasible and can be practiced by type II diabetic subjects themselves, after acquiring due skills and core techniques from physical therapist is the core of this original research study. Efficacy of aerobic exercises on obesity and fasting blood sugar are established among type II diabetic Indian subjects here.

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1. Introduction

An estimated 8.3% of world's population (Between 20-70 years of age) are living with diabetes (IDF 2013). Diabetes related health care costs were estimated to account for 11% of the global health care expenditure in 2013 (WHO 2013). India has the third largest obese population with (11%) and 30 Million Indian to be obese (Lancet 2013). Ensuring that blood glucose remains within normal limits is a key factor in preventing the increased morbidity and mortality associated with diabetes (Daily 2011). Physical activity has independent effects on glucose disposal (Good Year et al 1992). Aerobic activities help to treat or prevent over weight (Schmitz and Fery 2002). Ostergard et al (2006) have established that aerobic exercises are able to enhance glycaemic control in type II diabetic patients. ADA (2002) has recommended that type II diabetic patients perform 150 minutes of moderate intensity aerobic exercise per week. This original research study was aimed at to analyse the efficacy of aerobic exercises on fasting blood sugar and obesity among Indian type II diabetic subjects.

Materials And Methods:

This study was conducted with a sample size of 100, Group I as control and Group II as experimental. Diabetic camp was conducted in May 2010 in Chennai, known type II diabetic subjects on medication were recruited from this camp and they were allotted in random. While all the subjects continued their day to day routine activities, Group II subjects were assigned with aerobic exercises. All the subjects fasting blood sugar and body mass index were recorded prior to the study and after twelve weeks completion. The results were tabulated and analysed using due statistical means. This study was carried out

during the period from 2008 to 2013. Inclusion Criteria: Type II diabetic subjects on medication between 30-60 years age of both sex. Exclusion Criteria: Hemodynamically unstable diabetic subjects. ACSM (1991) guidelines were followed for exercises testing and prescription. The aerobic exercises as advocated by techniques of Horn Berger (1993) along with cooper and cooper (1998) principles of progression using frequency, intensity and time were adhered with.

Results:

The diagnostic criteria for type II diabetes is such that lower fasting glucose levels (>126 mg/ dl (7.0mmol/l), (Expert committee on diagnosis and classification of diabetes 1997).

Table: 1. Results of BMI the subjects with pre and post mean and paired 'T' Test.

Group I	Mean		SD	SE	P
	Pre	Post			
	28	28	.44	.06	P>.1
Group II	29	28	1.13	.16	P<.01

Table: 2 Results of Fasting Blood Sugar of the subjects with pre and post mean and paired 'T' Test.

Group I	Mean		SD	SE	P
	Pre	Post			
	146	149	3.69	.5	P>.1
Group II	143	136	25.26	4.6	P<.001

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Discussion:

Possible Mechanism of Action with aerobic exercises among type II diabetic subjects includes:

Endurance exercise training can improve insulin – stimulated glucose upto 2-3 fold in skeletal muscle (Anderson et al 2003). Increased, Daily physical activity can improve insulin sensitivity and glucose tolerance (Tumi White et al 2001). Adaptations that are responsible for the improvements in glucose regulations seen after EET include increases in capillary density, Glucose transporter is form 4 (GLUT4) content, protein kinase content, more insulin sensitive type 2 a muscle fibre yum et al 2001, HUG et al 2004. Walking is by or the most prevalent physical activity among adults and is feasible, accessible and relatively safe (Yusuf et al 1990).

Loss and weight maintenance with exercise are successfully recorded (Blair 1993). Adipose tissue loss resulting from physical activity is often from visceral than subcutaneous fat (Smith 1999) and visceral fat is strongly associated with IR and the related metabolic syndrome, hence a reduced risk of diabetes (Sigal 1996). Similar findings with mean body weight reduction of 1Kg as recorded among aerobic exercises subjects in this study with Roul et al 2010 in a 16 week study among Sedantry subjects with aerobic exercises.

Weight loss in obese individuals has been shown to improve or prevent atherosclerosis, diabetes mellitus, Ischemic heart disease and stroke (Klein et al 2004). These beneficial modifications begin to manifest with as little as a 5% drop in body weight and they continue to improve with further weight loss (Hug et al 2004). 4% drop in body weight by group II subjects in this study with aerobic exercises hence have benefited towards prevention of atherosclerosis, stroke and cardiovascular complications.

Positive association of FBG with BMI were recorded due to decreased insulin sensitivity (Slimane Mehsord et al 2012). While the reverse is also true as findings of this research study that a reduction in BMI is associated with a decrease in FBG, Drop of 4% BMI among aerobic subjects has resulted a decrease in 5% of FBS.

Conclusion:

Being safe, simple and self managing skills with aerobic exercises, once learnt from a skilled professional with due techniques is an effective means of long-term glycemic control and obesity among type II diabetes. Limitations of aerobic exercises includes learning proper techniques, progression, footwear, surface where practiced climate and environmental conditions. Limitations of this study includes lesser sample size, few parameters are studied, age group restriction duration of study, however further study with more physical means of exercises can be compared along with more measurable physical and biochemical parameters. Also sample size and duration to be increased.

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