



Research article

IMPACT OF DIFFERENT TYPES OF EXERCISE PROGRAM ON BLOOD SUGAR REGULATION AMONG DIABETIC WOMEN

Dr. SHEILA STEPHEN

Principal, Saveetha School of Physical Education, Saveetha Institute of Medical and
Technical Sciences, Chennai, Tamil Nadu.

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Abstract

The purpose of the study was to analyze the impact of selected exercise programme on Blood Sugar in diabetic women. For this purpose ninety women type II diabetic patients were selected randomly from various hospitals at Chennai. Their age ranged between 40-45 years. All the type II diabetic women subjects were assigned to two different groups say experimental group I which underwent yogic practices, experimental group II which underwent brisk walking and control group III. Each group had 30 subjects each. Control group was not given any training. The Glucose estimation is based on trinders method in which glucose oxidase (GOD) and peroxidase (POD) enzymes are used along with the Chromogen 4-aminoantipyrine and Phenol. The data obtained were analyzed by analysis of covariance (ANCOVA) to assess the significant differences among the groups between the pre test and post test on blood sugar in diabetic women. The adjusted post test mean differences among the experimental groups were tested and since the adjusted post test result was significant the Scheffe's post hoc test was used to determine the significance of the paired mean differences. The Blood sugar level of the experimental groups had significantly decreased while compared to that of the control group.

Key Words: *Yogic practices, Brisk walking and Blood Sugar.*

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Corresponding Author: Dr. Sheila Stephen
e-mail: principal.sspe@saveetha.com

INTRODUCTION

Science and Technology have revolutionized the life style of man. Increased standard of living has brought great comfort to mankind. Within a short period of about 100 years the modern medicine with its scientific approach and research has been able to unravel many mysteries which were out of reach for mankind over generations .Along with the developments, the modern man becoming submerged by a world full of concentration with large number of problems and recurrent crisis .Among these are the distortions of values, the corruption of mind, endless social problems Drug consumption and abuses stress, mental and physical ailment are increased in high rate (Davidson and Neal,1990).

Health status is usually measured in terms of life expectancy at birth, infant mortality rate, fertility rate, crude birth rate and crude death rate. These indicators of health are determined by numerous factors such as per capita income, nutrition , housing, sanitation, safe drinking water, social infrastructure, health and medical care services provided by government, geographical climate , employment status , incidence of poverty and the like (Reddy and Selvaraju 1994)

Diabetes mellitus is a constitutional disease with heritable tendencies. A disorder caused production of insulin, or by decreased ability to use insulin. Insulin is a hormone produced by the pancreas that is necessary for cells to be able to use blood sugar. The medical

name for diabetes mellitus comes with Greek and Latin roots. Diabetes comes from a Greek word that means to ‘Siphon’. The most obvious sign of diabetes is excessive urination. Water passes through the body of a person with diabetes as if it were being siphoned from the mouth through the urinary system out of the body. Mellitus comes from a Latin word that means “sweet like honey” (Strukic, 1981). In diabetes patients, sugar can cause for high blood sugar which is also from proteins by “cori cycle” which is the cause for high blood sugar in the blood even when food is not consumed.

The American Diabetes Association says there is no restriction on what exercise can do and it is the best way to prevent weight gain and cardiovascular disease. Walking is a popular and readily accessible form of moderate intensity physical activity, suitable for almost all the sedentary population. Regular walking, independent of participation in more vigorous exercise, is associated with a lower risk of coronary events (Lee et al., 2001) and type II diabetes (Hu et al, 1999). Yoga helps in the relaxation of body. An increasing number of people with diabetes mellitus are turning to yoga in an effort to keep their condition under control and improve overall quality of life. Regular practice of yoga helps to reduce levels of stress, enhance mobility, lower blood pressure and improve overall wellbeing (www.diabetes.co.uk).

Exercise is also known as physical activity and includes anything that gets

moving, such as walking in the yard. Being physically active help the human to feel better physically and mentally. Physical exercise is any bodily activity that enhances or maintains physical fitness and overall health and wellness. Frequent and regular physical exercise boosts immune system and helps to prevent the disease of affluence such as heart disease, cardiovascular disease, type II diabetes and obesity (Stempfer et al., 2000) Both vigorous exercise (i.e. running) and moderate exercise (i.e. walking) reduce the risk of type II diabetes. The more exercise taken, the greater the risk reduction. Just over three hours a week of vigorous exercise reduces the risk by 46% .Just three hours a week brisk walking reduces the risk by 42%.in other words. A daily brisk walk of thirty minutes approximately halves the risk of diabetes (www.wikipedia.com).

The liver is like a big factory that regulates blood sugar being an important chemical compound. The excess blood sugar is stored in the liver as glycogen and released when the blood sugar level lowers. Glycogen molecules are larger molecules containing thousands of glucose molecules. But glycogenolysis, individual muscle cells during exercise breakdown glycogen to glucose to provide energy for contraction. Glycogen is also broken down in liver, with the free glucose being released in to the blood stream and transported to tissues throughout the body (Power and Howley,1996).

The exercise produces biochemical changes in the cardio

respiratory system and other important alterations in body composition such as high density lipoprotein, low density lipoprotein, blood cholesterol, blood glucose and triglyceride levels.(Fox and Mathews,1981) Blood sugar concentration or glucose level refers to the amount of glucose present in the blood of a human or animal. Normally, in mammals the blood glucose level is maintained at a reference range between about 3.6 and 5.8 mM (mmol/l).It is tightly regulated as a part of metabolic homeostasis. Mean normal glucose levels in humans are about 90 mg/dl, equivalent to 5mM (mmol/l) (since the molecular weight of glucose, $C_6H_{12}O_6$, is about 180 g/mol).The total amount of glucose normally in circulating human blood is therefore about 3.3 to 7g (assuming an ordinary adult blood volume of 5 liters, plausible for an average adult male). Glucose levels rise after meals for an hour or two by a few grams and are usually lowest in the morning, before the first meal of the day .Transported via the bloodstream from the intestines or liver to body cells, glucose is the primary source of energy for body's cells, fats and oils (i.e., lipids) being primarily a compact energy store. Failure to maintain blood glucose in the normal range leads to conditions of persistently high (hyperglycemia) or low (hypoglycemia) blood sugar. Diabetes mellitus is characterized by persistent hyperglycemia from any of several causes, is the most prominent disease related to failure of blood sugar regulation (Anita and Pavan,2009).

METHODOLOGY

The purpose of the study was to analyze the impact of selected exercise programme on Blood sugar in diabetic women. For this purpose ninety women with type II diabetic patients were selected randomly from various hospitals at Chennai. Their age ranged between 40-45 years .All the type II diabetic women subjects were assigned to experimental group I, experimental group II and control group III each group consisting of 30 subjects. The experimental group I underwent Yogic Practices from 6.00 am to 6.45 am and experimental group II underwent brisk walking from 7.00 am to 7.45 am for the duration of forty five minutes from Monday to Friday (5days/week) for 12 weeks. Five to ten minute warm up and cooling down period were also included. The intensity of the training increased progressively once in four weeks from 50-60% with the duration of 20-25 min in the first week to 70-80% with the duration of 30-35 min in 8th week. No training was given to the control group. The pattern of yogic practice and brisk walking followed by the selected experimental groups are presented in the following order.

Experimental group I Loosening exercises, Suryanamaskar, Asanas, Pranayama, Meditation and Relaxation, Experimental group II -Brisk walking, Control group – No training. The method used to assess the blood sugar fasting and postprandial was “Enzyme reagent GOD and POD. The Glucose estimation is based on trinders method in which glucose oxidase (GOD) and peroxidase (POD) enzymes are used along with the Chromogen 4-aminoantipyrine and Phenol. (Ann and Trinder 1964) The pre and post test data on the selected criterion variables were collected by administering the test as per the standardized procedures before and after the 12 weeks of the training programme. The data obtained was analyzed by analysis of covariance (ANCOVA) to assess the significant differences among the groups between the pre test and post test on stress in diabetic women. The adjusted post test mean differences among the experimental groups were tested and since the adjusted post test result was significant the Scheffe’s post hoc test was used to determine the significance of the paired mean differences (Thirumalaisamy, 1995). The level of significance was fixed at 0.05.

RESULTS

TABLE – I
COMPUTATION OF ANALYSIS OF COVARIANCE OF BLOOD SUGAR
FASTING AND POSTPRANDIAL
(Scores in mg/dl)

		EXP group I	EXP group II	Control group	S V	SS	df	MS	F
Blood sugar fasting	Pre test Mean	133.97	134.37	134.93	B	14.16	2	7.078	0.54
					W	1131. 8	87	13.01	
Blood sugar postprandial	Pre test Mean	230.97	230.1	229.6	B	28.69	2	14.344	0.73
					W	1700. 87	87	19.55	
Blood sugar fasting	Post test Mean	127.4	128.63	134.37	B	829.2 7	2	414.63	42.38*
					W	851.1 3	87	9.78	
Blood sugar postprandial	Post test Mean	212.43	213.13	228.07	B	4678. 96	2	2339.4 8	86.58*
					W	2350. 7	87	27.02	
Blood sugar fasting	Adjusted Mean	127.59	128.66	134.15	B	735.7 9	2	367.89	48.37*
					W	654.1 54	86	7.61	
Blood sugar postprandial	Adjusted Mean	212.43	213.13	228.07	B	4630. 49	2	2315.2 5	84.70*
					W	2350. 69	86	27.33	

*Significant at 0.05 level, table value for df 2 and 87 is 3.1 and 2 and 86 is 3.2

The posttest means of blood sugar fasting and postprandial showed differences due to twelve weeks of yogic practices & brisk walking and control group mean values. The recorded scores for fasting were 127.4, 128.63 and 134.37

& for postprandial were 212.43, 213.13 and 228.07 respectively. The post test scores analysis proved that there was a significant difference between the groups as the obtained F value of blood sugar fasting and postprandial were 42.38 and

86.58 respectively which were greater than the required F value of 3.1 & 3.2. These values proved that the differences between the post test mean of the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical analysis. Thereby it is proved that there was a significant difference

among the means due to twelve weeks of yogic practices & brisk walking on the biochemical variables of blood sugar (fasting and postprandial).

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in table II.

TABLE – II

SCHEFFE'S POST HOC TEST ANALYSIS OF BLOOD SUGAR FASTING AND POSTPRANDIAL

	EXP group I	EXP group II	Control group	Mean difference	Required C.I
Blood sugar fasting	127.59	128.66	-	1.07	1.77
	127.59		134.15	6.56*	
	-	128.66	134.15	5.50*	
Blood sugar postprandial	212.43	213.13	-	0.7	3.36
	212.43	-	228.07	15.64*	
	-	213.13	228.07	14.93*	

*Significant

The blood sugar fasting mean difference between yogic practices group and brisk waking group was 1.07. Since 1.07 was lesser than the required Scheffe's confidential interval 1.77, the difference between the experiment groups was not significant. However, the difference between yogic practices group and control group was 6.56 while it was 5.50 for brisk walking group and control group. In both the cases the mean differences were greater than the required value of 1.77. Hence the differences were proved to be significant at 0.05 level.

The postprandial mean difference between yogic practices group and brisk waking group was 0.70. Since .70 was lesser than the required Scheffe's confidential interval 3.36, the difference between the experiment groups was not significant. However, the difference between yogic practices group and control group was 15.64 while it was 14.93 for brisk walking group and control group. In both the cases the mean differences were greater than the required value of 3.36. Hence, differences were found to be significant at 0.05 level.

training exercise regimens on type 2 diabetes shows decrease in blood glucose postprandial level. Malhotra et al., (2005)

proved that 40 days of yoga training on type 2 diabetic patients showed decrease in blood sugar postprandial.

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