Effect of Satvik Food and Physical Exercises in Lowering the Blood Sugar Level in Type 2 Diabetes

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Abstract

Introduction: Managing blood sugar levels is vital for Type 2 diabetes. To finds its way with natural means, this study was to find out the effect of Sattwik food and physical exercises in lowering blood sugar levels among type 2 diabetes.

Methodology: 60 men diabetic patients from different walks of life and being treated in Government General Hospital, Vizag, who consented to serve as subjects for this study were divided into three groups, each 20, namely Sattwik Food Group (SFG), Physical Exercise Group (PEG) and the control group. SFG followed Sattwik food Schedule with 30% grains, 20% diary product, 27% vegetables and fruits, 5% nuts and 18% pulses, cooking oil and fat formulated with detailed discussions and consultations with yogic practitioners daily and PEG group underwent Physical Exercises consisting of walking, aerobic exercises and rhythmic activities were formulated in consultation with the experts in the field in the morning 1 hour The follow-up intervening classes were conducted twice a week. The blood sugar (fasting) and blood sugar postparandial level) were measured prior to and after experimental treatments.

Results: The results of the study proved that both experimental protocols, namely, PEG and SFG significantly contributed for lowering blood sugar (postparandial) levels of type 2 diabetes compared to control group. SFG was significantly better than PEG in lowering blood sugar (postparandial). Though SFG and PEG lowered blood sugar levels of fasting compared to control group, there was no significant difference between experimental groups.

Conclusions: It was concluded that findings of this study can be used by future researchers as status reporting in lowering blood sugar levels among type 2 diabetes and the beneficial effects of physical exercise and Sattwik food for management of diabetics may be considered.

Keywords: Physical Exercise, Sattwik Food, Blood sugar (Fasting), Blood Sugar (postparandial) Type 2 Diabetic Patients

Introduction

"Life is an adventure and diabetes is just something that makes the adventure more complicated" (Hawier, 1989) Diabetes Mellitus is a constitutional disease with heritable tendencies. A disorder caused by decreased 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 cause of diabetes mellitus is unknown, but heredity and diet are believed to play a role in its development. Diabetes results when the pancreas produces insufficient amounts of insulin to meet the body's needs. It can also result when the pancreas produces insulin, but the cells are unable to efficiently use it that is, the cells have insulin resistance. Insulin is necessary for blood sugar (glucose) to go from the blood to the inside of the cells and unless the sugar enters into the cells, the body cannot produce energy. The excess sugar remains in the blood. Diabetes mellitus is the commonest endocrine disorder. (Strukic, 1981) Eating sugar increases sugar levels in the blood. It has been documented that diabetes can be controlled by proper diet. All the sugar in the blood do not form sugar that is consumed. Because sugar in the blood is necessary for cells, there is a backup source of sugar while food is not consumed. (Whichester, 1969)

The yogis of ancient times knew this, and many classical yogic texts, such as the Hatha Yoga Pradipika, contain advice on a yogic diet. However, proper diet is a controversial subject. Nutrition has been extensively researched by modern science, and there seems to be as many 'proper' diets as there are scientific studies. It is more than a bit confusing for someone to devise their own individual diet amidst so much, often contradictory, advice. Unlike modern scientists, yogis are not interested in the chemical content (protein, vitamins, etc...) of the food. Instead, food is traditionally classified according to its effect on the body and mind, using the three Gunas: Sattva (the quality of love, light and life), Raja (the quality of activity and passion, lacking stability) and Tamas (the quality of darkness and inertia, dragging us into ignorance and attachment) (Mouze, 2010)

Sattvic food promotes clarity and calmness of mind and is favourable for spiritual growth. It is "sweet, fresh and agreeable" and includes most fruits, nuts, seeds, vegetables, particularly green leafy vegetables, whole grains, honey, pure water and milk (with the reservation that commercially produced milk may not nowadays be so sattvic). Given the amount of pesticides and chemical fertilisers used on commercial crops, only organic products still qualify as Sattvic, and tinned or frozen food certainly don't. The advice given for yogic diet is based on the classical yogic texts and on the author's experience. It also gives pointers for further research and experimentation. (Mouze, 2010)

The major function of blood is the transport of oxygen from the lungs to the tissues and carbon dioxide from the tissues to the lungs. The transport of oxygen is accomplished by hemoglobin, the iron-protein molecule carried by the red blood cells. The red blood cells also contain a large quantity of carbonic anhydratse, which catalyses the reaction between carbon dioxide and water to facilitate the removal of carbon dioxide. The regular exercise results in increase in the number of red blood cells circulating in the blood. The improved oxygen carrying and waste removal capacity further increases work load capacity. (Lee, 1989)

The amount of hemoglobin, the haemotocrit and the volume percentage of the red blood cells are critical factors in oxygen association. Both hemoglobin and haematocrit levels increase with maximum exercise, largely because of increased haemo concentration, due to slight decrease of blood plasma volume. During exercise blood plasma shifts to the tissues, where it is needed to maintain water balance (McArdle et.al., 1986).

Physical exercises improves intake of oxygen. Oxygen is transported to muscles primarily by haemoglobin (Suhr F, Porten S, Hertrich T, et al. (2009). During aerobic exercise, the demand for oxygen increases at the working muscle; so an optimum level of hemoglobin is required to perform at the highest level with high intensity. Urea and uric acid accumulation is most frequently used as a measure of protein catabolism and degradation of adenonucleotides (Heitkamp HC, Wegler S, Brehme U, et al (2008). Lipids have important beneficial biological functions. These include usage of triglycerides for energy production, fat storage in adipose tissues, and usage of cholesterol as a component in phospholipids of cellular membranes or in the synthesis of steroid hormones (Kelley GA, Kelley KS.(2009). Elevated plasma cholesterol concentrations have been implicated in the development of coronary artery disease (CAD) (Halverstadt A, Phares DA, Wilund KR, et al. (2007).

Carei TR, et.al. (2010), assessed the effect of individualized yoga treatment on eating disorder outcomes among adolescents receiving outpatient care for diagnosed eating disorders and demonstrated greater decreases in eating disorder symptoms. McIver S,et.al. (2009) examined the experience of a 12-week yoga treatment program for binge eating and provided insights relevant to therapeutic processes that might occur within eating disorder interventions that draw on meditation-based approaches. Dittmann KA and Freedman MR. (2009) evaluated attitudes about body image and eating in women practicing postural yoga and found reported improvements in body satisfaction and disordered eating. Kim SD (2014) investigated the effects of yogic exercises on life stress and blood glucose levels in nursing students on twenty-seven undergraduate nursing students and gave yogic exercises intervention was undertaken for 60 minutes one day a week for 12 weeks. It consisted of physical exercise (surya namaskara) combined with relaxation and meditation (shavasana and yoga nidra). It was found yogic exercise group measurements were significantly decreased in both life stress and postprandial blood glucoselevels compared with the control group. McDermott KA et al. (2014) found significant reductions in systolic and diastolic blood pressure, total cholesterol among diabetes due to yogic practices while there were no significant differences in fasting blood glucose. Thus, the theoretical foundations laid proved that there were number of studies to find out the effect of yogic practices on biochemical variables however, the researcher found that there were further scope for research to find out the effect of Sattwik food (yogic food) compared to physical exercises in lowering blood sugar levels, both fasting and post parendial among type 2 diabetes.

Methodology

For the purpose of the study the investigator visited Government General Hospital, Visag, Andhra Pradesh and got the list of type 2 diabetic patients under treatment. Among the diabetic patients being treated, the investigator randomly selected 60 men diabetic patients, who consented to serve as subjects for this study, in view of the benefits of Sattwik Diet and physical exercises. The age group of the subjects was between 35 to 45 years. All the subjects were advised to undergo medical checkup for confirmation that they could undergo respective treatments. The subjects were divided into three groups, each 20, namely Sattwik Food Group (SFG), Physical Exercise Group (PEG). The control group (CG) was not involved in any treatment except of their routine. Sattwik food Schedule with 30% grains, 20% diary product, 27% vegetables and fruits, 5% nuts and 18% pulses, cooking oil and fat was formulated with detailed discussions and consultations with yogic practitioners and Physical Exercises consisting of walking, aerobic exercises and rhythmic activities were formulated in consultation with the experts in the field. The physical exercises were given to PEG in the morning 1 hour and for SFG sattwik food schedule followed throughout the day for twelve weeks. The follow-up intervening classes were conducted twice a week. The blood sugar base level (a) blood sugar (fasting) and (b) blood sugar (postparandial) were measured prior to experimental treatments. After experimental treatments to SFG and PEG groups post test scores were collected. The obtained data were subjected to statistical analysis using ANCOVA to test the significance. In all cases 0.05 level was fixed to test the hypothesis.

Results

Table 1: Effect of Sattwik Food and Physical Exercise on Blood Sugar (Fasting)

	PEG	SFG	CG	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	133.80	134.30	134.15	Between	2.63	2	1.32	0.05
				Within	1391.95	57	24.42	
Post Test Mean	129.65	129.70	130.85	Between	18.43	2	9.22	0.65
				Within	813.30	57	14.27	
Adjusted Post Test Mean	129.86	129.54	130.80	Between	17.19	2	8.59	9.37*
				Within	51.35	56	0.92	
Mean Diff	-4.15	-4.60	-3.30					

PEG: Physical Exercise Group; SFG : Sattwik Food Group; CG: Control Group

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.10, 2 and 56 (df) =3.10.

*Significant

Table 2: Multiple Comparisons of Adjusted Means on Fasting Blood Sugar

PEG	SFG	CG	MEAN DIFFERENCE	Reqd. C.I
129.86	129.54		0.32	0.76
129.86		130.80	0.94*	0.76
	129.54	130.80	1.26*	0.76

* Significant at 0.05 level.

Table 3: Effect of Physical Exercises and Sattwik Food on Blood Sugar Postprandial

	PEG	SFG	CG	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	225.65	227.40	226.45	Between	30.70	2	15.35	
				Within	5164.30	57	90.60	0.17
Post Test Mean	217.65	217.10	219.85	Between	84.70	2	42.35	
				Within	4828.90	57	84.72	0.50
Adjusted Post Test Mean	218.47	216.23	219.90	Between	136.15	2	68.08	
				Within	37.99	56	0.68	100.34*
Mean Diff	-8.00	-10.30	-6.60					

PEG: Physical Exercise Group; SFG : Sattwik Food Group; CG: Control Group

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.10 and 56 (df) =3.10.

*Significant

Table 4: Multiple Comparisons of Adjusted Means on Blood Sugar (Postparandial)

PEG	SFG	CG	MEAN DIFFERENCE	Reqd. C.I
218.47	216.23		2.24*	0.65
218.47		219.90	1.43*	0.65
	216.23	219.90	3.67*	0.65

* Significant at 0.05 level.

Discussions on Results

Physical Exercise is considered an acceptable method for improving and maintaining health related fitness. With the recent rise in awareness and the increased understanding of the importance of physical activity in promoting overall health, greater emphasis has been placed on improving physical fitness to enhance quality of life. Sattwik Food, a component of Yogic Practice, has been practiced by Indians for hundreds of years and is often used in place of a typical nutritional program. The results of this study proved that both experimental protocols, namely, PEG and SFG significantly contributed for lowering blood sugar (postparandial) levels of type 2 diabetes compared to control group. SFG was significantly better than PEG in lowering blood sugar (postparandial). Though SFG and PEG lowered blood sugar levels of fasting compared to control group, there was no significant difference between experimental groups. The results of this study are in agreement with the previous researches done by. Carei TR, et.al. (2010), who demonstrated greater decreases in eating disorder symptomsa and McIver S,et.al. (2009) provided insights relevant to therapeutic processes that might occur within eating disorder interventions due to yogic diet. With increased oxygen consumption due to physical exercises and regulation of eating disorders through yogic (Sattwik Food), the type 2 diabetes lowered blood sugar levels both fasting and postparandial due to Sattwik food, while physical exercise group failed to significantly lower blood sugar fasting

Conclusions

It was concluded that the findings of this study can be used by future researchers as status reporting on selected blood sugar levels among type 2 diabetes and the beneficial effects of physical exercise and Sattwik food for management of diabetics may be considered by physicians.

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