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Effect of Yogic Exercises on Serum HDL Cholesterol in Diabetes Mellitus.

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ABSTRACT

The science of yoga is an ancient one. Yoga has been claimed to be useful in Obesity, Diabetes, Hypertension and Heart disease, Asthma, Depression and Anxiety etc. The present study was planned to know the beneficial effects of yoga exercises on HDL cholesterol in diabetics. The study involved 100 diabetic persons age group 40-60 years, out of which 50 patients were randomly selected for yogic exercises. Baseline record HDL cholesterol of patients was taken before starting yogic exercises. The patients then underwent a course of yogic exercises (Pranayamas, Mandukasan) for three months. At monthly intervals the serum HDL cholesterol of patients was recorded. There was a lowering of HDL cholesterol levels ($p < 0.01$). This observation may be due to significant changes in insulin kinetics and those of counter regulatory hormones like cortisol, adrenaline and growth hormone. Thus Yogic exercises are recommended as a very cost effective useful adjunct along with medical treatments for the diabetes mellitus.

INTRODUCTION

Diabetes mellitus is now emerging as one of the major threats to human health in the 21st century [1]. Where non-communicable diseases are rapidly overtaking communicable diseases as the commonest cause of death.

Stress related increased sympathetic activity causing release of adrenaline; glucagon, growth hormone and cortisol which are antagonistic to insulin and reduced parasympathetic tone have also been implicated in the pathogenesis of insulin resistance, development and progression of type II DM and related cardiovascular complications [2].

Due to strong influence of psychosocial factors on the development of insulin resistance and Type II DM and the role of sympathetic activation in the pathogenesis of insulin resistance, there is particular interest in Yoga, an ancient mind body discipline that has been widely used in India for the management of diabetes, hypertension, and related chronic insulin resistance conditions [3].

With almost no side effects and multiple collateral lifestyle benefits^[4], yoga appears safe, is simple to learn and can be practiced by even elderly or disabled individuals^[5] with some studies indicating excellent long term adherence and benefits^[6].

There are various studies which show the beneficial effect of yoga on HDL cholesterol of the diabetic patients [7, 8, 9, 10].

The present study was undertaken to know the effect of yogic exercises on HDL cholesterol in diabetic patients as there are few studies from this part of country.

MATERIALS AND METHODS

Study Design

Prospective study was undertaken to know the effect of yogic exercises on HDL cholesterol in diabetics. A baseline record of HDL cholesterol of patients was made at the beginning of the study and then the HDL cholesterol was measured at monthly intervals for three months. The readings were compared with the heart rate at the start of yogic exercises

Study Subjects

The present study was conducted on diabetic patients of age group 40 – 60 years of both sexes randomly selected from patients attending Medicine OPD at Guru Nanak Dev Hospital, Amritsar.

Study site

Govt. Medical College, Amritsar (Punjab).

Duration of study

Study was conducted over a period of 3 months.

Number of subject/samples

Fifty patients who satisfy our inclusion criteria were included in the study.

Inclusion criteria

- Diabetes type 2 or maturity onset diabetes mellitus (NIDDM).
- Patients with age group 40-60 years.
- Patients with fasting blood glucose level between 140-180 mg percent.
- Patients not taking anti-diabetic drugs.

Exclusion criteria

- Patients with diabetic nephropathy, cardiovascular, ophthalmic and other complications of diabetes mellitus.
- Patients who are less than 40 years of age.

Informed consent procedure

Patients were informed about all the steps of research work in detail and then samples were collected with the written signed consent of the patients.

Detailed history and General physical examination

Detailed history and General physical examination as done and the whole data were collected systematically.

Ethical consideration

Approval from institutional ethical committee was also taken.

METHODOLOGY

Sample collection

Blood samples for serum HDL cholesterol were taken in the morning between 6:00 to 8:00 a.m. empty stomach. About 5 ml of venous blood sample was taken with dry disposable syringe and needle (21

gauge) under aseptic conditions by vene-puncture from ante-cubital vein in a dry sterilized vial. Blood sample were then centrifuged and serum was decanted and labelled properly. Laboratory investigations were carried out on each of the sample collected by using standard methods.

Estimation of Serum HDL Cholesterol

Serum HDL cholesterol was measured by sodium phosphotungstate magnesium chloride precipitation procedure by a modification of the method described by the Burstein et al ^[14].

Yogic exercises

The diabetics then underwent a course of yoga asana (Postures) under the supervision of a yoga expert for three months.

Yoga asana performed were:

- Mandukasan
- Pranayamas (Breathing exercises)

The daily duration of yoga was 30 minutes in the Department of Physiology, Government Medical College, Amritsar. The patients were given knowledge about illness and importance of yoga in daily life. Participants were advised to practice yoga according to their capacity, avoiding strain and discomfort of any kind. After completing the course of yoga practices heart rates recorded at monthly intervals were compared with the record at the start of yoga course.

Preparation & Precautions for doing Yoga

Yoga is not a competitive sport, and a good practice is defined as whatever one's body and mind are capable of giving on a specific day. Some peoples are however accustomed to punishing themselves hard, comparing their performances to those of others and assuming that exercise is not beneficial unless it hurts. Yoga teaches a gentle and accepting attitude toward one's body rather than punishing approach. Person should go into stretches and poses gradually, not forcibly or violently. Stretching should not be done past the point of mild discomfort, which is normal for beginners; frank pain is a warning that the body is not properly aligned in the pose or that the joints are being overstressed. Strenuous strength training is not recommended for people with uncontrolled diabetes. Such exercises can strain weakened blood vessels in patients with DM. Good preparation for yoga requires spiritual and mental readiness as well as appropriate clothing and a suitable space. Clothing should be comfortable and should allow free movement. Many practitioners of yoga begin their practice with simple breathing exercises and stretches intended to clear the mind as well as open up the lungs. All the patients were made to understand the usefulness of yoga by doing it with proper precautions.

Data management and statistical analysis

The data obtained was statistically analyzed. The mean, standard deviation and p- value of the various parameters were tabulated.

RESULTS

Out of total 50 subjects, 41 subjects reported for follow up at one month which further decreased to 39 at two months follow up and at three months there were 38 subjects. So, during the follow up study of three months, total of 12 subjects did not take part in the study till completion due to various personal reasons. The total dropout rate was calculated to be 24%. So, we have done our calculations on those diabetics who have completed our study of three months.

The data in table I revealed the mean value of S. HDL cholesterol at the beginning (P0) (45.92 ±4.70 mg%), after one month (P1) (46.55 ±3.49 mg%), after two months (P2) (47.55 ±3.57 mg%) and after three months (P3) (47.76 ±3.23 mg %) from the beginning of the yogic exercises.

Table 1: Showing the mean values and standard deviation of HDL cholesterol in mg% at the beginning and during the three months course of Yoga.

S.HDL-Cholesterol at start P ₀	S.HDL-Cholesterol at 1 st month P ₁	S.HDL-Cholesterol at 2 nd month P ₂	S.HDL-Cholesterol at 3 rd month P ₃
Mean ± S.D.	Mean ± S.D.	Mean ± S.D.	Mean ± S.D.
45.92 ± 4.70	46.55 ± 3.49	47.55 ± 3.57	47.76 ± 3.23

Table 2: Showing the comparison of HDL cholesterol at the beginning and during the three months course of yoga.

	P ₁ Vs P ₀	P ₂ Vs P ₀	P ₃ Vs P ₀	P ₃ Vs P ₁
P value	>0.05	>0.05	<0.05	>0.05
Significance	NS**	NS**	S*	NS**

(*) S – significant, (**) NS-highly significant.

DISCUSSION

Diabetes Mellitus is one of the many diseases that are precipitated by excessive stress and strain associated with modern life style. Moreover, an emerging issue is the recent increase in diagnosis of Type-2 DM and pre-diabetic conditions in children [12].

In present study, recording of HDL cholesterol was done at baseline and then at monthly intervals for a period of three months.

On comparing mean Serum HDL cholesterol level after one month, two months and three months of yogic exercises with the mean Serum HDL cholesterol level at the beginning of yogic exercises (45.92 ± 4.70 mg%), it was seen that after one month of yogic exercises the mean value increased to 46.55 ± 3.49 mg% which was statistically not significant (p>0.05). After two months of yogic exercises the mean value increased further to 47.55 ± 3.57 mg% which was also statistically not significant (p>0.05). After three months of yogic exercises (completion of study) the mean value further increased to 47.76 ± 3.23 mg % which was statistically significant (p<0.05)(Table 1&2).

It was further seen that in comparison to mean value of Serum HDL cholesterol at the beginning of yogic exercises (45.92 ± 4.70 mg %) there was increase in mean value of Serum HDL cholesterol after two months of yogic exercises (47.55 ± 3.57 mg%) which was statistically insignificant (p >0.05).

In comparison to mean value of Serum HDL cholesterol at the first month of yogic exercises (46.55 ± 3.49 mg %) there was increase in mean value of Serum HDL cholesterol after three months of yogic exercises (47.76 ± 3.23 mg %) which was also statistically insignificant (p>0.05).

Our findings are in coherence with the following studies done by different researchers:

Yogic exercises causes rise in Serum HDL cholesterol levels and lowering of serum total cholesterol, low density lipoprotein (LDL) cholesterol, very – low density lipoprotein (VLDL) cholesterol, ratio of total cholesterol to high density lipoprotein (HDL) cholesterol and total triglycerides[7].

Three month comprehensive yoga and meditation based program causes significant reduction in total serum and LDL cholesterol and elevation of Serum HDL cholesterol levels[8].

Cardiovascular parameters and lipid profile of those practicing yoga meditations were compared with those of non-meditators. Lipid profile including Serum HDL cholesterol of short and long term meditators was better than the profile of non-meditators[9].

An integrated course of yoga training was given for four days followed by practice at home showed a regular decrease in all lipid parameters and increase in Serum HDL cholesterol[10].

The beneficial effects of yogic exercises in diabetes mellitus may be due to:

- Increase in release of insulin like substance from muscle into the circulation [13].
- Reduction in the secretion of glucocorticoids due to amelioration of stress by yogic exercises.

- Change in biochemical profile-Lactate, pyruvate, adrenaline, nor adrenaline etc.
- Improvement in antioxidant status ^[14].
- Change in hormonal profile- On insulin kinetics and other counter regulatory hormones- Glucagon, growth hormone, corticosteroids ^[15].

CONCLUSION

Regular yogic exercises in maturity onset diabetes mellitus patients resulted in significant lowering of serum HDL cholesterol levels. Thus Yogic exercises are recommended as a very cost effective useful adjunct along with medical treatments for the diabetes mellitus. As the duration of this short term yoga based programs was only three months, the results would have been better, had this yoga practice been done for longer periods. So, further such studies may be planned with longer duration to know the optimum duration for which regular yogic exercises should be performed to have maximum beneficial effect of yoga in diabetic mellitus patients.

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