

## CAD RISK AND EFFECT OF YOGA IN YOUNG, HEALTHY MALES

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### ABSTRACT

**Background:** National Cholesterol Education Program (NCEP) guidelines recommend cholesterol screening as early as 20yrs. It also suggests that Risk ratio of > 3.5 is considered as risk for CAD (coronary artery disease).

**Aim:** (i) to know the lipid levels in young, healthy individuals, assess risk of CAD among them. (ii) to know the effect of yoga on lipid profiles and its effect on CAD.

**Methods :** Twenty five young healthy males of 18-25 years were selected for the study and they underwent Yoga practice for six months. Total Cholesterol (TC), Triglycerides (TG), High density lipoprotein cholesterol (HDL), Low density lipoprotein cholesterol (LDL), Very low density Lipoprotein Cholesterol (VLDL) were measured and "riskratio" (TC/HDL) was calculated.

**Results:** The risk ratio of >3.5 is noted in our subjects before practice of yoga. Significant reduction in TC, TG, VLDL, LDL, and significant increase in HDL is observed in this study. The risk ratio after practice of Yoga reduced significantly.

**Conclusion:** Our study suggests that there is a risk of CAD even in the younger age group as noted from the risk ratio >3.5 as per NCEP guidelines and the risk of CAD is reduced by regular practice of yoga as is evident from the reduced risk ratio.

**Key Words :** *Yoga, CAD, lipid profiles, TC,TG, LDL, HDL, triglyceride, Risk ratio.*

### INTRODUCTION

The word "Yoga" is derived from Sanskrit word "Yujir" means to yoke or union or to join. Yoga is the merging of individual consciousness with that of universal consciousness. The ultimate goal of Yoga is to realize ones own nature and to remain in absolute peace<sup>1</sup>. Maharshi Patanjali defined Yoga as cessation of fluctuation in consciousness. Bhagavad Gita says yoga is evenness of mind in dualities.

Today in our country, in this age of stress, people, especially the younger generation find hardly any time for

exercise or Yoga, where as in the west, the enthusiasm for exercise and fitness is at an unprecedented level, with millions of people spending countless hours and money on sports and exercise. As the practice of Yoga requires hardly any investment and has far more benefits, it can be practiced at a larger scale.

The HDL or  $\alpha$ -lipoprotein, a fraction of total plasma cholesterol has been identified as having a potentially protective effect on the development of CAD. Patients with CAD have lower levels of HDL Cholesterol than controls. It has also been observed that the HDL levels in men performing regular exercise are higher than in their more sedentary peers<sup>2</sup>. Previous study have shown that a life style which incorporates regular exercise is believed to be associated with a lower risk of development of CAD<sup>3</sup>, mild to moderate physical activity, meditation lowers serum triglycerides and raises HDL Cholesterol level<sup>4,5</sup>. There is evidence that the effect of yogic life style on some modifiable risk factors has preventive and therapeutic beneficial effect<sup>6</sup>. It is likely that certain lipoproteins ratios are more valid as criteria for risk of CAD than individual lipoprotein levels. One of these ratios is TC/HDL, which is clinically popular as "Risk Ratio". It has been reported that TC / HDL ratio is decreased by physical activity<sup>7,8</sup>.

The NCEP guidelines recommend cholesterol screening as early as 20yrs. It also suggests that Risk ratio of > 3.5 is considered as risk for CAD (coronary artery disease)<sup>9</sup>. As most lipid research focuses on people over the age of forty-five, this study was undertaken to know the lipid levels in young, healthy individuals, to assess risk of CAD among them and to study effect of Yoga on lipid profiles and its effect on CAD.

### MATERIALS & METHODS

Twenty five apparently healthy males of age group 18-25 years were selected for the study. The subjects were briefed about the study protocol and informed consent was obtained from them. Ethical clearance was obtained from the concerned institution.

The method of the study consisted of taking a detailed clinical history. An attempt was made to elicit the health status, by noting the present history, past

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history and family history. The personal history of the subject was taken and a detailed diet history was elicited. A thorough general and systemic examination was done.

The subjects were selected on the following criteria;

The inclusion criteria were; 1) males of age group of 18-25 years, 2) previously not exposed to any long term exercise, sports or yogic postures, 3) subjects who agreed not to change their life style during the study period.

The exclusion criteria were; 1) History of Diabetes, Hypertension and any other chronic illness. 2) smokers and alcoholics.

The following parameters were measured: Weight, Height, Body Mass Index (BMI), Body Surface Area (BSA) and Lipid profile. Lipid profile was estimated using a fully automated chemistry analyzer. The blood samples were collected between 7:00 a. m and 9:00 a.m morning after a 10-12 hr overnight fasting, by venipuncture technique in the antecubital vein. The following were measured; TC, TG, HDL, LDL, VLDL and "risk ratio" was calculated by formula TC / HDL.

All the above parameters were recorded before and after 6 months of practice of Yoga. The first reading was taken before the participants started Yoga, denoted by '(Y1)' and the final reading was recorded after the participants of Yoga Group completed 6 months of Yoga practice, denoted by '(Y2)'.

#### YOGA TRAINING & PRACTICE PROGRAMMES

All the subjects participated in this training programme, daily for a period of 1 hour for 6 days a week, over a period of 6 months. These sessions were conducted by a qualified yoga teacher. The first one month consisted of elementary asanas. For the next two to three months, new asanas were included along with the elementary asanas. Not all asanas were repeated daily, but they were repeated once in a week. The Yoga group was taught around 25 to 30 asanas, 4 pranayama, 3 Kriyas and Meditation.

The daily schedule consisted of 15 to 20 asanas, pranayama and Shavasana. Each asana was performed for a period of 1-2 minutes including 30 sec rest. These asanas were performed for 30-40 minutes, Pranayama for 10-15 minutes, and meditation for 5-10 minutes.

The subjects were also taught Yoga philosophy (Achara and Vichara) of Yoga. The subjects took about a month to learn the different Yoga practices and as such, the six months period did not include the period of learning.

The data obtained was subjected to statistical analysis using students' paired 't' test. p value of less than 0.05 was accepted as indicating significant difference between compared values.

#### RESULTS

The first set of readings were taken before the start of Yoga practice, and denoted by 'Y1' indicating pre-Yoga recordings. The final reading was recorded after the participants of Yoga group completed the Yoga course i.e. at the end of 6 months and denoted by 'Y2' indicating post Yoga recordings.

**TABLE - 1 PHYSICAL BIODATA OF SUBJECTS**

	Mean $\pm$ SD
AGE	21.64 $\pm$ 2.56
WEIGHT	56.4 $\pm$ 5.16
HEIGHT	168.36 $\pm$ 6.63
BMI	19.92 $\pm$ 2.86
BSA	1.74 $\pm$ 0.08

**TABLE – 2 PHYSIOLOGICAL & BIOCHEMICAL PARAMETERS**

	Y1	Y2	Y1-Y2 p value
TC mg/dL	170.2 $\pm$ 35.82	144.52 $\pm$ 24.46	<0.001
TG mg/ dL	143.76 $\pm$ 25.29	130.26 $\pm$ 26.82	<0.001
HDL mg/dL	42.8 $\pm$ 10.2	63.2 $\pm$ 19.03	<0.001
VLDL mg/dL	28.76 $\pm$ 10.2	26.08 $\pm$ 5.34	<0.001
LDL mg/dL	99.79 $\pm$ 29.46	55.22 $\pm$ 22.5	<0.001
TC / HDL	4.09 $\pm$ 0.85	2.44 $\pm$ 0.63	< 0.05

The results showed that there was a significant reduction in TC, TG, LDL, VLDL (<0.001) and a significant increase in HDL (<0.001). The 'Risk ratio' TC / HDL reduced significantly (p<0.05).

#### DISCUSSION

Many studies in the past have focused on the middle or elderly age group for the assessment of risk for CAD. The present study was undertaken to assess the risk of CAD in younger age group (18-25years). The effect of Yoga was also assessed in the same subjects.

Lipson et al<sup>4</sup> observed significant reduction in the TC levels following exercise. In our study, we observed

significant reduction in TC levels following 6 months of Yoga practice ( $p < 0.001$ ). Though TC has become less important in the prediction of disease than LDL and HDL, it serves as a valuable screening measure used to recommend further testing<sup>4</sup>. TC tends to reflect average dietary habits that affect LDL, and can reasonably provide an assessment of risk in the participants.

We noted a significant reduction in TG levels following Yoga ( $p < 0.001$ ). It has been understood that high TG levels were the result of elevated TC and lower levels of HDL cholesterol<sup>10,11</sup>, but recent studies have found elevated TG levels as independent predictor of CAD<sup>9,12,13,14</sup>.

A significant reduction was noted in LDL levels ( $p < 0.001$ ). The NCEP report<sup>9</sup> identifies LDL as the single greatest lipid predictor of CAD. Evidence from NCEP supports the need for intervention programs that target LDL levels in younger population. Accordingly, the greatest absolute diminution of risk for heart disease can be achieved by the reduction of LDL which may directly lower platelet aggregation, vascular reactivity, and lower cytokine release leading to a further reduction in risk for myocardial infarction.

Strong epidemiological evidence links low levels of serum HDL cholesterol to increased CAD morbidity and mortality. A low HDL-cholesterol level is strongly and inversely associated with risk for CAD<sup>4,5</sup>. High HDL-cholesterol levels conversely convey reduced risk. Epidemiological data taken as a whole signify that a 1 percent decrease in HDL cholesterol is associated with a 2–3 percent increase in CAD risk<sup>15</sup>. There was a significant increase in HDL levels in our study after 6 months of Yoga practice.

A significant decrease in TC / HDL ratio after 6 months was noted in our study. Previous studies show that the TC / HDL ratio is a powerful predictor of CAD risk<sup>7,8</sup> and this "cholesterol ratio" is a simple approach for lipid risk assessment as this ratio reflects two powerful components of risk<sup>9</sup>. The findings of this study suggest a strong need for education on the importance of daily activity in this case, regular practice of yoga to increase HDL levels. The risk ratio initially was  $4.09 + 0.85$  and after practice of Yoga reduced significantly to  $2.44 + 0.63$  ( $p < 0.05$ ). Our study suggests that there is a risk of CAD even in the younger age group as noted from the risk ratio which is  $> 3.5$  as per NCEP guidelines and the risk of CAD is reduced by regular practice of yoga as is evident from the risk ratio ( $2.44 + 0.63$ ) after practice.

## CONCLUSION

This study was undertaken to know the risk of CAD in young, healthy males and effect of yoga practice

on CAD risk in them. Our study noted that before the practice of yoga, the subjects were having risk of CAD and practice of yoga lead to a decreased risk of CAD as per NCEP guidelines. There was a significant reduction in LDL which according to the NCEP report is the primary target of cholesterol-lowering therapy. The 'Risk ratio' which is a powerful predictor of CAD risk decreased significantly. From this study we can conclude that regular practice of yoga can bring about favorable changes in the lipid profiles and can decrease the risk of CAD. It is time to increase awareness of yoga and its benefits in the younger population.

## LIMITATIONS

i) Sample size of the current study was small. ii) Only male subjects were included in this study. iii) Uniformity of diet could not be maintained. Further research in this direction is required.

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