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Cardiovascular Risk Factors Assessment in Individuals Performing Yoga And Residing in State of Delhi.

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Abstract: *Objectives: Cardiovascular disease (CVDs) is the leading cause of mortality and morbidity worldwide. There are no words to emphasize the role of primary prevention in pathogenesis of CVDs. The role of exercise in reducing the incidence or decreasing the severity of CVDs is undeniable. The sole purpose of this study is to explore and compare the changes in physiology in individuals performing yoga, with aid of certain parameters (BMI, Pulse Rate, Systolic and Diastolic blood pressure, HDL, Cholesterol, triglyceride) and who knows that with an extensive study we might discover yoga as a potential key that can alter the Natural Course of the CVDs.*

Methodology: *A Cross- Sectional study with 100 individuals; 50 in each group i.e. performing yoga regularly for more than 6 months and started performing yoga for less than 6 months or irregularly from the day of enrollment. The individuals were enrolled till the sample of 50 was achieved in each group.*

Results: Subjects in group performing yoga regularly >6 months showed lower pulse rate i.e. mean 79.44 ± 8.36 and higher HDL i.e. mean 43.58 ± 8.83, also it has p value < 0.05. BMI, fasting blood sugar and diastolic blood pressure were also better in yoga group >6 months as though the difference was not statistically significant. There was no clear evidence of a difference between groups for cholesterol, triglyceride and systolic blood pressure with p value is also >0.05.

Conclusion: *The study certainly showed that there is difference in the parameters between the two groups, which signifies that Yoga definitely alters the Human physiology. Our study encourages that there should be an extensive study to determine the direct physiological changes and correlate the role of yoga in prevention of CVDs.*

Keywords: *BMI- Body Mass Index, FBS- Fasting Blood Sugar, Cholesterol, Triglyceride, HDL- High Density Lipoprotein, Systolic Blood Pressure, Diastolic Blood Pressure.*

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I. Introduction

Yoga is the physical, mental and spiritual discipline that aims to achieve permanent peace. By performing yoga the oxygenation of body is increased. The aim of various yoga practices do not limit themselves just to achieve mental rest and decreasing the body weight, they tend to achieve optimum capacity of various body organs and a coordinated functioning among each other, a perfect modality to fit the various criteria applied for definition of "HEALTH" Certain disciplines of yoga like SETU BANDH decreases weight. Meditation helps in release of stress. So, yoga might be helpful in reducing the risk of cardiovascular diseases (CVDs). Neither the etiology nor prevalence matters for cardiovascular diseases more than the fact that, once occurred, one has to live with the disease. All can be done is to prevent and control it. There are modifiable and non-modifiable risk factors of cardiovascular diseases. Low physical activity, obesity, occupational stress or stress otherwise, personality 'A' disorder are some of the modifiable risk factors.This being an important problem in India and at the same time a modifiable factor, the topic has been chosen to understand one of the important thrust areas of public health in India.Cardiovascular diseases (CVDs) are one of the leading causes of mortality in the world [1]. More than 17 million people are dying because of CVDs [1]. Also the burden of CVDs has increased over past a few years on contrary to most of communicable diseases where disease burden is showing a decreasing trend. This is because of our changing lifestyle pattern. In India approximately 46.9 million people suffer from CVDs. During 2008, 2.33 million in India died of CVDs [2]. It is not only the leading cause of mortality but also posing a great economic burden in our society. Intensive measures are being undertaken globally to screen the disease

and treat at its earliest stage. Looking at the situation from consumer point of view, first of all majority of the population are still undiagnosed and among diagnosed the proportion of population taking treatment is less. Thus considering the burden of CVDs both economic and social, it wouldn't be wrong to say that prevention both primodial and primary are undoubtedly the best measure one can project towards being less vulnerable to manifesting the disease."The road to healthy heart is short: MAKE SMART CHOICES".Since CVDs are chronic illnesses, that does not only require control by medical and surgical intervention but also requires lifestyle modifications. Thus yoga not only forms the part of prevention but also should a force in increasing concept of "SELF CARE".There is limited published data focusing on risk factors of CVDs among the individuals regularly performing yoga for more than a year and not performing yoga regularly or started recently (at least duration of last 6 months from date of start of study), especially in metropolitan city. This study aims to identify the difference in the risk factors of CVDs in these groups of individuals.Though there is limited data published in this topic, still few of them have been carried out successfully and the results are published in many articles and journals. The type of study design vary widely among these studies, there is also variation in aim of the studies i.e. different study focusing on different parameters and also the manner that those were carried out.

Many of them have shown data which evidently suggest that yoga is a potential tool in decreasing the development of cardiovascular risk factors. Bearing the obvious fact in mind that CVDs are multifactorial one cannot rule out the effect of other factors present in a particular individual at the time of study. Also since the study is done in small sample size extrapolation of the results on the entire community is difficult.In a study conducted by Hartley L [3] yoga is suggested as an effective strategy in the primary prevention of CVD. Yoga was found to produce reductions in diastolic blood pressure and triglyceride.Yoga therapy significantly improved the parasympathetic activity and decreased the sympathetic activity in heart failure patients. This was concluded in a study by Krishna BH et.el. [4] Where significant decrease in heart rate, blood pressure, LFnu and LF-HF ratio and HFnu increased significantly in yoga group as compared to control group was seen. The methodology of this study is different. In this the parameters were compared not only between the yoga group and control group but also the parameter of a single individual was assessed before and after. The results were concluded as increase or decrease in the parameters and the difference was compared with that of control group. In this manner we are not comparing one individual with another who are subject to influence the result because of presence of different factors in them rather the change in parameter of both the groups were compared.

In a study by Sarvottam K et al [5] suggest that even a short-term yoga-based lifestyle intervention may be an important modality to reduce the risk for CVD as indicated by weight loss, reduction in systolic blood pressure, an increase in adiponectin, and decrease in IL-6 in overweight and obese men. The point to be highlighted in this study is, it is standardized by selecting a specific group to study i.e. obese men, thus ensuring that each of the subjects have common risk factor of high BMI among them. The results showed reduction in BMI (26.26±2.42, 25.69±2.47 kg/m (2), $p<0.001$, respectively). So, yoga does not only protect individual from developing risk factors, even if the subject has already been predisposed to one or more risk factors, as assuming everyone in this era, yoga can be considered as one of the final resort of saving ourselves from the plight of CVDs morbidity.A meta-analytic study by Cramer H et.el [6] with huge number of participants (3168) showed significance of yoga as an ancillary intervention for the general population and for patients with increased risk of cardiovascular disease. Since number of subjects are huge, the results can be considered close to general population.Reduction in blood sugar and lipid profile is evidently shown by Kanta Pr. Pokhariyal & Dr. Kamakhya Kumar [7] in study group of 70 subjects. The subjects were a heterogeneous group having Diabetes, Hypertension, Obesity and joints problem but otherwise healthy. The heterogeneity of group with already predisposition to one or more risk factors had an inevitable confounding role in the results. But selection of perfect controls in terms of exposure is difficult, thus as per feasibility criteria heterogeneous groups are mostly taken for study. There are some similar kinds of studies which showed the beneficial effects of yoga in the improvement of lipid profile. [8-13]Some of the studies are retrograde while some were prospective, where one of the sample group was subjected to yoga practices and there parameters were compared before and after. In some study the beneficial effect of yoga was shown on healthy individual, implying the protective effect while on other improvement on the parameters in CVD patients. How so ever, the effect of yoga has been provided with high confidence level.Despite of all the complexity in the occurrence of CVDs, this study has tried its best to conduct it in a simple manner and comment upon the cardio-vascular risk profile of the individuals performing yoga.

II. Material And Methods

Type of study: Observational and descriptive**.**
Study design: Cross-sectional study.
Study site: Lady Hardinge Medical College (LHMC) yoga out-patient department (OPD) under Central Council for Research in Yoga and Naturopathy(CCRYN).

Duration of study: 01-09-2014 to 10-10-2014
Study population: All individuals of either sex and of age ≥ 30 years performing yoga in yoga centers (OPD's under central council for research in yoga and naturopathy) of New Delhi.
Sample Size: Individuals performing yoga: for at least 100 subjects will be included in from yoga centers in New Delhi.
Selection Criteria: 1. Age: 30 years or more

2.1 Gender: Both male and female
Individuals performing yoga regularly i.e. for at least more than last 6months and residing in New Delhi.
4. Individuals not performing yoga regularly or started recently (duration is less than 6 months from date of start of study), and residing in New Delhi.
5. Individuals with no history of current cardiovascular emergencies.
Consent: The objective and procedure of the study will be explained to the subject and written consent will be obtained prior to the study.

Sampling: We first asked the individuals about the duration of start of yoga and then selected 100 individuals; 50 in each group i.e. performing yoga regularly for more than 6 months and started performing yoga for less than 6 months from the day of enrollment. The individuals were enrolled till the sample of 50 was achieved in each group.

Sample collection: All individuals aged 30 years or above and attending LHMC yoga OPD (under central council for research in yoga and naturopathy) were included in the study. The parameters and blood sample was taken under supervision of the guide, undertaking all the measures of precautions as per universal precautions guidelines. The instruments used were first set to zero error and then was applied to subjects.
Blood sample was collected in the yoga opd and was sent to process in the biochemistry lab with complete information of subjects on respective sample. The bio-medical waste generated, were disposed according to standard guidelines. The biochemical results were collected on same day.

2.2 Data collection procedure and instrument used: Data was collected from the selected subjects first by Interview technique, using pre-formed, semi-structured, pre-tested questionnaire. Then for further measurement following instruments were also used.
1. Weighing machine.
2. Digital blood pressure apparatus.
3. Height measuring scale.
4. Inch tape.

2.3 For sample collection:
1. Red and grey vacutainers.
2. Gloves.
3. Sterile cotton.
4. Isopropyl alcohol.
5. Rubber cuff.
6. Color coded disposal bags.
7. Hub cutter.
8. Tray for carrying vacutainers.
9. Disposable needles & Syringes.

2.4 Plan of analysis/ statistical tools:
1. All data in the questionnaire will be coded and entered into Statistical Package for the Social Sciences (SPSS) version 12.0.
2. Percentages and proportion will be used for analyzing the data.
3. Chi-square test was used for analyzing qualitative variables and unpaired 't' test was used for analyzing quantitative variables.
4. The statistical level of significance will be set at $p < 0.05$ as significant.

III. Results And Observations

Table 1: Subjects characteristics and lifestyle including Diet and Exercise.

Characteristics of study subjects		Duration of Yoga		Total
		<6months	>6months	
Sex	Female	47(94 %)	45(90%)	92
	Male	3(6%)	5(10%)	8
Diet	Vegetarian	33(66%)	26(52%)	59
	Non-vegetarian	17(34%)	24(48%)	41
Salt intake	Extra	17(34%)	21(42%)	38
	Not-extra	33(66%)	29(58%)	62
Physical activity	Sedentary	32(64%)	22(44%)	54
	Moderate to strenuous	18(36%)	28(56%)	46
Average servings of fruits/vegetables	Less than 3 times	13(26%)	13 (26%)	26
	3-5 times	3(6%)	8(16%)	11
	More than 5 times	34(68%)	29(58%)	64

Table 2: Distribution of subjects as per family history of heart attack, cardiovascular accidents (CVA), hypertension (HT)

Significant family history among study subjects		Duration of Yoga		Total
		<6months	>6months	
Family History of heart attack	Yes	4(8%)	3(6%)	7
	No	46(92%)	47(94%)	93
Family History of Cardio-vascular accidents	Yes	2(4%)	1(2%)	3
	No	48(96%)	49(98%)	97
Family History of Hypertension	Yes	5(10%)	5(10%)	10
	No	45(90%)	45(90%)	90

In the above table most of the subjects reported of not having any family history of heart attack, cardiovascular accidents and hypertension. The distribution of subjects as per status of family history were comparable in both groups but there is no statistical difference as p value (by chi-square test) is >0.05.

Table3: Distribution of different risk parameters among study subjects (Mean and SD).

Variables	Group	Mean 1)	Standard Deviation	P value (unpaired t test
Age	<6months	43.20	9.254	**.011**
	> 6months	47.92	8.873	2)

Body mass index (BMI)	<6months	30.26	5.66	.887
	> 6months	30.12	4.06	3)
Pulse	<6months	87.96	10.298	**.000**
	> 6months	79.44	8.360	4)
Fasting blood sugar	<6months	107.04	34.329	.236
	> 6months	99.73	25.679	5)
Cholesterol	<6months	178.24	39.142	**.008**
	> 6months	198.68	36.031	6)
Triglyceride	<6months	139.90	51.971	.316
	> 6months	151.00	57.946	7)
High density lipid	<6months	39.72	8.624	**.029**
	> 6months	43.58	8.839	8)
Systolic BP	<6months	125.76	15.004	.444
	> 6months	128.14	15.959	9)
Diastolic BP	<6months	82.00	9.551	.673
	> 6months	81.26	7.848	10)

Subjects in group performing yoga regularly >6 months showed lower pulse rate i.e. mean 79.44 ± 8.36 and higher HDL i.e. mean 43.58 ± 8.83. Also it has p value < 0.05. So, the difference was also statistically significant.BMI, fasting blood sugar and diastolic blood pressure were also better in yoga group >6 months as shown by averages in the table though the difference was not statistically significant.Whereas cholesterol, triglyceride and systolic blood pressure mean were higher in >6 months group (but the p value is also >0.05). This might be because the participants in yoga group have mean higher age more than the participants in < 6 months group.

IV. Discussion

In our study, subjects in group of performing yoga for >6 months shows lower pulse rate (mean 79.44 ± 8.36) and the difference was statistically significant. Similar results suggesting that Yoga therapy significantly improves the parasympathetic activity and decreases the sympathetic activity in study carried by Krishna BH et.al. [4]. But on contrary, this study also showed improvement in blood pressure level though significance value has not been mentioned. In our study there is decrease in diastolic blood pressure but was not statistically significant.BMI (mean=30.12± 4.06) and diastolic blood pressure (mean=81.26±7.848) were also better in yoga group >6 months as shown by averages in the table but the difference was not statistically significant. Whereas, weight loss, reduction in systolic blood pressure, an increase in adiponectin, and decrease in IL-6 in overweight and obese men with high confidence level was shown in study by Sarvottam K et al [5]. Also, There was no clear evidence of a difference between groups for cholesterol, triglyceride and systolic blood pressure with p value is also >0.05. Whereas lots of study have suggested that yoga-based lifestyle intervention to be an important modality to reduce the risk for CVDs as evidently shown by improvement in lipid profile [8-13]. The source of for deviation of the results from these studies can be the difference in age, as the participants in yoga group have mean age and salt consumption more than the participants in < 6 months group. So, this might be the reason for the subjects having a higher cholesterol, triglycerides, and high systemic blood pressure. The point to note here is though the mean values of cholesterol, triglyceride and systolic blood pressure is higher in individuals performing yoga for > 6 months which can be attributed to higher mean age in this group but the mean values in both the groups are within the reference range, there may be a possibility that these factors are benefited by yoga in both the groups.

V. Conclusion

Subjects in group performing yoga regularly >6 months showed lower pulse rate i.e. mean 79.44 ± 8.36 and higher HDL i.e. mean 43.58 ± 8.83, also it has p value < 0.05. BMI, fasting blood sugar and diastolic blood pressure were also better in yoga group >6 months as though the difference was not statistically significant. There was no clear evidence of a difference between groups for cholesterol, triglyceride and systolic blood pressure with p value is also >0.05. The study certainly showed that there is difference in the parameters between the two groups, which signifies that Yoga definitely alters the Human physiology. Our study encourages that there should be an extensive study of direct physiological changes and correlate the role yoga in prevention of CVDs36% and 56% subjects in <6months and >6 months group respectively performed moderate/ severe activities. 48% and 52% subjects in <6months and >6 months group respectively occasionally take fast foods. 84% and 90% subjects in <6months and >6 months group respectively have fruits intake at least once a week.The above data concludes that individual performing yoga for > 6 months have better awareness and healthy practices in context to their adherence to moderate/ strenuous activities, occasional fast food intake and fruits intake at least once a week than the group performing yoga < 6 months or irregularly.

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Conflict Of Interest

None

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