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Analysis of the Changes on High Density Lipoprotein Cholesterol in Response to Yogic Practices among Middle aged Men and Women of Different age Groups

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Abstract

The intention of this investigation was to examine the changes on high density lipoprotein cholesterol in response to yogic practices among middle aged men and women of different age groups. To achieve the purpose of this study sixty middle aged people were selected, in which 30 subjects were men and remaining 30 subjects were women. They were further categorized into four sub-groups of 15 subjects each. The first one is 40-44 age groups of men and women separately and another one 45-49 age groups of men and women separately. The selected participants were the inhabitants of Guntur, a metropolitan city in the State of Andhra Pradesh, India, and they were in the age group of 40 to 49 years. Random group design was used for the study, as it was most appropriate technique. The high density lipoprotein cholesterol was selected as dependent variables for the study. During the training period, the experimental groups underwent yoga training six days a week for twelve weeks. The data collected from different age category of men and women before to and after the completion of the training period were statistically analyzed for significant difference if any, by applying dependent 't' test. To eliminate the influence of pretest, the net mean gains were computed separately. The paired mean gains of groups were tested for significance by applying independent 't' test. Three-way analysis of variance was used to find out the influence of each factor independently and also their combined influence on each of the selected variables. The level of confidence was fixed at 0.05 for significance. The result of the study reveals that due to the effect of yoga training the high density lipoprotein cholesterol of 40-44 and 45-49 age category men and women were significantly increased. It also confers the existence of insignificant difference on high density lipoprotein cholesterol among gender in relevance to different age categories during pre and post tests.

Keywords: Yogic practices, High density lipoprotein cholesterol.

Introduction

Middle age is the stage of life when physical decline has started but a person cannot be called old. Various attempts have been made to define this age, which is around the third quarter of the average life span of human beings. According to Collins Dictionary, this is usually considered to occur approximately between the age of 40 and 60. The US Census lists middle age as including both the age categories 35 to 44 and 45 to 54. In this study 60 middle aged people, between the ages of 40 to 49 were selected as subjects. Recent research has shown that mind plays a more vital role in ensuring total health. Yoga is an effective way of dealing with mind, which in turn helps in dealing with any psychosomatic diseases/disorders like Hypertension. Yoga and meditation has helped to control blood pressure. Adopting a proper life-style and doing Yoga - a way of life, one can surely prevent as well as cure hypertension. Yoga is also beneficial in speedy rehabilitation of a patient. Past research has been found a wide range of health benefits for yoga, including reduced hypertension and obesity. But these studies have not focused on people with multiple health problems. Studies also suggest that practicing yoga might have other health benefits such as reducing heart rate and blood pressure. Researches also proved that yogic exercises significantly alter blood glucose, blood cholesterol, blood lipids and other benefits to different population. Thus, yoga places an important role in reducing the blood glucose level by increasing the level of secretion of insulin.

Though yogic exercises develop most of the components of fitness, it is expected that it will have an effect on lipid, lipoproteins and physiological parameters. Some modern texts seem to indicate that yogic exercises will strengthen all organs and all physiological functions of the body. Research work on the development and maintenance of lipid, lipoproteins and physiological functions of human being is an important area which requires a lot of investigation. By considering the above literature, in this study, an attempt has been made to analyze the changes on selected lipid, lipoproteins and physiological parameters due to the

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effect of performing selected yogasanas in middle aged people.

Methodology

Selection of the Subjects

The purpose of the study was to analyze the changes on mean arterial pressure in response to yogic practices among middle aged men and women of different age groups. To achieve the purpose of this study sixty middle aged people were selected, in which 30 subjects were men and remaining 30 subjects were women. They were further categorized into four sub-groups of 15 subjects each. The first one is 40-44 age groups of men and women separately and another one 45-49 age groups of men and women separately. The selected participants were the inhabitants of Guntur, a metropolitan city in the State of Andhra pradesh, India, and they were in the age group of 40 to 49 years. Random group design was used for the study, as it was most appropriate technique. All the subjects selected for this study were subjected to medical evaluation and certification from a doctor ensuring their health capacities to undergo the training programme. The requirement of the project was explained to all the subjects and all of them agreed voluntarily to undergo the testing and training programme.

Selection of the Variables

As for as this study concern the yoga training is an independent variable. Yoga is our ancient living art and good training. Yoga training is one of the methods of the overall physical training programme for young and old people. So the researcher thinks and selects yoga training for improving circulatory efficiency. Almost all public health researchers and clinicians agree that prevention could be the key strategy for controlling the current epidemic of hypertension. Until now, most approaches have focused on changing the behaviour of individuals exercise and it seems that these strategies have had little impact on the growing increase of the hypertension. Numerous scientific studies have reported beneficial physiological changes after short and long term yoga training. Yoga is an integral part of modern training and may be performed either in a slow or rapid manner. As there are few studies on yoga, the investigator selected yoga training as independent variable in order to determine its possible beneficial effect on mean arterial pressure among middle aged people.

Training Programme

Based on the results of the pilot study the training programme was designed. In this study, training was done under close supervision with frequent adjustments in training load to maintain the desired training stimulus. The training programmes were scheduled for one session a day, each session lasted between one hour to one and half hours approximately including preparation and relaxation. During the training period, the experimental groups underwent yoga training six days a week for twelve weeks. The yogasana exercise included in this training programme were Sugasana, Vajrasana, Viparitakarani, Sarvangasana, Bhujangasana, Matsyasana, Ardha matsyendrasana, Trikonasana, Vrksasana, and Savasana respectively. The training programme was conducted in the evening sessions from 5 `O`clock onwards.

Collection of the Data

The pre test data was collected prior to the experimental treatment and post test data was collected after twelve weeks of yoga training from the different age categories of middle age men and women groups on mean arterial pressure.

Experimental Design and Statistical Technique

The experimental design used for this study was random group design involving sixty middle aged people, in which 30 subjects were men and remaining 30 subjects were women. The data was collected from different age category men and women before and after the completion of the training. The application of dependent ‘t’ test, to eliminate the influence of pretest, the net mean gains are computed separately. The paired mean gains of groups are tested for significance by applying independent ‘t’ test. Three-way analysis of variance is used to find out the influence of each factor independently and also their combined influence on each of the selected variables. Data where calculated with the help of SPSS package.

Result

The descriptive analysis of the pre and post test data showing mean and standard deviation and ‘T’ ratio on mean arterial pressure of men and women of different age groups is presented in table-I.

Table I. Descriptive Analysis of the Data and 'T' Ratio on Mean Arterial Pressure of Men and Women of Different Age Groups

Gender	Age Category	Test	Mean	Standard Deviation	Mean Differences	'T' ratio
Men	40-44 years	Pre test	99.03	3.92	4.43	6.32*
		Posttest	94.60	2.65		
	45-49 years	Pre test	98.10	4.49	3.07	3.52*
		Posttest	95.02	3.61		
Women	40-44 years	Pre test	96.40	4.08	2.77	7.35*
		Posttest	93.62	3.69		
	45-49 years	Pre test	93.90	2.89	1.97	7.41*
		Posttest	91.93	2.38		

**Significant at 0.05 level*
The table value required for significant for df 14 is 2.14.

Table-I shows that the pre-test and post test mean and standard deviation values on mean arterial pressure of 40 to 44 age category men yoga training group are 99.03 $\pm$ 3.92 and 94.60 $\pm$ 2.65 respectively. It resulted with a mean difference of 4.43. The obtained 't' ratio is 6.32 and it is higher than the table value of 2.14 required for significance at 0.05 level for df 14. Hence, it is concluded that due to the effect of yoga training the mean arterial pressure of 40 to 44 age category men was significantly decreased. The pre-test and post test mean and standard deviation values on mean arterial pressure of 45 to 49 age category of men yoga training group are 98.10 $\pm$ 4.49 and 95.02 $\pm$ 3.61 respectively. It resulted with a mean difference of 3.07. The obtained 't' ratio is 3.52 and it is higher than the table value of 2.14 required for significance at 0.05 level for df 14. Hence, it is concluded that due to the effect of yoga training the mean arterial pressure of 45 to 49 age category men was significantly decreased. Table-I also shows that the pre-test and post test mean and standard deviation values on mean arterial pressure of 40 to 44 age category of women yoga training group are 96.40 $\pm$ 4.08 and 93.62 $\pm$ 3.69 respectively. It resulted with a mean difference of 2.77. The obtained 't' ratio is 7.35 and it is higher than the table value of 2.14 required for significance at 0.05 level for df 14. Hence, it is concluded that due to the effect of yoga training the mean arterial pressure of 40 to 44 age category women was significantly decreased. The pre-test and post test mean and standard deviation values on mean arterial pressure of 45 to 49 age category of women yoga training group are 93.90 $\pm$ 2.89 and 91.93 $\pm$ 2.38 respectively. It resulted with a mean difference of 1.97 The obtained 't' ratio is 7.41 and it is higher than the table value of 2.14 required for significance at 0.05 level for df 14. Hence, it is concluded that due to the effect of yoga training the mean arterial pressure of 45 to 49 age category women was significantly decreased.

Table II. Comparison of Mean Gain on Mean Arterial Pressure between Men and Women of Different Age Groups

Gender	Age Category	Mean Gain	S.D	SE	t-ratio
Men	40-44 Age	4.43	2.72	1.04	0.96
	45-49 Age	3.43	2.98	1.04	
Women	40-44 Age	2.77	1.46	0.46	1.73
	45-49 Age	1.97	1.03	0.46	
Men	40-44 Age	4.43	2.71	0.82	1.95
Women		2.82	1.49	0.82	
Men	45-49 Age	3.43	2.98	0.81	1.79
Women		1.97	1.03	0.81	

**Significant at 0.05 level*
The table value required for significance for df 28 is 2.05

Table-II shows the mean gain for different age category of men groups as a result of yoga training are 4.43 and 3.43 respectively. It resulted with a 't' ratio of 0.96 and it is lesser than the table value of 2.05 required

for significant at 0.05 level to the df 28. Hence, it is concluded that no significant differences exists between different age categories of men groups in decreasing the mean arterial pressure. The mean gain for different age category of women groups as a result of yoga training are 2.77 and 1.97 respectively. It resulted with a 't' ratio of 1.73 and it is lesser than the table value of 2.05 required for significant at 0.05 level to the df 28. Hence, it is concluded that no significant differences exists between different age category women groups in decreasing the mean arterial pressure. Table-II also shows the mean gain for 40 to 44 age category men and women groups as a result of yoga training are. 443 and 2.82 respectively. It resulted with a 't' ratio of 1.95 and it is lesser than the table value of 2.05 required for significant at 0.05 level to the df 28. Hence, it is concluded that no significant differences exists between 40 to 44 age category of men and women groups in decreasing the mean arterial pressure. The mean gain for 45 to 49 age category men and women groups as a result of yoga training were 3.43 and 1.97 respectively. It resulted with a 't' ratio of 1.79 and it is lesser than the table value of 2.05 required for significant at 0.05 level to the df 28. Hence, it is concluded that the no significant differences on mean arterial pressure between 45 and 49 age category of men and women. The pre and post test data collected from the different age category men and women on mean arterial pressure was statistically analyzed by three factor factorial analysis and the results are presented in table-III.

Table III. Three-Way Analysis of Variance on Mean Arterial Pressure of Different Age Category Men and Women

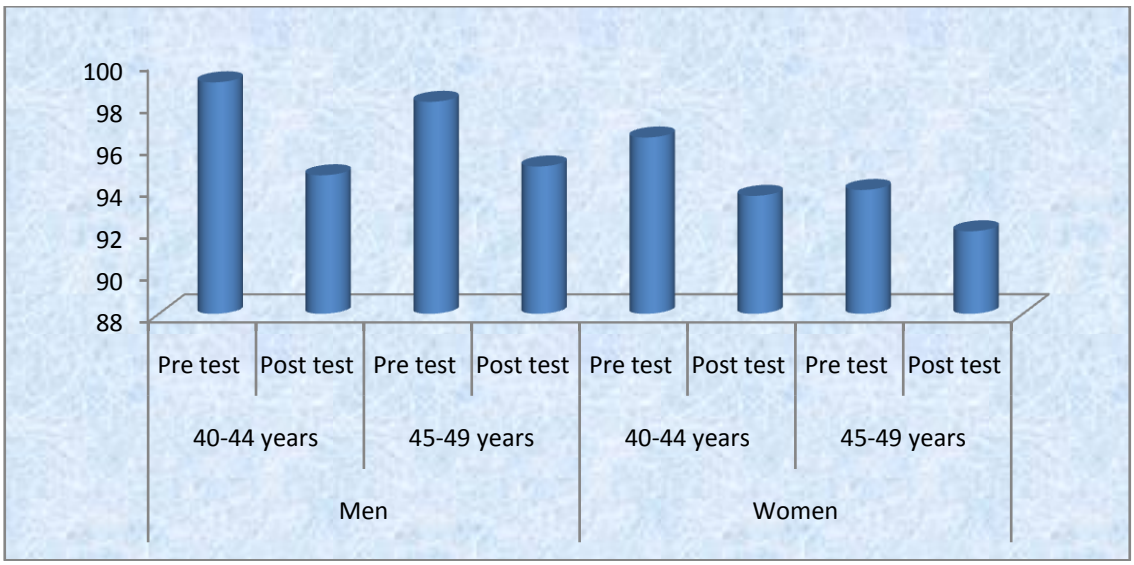
Source	Sum of Squares	df	Mean Squares	'F' ratio
Gender	222.49	1	222.49	17.76*
Age	56.30	1	56.30	4.50*
Test	281.52	1	281.52	22.49*
Gender & Age	25.39	1	25.39	2.02
Gender & Tests	14.28	1	14.28	1.14
Age & Tests	8.74	1	8.74	0.69
Gender, Age & Tests	8.58	1	8.58	0.68
Error	1401.85	112	12.51	

**Significant at .05 level of confidence*
(Table values required for significance at .05 level with df 1 and 112 is 3.92)

Table-III reveals that men and women differ significantly on mean arterial pressure irrespective of age and tests, since the obtained f ratio value of 17.76 is greater than the required table value of 3.92 for the degrees of freedom 1 and 112. It also proved that significant differences exist between age categories irrespective of gender and tests, since the obtained f ratio value of 4.50 is greater than the required table value of 3.92 for the degrees of freedom 1 and 112. Further, it reveals that significant differences exist between tests irrespective of gender and age, since the obtained f ratio value of 22.49 is greater than the required table value of 3.92 for the degrees of freedom 1 and 112. The obtained 'F' ratio value for interaction of gender and age irrespective of testing conditions is 2.02, which is lesser than the table value of 3.92 for the degrees of freedom 1 and 112 required for significance at 0.05 level of confidence. The result of the study shows that no significant difference exists for the interaction of gender at different age categories on mean arterial pressure irrespective of testing conditions.

The obtained 'F' ratio value for interaction of gender and tests irrespective of age categories is 1.4, which is lesser than the table value of 3.92 for the degrees of freedom 1 and 112 required for significance at 0.05 level of confidence. The result of the study shows that no significant difference exists for the interaction of gender at different testing conditions irrespective of age categories on mean arterial pressure. The results of the study also show that the obtained 'F' ratio value for the interaction of age and testing conditions irrespective of gender is 0.69, which is lesser than the table value of 3.92 for the degrees of freedom 1 and 112 required for significance at 0.05 level of confidence. It reveals no significant difference that exists on mean arterial pressure among different age categories at pre and post tests irrespective of gender. It is observed that the obtained 'F' ratio value for the interaction of gender, age and testing conditions is 0.68, which is lesser than the table value of 3.92 for the degrees of freedom 1 and 112 required for significance at 0.05 level of confidence. It confers the existence of insignificant difference on mean arterial pressure among gender in relevance to different age categories during pre and post tests.

Figure I. Diagram Showing the Pre and Post Test Mean Value on Mean Arterial Pressure of Different Age Groups Men and Women



Discussion

It is not surprising that the researchers have found positive results regarding yoga and so many diverse areas. The previous studies were comparing yoga with meditation techniques such as progressive relaxation. Yoga was found to be equal or superior to progressive relaxation in lowering blood pressure (Cusumano & Robinson, 1993). A randomized controlled study says that a reduction in both systolic and diastolic blood pressure by 16% after ten days' of add -on integrated approach to yoga therapy (IAYT) in patients with chronic neck pain (Yogitha et al., 2010). Ebnezar et al., (2012) found similar reduction of 16% in both systolic and diastolic BP after 90 days of intervention. Yoga can be preliminarily recommended as an effective intervention for reducing blood pressure (Hagins, States, Selfe & Innes, 2013). Kanojia et al., (2013) found higher percentage of decrease in HR, SBP and DBP in yoga group during both pre and post phases of menstrual cycle in healthy young female subjects. Bhavanani et al., (2011) reported that suryanamaskar has positive physiological benefits as evidenced by improvement of pulmonary function, respiratory pressures, and resting cardiovascular parameters.

The positive effect of yoga practices on high blood pressure has been confirmed in various studies. Okonta (2012) presented an evidence-based integrative research review that validates yoga therapy as an effective complementary treatment in the management of high blood pressure (BP). Hagberg, Park and Brown (2000) analyzed the most recent review of the effects of exercise training on patients with hypertension. These results continue to indicate that exercise training decreases blood pressure (BP) in approximately 75% of individuals with hypertension, with systolic and diastolic BP reductions averaging approximately 11 and 8mm Hg, respectively. Women may reduce BP more with exercise training than men, and middle-aged people with hypertension may obtain greater benefits than young or older people. Furthermore, a study that focused on the effect of yoga on stress, body mass index, heart rate, and blood pressure among hypertensive patients found that yoga practices were associated with decreased blood pressure (McCaffrey, Ruknui, Hatthakit, & Kasetsomboon, 2005). All the evidence was suggested that the yoga is an effective treatment for hypertension. The studies summarized above support the claims that the hypertension was greatly influenced by stress, and stress reduction via yoga practices reduces the effects of the disease.

Conclusion

The result of the study reveals that due to the effect of yoga training the resting heart rate and mean arterial pressure of 40-44 and 45-49 age category men and women were significantly decreased. In decreasing the resting heart rate no significant differences exists between 40-44 and 45-49 age categories of men groups and also between 40-44 and 45-49 age categories of women groups however, significant differences exists between 40-44 age categories of men and women groups and also between 45-49 age categories of men and women groups. In decreasing the mean arterial pressure, no significant differences existed between 40-44 and 45-49 age categories men groups and also between 40-44 and 45-49 age categories women groups. It is also concluded that no significant differences exists between 40-44 age category of men and women groups and also between 45-49 age category of men and women groups in decreasing the mean arterial pressure. It confers the existence of insignificant difference on resting heart rate and mean arterial pressure among gender in relevance to different age categories during pre and post tests.

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