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Effect of Yoga Practices on Selected Physiological and Biochemical Variables among the Diabetic Patients

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Abstract

The whole science of yoga has one view in common-to gain health, personal power, to develop knowledge and attain peace of mind. It also reduces stress, tension in the physical body, activates the parasympathetic nervous system. Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. Hyperglycaemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels *(WHO, 2011).* The purpose of the study was to design to find out the effect of yoga practices on selected physiological and biochemical variables among the diabetic patients. Forty five (N=45) men diabetic patients from Erode district, Tamilnadu India, were selected randomly as subjects. The age, height and weight of the subjects ranged from 40 to 40 years, 163 to 171 cms and 62 to 78 kg respectively, and the standard deviations were 0.18, 0.06, and 0.09 kilograms respectively. Subjects were randomly assigned into two experimental groups of fifteen each, namely yoga practices three days per week group (Group I) and yoga practices five days per week(Group II) and group third of fifteen subjects was acted as Control group. Experimental groups (Group I & Group II) underwent the respective yoga practices for duration of twelve weeks. However, they were free to withdraw their consent in case they felt any discomfort during the period of their participation. The following variables which were found appropriate and worthy to investigation. Breath holding time, Resting pulse rate, Respiratory rate and High density lipoproteins cholesterol (HDL). The data collected data from the three groups prior to and immediately after the training programme on the selected criterion variables were statistically analyzed with dependent 't' test and Analysis of Covariance (ANCOVA). Whenever the 'F' ratio for adjusted post test means was found to be significant, Scheffe's test was followed, as a post hoc test to determine which of the paired mean differences was significant.

Key Words: Yoga, Physical fitness and Diabetic

Introduction

As man is a physical, mental and spiritual being, yoga helps to promote a balanced development of all the three stated above. Physical exercises, aerobics and other forms of exercises assure welfare only to the physical body. It has little to do with the development of the spiritual body or the astral body.

Yogic exercises help to promote an all- round well being in an individual. They help to recharge the body with cosmic energy. This helps to attain perfect equilibrium and harmony. Yoga helps the aspirant to channelize and harness the cosmic energy for self- Healing. Consequently, it produces peace and positive feelings in the mind of the aspirant. It rejuvenates and energizes the

body. Development and healing is brought about from within.

In daily life, yoga helps the person to attain a relaxed state of mind. It provides him with vitality, vigor and zest to carry out his life. All negative blocks in the mind are removed. The body is cleansed of all the impurities and toxins.

Personal power is enhanced by the practice of yoga. One learns to identify their own inner resources and draw upon the energy needed from their own inner sources. It helps one to increase his or her awareness, i.e. self-awareness. It helps in attention focus and concentration. Children do better in their studies, if yoga practice is inculcated into their daily routine. The whole science of yoga has one view in common-to gain health, personal power, to develop knowledge and attain peace of mind. It also reduces stress, tension in the physical body, activates the parasympathetic nervous system.

Methodology

The purpose of the study was to design to find out the effect of yoga practices on selected physiological and biochemical variables among the diabetic patients. Forty five (N=45) men diabetic patients from Erode district, Tamilnadu, India were selected randomly as subjects. The age, height and weight of the subjects ranged from 40 to 40 years, 163 to 171cms and 62 to 78 kg respectively, and the standard deviations were 0.18, 0.06, and 0.09 kilograms respectively.

Training

During the training period, the experimental groups underwent their respective training programmes. Group-I underwent yoga practices three days per week, Group-II underwent yoga practices five days per week for twelve weeks. The duration of training session in all the days was between one hour to one and half hour approximately which included warming up and limbering down. All the subjects involved in this study were carefully monitored throughout the training programme to be away from injuries. They were questioned about their health status throughout the training programme. None of them reported any injuries or discomfort. However, muscle soreness appeared in the earlier period of the training programme and was reduced in due course.

Statistical Technique

The experimental design used in this study was random group design. The selected subjects were divided at random into three groups of fifteen each (n=15). Group I underwent yoga practices three days per week, Group-II underwent yoga practices five days per week for twelve weeks and Group III acted as Control. All the subjects were tested prior to and immediately after the training period for all the selected variables.

The data collected data from the three groups prior to and immediately after the training programme on the selected criterion variables were statistically analyzed with dependent ‘t’ test and Analysis of Covariance (ANCOVA). Whenever the ‘F’ ratio for adjusted post test means was found to be significant, Scheffe’s test was followed, as a post hoc test to determine which of the paired mean differences was significant. In all the cases .05 level of confidence was fixed as a level of confidence to test the hypotheses.

Results and Analysis

The influence of independent variables on each of the criterion variables is analyzed and presented below.

The training period was limited to twelve weeks. The dependent variables selected for this study were breath holding time, resting pulse rate and respiratory rate. All the subjects were tested prior to and immediately after the experimental period on the selected dependent variables.

TABLE – 1

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUP AND CONTROL GROUPS ON BREATH HOLDING TIME

Adjusted Post-test Means			Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
Yoga practices three days per week Group – (I)	Yoga practices five days per week Group – (II)	Control Group – (III)					
33.35	35.43	29.48	Between	273.42	2	136.71	59.30*
			With in	94.52	41	2.31	

**** Significant at.05 level of confidence***

(Breath holding time Scores in Numbers)

(The table value required for Significance at .05 level with df 2 and 41 is 3.23)

Table 1 shows that the adjusted post test mean values of Breath holding time for Yoga practices three days per week, Yoga practices five days per week and Control groups are 33.35, 35.43 and 29.48 respectively. The obtained F-ratio of 59.30 for the adjusted post test mean is more than the table value of 3.23 for df 2 and 41 required for significance at .05 level of confidence.

The results of the study indicate that there are significant differences among the adjusted post test means of Yoga practices three days per week, Yoga practices five days per week group and Control Group on the change of Breath holding time. To determine which of the paired means had a significant difference, Scheffe's test is applied as Post hoc test and the results are presented in Table 5.

TABLE - 2

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN

THE ADJUSTED POST TEST PAIRED MEANS ON BREATH HOLDING TIME

Adjusted Post-test means			Mean Difference	Confidence Interval
Yoga practices three days per week Group – (I)	Yoga practices five days per week Group – (II)	Control Group – (III)		
33.35	35.43		2.08*	1.39
33.35		29.48	3.87*	1.39
	35.43	29.48	5.95*	1.39

**** Significant at.05 level of confidence***

Table 2 shows that the adjusted post test mean difference on Yoga practices three days per week and Yoga practices five days per week groups, Yoga practices three days per week and Control groups, Yoga practices five days per week group and Control groups are 2.08, 3.87 and 5.95 respectively. The values are greater than the confidence interval value 1.39, which shows significant differences at .05 level of confidence.

THE ADJUSTED POST TEST MEAN VALUES OF YOGA PRACTICES THREE DAYS PER WEEK GROUP, YOGA PRACTICES FIVE DAYS PER WEEK GROUP AND CONTROL GROUP ON BREATH HOLDING TIME ARE GRAPHICALLY REPRESENTED IN THE FIGURE -1

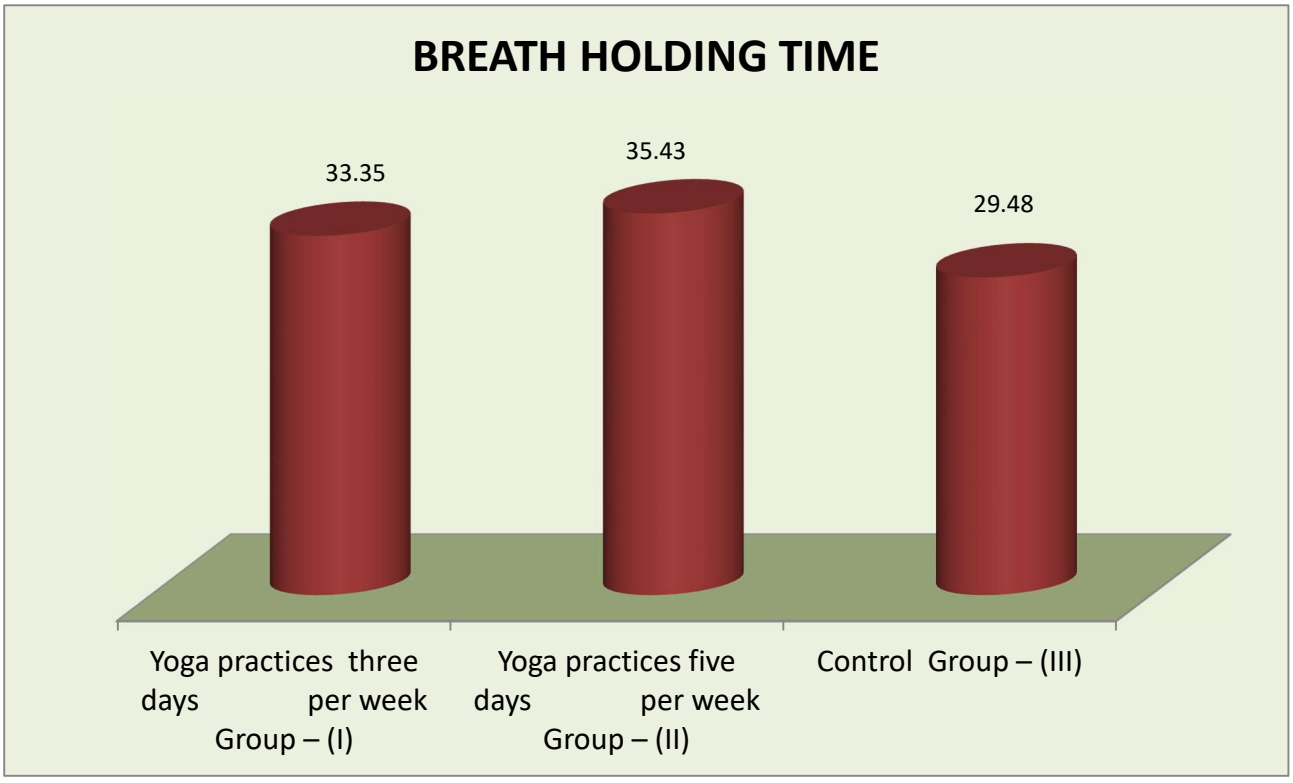


TABLE – 3

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUP AND CONTROL GROUPS ON RESTING PULSE RATE

Adjusted Post-test Means			Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
Yoga practices three days per week Group – (I)	Yoga practices five days per week Group – (II)	Control Group – (III)					
76.81	73.03	80.09	Between With in	369.92 106.63	2 41	184.96 2.60	71.12*

**** Significant at.05 level of confidence***
(Resting pulse rate Scores in Numbers)
(The table value required for Significance at .05 level with df 2 and 41 is 3.23)

Table 3 shows that the adjusted post test mean values of Resting pulse rate for Yoga practices three days per week, Yoga practices five days per week and Control groups are 76.81, 73.03 and 80.09 respectively. The obtained F-ratio of 71.12 for the adjusted post test mean is more than the table value of 3.23 for df 2 and 41 required for significance at .05 level of confidence.

The results of the study indicate that there are significant differences among the adjusted post test means of Yoga practices three days per week, Yoga practices five days per week group and Control Group on the change of resting pulse rate.

To determine which of the paired means had a significant difference, Scheffe's test is applied as Post hoc test and the results are presented in Table 4.

TABLE - 4
THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TEST PAIRED MEANS ON RESTING PULSE RATE

Adjusted Post-test means			**Mean Difference**	**Confidence Interval**
Yoga practices three days per week Group – (I)	**Yoga practices five days per week Group – (II)**	**Control Group – (III)**		
76.81	73.02		3.79*	1.48
76.81		80.09	3.28*	1.48
	73.02	80.09	7.07*	1.48

**** Significant at.05 level of confidence***

Table 4 shows that the adjusted post test mean difference on Yoga practices three days per week and Yoga practices five days per week groups, Yoga practices three days per week and Control groups, Yoga practices five days per week group and Control groups are 3.79, 3.28 and 7.07 respectively. The values are greater than the confidence interval value 1.48, which shows significant differences at .05 level of confidence.

It may be concluded from the results that there is a significant difference in Resting pulse rate between the adjusted post test means of Yoga practices three days per week and Yoga practices five days per week groups, Yoga practices three days per week and Control groups, Yoga practices five days per week group and Control groups. However, the change in Resting pulse rate is significantly higher for Yoga practices five days per week group than Yoga practices three days per week group and the Control group.

It may be concluded that the Yoga practices five days per week group has shown better change in decreasing Resting pulse rate than the Yoga practices three days per week group and Control groups.

The mean values of Yoga practices three days per week group, Yoga practices five days per week group and Control group on Resting pulse rate are graphically represented in the Figure 3.

THE ADJUSTED POST TEST MEAN VALUES OF YOGA PRACTICES THREE DAYS PER WEEK GROUP, YOGA PRACTICES FIVE DAYS PER WEEK GROUP AND CONTROL GROUP ON RESTING PULSE RATE ARE GRAPHICALLY REPRESENTED IN THE FIGURE -2.

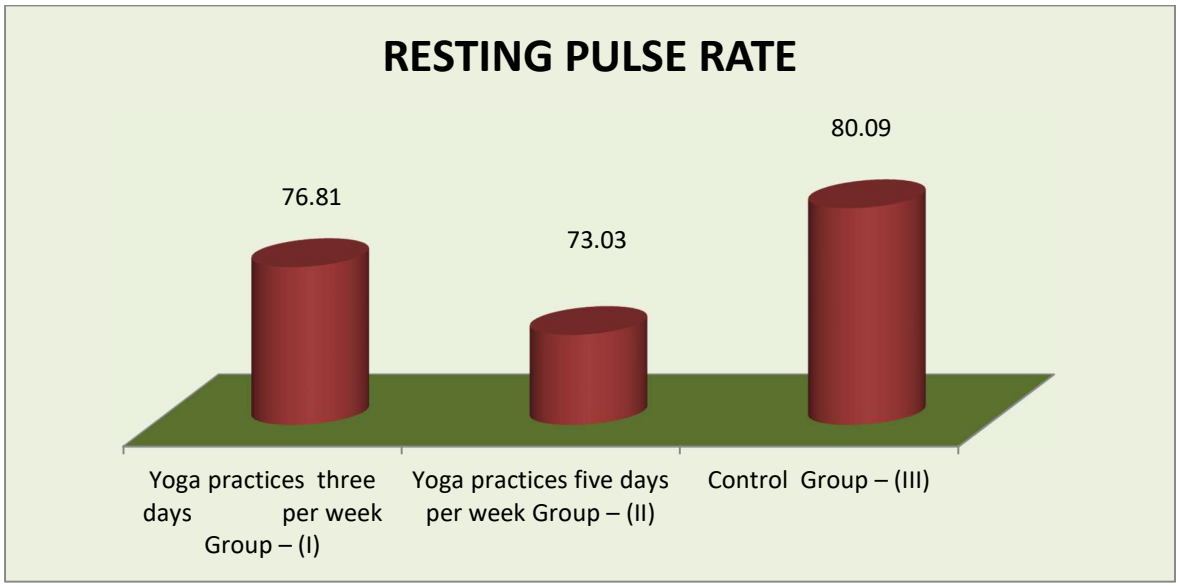


TABLE – 5

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUP AND CONTROL GROUPS ON RESPIRATORY RATE

Adjusted Post-test Means			Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
Yoga practices three days per week Group – (I)	Yoga practices five days per week Group – (II)	Control Group – (III)					
17.19	15.96	18.85	Between With in	63.27 28.03	2 41	31.63 0.68	46.27*

**** Significant at.05 level of confidence***

(Respiratory rate ***Scores in Numbers)***

(The table value required for Significance at .05 level with df 2 and 41 is 3.23)

Table 5 shows that the adjusted post test mean values of Respiratory rate for Yoga practices three days per week, Yoga practices five days per week and Control groups are 17.16, 15.96 and 18.85 respectively. The obtained F-ratio of 46.27 for the adjusted post test mean is more than the table value of 3.23 for df 2 and 41 required for significance at .05 level of confidence.

The results of the study indicate that there are significant differences among the adjusted post test means of Yoga practices three days per week, Yoga

practices five days per week group and Control Group on the change of Respiratory rate.

To determine which of the paired means had a significant difference, Scheffe's test is applied as Post hoc test and the results are presented in Table 6.

Table - 6
THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TEST PAIRED MEANS ON RESPIRATORY RATE

Adjusted Post-test means			Mean Difference	Confidence Interval
Yoga practices three days per week Group – (I)	Yoga practices five days per week Group – (II)	Control Group – (III)		
17.19	15.96		1.23*	0.76
17.19		18.85	1.66*	0.76
	15.96	18.85	2.89*	0.76

**** Significant at.05 level of confidence***

Table 6 shows that the adjusted post test mean difference on Yoga practices three days per week and Yoga practices five days per week groups, Yoga practices three days per week and Control groups, Yoga practices five days per week group and Control groups are 1.23, 1.66 and 2.89 respectively. The values are greater than the confidence interval value 0.76, which shows significant differences at .05 level of confidence.

It may be concluded from the results that there is a significant difference in Respiratory rate between the adjusted post test means of Yoga practices three days per week and Yoga practices five days per week groups, Yoga practices three days per week and Control groups, Yoga practices five days per week group and Control groups. However, the change in Respiratory rate is significantly higher for Yoga practices five days per week group than Yoga practices three days per week group and the Control group.

It may be concluded that the Yoga practices five days per week group has shown better change in decreasing Respiratory rate than the Yoga practices three days per week group and Control groups.

The mean values of Yoga practices three days per week group, Yoga practices five days per week group and Control group on Respiratory rate are graphically represented in the Figure 5.

THE ADJUSTED POST TEST MEAN VALUES OF YOGA PRACTICES THREE DAYS PER WEEK GROUP, YOGA PRACTICES FIVE DAYS PER WEEK GROUP AND CONTROL GROUP ON RESPIRATORY RATE ARE GRAPHICALLY REPRESENTED IN THE FIGURE -3.

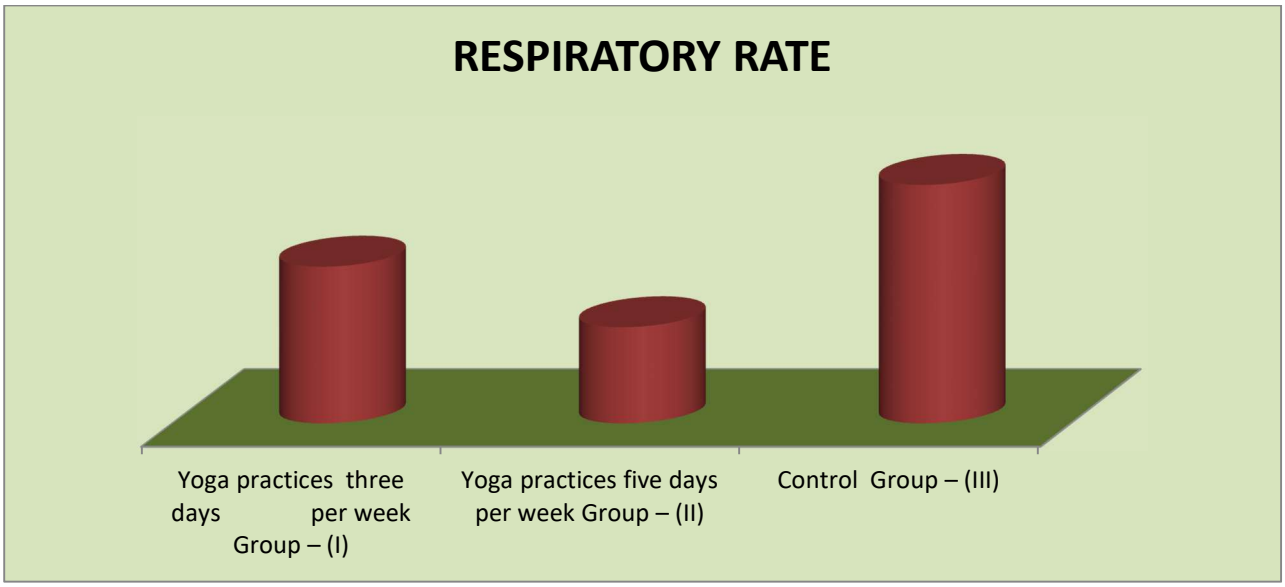


Table – 7

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUP AND CONTROL GROUPS ON HIGH DENSITY LIPOPROTEINS CHOLESTEROL (HDL)

Adjusted Post-test Means			Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
Yoga practices three days per week Group – (I)	Yoga practices five days per week Group – (II)	Control Group – (III)					
46.17	49.83	40.87	Between With in	604.61 273.69	2 41	302.31 6.68	45.29*

**** Significant at.05 level of confidence***

(High density lipoproteins cholesterol (HDL) Scores in mg/dl)

(The table value required for Significance at .05 level with df 2 and 41 is 3.23)

Table 7 shows that the adjusted post test mean values of High density lipoproteins cholesterol (HDL) for Yoga practices three days per week, Yoga practices five days per week and Control groups are 46.17, 49.83 and 40.87 respectively. The obtained F-ratio of 45.29 for the adjusted post test mean is more than the table value of 3.23 for df 2 and 41 required for significance at .05 level of confidence.

The results of the study indicate that there are significant differences among the adjusted post test means of Yoga practices three days per week, Yoga practices five days per week group and

Control Group on the change of High density lipoproteins cholesterol (HDL).

To determine which of the paired means had a significant difference, Scheffe's test is applied as Post hoc test and the results are presented in Table 8.

Table - 8

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TEST PAIRED MEANS ON HIGH DENSITY LIPOPROTEINS CHOLESTEROL (HDL)

Adjusted Post-test means			Mean Difference	Confidence Interval
Yoga practices three days per week Group – (I)	Yoga practices five days per week Group – (II)	Control Group – (III)		
46.17	49.83		3.66*	2.37
46.17		40.87	5.30*	2.37
	49.83	40.87	8.96*	2.37

**** Significant at.05 level of confidence***

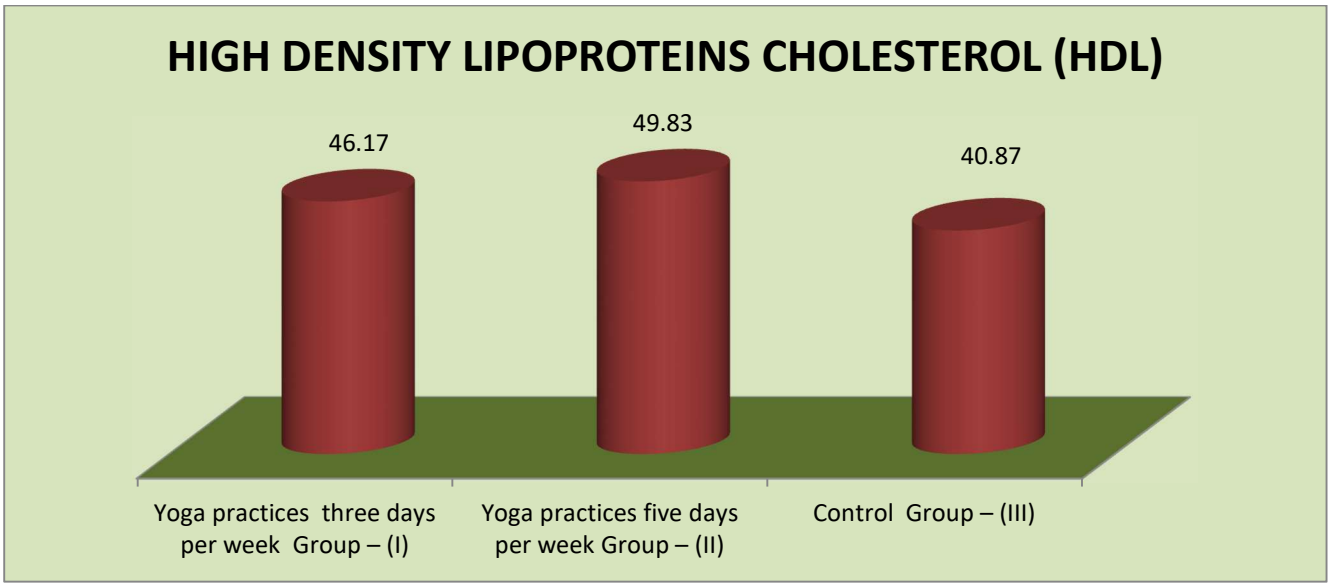
Table 8 shows that the adjusted post test mean difference on Yoga practices three days per week and Yoga practices five days per week groups, Yoga practices three days per week and Control groups, Yoga practices five days per week group and Control groups are 3.66, 5.30 and 8.96 respectively. The values are greater than the confidence interval value 2.37, which shows significant differences at .05 level of confidence.

It may be concluded from the results that there is a significant difference in High density lipoproteins cholesterol (HDL) between the adjusted post test means of Yoga practices three days per week and Yoga practices five days per week groups, Yoga practices three days per week and Control groups, Yoga practices five days per week group and Control groups. However, the change in High density lipoproteins cholesterol (HDL) is significantly higher for Yoga practices five days per week group than Yoga practices three days per week group and the Control group.

It may be concluded that the Yoga practices five days per week group has shown better change in increasing High density lipoproteins cholesterol (HDL) than the Yoga practices three days per week group and Control groups.

The mean values of Yoga practices three days per week group, Yoga practices five days per week group and Control group on High density lipoproteins cholesterol (HDL) are graphically represented in the Figure 7.

THE ADJUSTED POST TEST MEAN VALUES OF YOGA PRACTICES THREE DAYS PER WEEK GROUP, YOGA PRACTICES FIVE DAYS PER WEEK GROUP AND CONTROL GROUP ON HIGH DENSITY LIPOPROTEINS CHOLESTEROL (HDL) ARE GRAPHICALLY REPRESENTED IN THE FIGURE -4



Conclusions

From the analysis of the data, the following conclusions are drawn.

1. The Experimental groups namely, yoga practices three days per week and yoga practices five days per week Groups had significantly decreased in physiological and biochemical variables such as resting pulse rate and respiratory rate.
2. The Experimental groups namely, yoga practices three days per week and yoga practices five days per week Groups had significantly increased breath holding time
3. Significant differences were also noted between yoga practices three days per week and yoga practices five days per week in all the physiological and biochemical variables such as breath holding time, resting pulse rate, respiratory rate and high density lipoproteins cholesterol (HDL).
4. The yoga practices five days per week Group was found to be better in reduction of breath holding time, resting pulse rate, respiratory rate and High Density Lipoproteins Cholesterol (HDL),

Recommendations

1. A Similar studies may be conducted for the fairer sex also keeping age and other factors in to consideration for experimental variables.
2. Studies may be also being conducted on similar lines with different nutritional plans.

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