EFFECT OF SHORT-TERM CHANDRA NADI PRANAYAMA ON HEMATOLOGICAL PARAMETERS: COMPARATIVE STUDY

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Abstract:

The aim of this study was to assess the effect of short-term Chandra nadi pranayama on Hematological Parameters. Thirty, university level girls of Department of Physical Education (T), Guru Nanak Dev University, Amritsar between the age group of 21-26 years volunteered to participate in the study. The subjects from Group-A: Experimental, were subjected to a 3-week Chandra nadi pranayama. Statistical analyses were performed using the Statistical Package for the Social Sciences for Windows version 10.0 software (SPSS Inc., Chicago, IL). Data is expressed as the Mean ± SD. Student t-test for Paired Samples was utilized to compare the means of the Pre-Test and the Post-Test. To test the Hypothesis, the level of significance was set at 0.05. To conclude, it is significant to mention in relation to Hemoglobin (Hb), Total Cholesterol (TC), Low Density Lipoprotein Cholesterol (LDL-Cholesterol), High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Triglycerides (TG) that results of Paired Sample t-test were found statistically insignificant (P >.05).

Keywords: Chandra nadi pranayama, hemoglobin, total cholesterol, low density lipoprotein cholesterol, high density lipoprotein cholesterol, triglycerides

1. Introduction

In Indian religions, yoga is *"the means or techniques for transforming consciousness and attaining liberation (moksha) from karma (Ankerberg, 1996) and rebirth (samsara)"* (Bowker, 1997).

Yoga breathing, or Pranayama, is the science of breath control. It consists of series of exercises especially intended to meet the body's needs and keep it in vibrant health. Pranayama comes from the following words:

- Prana - "life force" or "life energy"

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- Yama - "discipline" or "control"
- Ayama - "expansion", "non-restraint", or "extension"

The process – the passage of air into and out of the lungs – is movement; specifically, it is movement in the body's cavities. This simplified illustration of the human body in Figure-1 shows that the torso consists of two cavities, thoracic and abdominal.

Yoga -a way of life- is marked with certain qualities namely balance, health, harmony, and bliss (Nagendra & Nagarathna, 1977). Inflating the matter into wider semantic denominations, Meditation-being part of yoga, which is the seventh limb of, is a state of alert rest as stated by (Maharishi Mahesh Yogi, 1972), who founded a new technique of meditation, popularly known as transcendental meditation. By Yogic participation, a person is supposed to reach a state of mental composure, where responses to favorable or unfavorable external events are well under the individual's control, and responses are moderate in intensity (Telles et al., 2000).
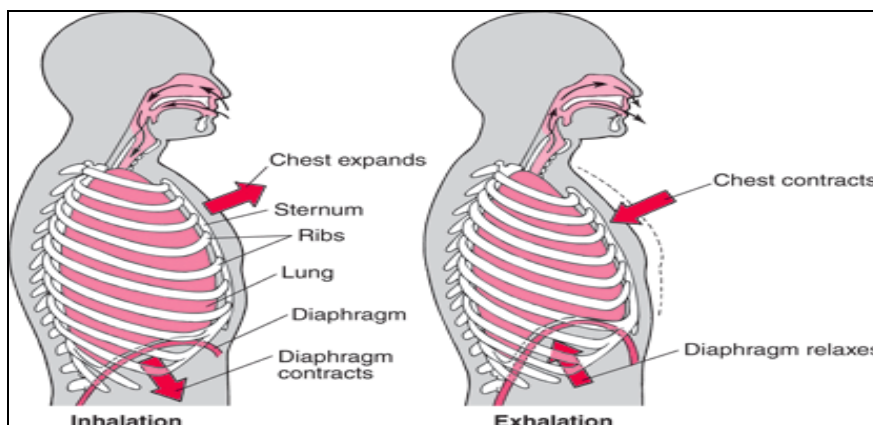

Figure 1: Breathing is thoracoabdominal shape changes
between (a) inhalation and (b) exhalation

2. Material and Methods

2.1 Selection of Subjects
Thirty, university level girls of Department of Physical Education (T), Guru Nanak Dev University, Amritsar between the age group of 21-26 years volunteered to participate in the study. The subjects were purposively assigned into two groups:
- Group-A: Experimental (N_1=15)
- Group-B: Control (N_2=15)

All the subjects were informed about the objective and protocol of the study.

2.2 Selection of Variables
The following variables were selected for the present investigation:
  i.   Hemoglobin (Hb)
  ii. Total Cholesterol (TC)
  iii. Low Density Lipoprotein Cholesterol (LDL-Cholesterol)

iv.   High Density Lipoprotein Cholesterol (HDL-Cholesterol)
v.   Triglycerides (TG)

3. Methodology

This study is designed as a retrospective Cross-Sectional study. The subjects from Group-A: Experimental were subjected to a 3-week Chandra nadi pranayama. This lasted 3 weeks and consisted of daily sessions. Hemoglobin was determined in the blood samples of all the subjects with the use of a hematology analyzer (Celldyne model 3500). Blood samples (10 ml) for the determination of lipid profiles were obtained.

All of Biochemical tests have been done with serum samples. Lipid parameters were measured using Boehringer Mannheim kits and Clinilab, BioMerieux analyser as used by (Jastrzebska et al., 2002).
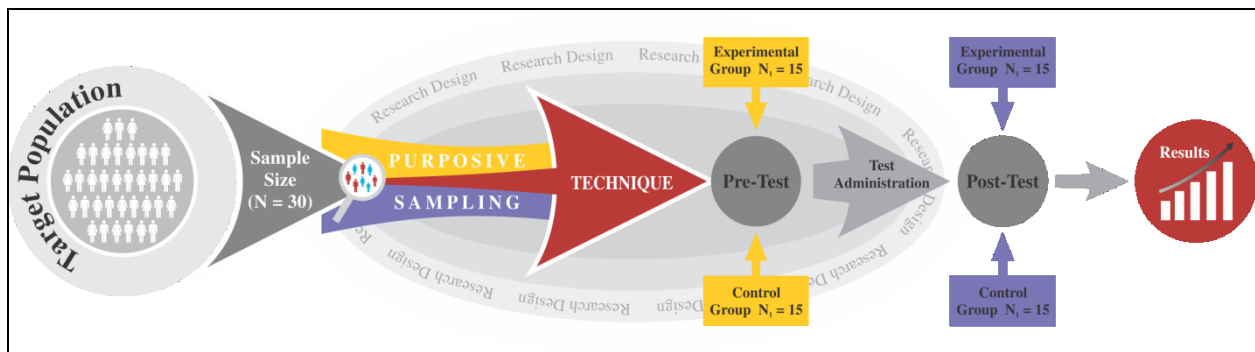

Figure 2: Study design

Table 1: Experimental Treatment

| 3-Weeks Chandra Nadi Pranayama Training			
Weeks	**Schedule**	**Time**	**Duration**
1st **Week**	Preliminary Yogic Exercises	5 Minute	20 Minute
	Practice of Chandra Nadi Pranayama (9 Rounds X 1 Set)	10 Minute	
	Relaxation Posture	5 Minute	
2nd **Week**	Preliminary Yogic Exercises	5 Minute	30 Minute
	Practice of Chandra Nadi Pranayama (9 Rounds X 2 Set)	20 Minute	
	Relaxation Posture	5 Minute	
3rd **Week**	Preliminary Yogic Exercises	5 Minute	40 Minute
	Practice of Chandra Nadi Pranayama (9 Rounds X 3 Set)	30 Minute	
	Relaxation Posture	5 Minute	
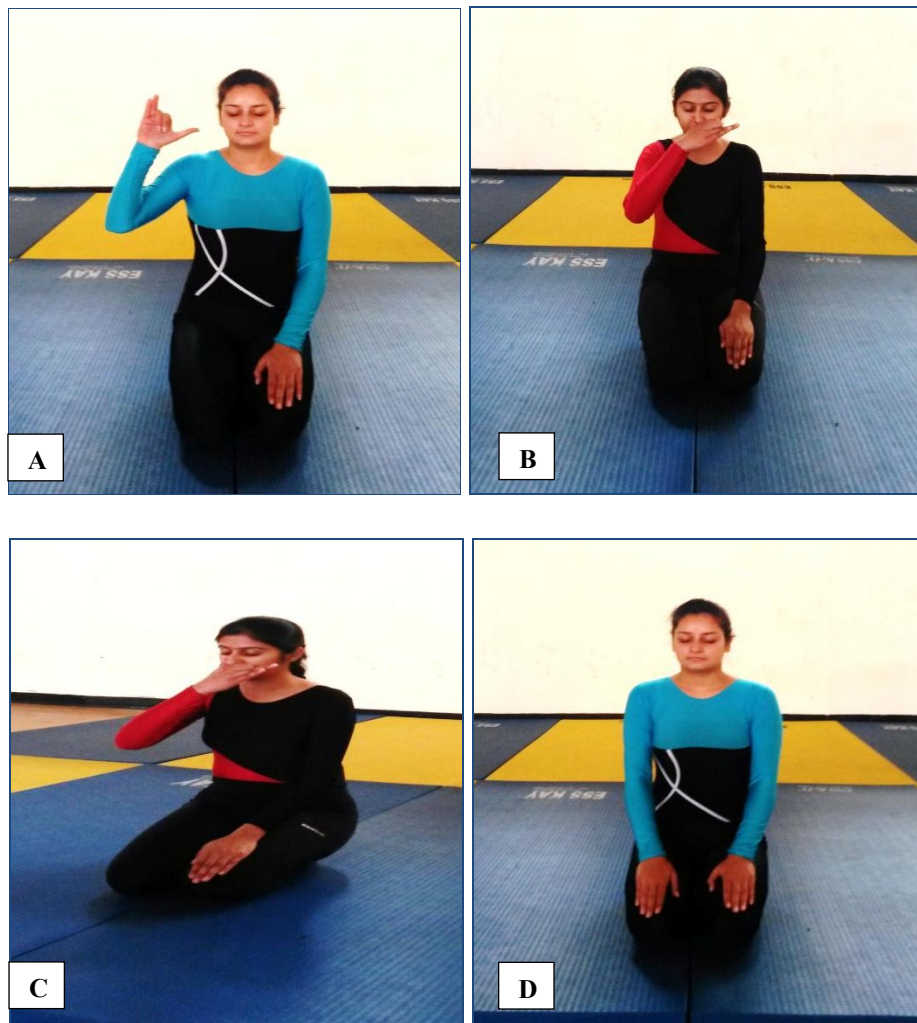
Figure 3: Subject performing chandra nadi pranayama

Figure 4: Biochemical tests with serum samples

4. Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences for Windows version 10.0 software (SPSS Inc., Chicago, IL).

Data is expressed as the Mean ± SD. Student t-test for Paired Samples was utilized to compare the means of the Pre-Test and the Post-Test. To test the Hypothesis, the level of significance was set at 0.05.

5. Results

Table 2: Descriptive Statistics (Mean & Standard Deviation) and
Paired Sample t-test of Hemoglobin (Hb) of University Level Girls

Hemoglobin (Hb)				
Group	Number	Mean	Standard Deviation	t-value
Experiment (Pre-test)	15	11.7133	0.4926	0.3427
Experimental (Post-test)	15	11.6533	0.3292	
Control (Pre-test)	15	12.28	0.8179	0.0758
Control (Post-test)	15	12.3067	0.9098	

- The calculated *t* value is smaller than critical value (0.3427<2.145), so the means are not significantly different with regards to Hemoglobin (Hb) in group (Experimental).
- The absolute value of the calculated *t* is smaller than critical value (0.0758<2.145), so the means are not significantly different with regards to Hemoglobin (Hb) in group (Control).

Table 3: Descriptive Statistics (Mean & Standard Deviation) and
Paired Sample t-test of Total Cholesterol (TC) of University Level Girls

Total Cholesterol (TC)				
Group	Number	Mean	Standard Deviation	t-value
Experiment (Pre-test)	15	155.4133	2.2405	0.7574
Experimental (Post-test)	15	154.8067	2.3051	
Control (Pre-test)	15	141.0333	13.1148	0.273
Control (Post-test)	15	139.74	13.3036	

- The calculated t value is smaller than critical value (0.7574<2.145), so the means are not significantly different with regards to Total Cholesterol (TC) in group (Experimental).
- The calculated *t* value is smaller than critical value (0.273<2.145), so the means are not significantly different with regards to Total Cholesterol (TC) in group (Control).

Table 4: Descriptive Statistics (Mean & Standard Deviation) and Paired Sample t-test of Low Density Lipoprotein Cholesterol (LDL-Cholesterol) of University Level Girls

Low Density Lipoprotein Cholesterol (LDL-Cholesterol)				
Group	Number	Mean	Standard Deviation	t-value
Experiment (Pre-test)	15	119.2867	6.0965	1.0826
Experimental (Post-test)	15	115.6667	11.6566	
Control (Pre-test)	15	122.0667	6.0784	0.1889
Control (Post-test)	15	121.9067	6.7069	

- The calculated t value is smaller than critical value (1.0826<2.145), so the means are not significantly different with regards to Low Density Lipoprotein Cholesterol (LDL-Cholesterol) in group (Experimental).
- The calculated t value is smaller than critical value (0.1889<2.145), so the means are not significantly different with regards to Low Density Lipoprotein Cholesterol (LDL-Cholesterol) in group (Control).

Table 5: Descriptive Statistics (Mean & Standard Deviation) and Paired Sample t-test of High Density Lipoprotein Cholesterol (HDL-Cholesterol) of University Level Girls

High Density Lipoprotein Cholesterol (HDL-Cholesterol)				
Group	Number	Mean	Standard Deviation	t-value
Experiment (Pre-test)	15	88.99	5.7042	0.542
Experimental (Post-test)	15	90.0947	3.7666	
Control (Pre-test)	15	86.942	4.4474	1.6786
Control (Post-test)	15	90.102	4.1995	

- The absolute value of the calculated t is smaller than critical value (0.542<2.145), so the means are not significantly different with regards to High Density Lipoprotein Cholesterol (LDL-Cholesterol) in group (Experimental).
- The absolute value of the calculated t is smaller than critical value (1.6786<2.145), so the means are not significantly different with regards to High Density Lipoprotein Cholesterol (LDL-Cholesterol) in group (Control).

Table 6: Descriptive Statistics (Mean & Standard Deviation) and Paired Sample t-test of Triglycerides (TG) of University Level Girls

Triglycerides (TG)				
Group	Number	Mean	Standard Deviation	t-value
Experiment (Pre-test)	15	116.1	11.6091	**0.1897**
Experimental (Post-test)	15	116.96	10.6796	
Control (Pre-test)	15	116.5533	9.354	**1.8662**
Control (Post-test)	15	123.3733	9.7449	

- The absolute value of the calculated t is smaller than critical value (0.1897<2.145), so the means are not significantly different with regards to Triglycerides (TG) in group (Experimental).
- The absolute value of the calculated t is smaller than critical value (1.8662<2.145), so the means are not significantly different with regards to Triglycerides (TG) in group (Control).
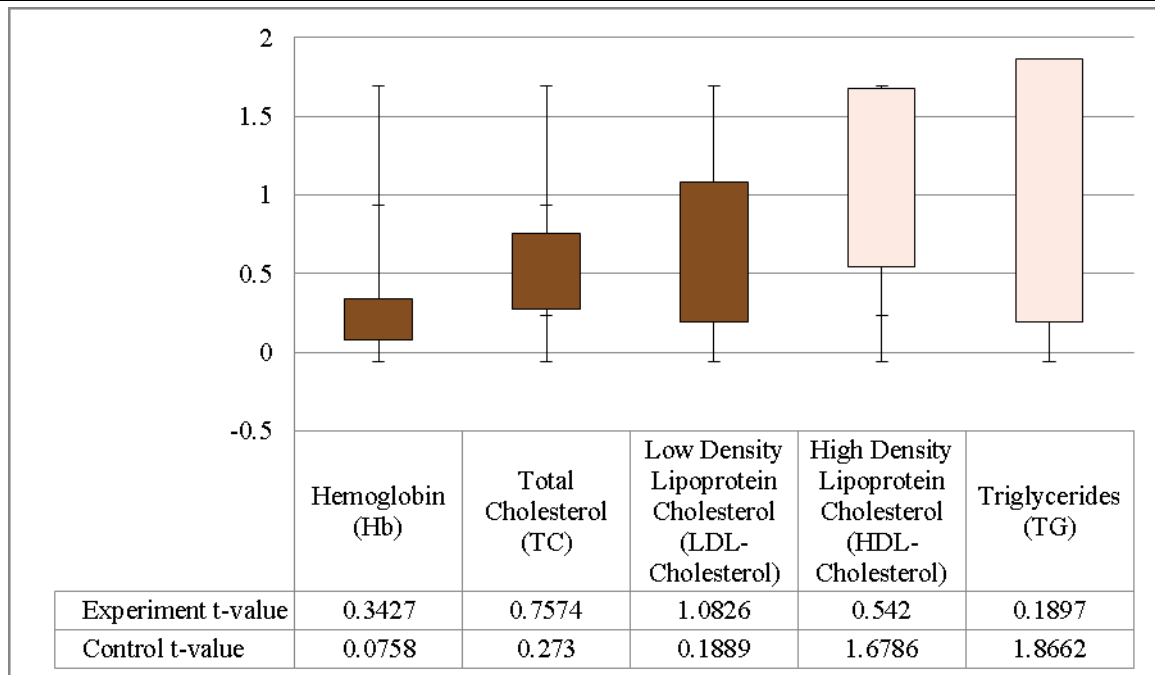
	Hemoglobin (Hb)	Total Cholesterol (TC)	Low Density Lipoprotein Cholesterol (LDL-Cholesterol)	High Density Lipoprotein Cholesterol (HDL-Cholesterol)	Triglycerides (TG)
Experiment t-value	0.3427	0.7574	1.0826	0.542	0.1897
Control t-value	0.0758	0.273	0.1889	1.6786	1.8662

Figure 5: t-value for the experimental and control groups scores of hematological parameter

6. Conclusions

To conclude, it is significant to mention in relation to Hemoglobin (Hb), Total Cholesterol (TC), Low Density Lipoprotein Cholesterol (LDL-Cholesterol), High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Triglycerides (TG) that results of Paired Sample t-test were found statistically insignificant (P > .05).

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