

Effects of Chandra Nadi Pranayama on Hematological Parameters

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Abstract

Study Aim: To assess the effects of Chandra nadi pranayama on hematological parameters. **Methods:** Thirty, university level girls of Department of Physical Education (T), Guru Nanak Dev University, Amritsar between the age group of 21 - 26 years (Mean \pm SD: age 22.8 ± 2.023 yrs, height 5.53 ± 1.822 ft, body mass 61.506 ± 4.514 kg) volunteered to participate in the study. The subjects from Group-A: experimental were subjected to a 4-week Chandra nadi pranayama (Left Nostril). **Statistical Analysis:** Student t test for paired samples was utilized to compare the means of the pre-test and the post-test. **Results:** No significant differences were found in Hemoglobin (Hb), Total Cholesterol (TC), Low Density Lipoprotein Cholesterol (LDL-Cholesterol), High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Triglycerides (TG) among university level girls.

Keywords

Chandra Nadi Pranayama, Hemoglobin, Total Cholesterol, Low Density Lipoprotein Cholesterol, High Density Lipoprotein Cholesterol, Triglycerides

1. Introduction

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 Ashtanga Yoga Tamini (1961), 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). The science of yoga is a powerful stream of knowledge, which enables the practitioners to achieve radiant physical health, serene mind, continues spiritual uplift, and creates the ability for harmonious

social living Kumar (2005). The traditional yogic practices of pranayama have a history of over 4000 years. The practice of pranayama has substantiated valuable both for the healthy and for the sick. In addition, recent research has established the therapeutic effect on some diseases. Women subject to psychological stress found significant improvement of their symptoms after a three-month yoga program Michalsen et al. (2005). In anxiety disorders, at least two comparative studies of yoga and meditation techniques (mindfulness) revealed the same effectiveness for both procedures (Krisanaprakornkit et al., 2006 & Smith et al., 2007). There are a multitude of pranayama techniques and it is traditionally taught that each of them has different psycho-physiological benefits Gitananda (2008). Pranayama has immense therapeutic potential in a wide range of psychosomatic disorders, but there is currently lack of an adequate meta-analysis in relation to Chandra nadi pranayama to assess its efficacy with respect to hematological parameters and as a result the present study was conducted to find out effects of Chandra nadi pranayama on hematological parameters.

2. Methods

2.1. Subjects

Thirty, university level girls of Department of Physical Education (T), Guru Nanak Dev University, Amritsar between the age group of 21 - 26 years (Mean \pm SD: age 22.8 ± 2.023 yrs, height 5.53 ± 1.822 ft, body mass 61.506 ± 4.514 kg) 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. Distribution and demographics of subjects are brought forth in Table 1.

2.2. Procedure

This study is designed as a retrospective cross-sectional study (Figure 1). The subjects from Group-A: Experimental were subjected to a 4-weeks Chandra nadi pranayama (Left Nostril). This lasted 3 weeks and consisted of daily sessions as shown in Table 2 & Figure 2. 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 determi-

Table 1. Distribution and demographics of subjects.

Variables	Sample Size (N = 30)		
	Total (N = 30)	Experimental group ($n_1 = 15$)	Control group ($n_2 = 15$)
Age	22.8 ± 2.023	22.6 ± 1.956	23 ± 2.138
Body Height	5.53 ± 1.822	5.546 ± 1.959	5.513 ± 1.726
Body Mass	61.506 ± 4.514	61.92 ± 4.866	61.093 ± 4.262

Table 2. Experimental treatment.

4-Weeks Chandra Nadi Pranayama Training			
Weeks	Schedule	Time	Duration
1 st Week	Preliminary Yogic Exercises	5 Minute	20 Minute
	Practice of Chandra Nadi Pranayama (9 Rounds \times 1 Set)	10 Minute	
	Relaxation Posture	5 Minute	
2 nd Week	Preliminary Yogic Exercises	5 Minute	25 Minute
	Practice of Chandra Nadi Pranayama (9 Rounds \times 2 Set)	15 Minute	
	Relaxation Posture	5 Minute	
3 rd Week	Preliminary Yogic Exercises	5 Minute	30 Minute
	Practice of Chandra Nadi Pranayama (9 Rounds \times 3 Set)	20 Minute	
	Relaxation Posture	5 Minute	
4 th Week	Preliminary Yogic Exercises	5 Minute	35 Minute
	Practice of Chandra Nadi Pranayama (9 Rounds \times 4 Set)	25 Minute	
	Relaxation Posture	5 Minute	

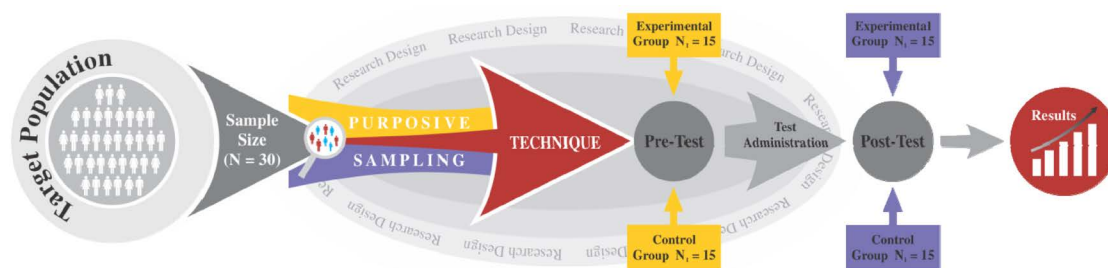


Figure 1. Study design.

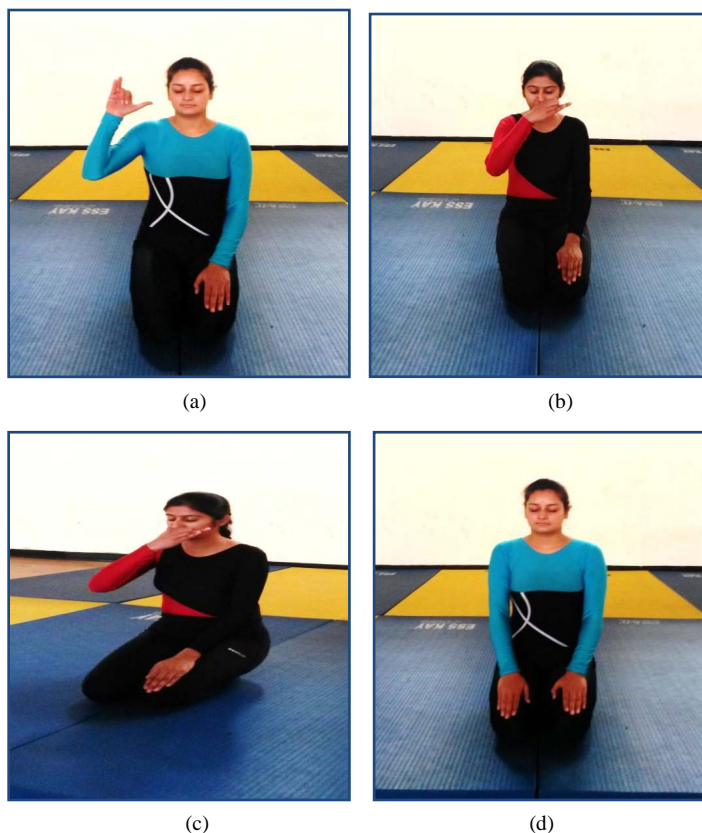


Figure 2. Subject performing Chandra Nadi Pranayama.

nation of lipid profiles were obtained. All of biochemical tests have been done with serum samples. Lipid parameters (Triglyceride; Cholesterol; Low-density lipoprotein; High-density lipoprotein) were measured using Boehringer Mannheim kits and Clinilab, BioMerieux analyser as used by Jastrzebska et al. (2002). The Collection of Biochemical tests with Serum Samples show in the Figure 3.

3. Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences for Windows version 16.0 software (SPSS Inc., Chicago, IL). Data is expressed as the mean \pm SD. Student t test for paired samples was utilized to compare the means of the pre-test and the post-test. The level of significance was set at 0.05.

4. Results

4.1. Hemoglobin (Hb)

The results of Hematological Parameter in group (Experimental) and group (Control) are shown in Table 3. The



Figure 3. Biochemical tests with Serum Samples.

Table 3. Descriptive statistics (Mean & Standard Deviation) and paired sample t-test of hematological parameter (i.e., Hemoglobin (Hb), total cholesterol (TC), low density lipoprotein cholesterol (LDL-cholesterol), high density lipoprotein cholesterol (HDL-cholesterol) and triglycerides (TG) of university level girls.

Hemoglobin (Hb)						
Group	Number	Mean	Standard Deviation	Standard Error of the Mean	t-value	p-value
Experiment (Pre-test)	15	12.780	0.421	0.108	1.740	0.1038
Experimental (Post-test)	15	12.913	0.456	0.117		
Control (Pre-test)	15	12.473	0.240	0.062	0.517	0.6132
Control (Post-test)	15	12.506	0.265	0.068		
Total Cholesterol (TC)						
Experiment (Pre-test)	15	167.240	14.598	3.7694	1.937	0.0732
Experimental (Post-test)	15	168.940	15.355	3.964		
Control (Pre-test)	15	166.760	14.613	3.773	0.581	0.5705
Control (Post-test)	15	166.893	14.266	3.683		
Low Density Lipoprotein Cholesterol (LDL-Cholesterol)						
Experiment (Pre-test)	15	119.120	7.640	1.972	1.243	0.2343
Experimental (Post-test)	15	119.486	7.694	1.986		
Control (Pre-test)	15	118.980	7.506	1.938	0.169	0.8682
Control (Post-test)	15	119.040	7.532	1.945		
High Density Lipoprotein Cholesterol (HDL-Cholesterol)						
Experiment (Pre-test)	15	75.120	4.443	1.147	0.617	0.5471
Experimental (Post-test)	15	75.206	4.296	1.109		
Control (Pre-test)	15	74.926	4.799	1.239	0.289	0.7768
Control (Post-test)	15	74.960	4.682	1.208		
Triglycerides (TG)						
Experiment (Pre-test)	15	135.473	9.647	2.491	1.011	0.3292
Experimental (Post-test)	15	217.626	314.503	81.204		
Control (Pre-test)	15	132.913	14.755	3.809	0.617	0.5471
Control (Post-test)	15	133.113	15.297	3.949		

Mean and Standard Deviation values of Hemoglobin (Hb) of pre-test and post-test of experimental group was 12.780 ± 0.421 and 12.913 ± 0.456 respectively. However, the Mean and Standard Deviation values of Hemoglobin (Hb) of pre-test and post-test of control group were 12.473 ± 0.240 and 12.506 ± 0.265 . The t-value in case of experimental group was 1.740 and for control group it was 0.517 as show in the **Figure 4**.

No significant between-group differences were noted in Haemoglobin (Hb) since the calculated value of ($t = 1.740$) is smaller than tabulated value of $t_{0.05} (14) = 2.1448$ for the selected degree of freedom and level of significance. The data does suggest that the differences between pre-test and post-test of Hemoglobin (Hb) in experimental and control group are insignificant. The t-test and p-value for the Experimental (Pre-Test & Post-Test) and Control (Pre-Test & Post-Test) Groups on the parameter Hemoglobin (Hb) has been presented graphically in **Figure 5**.

4.2. Total Cholesterol (TC)

A glance at **Table 3** shows the Mean and Standard Deviation values of Total Cholesterol (TC) of pre-test and post-test of experimental group was 167.240 ± 14.598 and 168.940 ± 15.355 respectively. However, the Mean and Standard Deviation values of Total Cholesterol (TC) of pre-test and post-test of control group were 166.760 ± 14.613 and 166.893 ± 14.266 . The t-value in case of experimental group was 1.937 and for control group it was 0.581 as show in the **Figure 4**.

No significant between-group differences were noted in Total Cholesterol (TC) since the calculated value of ($t = 1.937$) is smaller than tabulated value of $t_{0.05} (14) = 2.1448$ for the selected degree of freedom and level of significance. The data does suggest that the differences between pre-test and post-test of Total Cholesterol (TC) in experimental and control group are insignificant. The t-test and p-value for the Experimental (Pre-Test & Post-Test) and Control (Pre-Test & Post-Test) Groups on the parameter Total Cholesterol (TC) has been presented graphically in **Figure 6**.

4.3. Low Density Lipoprotein Cholesterol (LDL-Cholesterol)

A glance at **Table 3** shows the Mean and Standard Deviation values of Low Density Lipoprotein Cholesterol

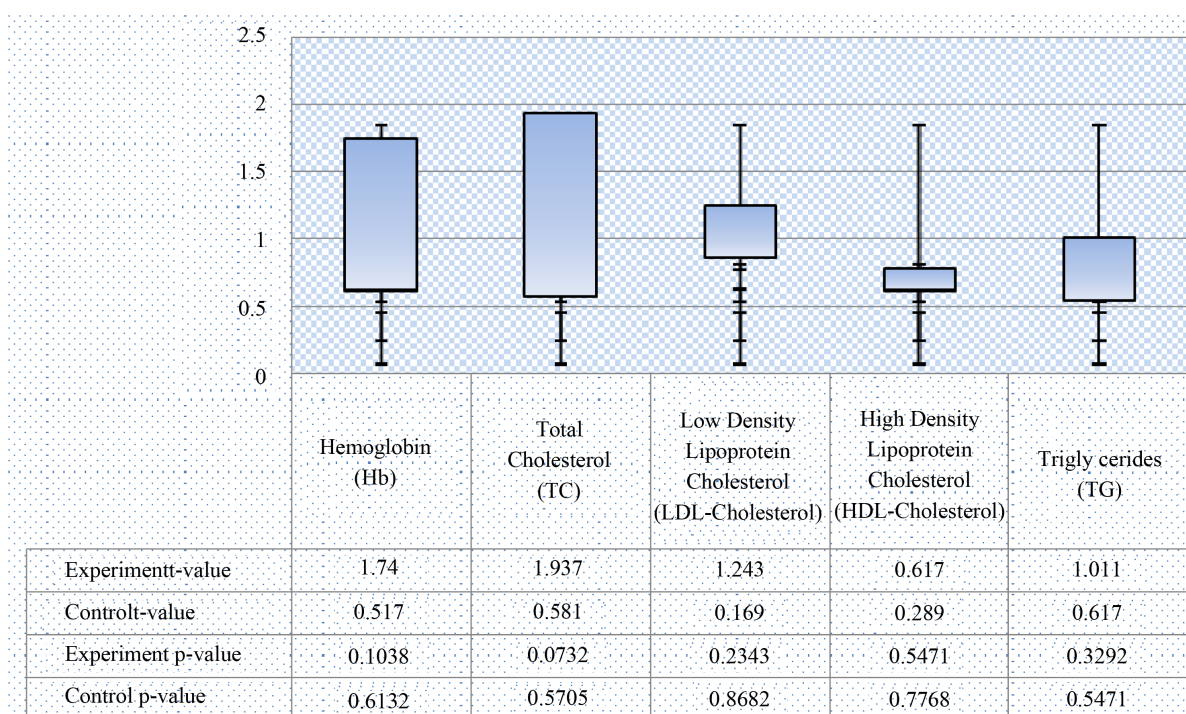


Figure 4. t-value and p-value for the experimental (Pre-Test & Post-Test) and control (Pre-Test & Post-Test) groups scores of hematological parameter.

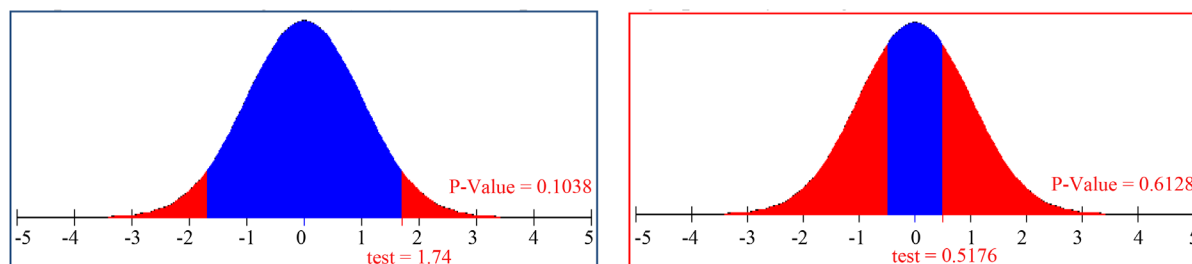


Figure 5. t-test and *p*-value for the experimental (Pre-Test & Post-Test) and control (Pre-Test & Post-Test) groups on the parameter hemoglobin (Hb).

(LDL-Cholesterol) of pre-test and post-test of experimental group was 119.120 ± 7.640 and 119.486 ± 7.694 respectively. However, the Mean and Standard Deviation values of Low Density Lipoprotein Cholesterol (LDL-Cholesterol) of pre-test and post-test of control group were 118.980 ± 7.506 and 119.040 ± 7.532 . The t-value in case of experimental group was 1.243 and for control group it was 0.169 as show in the **Figure 4**.

No significant between-group differences were noted in Low Density Lipoprotein Cholesterol (LDL-Cholesterol) since the calculated value of ($t = 1.243$) is smaller than tabulated value of $t_{0.05} (14) = 2.1448$ for the selected degree of freedom and level of significance. The data does suggest that the differences between pre-test and post-test of in Low Density Lipoprotein Cholesterol (LDL-Cholesterol) in experimental and control group are insignificant. The t-test and p-value for the Experimental (Pre-Test & Post-Test) and Control (Pre-Test & Post-Test) Groups on the parameter Low Density Lipoprotein Cholesterol (LDL-Cholesterol) has been presented graphically in **Figure 7**.

4.4. High Density Lipoprotein Cholesterol (HDL-Cholesterol)

A glance at **Table 3** shows the Mean and Standard Deviation values of High Density Lipoprotein Cholesterol (HDL-Cholesterol) of pre-test and post-test of experimental group was 75.120 ± 4.443 and 75.206 ± 4.296 respectively. However, the Mean and Standard Deviation values of High Density Lipoprotein Cholesterol (HDL-Cholesterol) of pre-test and post-test of control group were 74.926 ± 4.799 and 74.960 ± 4.682 . The t-value in case of experimental group was 0.617 and for control group it was 0.289 as show in the **Figure 4**.

No significant between-group differences were noted in High Density Lipoprotein Cholesterol (HDL-Cholesterol) since the calculated value of ($t = 0.617$) is smaller than tabulated value of $t_{0.05} (14) = 2.1448$ for the selected degree of freedom and level of significance. The data does suggest that the differences between pre-test and post-test of High Density Lipoprotein Cholesterol (HDL-Cholesterol) in experimental and control group are insignificant. The t-test and p-value for the Experimental (Pre-Test & Post-Test) and Control (Pre-Test & Post-Test) Groups on the parameter High Density Lipoprotein Cholesterol (HDL-Cholesterol) has been presented graphically in **Figure 8**.

4.5. Triglycerides (TG)

A glance at **Table 3** shows the Mean and Standard Deviation values of Triglycerides (TG) of pre-test and post-test of experimental group was 135.473 ± 9.647 and 217.626 ± 314.503 respectively. However, the Mean and Standard Deviation values of Triglycerides (TG) of pre-test and post-test of control group were 132.913 ± 14.755 and 133.113 ± 15.297 . The t-value in case of experimental group was 1.011 and for control group it was 0.617 as show in the **Figure 4**.

No significant between-group differences were noted in Triglycerides (TG) since the calculated value of ($t = 1.011$) is smaller than tabulated value of $t_{0.05} (14) = 2.1448$ for the selected degree of freedom and level of significance. The data does suggest that the differences between pre-test and post-test of Triglycerides (TG) in experimental and control group are insignificant. The t-test and p-value for the Experimental (Pre-Test & Post-Test) and Control (Pre-Test & Post-Test) Groups on the parameter Triglycerides (TG) has been presented graphically in **Figure 9**.

5. Conclusion

In summary, the present work manifests an overriding endeavor to explore effects of Chandra nadi pranayama on hematological parameters of university level girls. No significant differences were found in Hemoglobin (Hb),

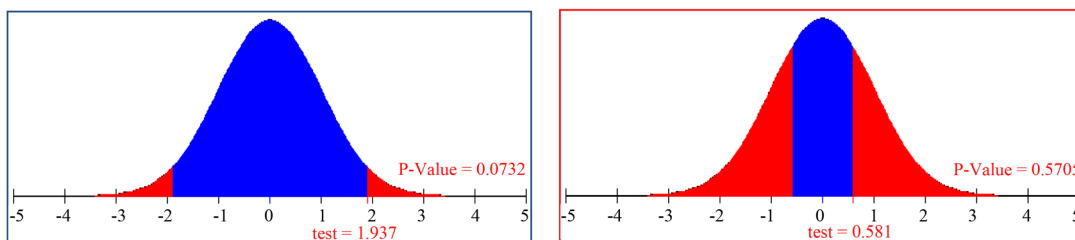


Figure 6. t-test and p -value for the experimental (Pre-Test & Post-Test) and control (Pre-Test & Post-Test) groups on the parameter total cholesterol (TC).

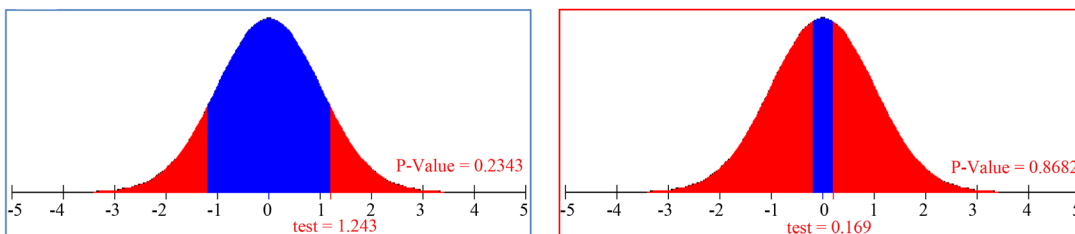


Figure 7. t-test and p -value for the experimental (Pre-Test & Post-Test) and control (Pre-Test & Post-Test) groups on the parameter low density lipoprotein cholesterol (LDL-cholesterol).

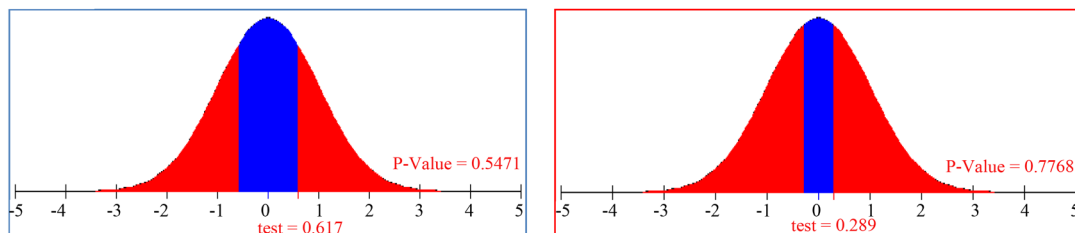


Figure 8. t-test and p -value for the experimental (Pre-Test & Post-Test) and control (Pre-Test & Post-Test) groups on the parameter high density lipoprotein cholesterol (HDL-cholesterol).

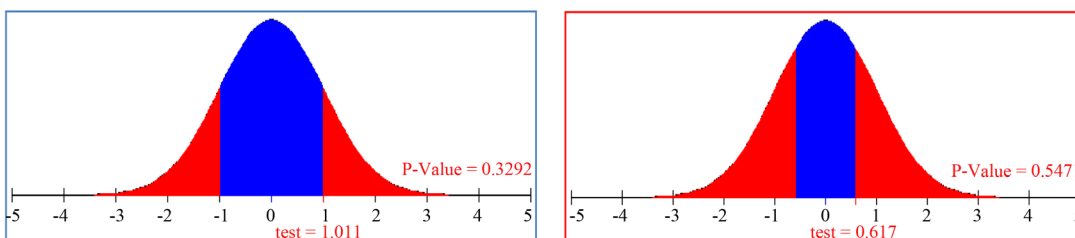


Figure 9. t-test and p -value for the experimental (Pre-Test & Post-Test) and control (Pre-Test & Post-Test) groups on the parameter triglycerides (TG).

Total Cholesterol (TC), Low Density Lipoprotein Cholesterol (LDL-Cholesterol), High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Triglycerides (TG) of university level girls.

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