CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

In this chapter, the collected data were analyzed by employing standard statistical software. The data were presented through tables systematically. The step-wise results along with scientific as well as logical interpretations have been presented in this chapter. Further, the results were discussed and justified with sound reasoning to draw definite conclusions.

4.1 Results on Descriptive Data Analysis

4.1.1 Descriptive Data Analysis – Psychological Variables

In case of ***Examination Anxiety*** the result of central tendency and dispersion revealed that the mean *pretest* scores *of Yoga and Control groups* were 15.47 (SD=5.42) and 15.10 (SD=5.29) respectively. All the scores have been expressed in **points (Table 4.1).** The result indicates that the ***pretest*** scores of all the selected groups are mostly **similar**. The mean ***posttest*** scores in ***Examination Anxiety*** *of Yoga and Control groups* were 17.93 (SD=4.24) and 26.13 (SD=4.02) respectively. The result indicates that the ***posttest*** scores are **different**, which helps to interpret that training intervention **brought reduction in *Examination Anxiety*.**

In case of ***Stress*** the result of central tendency and dispersion revealed that the mean *pretest* scores *of Yoga and Control groups* were 18.47 (SD=3.39) and 19.10 (SD=3.24) respectively. All the scores have been expressed in **points (Table 4.1).** The result indicates that the ***pretest*** scores of all the selected groups are mostly **similar**. The mean ***posttest*** scores in ***Stress*** *of Yoga and Control groups* were 14.07 (SD=2.48) and 20.70 (SD=3.28) respectively. The result indicates that the ***posttest*** scores are

different, which helps to interpret that training intervention **brought reduction in *Stress.***

In case of ***Depression*** the result of central tendency and dispersion revealed that the mean *pretest* scores *of Yoga and Control groups* were 14.77 (SD=3.88) and 14.17 (SD=3.62) respectively. All the scores have been expressed in **points (Table 4.1).** The result indicates that the ***pretest*** scores of all the selected groups are mostly **similar**. The mean ***posttest*** scores in ***Depression*** *of Yoga and Control groups* were 10.07 (SD=2.69) and 16.83 (SD=3.21) respectively. The result indicates that the ***posttest*** scores are **different**, which helps to interpret that training intervention **brought reduction in Depression***.*

The results on measures of central tendency and dispersion revealed that the mean *pretest* scores in ***Concentration*** *of Yoga and Control groups* were 75.90 (SD=5.23) and 75.50 (SD=4.18) respectively. All the scores have been expressed in **points (Table 4.1).** The result indicates that the ***pretest*** scores of all the selected groups are mostly **similar**. The mean ***posttest*** scores in ***Concentration*** *of Yoga and Control groups* were 89.93 (SD=9.21) and 77.47 (SD=4.28) respectively. The result indicates that the ***posttest*** scores are **different**, which helps to interpret that training intervention **brought improvement** in ***Concentration***.

The measures of central tendency and dispersion revealed that the mean *pretest* scores in ***Positive Self Evaluation*** *(Dimension of Mental Health) of Yoga and Control groups* were 27.60 (SD=3.19) and 27.97 (SD=2.40) respectively. All the scores have been expressed in **points (Table 4.1).** The result indicates that the ***pretest*** scores of all the selected groups are mostly **similar**. The mean ***posttest*** scores in ***Positive Self Evaluation*** *(Dimension of Mental Health) of Yoga and Control groups* were 35.17

(SD=3.43) and 27.70 (SD=2.94) respectively. The result indicates that the *posttest* scores are **different**, which helps to interpret that training intervention **brought improvement** in *Positive Self Evaluation (Dimension of Mental Health).*

The results on measures of central tendency and dispersion revealed that the mean *pretest* scores in *Perception of Reality (Dimension of Mental Health) of Yoga and Control groups* were 22.27 (SD=3.51) and 21.37 (SD=3.40) respectively. All the scores have been expressed in **points (Table 4.1).** The result indicates that the *pretest* scores of all the selected groups are mostly **similar**. The mean *posttest* scores in *Perception of Reality (Dimension of Mental Health) of Yoga and Control groups* were 28.07 (SD=3.32) and 20.47 (SD=3.85) respectively. The result indicates that the *posttest* scores are **different**, which helps to interpret that training intervention **brought improvement** in *Perception of Reality (Dimension of Mental Health).*

The results on measures of central tendency and dispersion revealed that the mean *pretest* scores in *Integration of Personality (Dimension of Mental Health) of Yoga and Control groups* were 35.30 (SD=4.65) and 33.43 (SD=4.32) respectively. All the scores have been expressed in **points (Table 4.1).** The result indicates that the *pretest* scores of all the selected groups are mostly **similar**. The mean *posttest* scores in *Integration of Personality (Dimension of Mental Health) of Yoga and Control groups* were 40.80 (SD=3.04) and 32.00 (SD=4.28) respectively. The result indicates that the *posttest* scores are **different**, which helps to interpret that training intervention **brought improvement** in *Integration of Personality (Dimension of Mental Health).*

The results on measures of central tendency and dispersion revealed that the mean *pretest* scores in **Autonomy** *(Dimension of Mental Health) of Yoga and Control groups* were 15.83 (SD=3.76) and 15.47 (SD=3.58) respectively. All the scores have been expressed in points**. (Table 4.1)** The result indicates that the **pretest** scores of all the selected groups are mostly **similar**. The mean **posttest** scores in **Autonomy** *(Dimension of Mental Health) of Yoga and Control groups* were 20.97 (SD=2.63) and 15.40 (SD=3.28) respectively. The result indicates that the **posttest** scores are **different**, which helps to interpret that training intervention **brought improvement** in **Autonomy** *(Dimension of Mental Health).*

The results on measures of central tendency and dispersion revealed that the mean *pretest* scores in **Group Oriented Attitudes** *(Dimension of Mental Health) of Yoga and Control groups* were 26.23 (SD=4.28) and 26.13 (SD=3.75) respectively. All the scores have been expressed in **points (Table 4.1).** The result indicates that the **pretest** scores of all the selected groups are mostly **similar**. The mean **posttest** scores in **Group Oriented Attitudes** *(Dimension of Mental Health) of Yoga and Control groups* were 34.90 (SD=2.93) and 25.93 (SD=3.69) respectively. The result indicates that the **posttest** scores are **different**, which helps to interpret that training intervention **brought improvement** in **Group Oriented Attitudes** *(Dimension of Mental Health).*

The results on measures of central tendency and dispersion revealed that the mean *pretest* scores in **Environmental Competence** *(Dimension of*

Mental Health) of Yoga and Control groups were 25.77 (SD=3.93) and 25.90 (SD=3.29) respectively. All the scores have been expressed in **points (Table 4.1).** The result indicates that the ***pretest*** scores of all the selected groups are mostly **similar**. The mean ***posttest*** scores in ***Environmental Competence (Dimension of Mental Health) of Yoga and Control groups*** were 34.00 (SD=2.44) and 25.63 (SD=4.21) respectively. The result indicates that the ***posttest*** scores are **different**, which helps to interpret that training intervention **brought improvement** in ***Environmental Competence (Dimension of Mental Health)***.

The results on measures of central tendency and dispersion revealed that the mean *pretest* scores in ***Overall Mental Health*** *of Yoga and Control groups* were 153.00 (SD=10.01) and 150.27 (SD=7.07) respectively. All the scores have been expressed in **points (Table 4.1).** The result indicates that the ***pretest*** scores of all the selected groups are mostly **similar**. The mean ***posttest*** scores in ***Overall Mental Health*** *of Yoga and Control groups* were 193.90 (SD=7.19) and 147.13 (SD=6.25) respectively. The result indicates that the ***posttest*** scores are **different**, which helps to interpret that training intervention **brought improvement** in ***Overall Mental Health***.

Table 4.1

Results on Descriptive Data Analysis of Selected Psychological Variables of School Students (M ± SD)

Parameters	Yoga Group		Control Group	
	Pre-test	Post-test	Pre-test	Post-test
Examination Anxiety (Points)	15.47 (±5.42)	17.93 (±4.24)	15.10 (±5.29)	26.13 (±4.02)
Stress (Points)	18.47 (±3.39)	14.07 (±2.48)	19.10 (±3.24)	20.70 (±3.28)
Depression (Points)	14.77 (±3.88)	10.07 (±2.69)	14.17 (±3.62)	16.83 (±3.21)
Concentration (Points)	75.90 (±5.23)	89.93 (±9.21)	75.50 (±4.18)	77.47 (±4.28)
Positive Self Evaluation (Points)	27.60 (±3.19)	35.17 (±3.43)	27.97 (±2.40)	27.70 (±2.94)
Perception of Reality (Points)	22.27 (±3.51)	28.07 (±3.32)	21.37 (±3.40)	20.47 (±3.85)
Integration of Personality (Points)	35.30 (±4.65)	40.80 (±3.04)	33.43 (±4.32)	32.00 (±4.28)
Autonomy (Points)	15.83 (±3.76)	20.97 (±2.63)	15.47 (±3.58)	15.40 (±3.28)
Group Oriented Attitudes (Points)	26.23 (±4.28)	34.90 (±2.93)	26.13 (±3.75)	25.93 (±3.69)
Environmental Competence (Points)	25.77 (±3.93)	34.00 (±2.44)	25.90 (±3.29)	25.63 (±4.21)
Overall Mental Health (Points)	153.00 (±10.01)	193.90 (±7.19)	150.27 (±7.07)	147.13 (±6.25)

4.1.2 Descriptive Data Analysis – Physiological Variables

In case of **Systolic Blood Pressure** the result of central tendency and dispersion revealed that the mean *pretest* scores *of Yoga and Control groups* were 114.50 (SD=6.50) and 117.47 (SD=4.40) respectively. All the scores have been expressed in mmHg **(Table 4.2).** The result indicates that the **pretest** scores of all the selected groups are mostly **similar**. The mean **posttest** scores in **Systolic Blood Pressure** *of Yoga and Control groups* were 115.67 (SD=4.20) and 118.67 (SD=2.87) respectively. The result indicates that the **posttest** scores are **different**, which helps to interpret that training intervention **did not bring any change in** *Systolic Blood Pressure.*

The result of central tendency and dispersion revealed that in **Diastolic Blood Pressure** the mean *pretest* scores *of Yoga and Control groups* were 77.50 (SD=3.16) and 78.77 (SD=3.99) respectively. All the scores have been expressed in mmHg **(Table 4.2).** The result indicates that the **pretest** scores of all the selected groups are mostly **similar**. The mean **posttest** scores in **Diastolic Blood Pressure** *of Yoga and Control groups* were 77.13 (SD=3.13) and 78.30 (SD=2.69) respectively. The result indicates that the **posttest** scores are **different**, which helps to interpret that training intervention **did not bring any change in** *Diastolic Blood Pressure.*

In case of **Pulse Rate** the result of central tendency and dispersion revealed that the mean *pretest* scores *of Yoga and Control groups* were 76.50 (SD=4.25) and 78.57 (SD=4.99) respectively. All the scores have been expressed in beats/min**. (Table 4.2).** The result indicates that the **pretest** scores of all the selected groups are mostly **similar**. The mean **posttest** scores in **Pulse Rate** *of Yoga and Control groups* were 72.53 (SD=2.61) and 80.40 (SD=4.11) respectively. The result indicates that the **posttest** scores are **different**, which helps to interpret that training intervention **brought change in** *Pulse Rate.*

The result of central tendency and dispersion revealed that in **Respiratory Rate** the mean *pretest* scores *of Yoga and Control groups* were 15.03 (SD=1.13) and 15.87 (SD=1.74) respectively. All the scores have been expressed in Cycle per min **(Table 4.2).** The result indicates that the **pretest** scores of all the selected groups are mostly **similar**. The mean **posttest** scores in **Respiratory Rate** *of Yoga and Control groups* were 12.30 (SD=1.26) and 14.43 (SD=1.91) respectively. The result indicates that the **posttest** scores are **different**, which helps to interpret that training intervention **brought reduction in Respiratory Rate**.

The result of central tendency and dispersion revealed that in **Electrodermal Activity** the mean *pretest* scores *of Yoga and Control groups* were 4.12 (SD=1.10) and 4.33 (SD=1.06) respectively. All the scores have been expressed in microsiemens **(Table 4.2).** The result indicates that the **pretest** scores of all the selected groups are mostly **similar**. The mean **posttest** scores in **Electrodermal Activity** *of Yoga and Control groups* were 1.52 (SD=0.73) and 4.25 (SD=0.67) respectively. The result indicates that the **posttest** scores are **different**, which helps to interpret that training intervention **brought improvement in Electrodermal Activity**.

Table 4.2

**Results on Descriptive Data Analysis of Selected Physiological
Variables of School Students (M ± SD)**

Parameters	Yoga Group		Control Group	
	Pre-test	Post-test	Pre-test	Post-test
Systolic Blood Pressure (mmHg)	114.50 (±6.50)	115.67 (±4.20)	117.47 (±4.40)	118.67 (±2.87)
Diastolic Blood Pressure (mmHg)	77.50 (±3.16)	77.13 (±3.13)	78.77 (±3.99)	78.30 (±2.69)
Pulse Rate (Beats/min)	76.50 (±4.25)	72.53 (±2.61)	78.57 (±4.99)	80.40 (±4.11)
Respiratory Rate (Cycle/min)	15.03 (±1.13)	12.30 (±1.26)	15.87 (±1.74)	14.43 (±1.91)
Electrodermal Activity (microsiemens)	4.12 (±1.10)	1.52 (±0.73)	4.33 (±1.06)	4.25 (±0.67)

4.1.3 Descriptive Data Analysis – Biochemical Variables

In case of **Cortisol** *the* result of central tendency and dispersion revealed that the mean *pretest* scores *of Yoga and Control groups* were 12.05 (SD=3.30) and 12.30 (SD=2.92) respectively. All the scores have been expressed in ng/ml **(Table 4.3).** The result indicates that the **pretest** scores of all the selected groups are mostly **similar**. The mean **posttest** scores in **Cortisol** *of Yoga and Control groups* were 9.68 (SD=2.51) and 13.25 (SD=2.94) respectively. The result indicates that the **posttest** scores are **different**, which helps to interpret that training intervention **brought improvement in Cortisol**.

The result of central tendency and dispersion revealed that in **Dehydroepiandrosterone sulfate (DHEAs)** the mean *pretest* scores *of Yoga and Control groups* were 0.97 (SD=0.58) and 0.89 (SD=0.41) respectively. All the scores have been expressed in ng/ml **(Table 4.3).** The result indicates that the **pretest** scores of all the selected groups are mostly **similar**. The mean **posttest** scores in **Dehydroepiandrosterone sulfate (DHEAs)** *of Yoga and Control groups* were 1.26 (SD=0.49) and 0.79 (SD=0.34) respectively. The result indicates that the **posttest** scores are **different**, which helps to interpret that training intervention **brought improvement in Dehydroepiandrosterone sulfate (DHEAs)**.

Table 4.3

Results on Descriptive Data Analysis of Selected Biochemical Variables of School Students (M ± SD)

Parameters	Yoga Group		Control Group	
	Pre-test	Post-test	Pre-test	Post-test
Cortisol (ng/ml)	12.05 (±3.30)	9.68 (±2.51)	12.30 (±2.92)	13.25 (±2.94)
Dehydroepiandrosterone (ng/ml)	0.97 (±0.58)	1.26 (±0.49)	0.89 (±0.41)	0.79 (±0.34)

4.2 Results of ANOVA for Psychological Variables

In case of inferential statistics applied on psychological variables, the result of 2 x 2 x 11 Factorial ANOVA (Table 4.4) revealed that all most all the variables got remarkably significant changes (F=42.55, p<0.01). Further, statistically significant changes are also evident in case of experimental and control groups (F=31.20, p<0.01) and even in interaction (F=14.25, p<0.05). It seems the training intervention had statistically significant effects. These changes, therefore, have been discriminated further by using Scheffe's post hoc test.

Table 4.4

Result of Analysis of Variance (ANOVA) for Psychological Variables

Source of Variation	SS	df	MS	F
TOTAL	21855.05	515	--	--
Psychological Variables (A)	7505.80	10	750.58	42.55**
Groups (B)	550.36	1	550.36	31.20**
Interaction	5278.77	21	251.37	14.25*
ERROR	8520.12	483	17.64	

* p < 0.05 ** p < 0.01

4.3 Results of Scheffe's Post Hoc analysis for Psychological Variables

4.3.1 Result on the status of Examination Anxiety

In **Examination Anxiety (Points)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.5 were 16.50, 11.05, 16.40 and 19.17** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.6** revealed that-

- Control group showed a significant increase in **Examination Anxiety** (CD=0.31, p<0.05).

- **Yoga training** helped for reduction in **Examination Anxiety** (CD=0.33, p<0.05).

- **"Yoga training"** showed significant superiority over the "Controls" in lowering **Examination Anxiety** (CD=0.38, p<0.05) (Fig. 4.1).

This result helps to interpret that the selected **Yoga** training helped to maintained baseline anxiety level in students appearing for board examination. Thus, **Yoga** has significant effects in lowering **Examination Anxiety**.

Table 4.5

Ordered Treatment Means of Examination Anxiety
(Yoga Training Group Vs Control Group)

	ORDER			
	1	2	3	4
Means	16.50	11.05	16.40	19.17

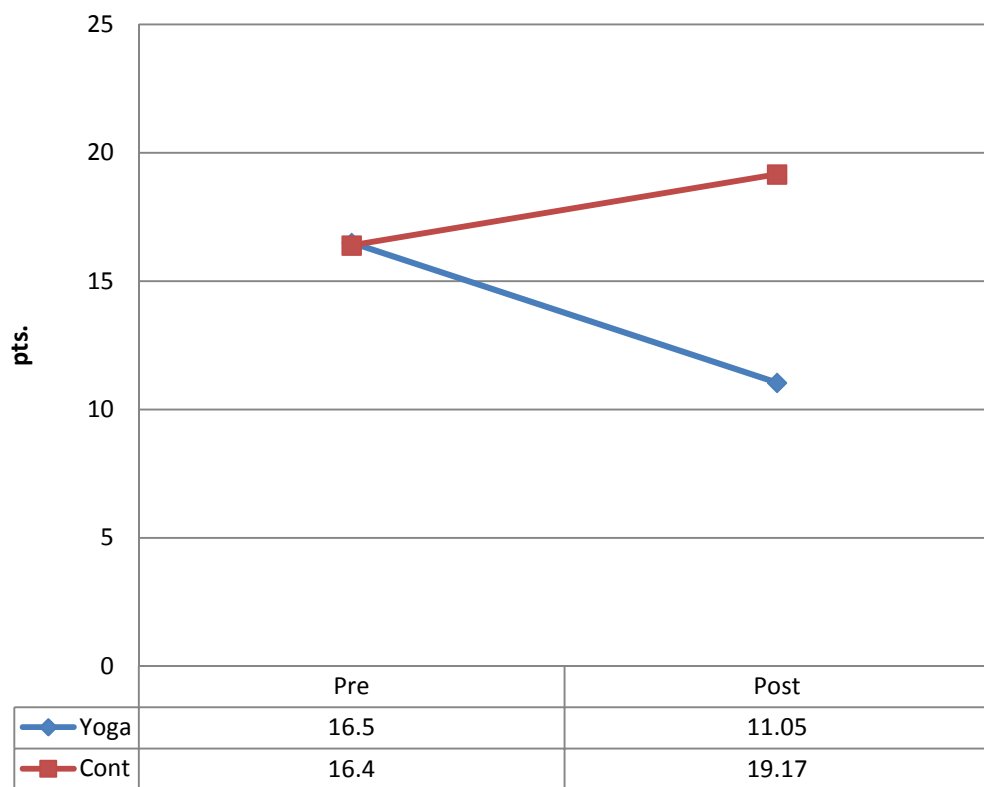Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.6

Scheffe's Post Hoc Test for Difference Between Pairs of Ordered Means in Examination Anxiety (Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.31*↑	0.38*↓	0.21
3		0.39*	0.10
2		--	0.33*↓
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.1 Yoga for reduction in pre-examination anxiety

	Pre	Post
Yoga	16.5	11.05
Cont	16.4	19.17

pts.

4.3.2 Result on the status of Stress

In **Stress (Points)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.7 were 19.06, 13.12, 18.94 and 23.15** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.8** revealed that-

- Control group showed significant increase in **Stress** prior to examination (CD=0.27, $p<0.05$).

- *Yoga training* group showed significant reduction in **Stress** prior to examination (CD=0.30, $p<0.05$).

- *"Yoga training"* showed significant superiority over "Controls" for reduction in **Stress** (CD=0.36, $p<0.05$) (Fig. 4.2).

This result helps to interpret that the selected **Yoga** training has significant effects for reduction of **Stress**.

Table 4.7

**Ordered Treatment Means of Stress
(Yoga Training Group Vs Control Group)**

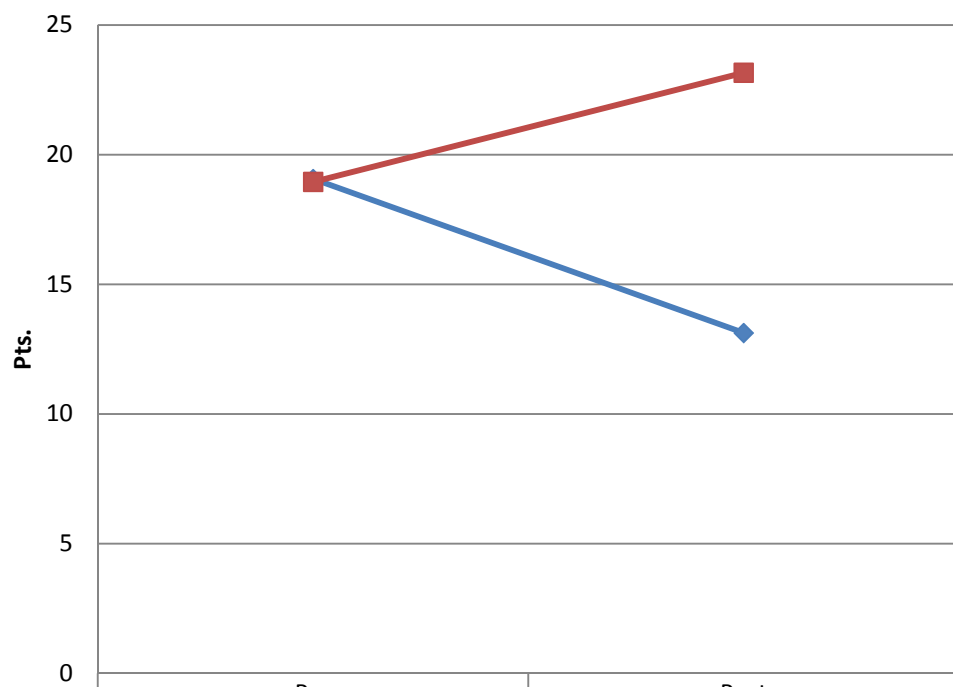|	ORDER			
	1	2	3	4
Means	19.06	13.12	18.94	23.15

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.8

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Stress**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.27*↑	0.36*↓	0.16
3		0.37*	0.12
2		--	0.30*↓
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.2 Yoga for controlling pre-examination stress

	Pre	Post
Yoga	19.06	13.12
Cont	18.94	23.15

4.3.3 Result on the status of Depression

In **Depression (Points.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.9 were 15.20, 10.28, 15.06, 18.27** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.10** revealed that-

- Control group showed significant increase in **Depression** (CD=0.24, p<0.05).

- **Yoga training** helped for reduction in **Depression** (CD=0.37, p<0.05).

- **"Yoga training"** showed significant superiority over the "Controls" in reducing **Depression** (CD=0.42, p<0.01) (Fig. 4.3).

This result helps to interpret that the selected **Yoga** practices for six weeks helps to reduce depression in students. Thus, **Yoga** has significant effects for reducing depression among students appearing for board examination.

Table 4.9

Ordered Treatment Means of Depression
(Yoga Training Group Vs Control Group)

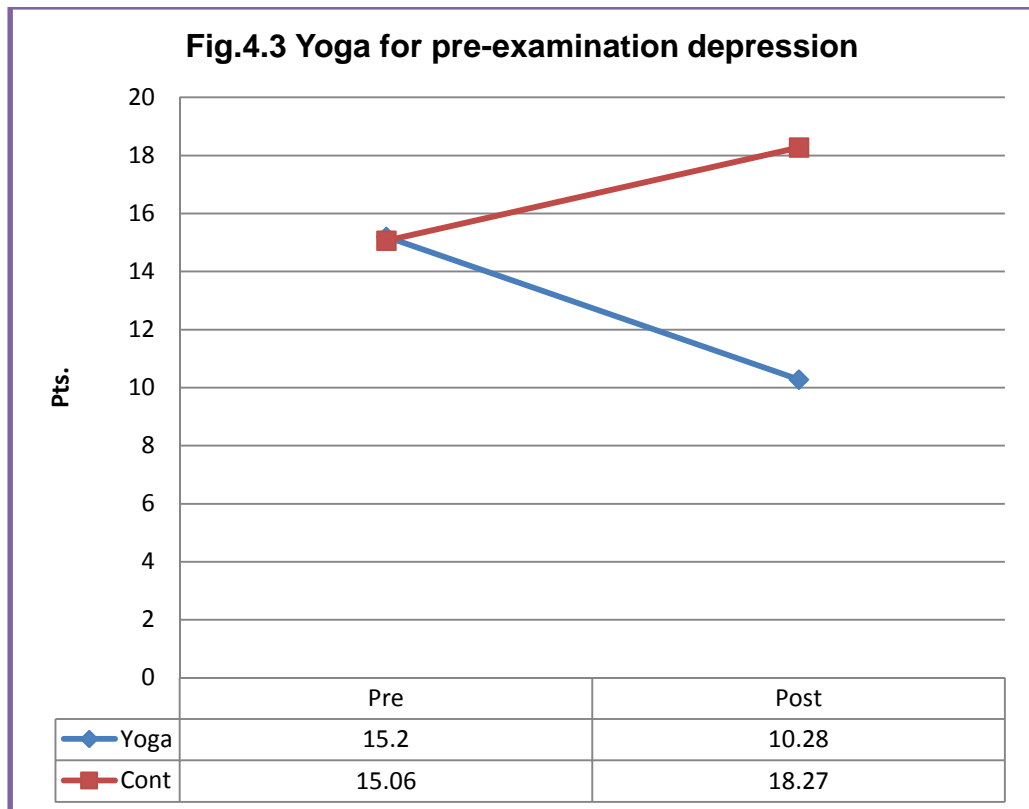|	ORDER			
	1	2	3	4
Means	15.20	10.28	15.06	18.27

Where,　　1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.10

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Depression**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.24*↑	0.42**↓	0.19
3		0.44*	0.15
2		--	0.37* ↓
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.3 Yoga for pre-examination depression

	Pre	Post
Yoga	15.2	10.28
Cont	15.06	18.27

4.3.4 Result on the status of Concentration

In **Concentration (Points)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.11 were 76.54, 91.08, 75.85 and 78.38** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.12** revealed that-

- Control group could not bring significant change in *Concentration* (CD=0.14, p<0.05).

- *Yoga training* brought significant improvement in *Concentration* (CD=0.47, p<0.01).

- *"Yoga training"* showed significant superiority over the controls in improving concentration (CD=0.43, p<0.01) **(Fig. 4.4)**.

This result helps to interpret that *Yoga* has significant effects for improving *Concentration*.

Table 4.11

Ordered Treatment Means of Concentration
(Yoga Training Group Vs Control Group)

	ORDER			
	1	2	3	4
Means	76.54	91.08	75.85	78.38

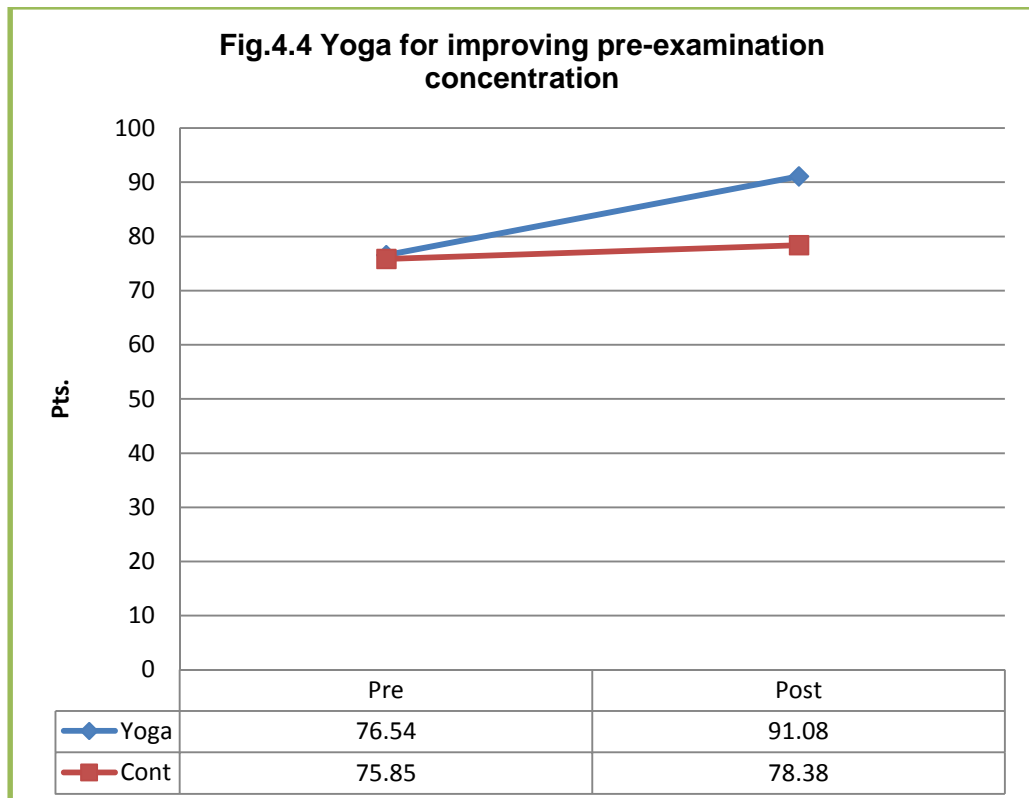Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.12

Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Concentration
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.14	0.43**↑	0.10
3		0.40**	0.09
2		--	0.47**↑
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.4 Yoga for improving pre-examination concentration

	Pre	Post
Yoga	76.54	91.08
Cont	75.85	78.38

Pts.

4.3.5 Result on the status of Positive Self Evaluation (Mental Health)

In **Positive Self Evaluation (Points)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.13 were 27.13, 35.68, 27.28 and 28.41** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.14** revealed that-

- Control group did not show significant change in *Positive Self Evaluation (component of Mental Health)* (CD=0.16, p>0.05).

- *Yoga training* group showed significant improvement (CD=0.33, p<0.05) in *Positive Self Evaluation (Component of Mental Health)*.

- *"Yoga training"* showed significant superiority over the "Controls" in improving *Positive Self Evaluation (Component of Mental Health)* (CD=0.27 p<0.05) (Fig. 4.5).

This result helps to interpret that the selected *Yoga* practices helped to bring about relaxation and values which might have improved the Positive self Evaluation (Component of Mental Health). Thus, *Yoga* has significant effects for improving *Positive Self Evaluation (Component of Mental Health)*.

Table 4.13

Ordered Treatment Means of Positive Self Evaluation
(Yoga Training Group Vs Control Group)

	ORDER			
	1	2	3	4
Means	27.13	35.68	27.28	28.41

Where,   1 = Pre-test Score of "Yoga training Gr."

             2 = Post-test Score of "Yoga training Gr."

             3 = Pre-test Score of "Control Gr."
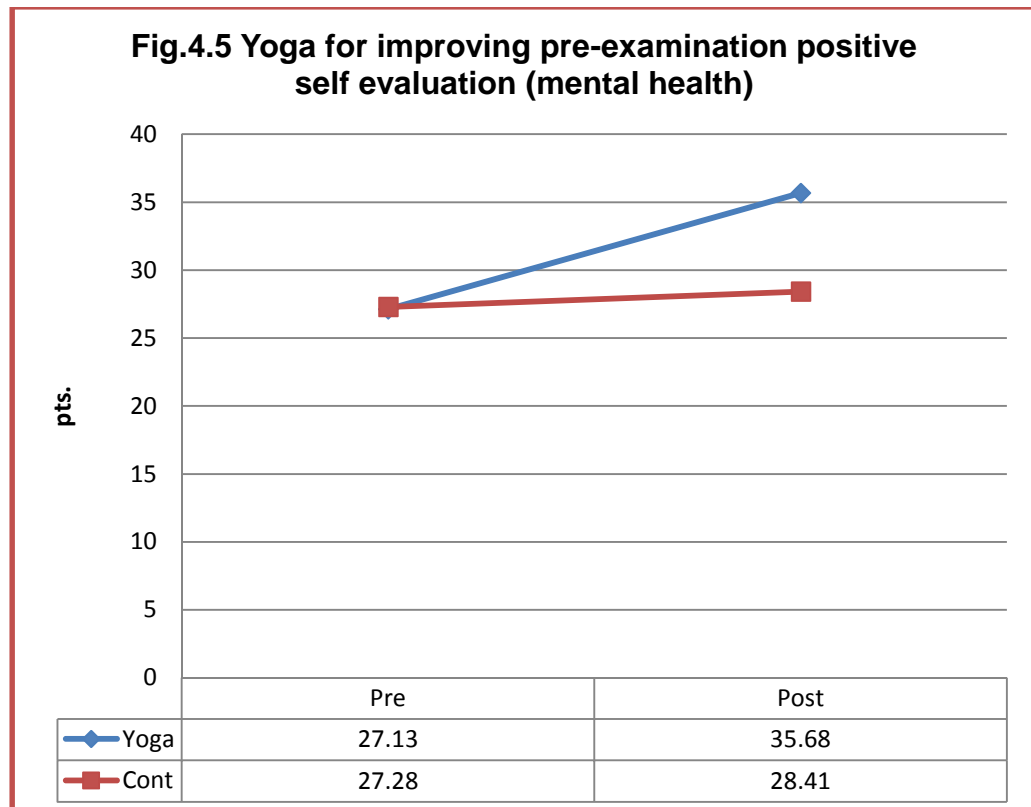
             4 = Post-test Score of "Control Gr."

Table 4.14

Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Positive Self Evaluation
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.16	0.27* ↑	0.12
3		0.21*	0.10
2		--	0.33* ↑
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.5 Yoga for improving pre-examination positive self evaluation (mental health)

	Pre	Post
Yoga	27.13	35.68
Cont	27.28	28.41

pts.

4.3.6 Result on the status of Perception of Reality

In **Perception of Reality (pts.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.15 were 20.85, 29.45, 21.04 and 22.27** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.16** revealed that-

- Control group did not show significant change in **Perception of Reality** (CD=0.13, p>0.05).

- **Yoga training** group showed significant improvement (CD=0.43, p<0.01) in **Perception of Reality**.

- **"Yoga training"** showed significant superiority over the "Controls" in improving **Perception of Reality** (CD=0.40, p<0.01) (Fig. 4.6).

This result helps to interpret that the selected **Yoga** perhaps helped to bring about change in perception of reality among students appearing for board examination. Thus, **Yoga** has significant effects for improving **Perception of Reality (Component of Mental Health)**.

Table 4.15

Ordered Treatment Means of Perception of Reality
(Yoga Training Group Vs Control Group)

	ORDER			
	1	2	3	4
Means	20.85	29.45	21.04	22.27

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

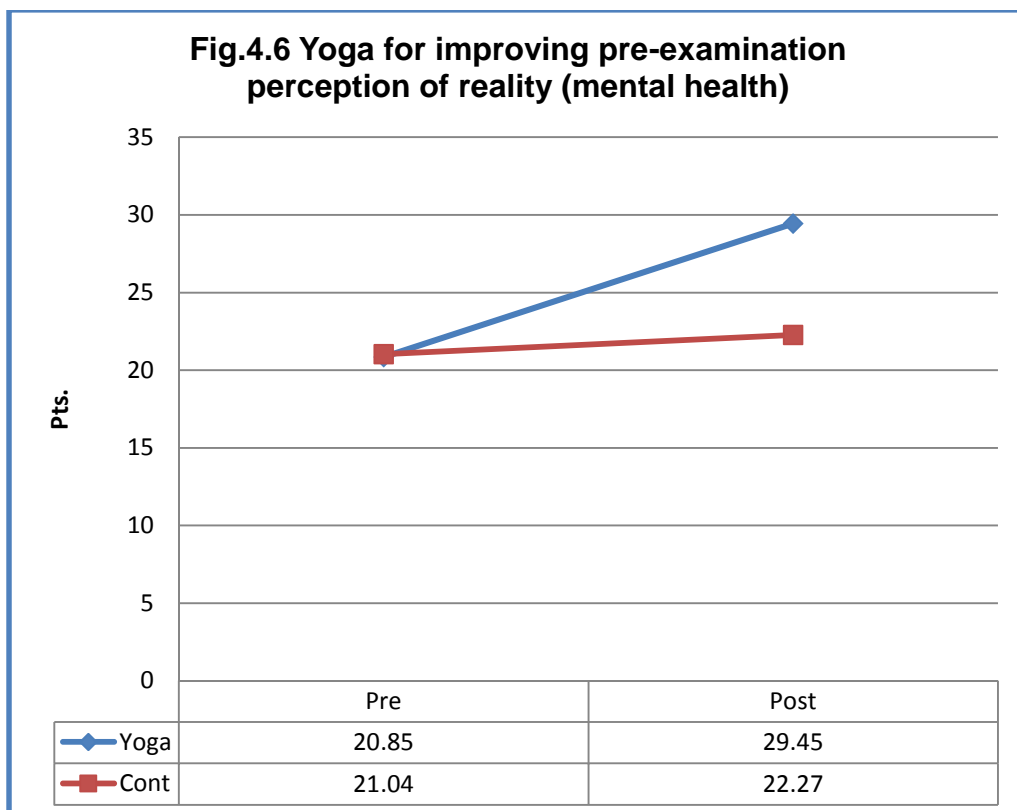3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.16

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Perception of Reality**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.13	0.40**↑	0.14
3		0.35*	0.11
2		--	0.43**↑
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.6 Yoga for improving pre-examination perception of reality (mental health)

	Pre	Post
Yoga	20.85	29.45
Cont	21.04	22.27

4.3.7 Result on the status of Integration of Personality

In **Integration of Personality (Pts.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.17 were 34.25, 41.65, 33.86 and 32.00** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.18** revealed that-

- Control group did not show significant change in **Integration of Personality** (CD=0.11, p>0.05).

- *Yoga training* group showed significant improvement (CD=0.27, p<0.05) in *Integration of Personality*.

- *"Yoga training"* showed significant superiority over the "Controls" in improving *Integration of Personality* (CD=0.24, p<0.05) (Fig. 4.7).

Thus, *Yoga* has significant effects for improving *Integration of Personality (Component of Mental Health)*.

Table 4.17

Ordered Treatment Means of Integration of Personality
(Yoga Training Group Vs Control Group)

	ORDER			
	1	2	3	4
Means	34.25	41.65	33.86	32.00

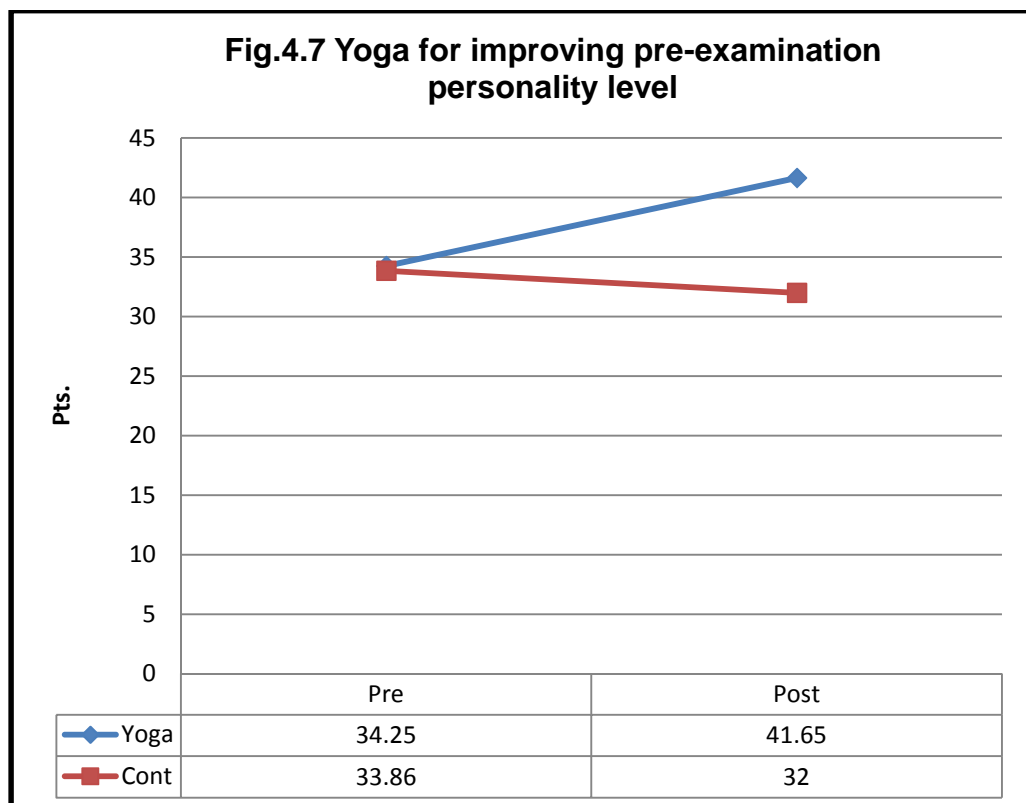Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.18

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Integration of Personality**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.11	0.23* ↑	0.09
3		0.18	0.10
2		--	0.27* ↑
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.7 Yoga for improving pre-examination personality level

	Pre	Post
Yoga	34.25	41.65
Cont	33.86	32

4.3.8 Result on the status of Autonomy

In **Autonomy (Pts.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.19 were 15.44, 21.06, 15.40 and 15.37** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.20** revealed that-

- Control group could not bring significant change in **Autonomy (Component of Mental Health)** (CD=0.12, p>0.05).

- **Yoga training** group showed significant improvement (CD=0.30, p<0.05) in **Autonomy (Component of Mental Health)**.

- **"Yoga training"** showed significant superiority over the "Controls" in improving **Autonomy (Component of Mental Health)** (CD=0.26, p<0.05) (Fig. 4.8).

This result helps to interpret that the selected *Yoga* practices possibly helped to improve the autonomy i.e. dependence for own development upon own potentialities rather than dependence on other people. Thus, *Yoga* has significant effects for improving Autonomy *(Component of Mental Health)*.

Table 4.19

Ordered Treatment Means of Autonomy
(Yoga Training Group Vs Control Group)

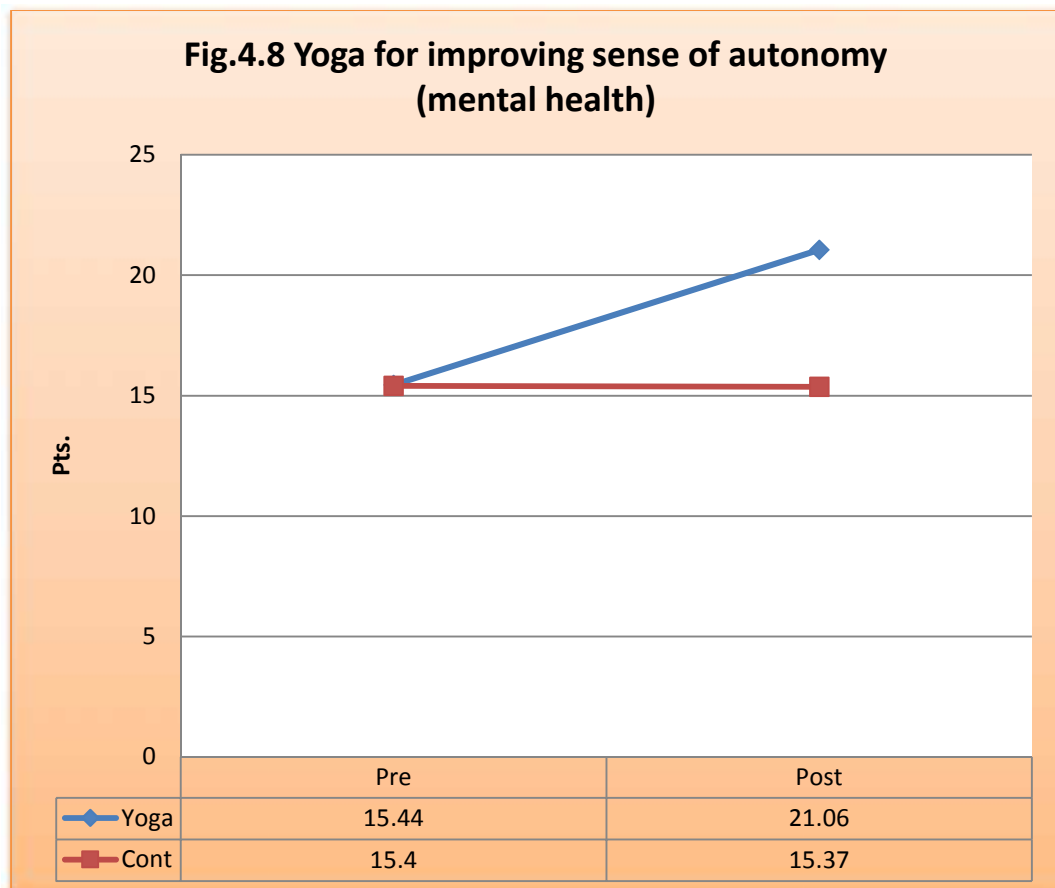|	ORDER			
	1	2	3	4
Means	15.44	21.06	15.40	15.37

Where, 1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.20

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Autonomy**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.12	0.26* ↑	0.11
3		0.19	0.10
2		--	0.30* ↑
1			--

Where, 1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.8 Yoga for improving sense of autonomy (mental health)

	Pre	Post
Yoga	15.44	21.06
Cont	15.4	15.37

4.3.9 Result on the status of Group Oriented Attitudes

In **Group Oriented Attitudes (Pts.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.21 were 26.17, 34.72, 26.14 and 25.98** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.22** revealed that-

- Control group did not show significant change in **Group Oriented Attitudes (Component of Mental Health)** (CD=0.09, p>0.05).

- *Yoga training* group showed significant improvement (CD=0.34, p<0.05) in **Group Oriented Attitudes (Component of Mental Health)**.

- *"Yoga training"* showed significant superiority over the "Controls" in improving **Group Oriented Attitudes (Component of Mental Health)** (CD=0.30, p<0.05) (Fig. 4.9).

This result helps to interpret that the selected *Yoga* practices possibly helped to brought improvement in group oriented attitudes i.e. ability to get along with others, work with others and ability to find recreation. Thus, *Yoga* has significant effects for improving group oriented attitudes *(Component of Mental Health)*.

Table 4.21

Ordered Treatment Means of Group Oriented Attitudes
(Yoga Training Group Vs Control Group)

	O R D E R			
	1	2	3	4
Means	26.17	34.72	26.14	25.98

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."
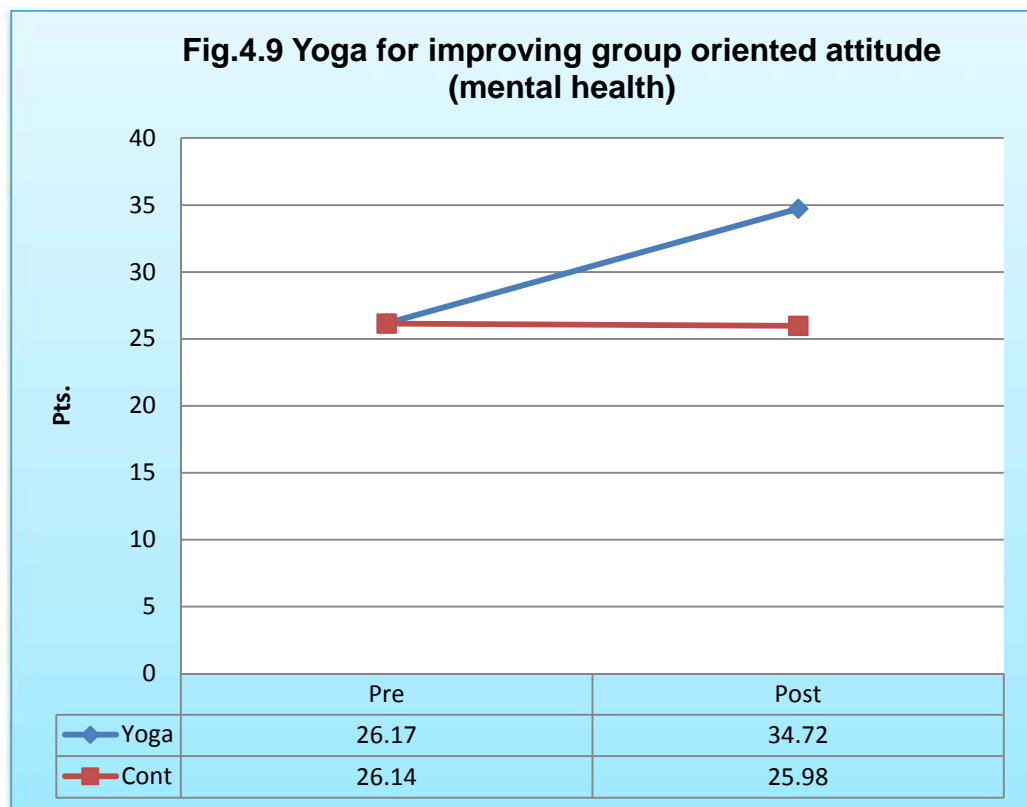
4 = Post-test Score of "Control Gr."

Table 4.22

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Group Oriented Attitudes**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.09	0.30* ↑	0.13
3		0.21	0.12
2		--	0.34* ↑
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.9 Yoga for improving group oriented attitude (mental health)

	Pre	Post
Yoga	26.17	34.72
Cont	26.14	25.98

4.3.10 Result on the status of Environmental Mastery

In **Environmental Mastery (Pts.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.23 were 25.50, 32.84, 25.68 and 22.54** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.24** revealed that-

- Control group did not show significant change in *Environmental Mastery (Component of Mental Health)* (CD=0.15, p>0.05).

- *Yoga training* group showed significant improvement (CD=0.32, p<0.05) in *Environmental Mastery (Component of Mental Health)*.

- *"Yoga training"* showed significant superiority over the "Controls" in improving *Environmental Mastery (Component of Mental Health)* (CD=0.27, p<0.05) (Fig. 4.10).

This result helps to interpret that the selected *Yoga* practices possibly helped to brought improvement in environmental mastery i.e. efficiency in meeting situational requirements, the ability to work and play, the ability to take responsibilities and capacity for adjustment. Thus, *Yoga* has significant effects for improving Environmental Mastery *(Component of Mental Health)*.

Table 4.23

Ordered Treatment Means of Environmental Mastery
(Yoga Training Group Vs Control Group)

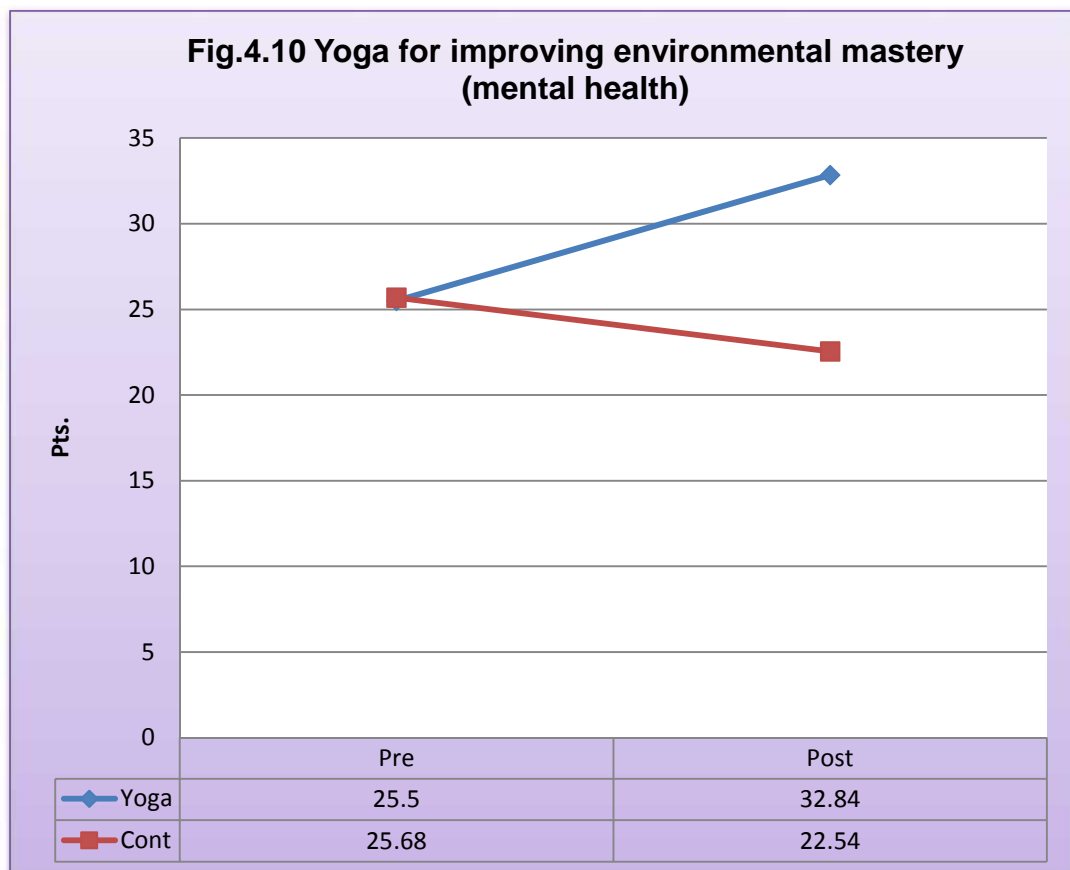|	ORDER			
	1	2	3	4
Means	25.50	32.84	25.68	22.54

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.24

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Environmental Mastery**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.15	0.27* ↑	0.14
3		0.22	0.10
2		--	0.32* ↑
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.10 Yoga for improving environmental mastery (mental health)

	Pre	Post
Yoga	25.5	32.84
Cont	25.68	22.54

(Y-axis: Pts., scale 0 to 35)

4.3.11 Result on the status of Overall Mental Health

In **Overall Mental Health (Pts.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.25 were 152.95, 190.20, 151.29 and 146.52** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.26** revealed that-

- Control group did not show significant improvement in ***Overall Mental Health*** (CD=0.16, $p > 0.05$).

- ***Yoga training*** group showed significant improvement (CD=0.38, $p < 0.05$) in ***Overall Mental Health***.

- ***"Yoga training"*** showed significant superiority over the "Controls" in improving ***Overall Mental Health*** (CD=0.33, $p < 0.05$) (Fig. 4.11).

This result helps to interpret that the selected *Yoga* practices helped to bring improvement in overall mental health. Thus, *Yoga* has significant effects for improving overall mental health.

Table 4.25

Ordered Treatment Means of Overall Mental Health
(Yoga Training Group Vs Control Group)

	ORDER			
	1	2	3	4
Means	152.95	190.20	151.29	146.52

Where, 1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.26

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Overall Mental Health**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.16	0.33* ↑	0.13
3		0.20	0.11
2		--	0.38* ↑
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

                2 = Post-test Score of "Yoga training Gr."

                3 = Pre-test Score of "Control Gr."

                4 = Post-test Score of "Control Gr."

Fig.4.11 Yoga for improving overall mental health prior to examination

	Pre	Post
Yoga	152.95	190.2
Cont	151.29	146.52
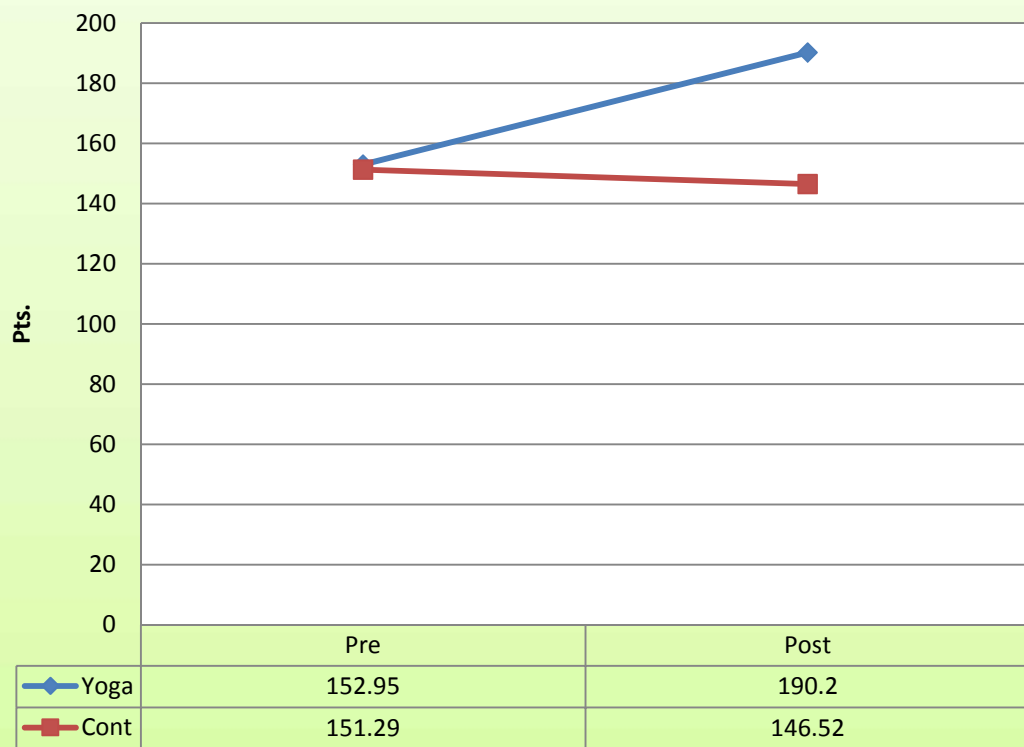
4.4 Results on ANOVA for Physiological Variables

In case of inferential statistics applied on physiological variables, the result of 2 x 2 x 5 Factorial ANOVA (Table 4.27) revealed that all most all the variables got remarkably significant changes (F=15.96, p<0.01). Further, statistically significant changes are also evident in case of the experimental and control groups (F=19.43, p<0.01) and even in interactions (F=7.88, p<0.05). It seems the training intervention had statistically significant effects. These changes, therefore, have been discriminated further by using Scheffe's post hoc test.

Table 4.27

Result of Analysis of Variance (ANOVA) of Physiological Variables

Source of Variation	SS	df	MS	F
TOTAL	5925.98	244	--	--
Physiological Variables (A)	865.67	4	216.41	15.96**
Groups (B)	526.94	2	263.47	19.43**
Interaction	1495.93	14	106.85	07.88*
ERROR	3037.44	224	13.56	

* p < 0.05 ** p < 0.01

4.5 Results on Scheffe's Post Hoc analysis for Physiological Variables

4.5.1 Result on the status of Systolic Blood Pressure

In **Systolic Blood Pressure (mmHg.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.28 were 114.64, 113.25, 114.56 and 118.84** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.29** revealed that-

- Control group showed significant increase in **Systolic Blood Pressure** prior to examination (CD=0.26, p<0.05).

- *Yoga training* also could not show significant change in (CD=0.14, p>0.05) in **Systolic Blood Pressure**.

- *"Yoga training"* helped to maintain normal level of *systolic blood pressure* prior to examination better than the control group (CD=0.24, p<0.05) (Fig. 4.12).

This result helps to interpret that *"Yoga training"* helped to maintain normal level of systolic blood pressure prior to examination, whereas control group could not. Thus, yoga training is found to control systolic blood pressure at normal.

Table 4.28

Ordered Treatment Means of Systolic Blood Pressure
(Yoga Training Group Vs Control Group)

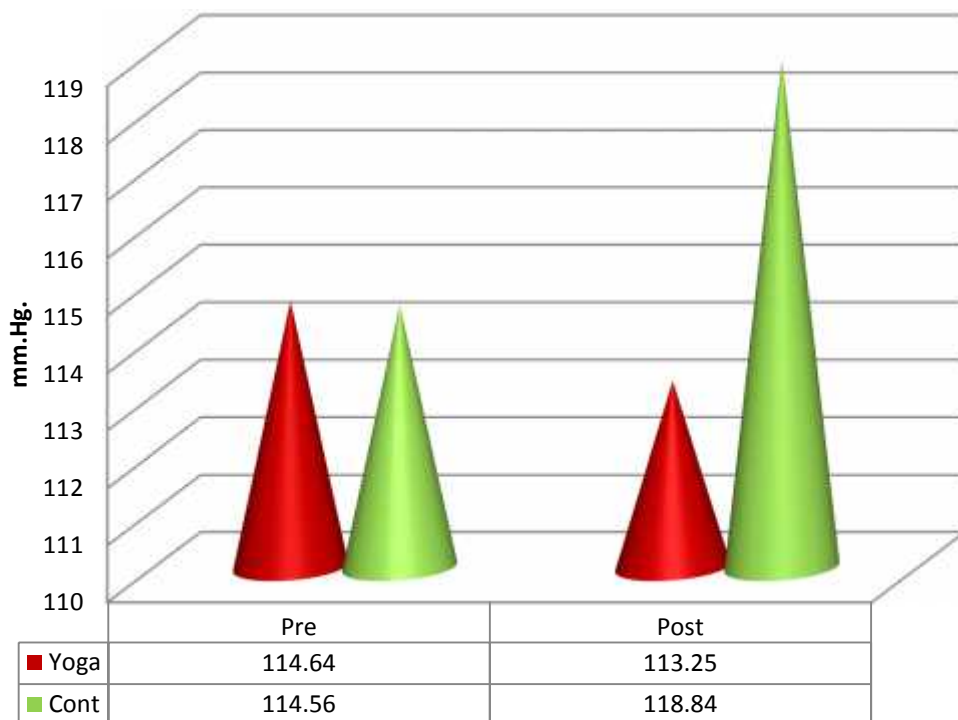|	ORDER			
	1	2	3	4
Means	114.64	113.25	114.56	118.84

Where,　　1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.29

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Systolic Blood Pressure**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.26*↑	0.24*	0.13
3		0.18	0.09
2		--	0.14
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.12 Yoga for pre-examination systolic blood pressure

	Pre	Post
■ Yoga	114.64	113.25
■ Cont	114.56	118.84

mm.Hg.

4.5.2 Result on the status of Diastolic Blood Pressure

In **Diastolic Blood Pressure (mmHg.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.30 were 77.84, 77.10, 78.02 and 78.23** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.31** revealed that-

- Control group did not show significant improvement in *Diastolic Blood Pressure* (CD=0.12, p>0.05).

- *Yoga training* group also did not show significant change (CD=0.13, p>0.05) in *Diastolic Blood Pressure*.

- *"Yoga training"* and controls had similar results in case of Diastolic Blood Pressure (CD=0.09, p>0.05) (Fig. 4.13).

This result helps to interpret that the selected *Yoga* practices did not bring any significant change in Diastolic Blood Pressure in students appearing for board examination.

Table 4.30

Ordered Treatment Means of Diastolic Blood Pressure
(Yoga Training Group Vs Control Group)

	ORDER			
	1	2	3	4
Means	77.84	77.10	78.02	78.23

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

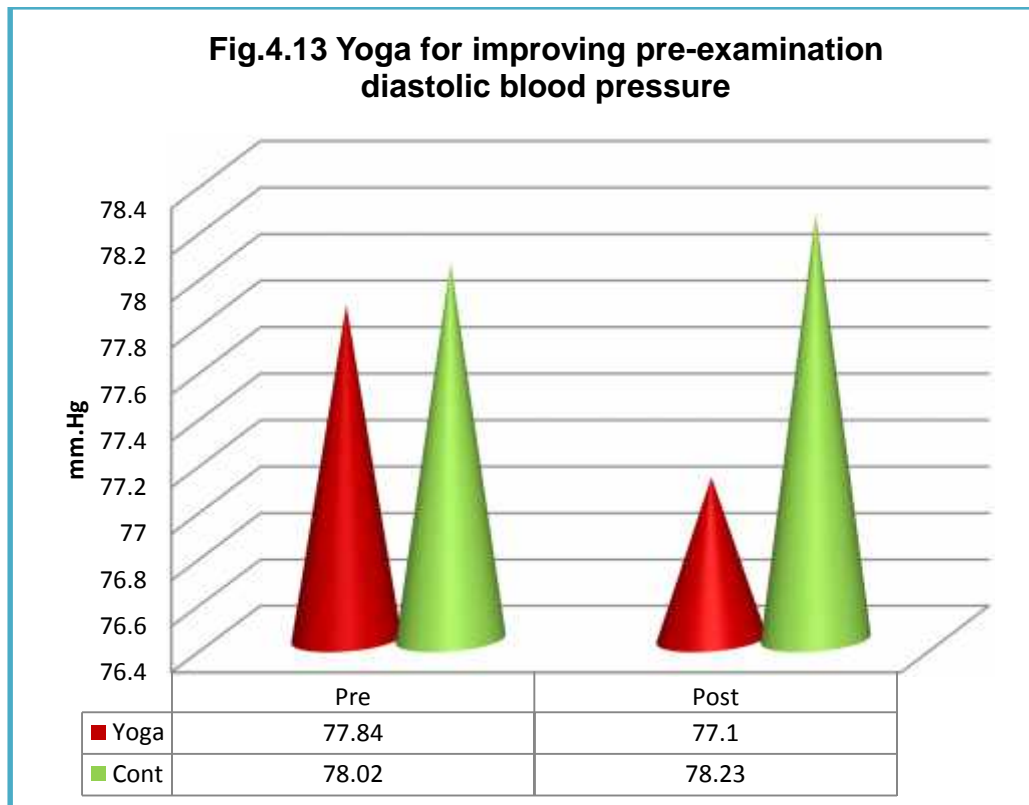3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.31

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Diastolic Blood Pressure**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.12	0.09	0.10
3		0.08	0.07
2		--	0.13
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.13 Yoga for improving pre-examination diastolic blood pressure

	Pre	Post
■ Yoga	77.84	77.1
■ Cont	78.02	78.23

mm.Hg

4.5.3 Result on the status of Pulse Rate

In **Pulse Rate (beats/min.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.32 were 77.35, 71.22, 77.30 and 81.87** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.33** revealed that-

- Control group showed significant increase in *Pulse Rate* (CD=0.28, p<0.05).

- *Yoga training* group showed significant reduction (CD=0.35, p<0.05) in *Pulse Rate*.

- *"Yoga training"* helped to decrease **Pulse Rate** which was significantly lower than the "Control" (CD=0.43, p<0.01) (Fig. 4.14).

This result helps to interpret that the selected *Yoga* helps to maintain Pulse Rate at the lower side of normal range. Thus, *Yoga* has significant effects for reducing Pulse Rate.

Table 4.32

Ordered Treatment Means of Pulse Rate
(Yoga Training Group Vs Control Group)

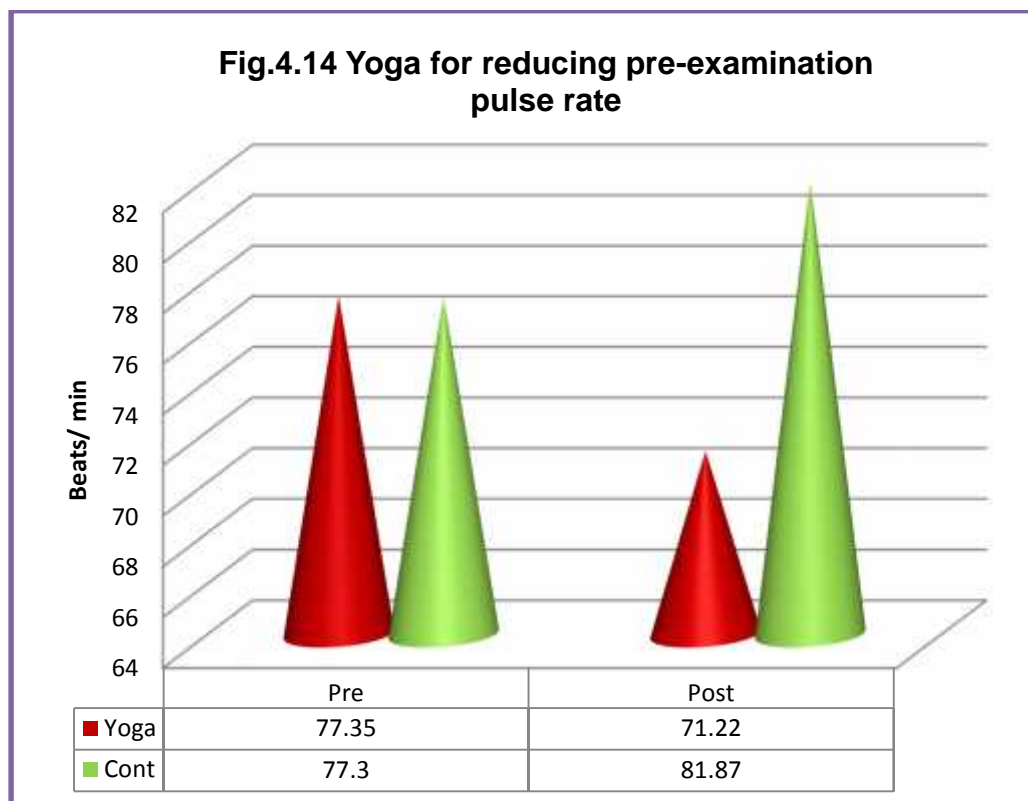|	ORDER			
	1	2	3	4
Means	77.35	71.22	77.30	81.87

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.33

Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Pulse Rate
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.28*↑	0.43**	0.24*
3		0.25*	0.10
2		--	0.35*↓
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.14 Yoga for reducing pre-examination pulse rate

	Pre	Post
Yoga	77.35	71.22
Cont	77.3	81.87

4.5.4 Result on the status of Respiration Rate

In **Respiration Rate (cycle/min.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.34 were 16.28, 12.20, 16.23 and 15.70** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.35** revealed that-

- Control group did not show significant change in *Respiration Rate* (CD=0.17, p>0.05).

- *Yoga training* group showed significant reduction (CD=0.31, p<0.05) in *Respiration Rate*.

- *"Yoga training"* helped to decrease **Respiration Rate** which was significantly lower than the "Control" (CD=0.25, p<0.05) (Fig. 4.15).

This result helps to interpret that the selected *Yoga* practices helped to reduce Respiration Rate, which remained in the lower level of normal range. Thus, *Yoga* training has significant effects for reducing Respiration Rate.

Table 4.34

Ordered Treatment Means of Respiration Rate
(Yoga Training Group Vs Control Group)

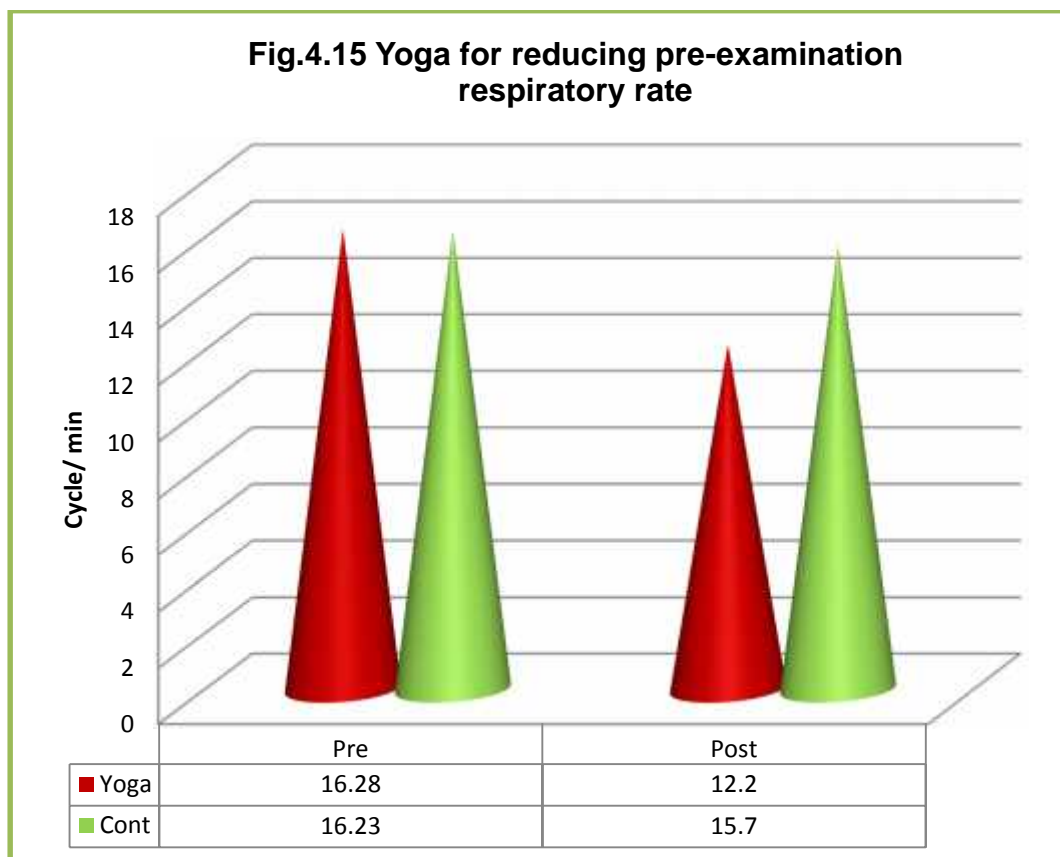|	ORDER			
	1	2	3	4
Means	16.28	12.20	16.23	15.70

Where,　1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.35

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Respiration Rate**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.17	0.25*↓	0.18
3		0.20	0.12
2		--	0.31*↓
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.15 Yoga for reducing pre-examination respiratory rate

	Pre	Post
■ Yoga	16.28	12.2
■ Cont	16.23	15.7

4.5.5 Result on the status of Electrodermal Activity

In **Electrodermal Activity (microsiemens)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.36 were 4.16, 1.48, 4.20, and 4.28** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.37** revealed that-

- Control group did not show significant change in ***Electrodermal Activity*** (CD=0.13, p>0.05).

- ***Yoga training*** group showed significant reduction (CD=0.46, p<0.01) in ***Electrodermal Activity***.

- ***"Yoga training"*** helped to decrease **Electrodermal Activity** and the rate of reduction was significantly superior to the "Control" (CD=0.32, p<0.05) (Fig. 4.16).

This result helps to interpret that the selected ***Yoga*** perhaps helped to reduce Electrodermal resistance. Thus, ***Yoga*** has significant effects for reducing Electrodermal resistance indicating increase in parasympathetic activity.

Table 4.36

Ordered Treatment Means of Electrodermal Activity
(Yoga Training Group Vs Control Group)

	ORDER			
	1	2	3	4
Means	4.16	1.48	4.20	4.28

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.37

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Electrodermal Activity**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.13	0.32*↓	0.14
3		0.22	0.12
2		--	0.46**↓
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.16 Yoga for controlling pre-examination electrodermal activity

	Pre	Post
Yoga	4.16	1.48
Cont	4.2	4.28

microsiemens
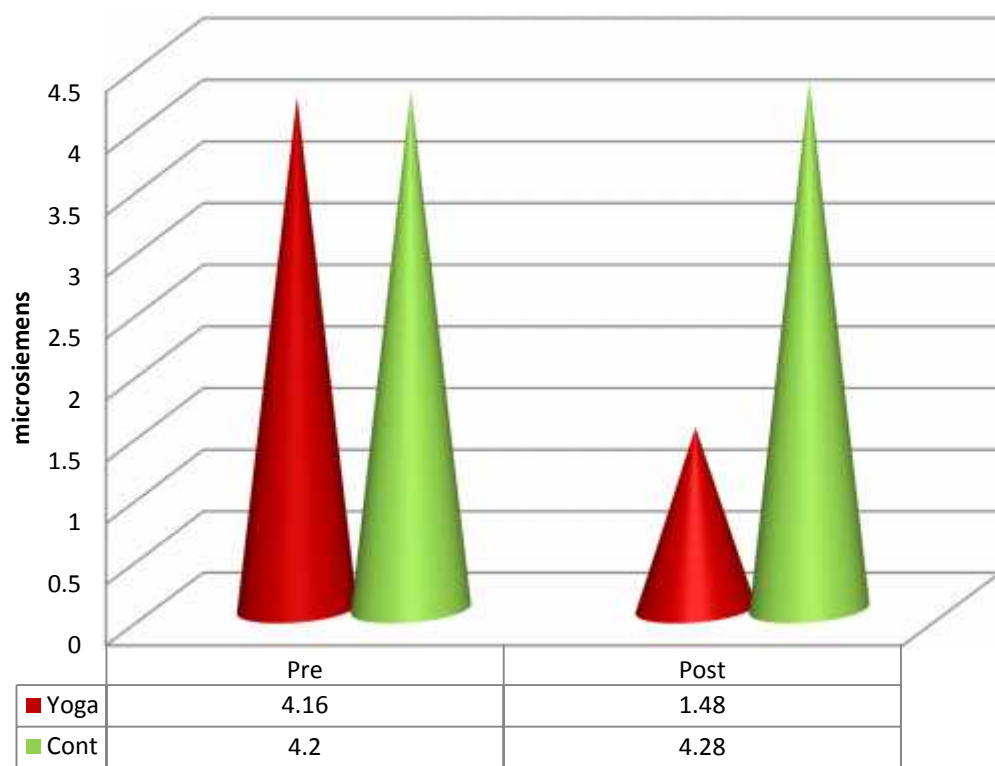
4.6 Results on ANOVA for Biochemical Variables

In case of inferential statistics applied on biochemical variables, the result of 2 x 2 x 2 Factorial ANOVA (Table 4.38) revealed that all most all the variables got remarkably significant changes (F=25.70, p<0.01). Further, statistically significant changes are also evident in case of the experimental and control groups (F=21.40, p<0.01) and even in interactions (F=8.45, p<0.05). It seems the training intervention had statistically significant effects. These changes, therefore, have been discriminated further by using Scheffe's post hoc test.

Table 4.38

Result of Analysis of Variance (ANOVA) of Biochemical Variables

Source of Variation	SS	df	MS	F
TOTAL	1313.48	20	--	--
Biochemical Variables (A)	386.01	1	386.01	25.70**
Groups (B)	321.42	1	321.42	21.40**
Interaction	380.75	3	126.92	08.45*
ERROR	225.30	15	15.02	

* p < 0.05 ** p < 0.01

4.7 Results on Scheffe's Post Hoc analysis for Biochemical Variables

4.7.1 Result on the status of Salivary Cortisol

In **Salivary Cortisol (ng/ml.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.39 were 12.26, 9.63, 12.29 and 13.45** (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.40** revealed that-

- Control group did not show significant change in **Salivary Cortisol level** (CD=0.17, p>0.05).

- **Yoga training** showed significant reduction in (CD=0.32, p<0.05) **Salivary Cortisol level**.

- **"Yoga training"** showed significant superiority over control group in reducing **Salivary Cortisol level** (CD=0.26, p<0.05) (Fig. 4.17).

This result helps to interpret that the selected **Yoga** training reduces salivary cortisol level indicating reduction in examination-anxiety which in turn reduces stress.

Table 4.39

Ordered Treatment Means of Salivary Cortisol
(Yoga Training Group Vs Control Group)

	ORDER			
	1	2	3	4
Means	12.26	09.63	12..29	13.45

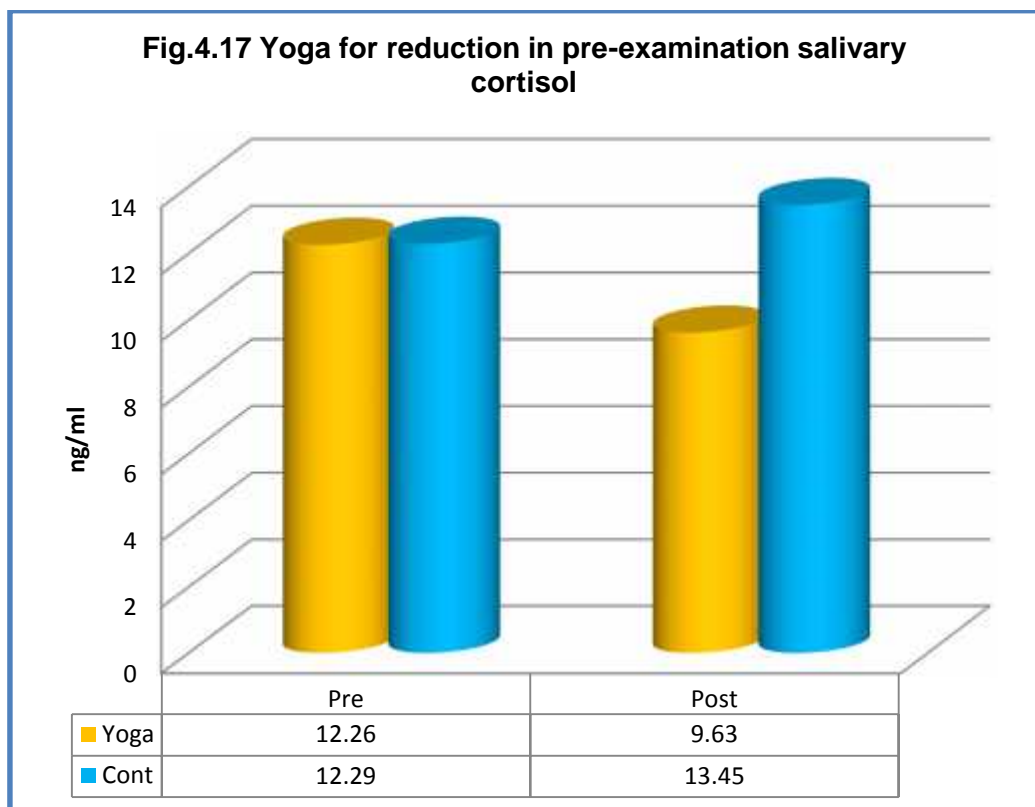Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.40

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in Salivary Cortisol**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.17	0.26* ↓	0.12
3		0.18	0.10
2		--	0.32* ↓
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.17 Yoga for reduction in pre-examination salivary cortisol

	Pre	Post
Yoga	12.26	9.63
Cont	12.29	13.45

ng/ml

4.7.2 Result on the status of Salivary DHEAs

In **Salivary Dehydroepiandrosterone (ng/ml.)**, the Ordered Means of "Yoga training Group" (Pre:1 & post: 2) and "Control Group" (Pre:3 & post:4) as presented in **Table 4.41 were 0.90, 1.29, 0.91 and 0.80** respectively (Where, 1 = Pre-test of **Yoga training** Group, 2 = Post-test of **Yoga training** group, 3 = Pre-test of Control group, and 4 = Post-test of Control group).

The statistical significance of Scheffe's Post Hoc test presented in **Table 4.42** revealed that-

- Control group showed significant reduction in *Salivary DHEAs level* (CD=0.25, p>0.05).

- *Yoga training* showed significant increase in (CD=0.42, p<0.01) *Salivary DHEAs level*.

- *"Yoga training"* showed significant superiority over control group in increasing *Salivary DHEAs level* (CD=0.31, p<0.05) (Fig. 4.18).

This result helps to interpret that the selected *Yoga* training might have helped to stabilize the sympathetic nervous system by increasing salivary DHEAs level.

Table 4.41

Ordered Treatment Means of DHEAs
(Yoga Training Group Vs Control Group)

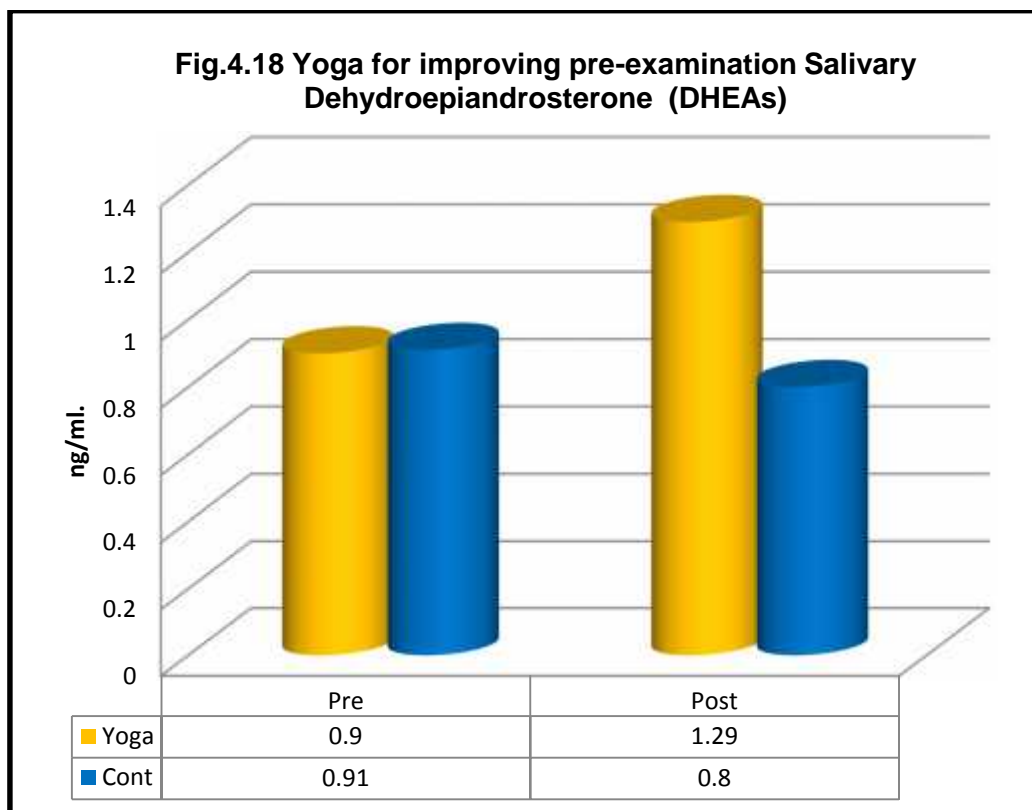|	ORDER			
	1	2	3	4
Means	0.90	1.29	0.91	0.80

Where, 1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Table 4.42

**Scheffe's Post Hoc Test for Difference Between Pairs
of Ordered Means in DHEAs**
(Yoga Training Group Vs Control Group)

(STEPS)	3	2	1
4	0.25* ↓	0.31* ↑	0.15
3		0.19	0.12
2		--	0.42** ↑
1			--

Where,   1 = Pre-test Score of "Yoga training Gr."

2 = Post-test Score of "Yoga training Gr."

3 = Pre-test Score of "Control Gr."

4 = Post-test Score of "Control Gr."

Fig.4.18 Yoga for improving pre-examination Salivary Dehydroepiandrosterone (DHEAs)

	Pre	Post
Yoga	0.9	1.29
Cont	0.91	0.8

4.8 Discussion of Results

Yoga is an ancient Indian way of life which includes the practice of certain postures (*asanas*), regulated breathing (*pranayamas*), and concentration (*dhyana*). Yoga practices are considered to be beneficial for the physical and mental health of children. Further, many scientific investigations on yoga have already been done in past and yoga has been accepted as a fruitful technique not only to develop spirituality, but also as an effective means to maintain psycho-physiological and biochemical homeostasis leading to good health (Malathi *et al.,* 1998; Shapiro, 2007; Uebelacker *et al.,* 2010)[1,2,3]. Although nowadays majority of the Indian schools included yoga for school children, little is known about its role on controlling psycho-physiological and hormonal activities in those students who are especially appearing for Board examination. Thus, the present investigation seems to be justified and has a large scope.

From the results it is evident that practice of yoga reduces anxiety, depression, stress and improves overall mental health. In the present study the participants were students appearing for board examination. The students appearing for board examination perceived a higher level of stress. The perceived stress of an examination may be aggravated by the anticipation of difficult examination questions, feelings, or beliefs regarding mastery in the subject, relative importance of the exam, and other factors. This can lead to sense of distress, which is generally manifested in a variety of psychological and behavioral problems. The experience of academic stress and adolescent

[1] A. Malathi, A. Damodaran, N. Shah, G. Krishnamurthy, P. Namjoshi, and S. Ghodke, "Psychophysiological changes at the time of examination in medical students before and after the practice of yoga and relaxation." Indian Journal of Psychiatry, 40, 1, 1998, pp.35-40.

[2] D. Shapiro, I. A. Cook, D. M. Davydov, C. Ottaviani, A. F. Leuchter, and M. Abrams, "Yoga as a complementary treatment of depression: effects of traits and moods on treatment outcome." Evidence-Based Complementary and Alternative Medicine, 4, 4, 2007, pp.493–502.

[3] L. A. Uebelacker, G. Epstein-Lubow, B. A. Gaudiano, G. Tremont, C. L. Battle, and I. W. Miller, "Hatha yoga for depression: critical review of the evidence for efficacy, plausible mechanisms of action, and directions for future research." Journal of Psychiatric Practice, 16, 1, 2010, pp.22–33.

distress has been identified and explored by researchers (Lee & Larson, 1996, 2000; Hill, 1996; Schoolland, 1990)[4,5,6,7]. Further, Psychologists in India have speculated that academic stress leads to adolescent distress (Iype, 2004)[8]. For instance, a study conducted by a mental health organization in 150 educational institutions in New Delhi found that 40% of students feel overwhelmed by exams. Another study conducted by a non-governmental organization with 850 students found that 57% were depressed and 9% had considering committing suicide as a result of academic stress (Pasmantier, 2005)[9] and the similar result has been supported by Swami Maheshananda *et al.* (2012)[10]. These studies, in fact, reflects that the students appearing for Board examination are under stress and this can lead to increase in anxiety, depression and poor mental health. Nevertheless, previous studies indicate potential benefit of yoga intervention in patients suffering from anxiety neurosis and reactive depression (Maheshananda *et al.,* 2012; Malathi *et al.*, 1998; Vahia *et al.*, 1973)[11,12]. Further, some studies have specifically

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[4] M. Lee, and R. W. Larson, "Effectiveness of coping in adolescence: The case of Korean examination stress." International Journal of Behavioral Development, 19, 1996, pp.851-869.

[5] M. Lee, and R. W. Larson, "The Korean "Examination Hell": Long hours of studying, distress, and depression." Journal of Youth and Adolescence, 29, 2000, pp.249- 272.

[6] B. Hill, "Breaking the rules in Japanese schools: *K soku Ihan,* academic competition, and moral education." Anthropology & Education Quarterly, 27, 1996, pp.90-110.

[7] K. Schoolland, *Shogun's ghost: The dark side of Japanese education.* New York: Bergin & Garvey.1990.

[8] G. Iype, South India: World's suicide capital. 2000, Retrieved from www.rediff.com/news/2004/apr/15spec.htm.

[9] D. Pasmantier, Depression and suicide as Indian teenagers dread 'killer exams.' Epilepsy News.2005, Retrieved from www.epilepsy.com/newsfeed/pr_1122384638.html.

[10] Maheshananda Swami, T. K. Bera, M. M. Gore, R. S. Bhogal, D. D. Kulkarni, J. P. Oak, S. U. Shete, and G. Thakur, "Management of suicidal tendency through yoga amongst adolescent students." Yoga-Mimamsa, 44, 3, 2012, pp.162-179.

[11] A. Malathi, A. Damodaran, N. Shah, G. Krishnamurthy, P. Namjoshi, and S. Ghodke, "Psychophysiological changes at the time of examination in medical students before and after the practice of yoga and relaxation." Indian Journal of Psychiatry, 40, 1, 1998, pp.35-40.

[12] N. S. Vahia, D. R. Doongaji, D. V. Jeste, S. N. Kapoor, I. Aradhapurkar, and N. S. Ravindra, "Psychophysiological therapy based on the concepts of Patanjali-a new approach to the treatment of neurotic and psychosomatic disorders." American Journal of Psychotherapy, 27, 1973a, pp.557-565.

demonstrated prospective psychological benefits of yoga in various clinical populations, including patients with depression (Pilkington, 2005; Shapiro, 2007; Uebelacker, 2010)[13,14,15], stress (Mohan, 1996)[16], and anxiety (Gupta, 2006, Kirkwood, 2005)[17,18]. In the present investigation various psychological parameters like depression, stress, anxiety and mental health in students were explored scientifically and it was evident from the results that yoga practices helped to improve in overall psychological parameters. These results suggest that yoga practice increases the likelihood of positive behavior patterns and reduces negative behaviors. Thus, the result indicates that the **null Hypothesis- HO₁:** *Yoga training may not help to control pre-examination anxiety and associated psychological variables and thereby may not restore relaxation as well as concentration*" is refuted.

Cortisol is a major gluco-corticoid in humans that reflects adrenocortical activity. Activation of the hypothalamic-pituitary-adrenal (HPA) axis and subsequent release of cortisol are major components of the physiological stress response. Salivary cortisol accurately reflects serum cortisol, the physiologically active component (Kirschbaum & Helhammer

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[13] K. Pilkington, G. Kirkwood, H. Rampes, and J. Richardson, "Yoga for depression: the research evidence." Journal of Affective Disorders, 89, 1–3, 2005, pp.13–24.

[14] D. Shapiro, I. A. Cook, D. M. Davydov, C. Ottaviani, A. F. Leuchter, and M. Abrams, "Yoga as a complementary treatment of depression: effects of traits and moods on treatment outcome." Evidence-Based Complementary and Alternative Medicine, 4, 4, 2007, pp.493–502.

[15] L. A. Uebelacker, G. Epstein-Lubow, B. A. Gaudiano, G. Tremont, C. L. Battle, and I. W. Miller, "Hatha yoga for depression: critical review of the evidence for efficacy, plausible mechanisms of action, and directions for future research." Journal of Psychiatric Practice, 16, 1, 2010, pp.22–33.

[16] J. Mohan, "Stress management and yoga." International Journal of Psychology, 31, 3-4, 1996, p.1818.

[17] N. Gupta, S. Khera, R. P. Vempati, R. Sharma, and R. L. Bijlani, "Effect of yoga based lifestyle intervention on state and trait anxiety." Indian Journal of Physiology and Pharmacology, 50, 1, 2006, pp.41–47.

[18] G. Kirkwood, H. Rampes, V. Tuffrey, J. Richardson, and K. Pilkington, "Yoga for anxiety: a systematic review of the research evidence." British Journal of Sports Medicine, 39, 12, 2005, pp.884–891.

1994)[19]. Salivary cortisol levels were noted to be higher prior to the written test. Anticipation of the board examination is a stressor. Studies have reported increased cortisol levels during anticipation of stressful experiences such as academic examinations (Lacey *et al.*, 2000)[20]. The psychological stress can increase the activity of the HPA with subsequent rise in cortisol level (Kirschbaum & Hellhammer 1994). Further, both animal and human studies have indicated that stress and glucocorticoids may impair memory and cognitive function (al Absi *et al.*, 2002; Kirschbaum *et al.*,1996; Quervain *et al.*, 1998)[21,22,23]. These salivary biomarkers have the potential of being assessment tools to identify those students who are consistently stressed during examinations and who may perform poorly because of inability to cope with stress. Further, DHEA is also a steroid hormone along the same synthetic pathway as cortisol. Additionally, DHEA has an anabolic effect while cortisol has a catabolic effect on the body. In fact, DHEA is shown to have anxiolytic effects (Wellman *et al.*, 1999)[24]. Nevertheless, the students under

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[19] C. Kirschbaum, and D. H. Hellhammer, "Salivary cortisol in psychoneuroendocrine research: recent developments and applications." Psychoneuroendocrinology, 194, 1994, pp.313-333.

[20] K. Lacey, M. D. Zaharia, J. Griffiths, A. V. Ravindran, Z. Merali, and H. Anisman, "A prospective study of neuroendocrine and immune alterations associated with the stress of an oral academic examination among graduate students." Psychoneuroendocrinology, 25, 2000, pp.339–356.

[21] M. al'Absi, K. Hugdahl, and W. R. Lovallo, "Adrenocortical stress responses and altered working memory performance." Psychophysiology, 39, 2002, pp.95-99.

[22] C. Kirschbaum, O. T. Wolf, M. May, W. Wippich, and D. H. Hellhammer, "Stress- and treatment-induced elevations of cortisol levels associated with impaired declarative memory in healthy adults." Life Science, 58, 1996, pp.1475-1483.

[23] D. J. de Quervain, B. Roozendaal, and J. L. McGaugh, "Stress and glucocorticoids impair retrieval of long-term spatial memory." Nature, 394, 1998, pp.787-790.

[24] M. Wellman, L. Shane-McWhorter, P. L. Orlando, and J. P. Jennings, "The role of deydroepiandrosterone in diabetes mellitus." Pharmacotherapy, 19, 5, 1999, pp.582-591.

examination stress may benefit from learning of effective coping strategies during the preparation for examinations. Number of studies showed beneficial effect of yoga training on stress and salivary cortisol levels (West *et al.*, 2004; Capaldi *et al.*, 2005; Wright *et al.*, 2007; Simpsom *et al.*, 2008)[25,26,27,28]. These studies confirm the usefulness of yoga as a complementary treatment method in psychological disorders (Gupta *et al.*, 2006; Khalsa, 2004; Ramaratnam *et al.*, 2000)[29,30,31]. The results of this study also indicate positive impact of yoga practices among students. In fact, yoga training in students appearing for examination brings about homeostasis in corticosteroid hormones. The appearance of such result may be due to better adjustment to the environmental and internal stressors. Thus, the result indicates that the null **hypothesis- HO₂**: *Yoga training may not be effective in reinstating hormonal balance in students appearing for final examination*", is refuted.

It was also noted that practice of yoga and relaxation helps to maintain the baseline pulse rate and baseline systolic as well as diastolic blood

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[25] J. West, "Effects of Hatha yoga and African dance on perceived stress, affect, and salivary cortisol." Ann. Behav. Med., 28, 2004, pp.114-118.

[26] V. F. Capaldi, "Associations between sleep and cortisol responses to stress in children and adolescents: a pilot study." Behav. Sleep, Med., 3, 2005, pp.177–192.

[27] C. E. Wright, "Poor sleep the night before an experimental stress task is associated with reduced cortisol reactivity in healthy women." Biol. Psychol., 74, 2007, pp.319–327.

[28] E. E. A. Simpsom, "Salivary cortisol, stress and mood in healthy older adults: The Zenith study." Biol. Psychol., 78, 2008, pp.1–9.

[29] N. Gupta, "Effect of yoga based lifestyle intervention on state and trait anxiety." Indian Journal of Physiology and Pharmacology, 50, 2006, pp.41–47.

[30] S. B. Khalsa, "Yoga as a therapeutic intervention: a bibliometric analysis of published research studies." Indian Journal of Physiology and Pharmacology, 48, 2004, pp.269–285.

[31] S. Ramaratnam, "Yoga for epilepsy." Cochrane Database Syst. Rev., 3, 2000, CD001524.

pressure in response to stress like examination. Similar decrease in Pulse rate and blood pressure has been reported with the regular practice of yoga in earlier studies (Joseph *et al.*, 1981; Selvamurthy *et al.*, 1983)[32,33]. Beneficial effects in similar lines have also been reported in patients suffering from hypertension with relaxation, yoga and biofeedback (Benson *et al.*, 1974; Patel, 1973)[34,35]. Furthermore, Electrodermal activity and respiration rate usually increases during the stressful situation and decreases during relaxation (Joseph *et al.,* 1981; Kirschbaum and Hellhammer, 1994). It was noted that practice of yoga and relaxation training in students might have reduced the academic stress thereby decreases the baseline Electrodermal activity and respiration rate in response to stress like examination. Moreover, yoga might have reduced the examination stress because of increase in parasympathetic activity that causes reduction in Pulse rate, systolic and diastolic blood pressure, muscle tension, skin conductance and rate of respiration which was evident in the present study (de Quervain *et al.,* 1998; Lacey, 2000; Wellman, 1999). The appearance of such results in this study seems to be logical and justified on the basis of earlier reports (Kirkwood, Rampes, Tuffrey, Richardson, and Pilkington, 2005; Gupta, Khera, Vempati,

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[32] S. Joseph, K. Sridharan, S. K. B. Patil, M. L. Kumaria, W. Selvamurthy, N. T. Joseph, and H. S. Nayar, "Study of some physiological and biochemical parameters in subjects undergoing yogic training." Indian Journal of Medical Research,74, 1981, pp.120-124.

[33] W. Selvamurthy, H. S. Nayar, N. T. Joseph, and S. Joseph, "Physiological effects of yogic practice." NIMHANS Journal, 1, 1983, pp.71-80.

[34] H. Benson, B. A. Ronner, B. R. Marzetta, and H. M. Klemchuk, "Decreased blood pressure in Pharmacologically treated hypertensive patients who regularly elicited the relaxation response." Lancer, 1, 1974, pp.289-291.

[35] J. Patel, "Yoga and biofeedback in the management of hypertension." Lancet, 2, 1973, pp.1053-1055.

Sharma, and Bijlani, 2006). Thus, the null hypothesis-"*HO$_3$: Yoga training may not be effective in reinstating physiological homeostasis in students appearing in the state level Board examination*" has been refuted.

To summarize, the results of this study proved beyond doubt, that regular practice of yoga for one hour daily for six weeks is beneficial in maintaining psych-physiological-biochemical homeostasis (reducing stress, depression, anxiety, corticosteroid hormones, pulse rate, respiratory rate, blood pressure, electrodermal activities etc) in students appearing for board examination. Thus, systematic yoga practices could justifiably be incorporated as part of curriculum in schools for promoting psycho-physiological health and thereby preventing ill effects of examination anxiety.