A study on Effect of Bhramari Pranayama Training on Systolic and Diastolic Blood Pressure of School Going Children

[a]Santosh Kumar Giri, [b]J.P.Sharma
[a]Ph.D. Research Scholar, DPESS, University of Delhi, New Delhi, India
[b]Associate Professor, I.G.I.P.E.S.S, University of Delhi, New Delhi, India

Abstract

The Purpose of this study was to see the six months Training Effect of Bhramari Pranayama on Systolic and Diastolic Blood Pressure of School Going Children. Total 70 School Going Children were selected as subjects for this study. These subjects were randomly divided into two equal groups i.e Control (35) and Experimental (35). The age of the subjects were ranged between 10-14 years. The Bhramari Pranayama Training was executed only to Experimental Group in addition to their daily tasks for six months i.e Monday to Saturday i.e., 30 Minutes a day in the Morning. The Control Group did not participate in any Yogic Training (Bhramari Pranayama) but continued with their daily schedule. The Pre-Test was conducted on both the groups before to start six months Bhramari Pranayama Training and just after completion of six months Bhramari Pranayama Training, similarly the Post-Test was conducted on both the groups. The Automatic Digital Blood Pressure Monitoring Machine was used to collect the data. The collected raw data was analysed by computing descriptive statistics followed by Independent and Paired sample t- Test to find out the significant Equality of variance and Significant differences between the Pre-Test data and the Post-Test data respectively. Regarding Systolic and Diastolic Blood Pressure of Control Pre-Test V/S Experimental Pre-Test, the calculated value of Independent t was [-0.727(P=0.469), P>0.05] and [-1.026(P=0.309), P>0.05] respectively which were not significant at 0.05 level of alpha. Further regarding Systolic and Diastolic Blood Pressure of Experimental Pre-Test V/S Experimental Post-Test the calculated value of dependent t was 7.152 and 6.172 with df34 respectively which were statistically significant at 0.05 level of alpha($p<0.05$). Therefore, it was observed that six months Bhramari Pranayama Training made significant variation on Systolic and Diastolic Blood Pressure of the subjects of Experimental Group.

KEYWORDS: Yoga, Bhramari Pranayama, Systolic and Diastolic Blood Pressure, School Going Children.

INTRODUCTION

In reference to comforts, now a day our life became easier due to development in science and technology but on the other hand it becomes more complicated also. A big number of new dangerous diseases have ruined our modern life. Because day by day most of the people going away from the nature. Now a days physical inactivity becomes a way of life. Therefore today's man faces many new physiological problems such as Systolic Blood Pressure and Diastolic Blood Pressure. It is the serious health problem. Due to B.P Problem, other very serious diseases were also attacked to the human being such as

Cardio-vascular disease etc. Hence, peoples are searching the ways to keep themselves healthy and disease-free. In this direction Yoga can play a beneficial role for them. Because many experiments have done on yoga and result of these experiment revealed that people got cured from various diseases by doing its regular practice.

Yoga is an ancient science of living & it is originated in India. According to Indian Rishis Yoga is a practical method for the complete physical, mental and spiritual transformation of an individual. Maharishi Patanjali is known as the father of Modern Yog, according to him Yoga has eight elements and Pranayama is the fourth element of yoga. It is composed from two Sanskrit words: Prana means 'Vital force' and Yama means 'to control'. Pranayama helps in controlling all the functions of breathing. Pranayama is the art of breath manipulation. Thus pranayama is a series of techniques that aim at stimulating and increase the vital energy in the body. Thus yoga can be used to bring about a state of relaxation of body and mind from the unwanted problems.

STATEMENT OF THE PROBLEM

The purpose of the present study was to see the Effect of Bhramari Pranayama on Systolic and Diastolic Blood Pressure of School Going Children.

METHODOLOGY

Total Seventy students of class VI – VIII age ranging between 10-14 years of Rastra Shakti Vidyalaya, (Hastsal) Uttam Nagar, Delhi - 110059 (India) were randomly selected as subjects for this study. Futher these subjects were randomly divided into two groups i.e Experimental Group and Control Group. Each group consisted of 35 subjects. Only Experimental Group has been briefed about the Yog Training Programme. Six months Training of Bhramari Pranayama was administered only to the Experimental Group Subjects of Control Group did not take part in Bhramari PranayamaTraining, but they were engaged in their regular routine work. The scholar himself administered the Yog Training Programme. Systolic and Diastolic Blood Pressure were selected as dependent variables for this study. The data was collected prior to start Bhramari Pranayama Training i.e known as Pre-Test and at the end of the Bhramari Pranayama Training i.e Post-Test from both the groups by using Automatic Digital Blood Pressure Monitoring Machine. The collected raw data was analysed by computing descriptive statistics followed by Independent and Paired Sample t- Test

TRAINING PROTOCOL

The Bhramari Pranayama Training was executed to only Experimental Group for six months. The Training was executed by scholar himself in the morning from 8.00 Am onwards for 30 minutes for six days in a week at the Basket Ball Court of Rashtra Shakti Vidyalaya,(Hastsal) Uttam Nagar, New Delhi - 110059 (India).All Sundays and Gagetted Holidays has been observed as Training off days. There was no change in the routine of Control Group. But Experimental Group was given Yogic Training Programme (i.e. Bhramari Pranayama) along with their routine work and each subject of the Experimental Group was ready to learn Bhramari Pranayama.

TOOL USED

Automatic Digital Blood Pressure Monitoring Machine was used to measure the Systolic and Diastolic Blood Pressure in the unit of mmhg.

RESULTS

Table No – 1

Descriptive statistics about Systolic Blood Pressure of Control Pre Test v/s Experimental Pre Test.

Variable	Group	Phase	N	Mean	SD	SEM
SBP	Control	Pre-Test	35	113.54	12.19	2.06
	Experimental	Pre-Test	35	115.54	10.76	1.81

The above Table No – 1 reveals that there were 35 subjects in each group i.e Control and Experimental have been tested primarily (Pre-Test) on Systolic Blood Pressure. The mean score of Control Group and Experimental Group regarding Systolic Blood Pressure was 113.54 and 115.54 respectively. Further the standard deviation score of Control Group and Experimental Group was recorded as 12.19 and 10.76 respectively, which is also reflected in the graphical representation as Figure No- 1

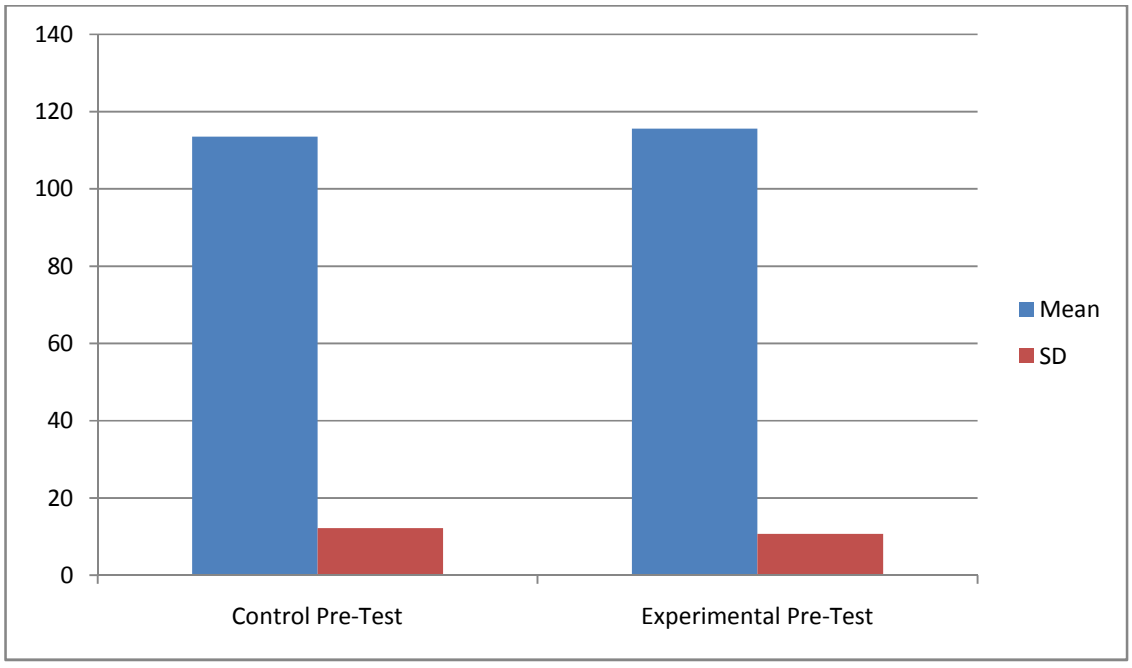

Figure No – 1 Graphical Representation regarding Mean and S.D Score of Control and Experimental Pre Tests related to Systolic Blood Pressure Variable.

Hence, there was not so much difference noticed in the Pre-Test score of subjects of both the groups regarding Systolic Blood Pressure between Control Group and Experimental Group. Therefore, to test the equality of means between both the groups i.e Control and

Experimental on Systolic Blood Pressure, levene's test for equality of variances (Independent sample T-Test) has been employed which have been reflected in the below table i.e Table No 2

Table No-2

Independent Sample t-Test about Systolic Blood Pressure of Control Pre Test v/s Experimental Pre-Test.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
SBP	Equal Variance assumed	.800	.374	-.727	68	.469	-2.00000	2.74939	-7.48632	3.48632
	Equal Variance not assumed			-.727	66.966	.469	-2.00000	2.74939	-7.48785	3.48785

Table No- 2 reveals about the summary of Independent Sample t Test with Levene's test for equality of variance between Control and Experimental Groups at their Pre-Test. The F – Value of Levene's test was 0.800, which was not significant at 0.05[P=0.374, p>0.05]. Therefore, the assumption of equal variance assumed was met.

The calculated value of independent t was -0.727 (p=0.469,p>0.05) which was not significant at 0.05 level of alpha. Hence, both the groups are significantly equal at the time of Pre-Test.

Table No - 3

Descriptive statistics about Diastolic Blood Pressure of Control Pre Test v/s Experimental Pre Test.

Variable	Group	Phase	N	Mean	SD	SEM
DBP	Control	Pre-Test	35	76.65	8.90	1.50
	Experimental	Pre-Test	35	79.08	10.81	1.82

The above table reveals that there were 35 subjects in each group i.e Control and Experimental have been tested primarily (Pre-Test) on Diastolic Blood Pressure. The

mean score of Control Group and Experimental Group regarding Diastolic Blood Pressure was 76.65 and 79.08 respectively. Further the standard deviation score of Control Group and Experimental Group was recorded as 8.90 and 10.81 respectively, which is also reflected in the graphical representation as Figure No- 2.

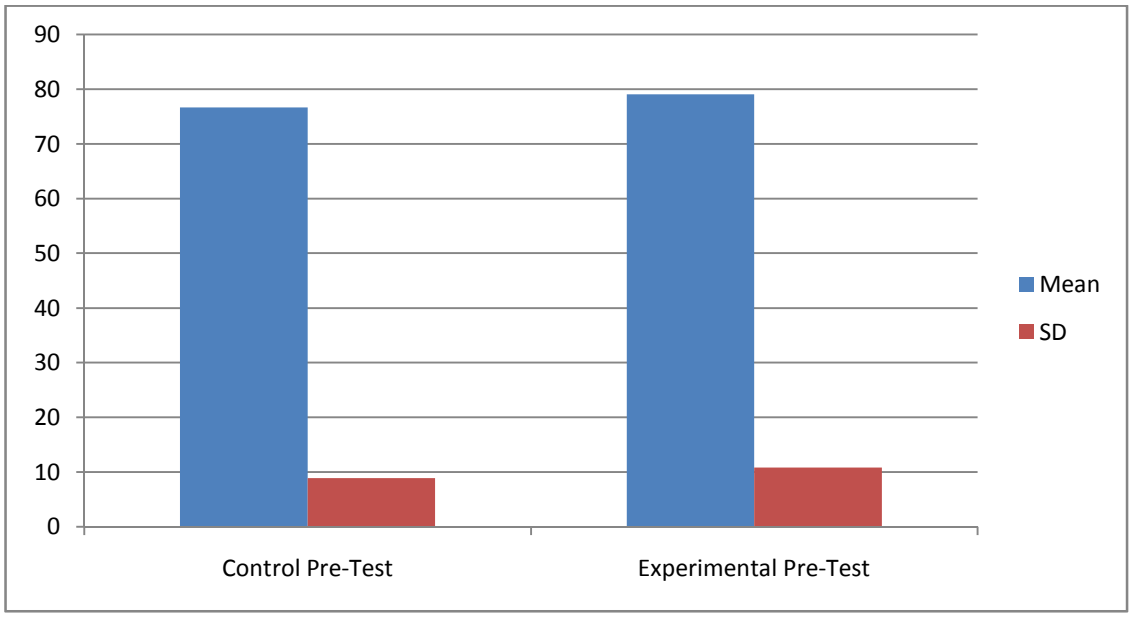

Figure No – 2 Graphical Representation regarding Mean and S.D Score of Control and Experimental Pre-Test related to Diastolic Blood Pressure Variable.

Hence, there was not so much difference noticed in the Pre-Test score of subjects of both the groups regarding Diastolic Blood Pressure between Control Group and Experimental GroupS. Therefore, to test the equality of means between both the groups i.e Control and Experimental on Diastolic Blood Pressure, levene's test for equality of variances (Independent sample t-Test) has been employed which have been reflected in the below table i.e Table No - 4

Table No-4

Independent Sample t-Test about Diastolic Blood Pressure of Control Pre Test v/s Experimental Pre-Test.

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper

DBP	Equal Variance assumed	.081	.777	-1.026	68	.309	-2.42857	2.36796	-7.15377	2.29663
	Equal Variance not assumed			-1.026	65.598	.309	-2.42857	2.36796	-7.15690	2.29976

Table No- 4 reflects about the summary of independent sample t test with Levene's test for equality of variance between Control and Experimental Groups at their Pre-Test. The F – Value of Levene's test was 0.081, which was not significant at 0.05[P=0.777, p>0.05]. Therefore, the assumption of equal variance assumed was met.

The calculated value of independent t was -1.026 (p=0.309, p>0.05) which was not significant at 0.05 level of alpha. Hence, both the groups are significantly equal at the time of Pre-Test.

Table No - 5

Descriptive statistics about Systolic Blood Pressure of Experimental Pre Test v/s Experimental Post Test

Variable	Group	Phase	N	Mean	SD	SEM
SBP	Experimental	Pre-Test	35	115.54	10.76	1.81
	Experimental	Post-Test	35	100.17	10.45	1.76

The above table states that there were 35 subjects in Experimental Group, The same Subjects have been tested at the time of Pre-Test and Post-Test on Systolic Blood Pressure. The mean score of Experimental Group Pre Test and Experimental Group Post Test regarding Systolic Blood Pressure was 115.54 and 100.17 respectively. Further the standard deviation score of Experimental Group Pre Test and Experimental Group Post Test was recorded as 10.76 and 10.45 respectively, which is also reflected in the graphical representation as Figure No- 3

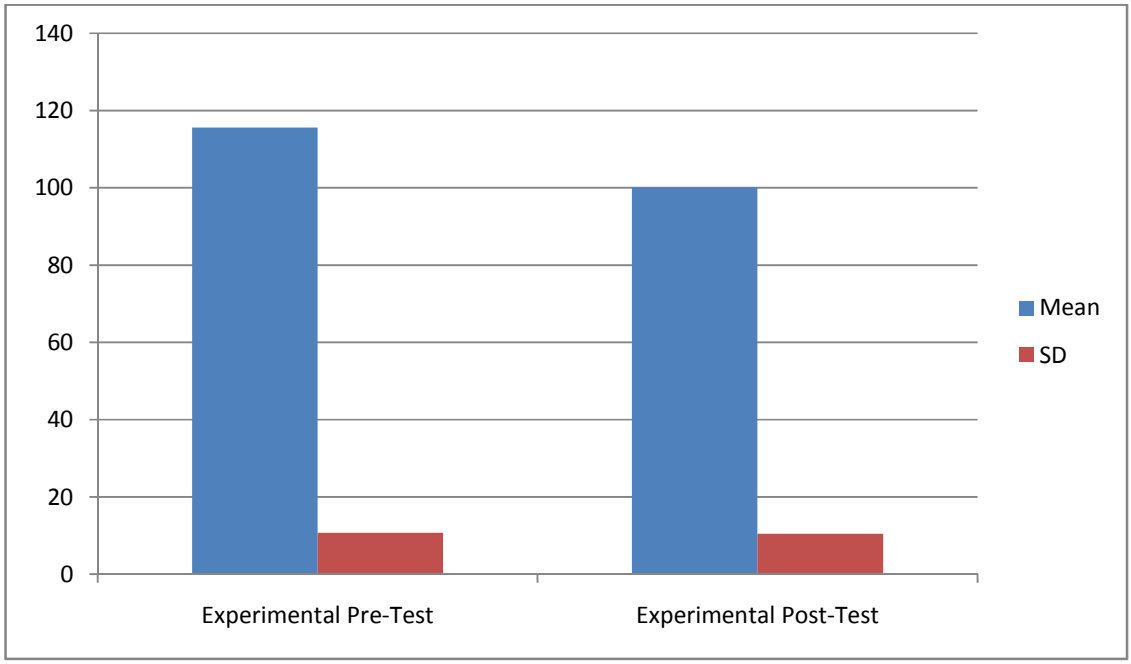

Figure No – 3 Graphical Representation regarding Mean and S.D Score of Experimental Pre-Test and Experimental Post Test related to Systolic Blood Pressure Variable.

Hence, the difference was noticed between mean and SD score of Experimental Pre-Test and Mean and SD score of Experimental Post-Test Regarding the Systolic Blood Pressure Variable of the subjects. Therefore to Test the difference significantly, Paired sample t-Test has been employed which is reflected in Table No - 6

Table No – 6

Paired sample t-Test regarding Systolic Blood Pressure of Experimental Pre Test v/s Experimental Post Test

Name of the Pair	Mean Difference	Std.Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	Df	Sig.(2-tailed)
				Lower	Upper			
SYS_EX_PRE-SYS_EX_POST	15.37	12.71	2.14	11.00	19.73	7.152	34	.000

Table No- 6 shows about the summary of paired sample t statistics between the mean score of Experimental Group Pre-Test and Post-Test. It was taking into notice that difference between Pre and Post Mean Score was 15.37 . The calculated value of

dependent t was 7.152 with df34 which was statistically significant at 0.05 level of alpha($p<0.05$). Therefore, it was observed that six months Bhramari Pranayama Training made significant variation on Systolic Blood Pressure of the subjects of Experimental Group.

Table No - 7

Descriptive statistics about Diastolic Blood Pressure of Experimental Pre Test v/s Experimental Post Test

Variable	Group	Phase	N	Mean	SD	SEM
DYS	Experimental	Pre - Test	35	79.08	10.81	1.82
	Experimental	Post - Test	35	65.62	8.35	1.41

The above table states that there were 35 subjects in Experimental Group, The same Subjects have been tested at the time of Pre-Test and Post-Test on Diastolic Blood Pressure. The mean score of Experimental Group Pre-Test and Experimental Group Post-Test regarding Diastolic Blood Pressure was 79.08 and 65.62 respectively. Further the standard deviation score of Experimental Group Pre-Test and Experimental Group Post-Test was recorded as 10.81 and 8.35 respectively, which is also reflected in the graphical representation as Figure No - 4

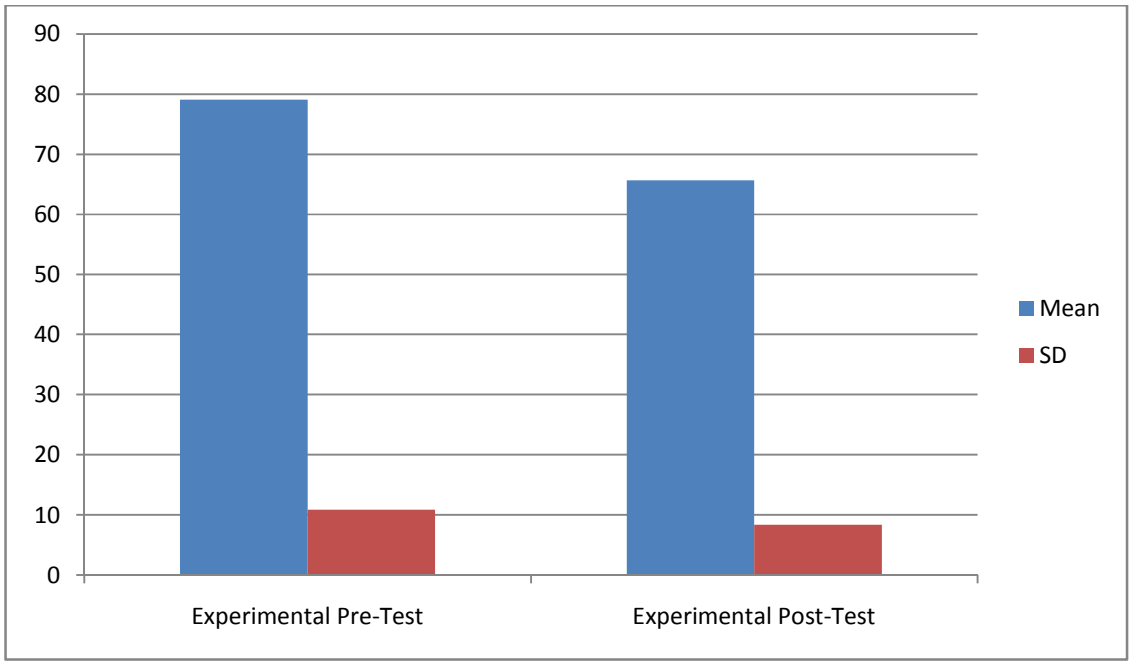

Figure No – 4 Graphical Representation regarding Mean and S.D Score of Experimental Pre Test and Experimental Post Test related to Diastolic Blood Pressure Variable.

Hence, the difference was noticed between mean and SD score of Experimental Pre-Test and Mean and SD score of Experimental Post-Test Regarding the Diastolic Blood

Pressure Variable of the subjects. Therefore to test the difference significantly, Paired sample t- Test has been employed which is reflected in Table No - 8

Table No – 8

Paired sample t-Test regarding Diastolic Blood Pressure of Experimental Pre Test v/s Experimental Post Test

Name of the Pair	Mean Difference	Std.Deviation	Std. Error Mean	95% Confidence Interval of the Difference		T	df	Sig.(2-tailed)
				Lower	Upper			
DYS_EX_PRE-DYS_EX_POST	13.45	12.89	2.18	9.02	17.88	6.172	34	.000

Table No- 8 shows about the summary of Paired sample t statistics between the mean score of Experimental Group Pre-Test and Post-Test. It was taking into notice that difference between Pre and Post Mean Score was 13.45 . The calculated value of dependent t was 6.172 with df34 which was statistically significant at 0.05 level of alpha($p<0.05$). Therefore, it was observed that six months Bhramari Pranayama Training made significant variation on Diastolic Blood Pressure of the subjects of Experimental Group.

Table No – 9

Descriptive statistics about Systolic Blood Pressure of Control Post Test v/s Experimental Post Test.

Variable	**Group**	**Phase**	**N**	**Mean**	**SD**	**SEM**
SBP	Control	Post-Test	35	117.00	17.23	2.91
	Experimental	Post-Test	35	100.17	10.45	1.76

The above table reveals that there were 35 subjects in each group i.e Control and Experimental have been tested (Post-Test) after six months from the timing of Pre-Test on Systolic Blood Pressure. The mean score of Control Group and Experimental Group regarding Systolic Blood Pressure was 117.00 and 100.17 respectively. Further the standard deviation score of Control Group and Experimental Group was recorded as 17.23 and 10.45 respectively, which is also reflected in the graphical representation as Figure No- 5

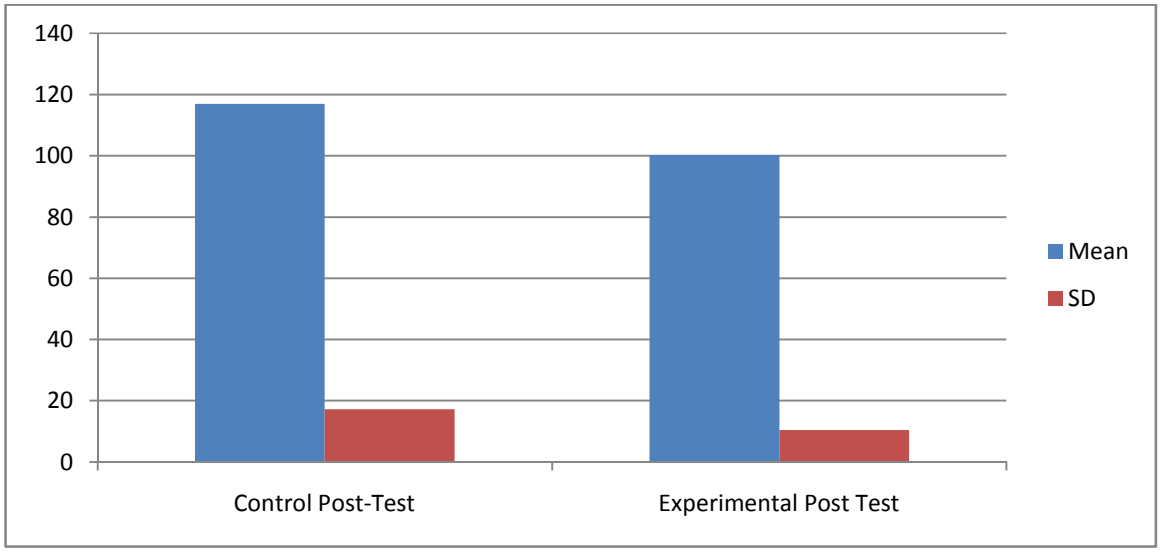

Figure No – 5 Graphical Representation regarding Mean and S.D Score of Control and Experimental Post-Tests related to Systolic Blood Pressure variable.

Hence, so much difference was noticed in the Post-Test score of subjects of both the groups i.e Control and Experimental, regarding Systolic Blood Pressure Variable. Therefore, to test the significant difference of means between both the groups i.e control and experimental on systolic blood pressure, Independent sample t-Test has been employed which have been reflected in the below table i.e Table No IV.10

Table No – IV.10

Independent Sample t-Test about Systolic Blood Pressure of Control Post Test v/s Experimental Post-Test.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
SBP	Equal Variance assumed	8.185	.066	4.939	68	.000	16.82857	3.40723	10.02955	23.62759
	Equal Variance not assumed			4.939	56.043	.000	16.82857	3.40723	10.00319	23.65396

Table No- IV.10 reflects about the summary of independent sample t test with Levene's test for equality of variance between Control and Experimental Groups at their Post-Test. The F – Value of Levene's test was 8.185, which was not significant at 0.05[P=.066, p>0.05]. Therefore, the assumption of equal variance assumed was met.

The calculated value of independent t was 4.939 (p=.000, p<0.05) which was significant at 0.05 level of alpha. Hence, both the groups are significantly unequal at the time of Post-Test. It means that the difference was noticed between the Mean Score of both the groups at the time of Post-Test related to Systolic Blood Pressure was due to six months of Bhramari Pranayama training given to Experimental Group only.

Table No – 11

Descriptive statistics about Diastolic Blood Pressure of Control Post Test v/s Experimental Post Test.

Variable	Group	Phase	N	Mean	SD	SEM
DYS	Control	Post-Test	35	77.08	14.66	2.47
	Experimental	Post-Test	35	65.62	8.35	1.41

The above table reveals that there were 35 subjects in each group i.e Control and Experimental have been tested (Post-Test) after six months from the timing of Pre-Test Diastolic Blood Pressure. The mean score of Control Group and Experimental Group regarding Diastolic Blood Pressure was 77.08 and 65.62 respectively. Further the standard deviation score of Control Group and Experimental Group was recorded as 14.66 and 8.35 respectively, which is also reflected in the graphical representation as Figure No- 6

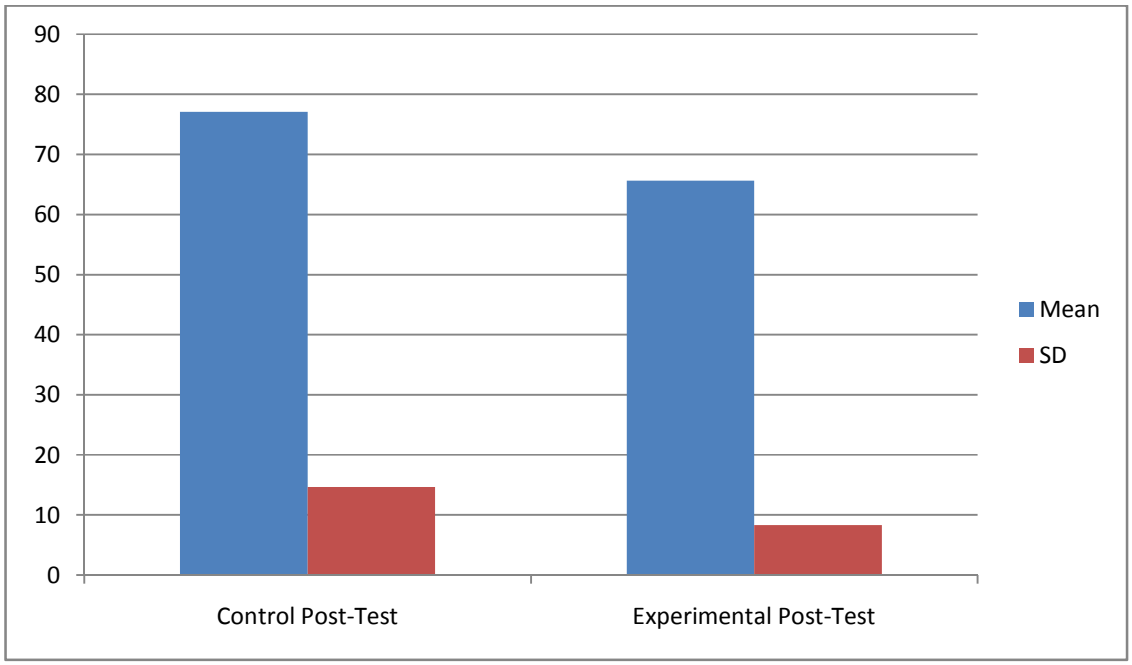

Figure No – 6 Graphical Representation regarding Mean and S.D Score of Control and Experimental Post-Tests related to Diastolic Blood Pressure variable.

Hence, so much difference was noticed in the Post-Test Mean Score of subjects of both the groups i.e Control and Experimental, regarding Diastolic Blood Pressure Variable. Therefore, to test the significant difference of means between both the groups i.e Control and Experimental on Diastolic Blood Pressure, Independent sample t-Test has been employed which have been reflected in the below table i.e Table No - 12

Table No – 12

Independent Sample t-Test about Diastolic Blood Pressure of Control Post Test v/s Experimental Post-Test.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
DYS	Equal Variance assumed	2.920	.092	4.016	68	.000	11.45714	2.85311	5.76384	17.15044
	Equal Variance not assumed			4.016	53.954	.000	11.45714	2.85311	5.73688	17.17741

Table No- 12 reflects about the summary of independent sample t test with Levene's test for equality of variance between Control and Experimental Groups at their Post-Test. The F – Value of Levene's test was 2.920, which was not significant at 0.05[P=.092, p>0.05]. Therefore, the assumption of equal variance assumed was met.

The calculated value of independent t was 4.016 (p=.000, p<0.05) which was significant at 0.05 level of alpha. Hence, both the groups are significantly unequal at the time of Post-Test. It means that the difference was noticed between the Mean Score of both the groups at the time of Post-Test related to Diastolic Blood Pressure was due to six months of Bhramari Pranayama Training given to Experimental Group only.

DISCUSSION OF FINDINGS

The above results helps us to interpret that Regular Practice of Pranayam activate various functions of our body. It exercise the respiratory system. It also helps to trained the respiratory muscles and might have improve the functional ability of intercostals muscles. Thus, in turn it helped to improve the Systolic and Diastolic Blood Pressure of the Subject of Experimental Group. Hence, six months training of Bhramari Pranayama have shown significant effect of improving Systolic and Diastolic Blood Pressure.

Overall, the present study proved that if the school going children actively involved in the regular practice of Bhramari Pranayama then they can improve their health specially related to Blood Pressure (Systolic and Diastolic). The result indicates that there is a significant effect of six months Training of Bhramari Pranayama on Systolic and Diastolic Blood Pressure of School Going Children as independent t- value is found. 4.016 (P=.000, P<0.05) which was significant at 0.05 level of alpha.

CONCLUSION

Improvement in Systolic and Diastolic Blood Pressure has been achieved among the School Going Children due to the regular practice of Bhramari Pranayama. School Going Children can improve their health specially related to Systolic and Diastolic Blood Pressure Variable by adopting a systematic Practice of Bhramari Pranayama as an important aspect of their life.

Observation and result make it eveident that Yogic Training like Bhramari Pranayama can be used along with their routine work to normalize their Systolic and Diastolic Blood Pressure, so that they can live their normal & productive life. Within the limits and the limitations of the study it was concluded that regular practice of Bhramari Pranayama have substantially and significantly improved the Systolic and Diastolic Blood Pressure of School Going Children. Therefore on the basis of Result, we cannot denied the benefits of yoga is very much high in reference to regarding one's health.

REFERENCES

- Sharma.J.P, Seema.Kumari(June 2019), Effect of selected yogic Asanas and Pranayamas on Maximum Breath Holding Time of Asthmatic Patients, Online International Interdisciplinary Research Journal (Bi-Monthly),Volume 09, 138-143

- Pramanik, T., Pudasaini, B., & Prajapati, R. (2010). Immediate effect of a slow pace breathing exercise Bhramari pranayama on blood pressure and heart rate. *Nepal Med Coll J, 12333333*363(3), 154-157.

- **Vialatte, F. B., Bakardjian, H., Prasad, R., & Cichocki, A. (2009). EEG paroxysmal gamma waves during Bhramari Pranayama: a yoga breathing technique.** ***Consciousness and cognition, 18*****(4), 977-988.**
- **Galantino, M. L., Galbavy, R., & Quinn, L. (2008). Therapeutic effects of yoga for children: a systematic review of the literature.** ***Pediatric Physical Therapy, 20*****(1), 66-80.**
- Kamei T, Toriumi Y, Kimura H, Ohnos, Kumano H, Kimura K., "Decrease in serum cortisol during yoga exercise is correlated with alpha wave activation", Shimane Institute of Health Science, Izumo japan. (jun 2000)
- Raju. PS, Madhavi S, Prasad KV, Reddy MV, Reddy ME, Sahay BK, Murthy KJ., "Comparison of effects of Yoga-Physical exercise in athletes,": Govt. Vemana Yoga Research Institute, Secunderabad(Aug. 1994)
- Bere T.K (1993), Muscular activity in yoga and physical exercise. Research Bi-annual for movement, vol.10.
- http://www.swamij.com/history-yoga.htm
- http://www.yogapranayama.net/what-is-pranayama.html