



Physical Education

EFFECT OF YOGA ON SELECTED ANTHROPOMETRICAL AND PHYSIOLOGICAL VARIABLES OF COLLEGE GOING STUDENTS

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ABSTRACT **INTRODUCTION:** -Yoga plays an important role and has made unlimited Contribution in our modern life. The purpose of the study was to analyze the effect of twelve (12) weeks Yoga on selected Anthropometrical and Physiological variables of college going male students within the age group of 18-21 years. **MATERIALS & METHODS:** -Total 60 subjects were taken for the study from Fakir Chand College (Calcutta University), Diamond Harbour, South 24 Parganas, West Bengal, Pin-743331. The Anthropometrical and Physiological parameters were Weight, BMI and Fat (%) & Pulse rate, S.B.P and D.B.P which were measured by the reputed Physician. The Pre-test and Post-test were taken of all the parameters before and after the twelve (12) weeks of yoga training. The Weight and Height were measured by weighing Machine and Stadiometer respectively. They were measured for the calculation of Body Mass Index ($BMI = \text{Weight in kg} / \text{Height in meter}^2$) and for measuring the percentage of Body Fat, Skin Fold Caliper was used. Similarly, the physiological parameters were assessed by recording the blood pressure (S.B.P and D.B.P) and pulse rate before and after the twelve (12) weeks of regular yogic exercise or training. The subjects were randomly selected for the study. To measure the blood pressure mercury sphygmomanometer was used and pulse Rate was recorded after a rest for 30 minutes in right radial artery by Palpatory method. For statistical analysis and Interpretation of data 't' test was conducted at 0.05 level of significance. **RESULTS & DISCUSSION:** - The findings of the present study reveals that there was significant difference found in reduction in the pulse rate, Systolic Blood Pressure and diastolic Blood Pressure after the twelve (12) weeks of yoga practice. The mean pulse rate (beats/minute) before yoga practice was (74.60 ± 2.28) . It was reduced highly significant to (72.10 ± 2.06) ($P > 0.001$). The Systolic Blood Pressure (mm of Hg) before yoga practice was (124.30 ± 2.42) . It was reduced highly significant level to (120.28 ± 2.25) ($P > 0.001$). The mean Diastolic Blood Pressure (Mm of Hg) before yoga practice was (84.40 ± 1.98) . It was reduced highly significant level to (80.10 ± 2.12) ($P > 0.001$) after twelve weeks of yoga practice. The Independent paired 't'- test was used at 0.05 level of significance. Similarly, The Anthropometrical variables i.e Weight, BMI and Fat (%) were (51.60 ± 2.50) , (47.90 ± 2.35) and (19.50 ± 2.25) , (16.90 ± 2.15) and (24.40 ± 1.62) , (21.80 ± 2.28) respectively. The weight, BMI and Fat (%) were also reduced significantly after the twelve (12) weeks of yoga practice. The Independent paired 't'- test was used at 0.05 level of significance. **CONCLUSION:** -On the basis of the obtained result, it has been observed that yoga can reduce the high blood pressure, pulse rate and Body Weight, BMI and Fat (%) and plays an important role in healthy impact on the life style of a man.

KEYWORDS : Yoga, Anthropometrical and Physiological variables.

INTRODUCTION:-

“Yoga is a life of self-discipline. Yoga balances, harmonizes, purifies and strengthens the body, mind and soul. It shows the way to perfect health, perfect mind control and perfect peace with one's own self, the world, nature and God.”

- *Swami Vishnu-devananda*

The word 'yoga' is derived from the roots of Sanskrit 'Yuj' which means to join, to attach, to bind, yoke, and a concentrate or one attention. It also means Union. Yoga is true union of our will with the will have had. The literal meaning of the word 'Yoga' is 'yoke'. It means for uniting the individual spirit with the Universal spirit, or God. Yoga means the Experience of oneness or unity with inner being. It is a science by which the individual approaches truth. Yoga is not religion; it is a method by which one obtains Control of one's latent powers. It is the means to reach complete Self-Realization. Yoga is a reduction of one's mental process, along with the physical. The practice of Yoga in the Indian subcontinent has been documented as early as B.C. Regular practice of variety of Yoga techniques have been shown to lower heart rate and blood pressure in various population Ckuvalayananda 1968; Lakshmikanthan et al. 1979 and mahajan et al 1999. All over the world scientists have extensively studied Yoga and claimed that it increases longevity C Marugeson et al 2000; Mc Calfrey et al. 2005; Nagarathan and Nagendra 2003 and patel 1975). It has therapeutic and rehabilitative effects (Raubetal 2003. Schindf et al. 1998. A short time (30-45 minutes) of regular yogic practice may give mental relief to the people. Yoga has a sound scientific basis and is an ideal tool for improving the health of our masses. Pranayama helps us to control our emotions which are linked to breathing.

In Bhagvad Gita, the main stress is on karma yoga (yoga by action). Work alone is your privilege, never the fruits thereof. Never let the fruits of action be your motive; and never cease to work. Work in the name of Lord, abandoning selfish desires. Be not affected by success or failure. This equipoise is called Yoga. A man who cannot control his mind will find it difficult to attain this Divine communion; but the self-

controlled man can attain it if he tries hard and directs his energy by the right means. “Yoga is an art, a science and a philosophy. It touches the life of man at every level, physical, mental, and spiritual. It is a practical method for making one's life purposeful, useful and noble.

The blood pressure is measured with an instrument called a sphygmomanometer in millimeters of mercury. The highest pressure reached during each heart beat is called systolic blood pressure and lowest between two beats is known as diastolic blood pressure. The blood pressure is considered as normal when it is $(120/80 \pm 10 \text{ mm of Hg})$. The purpose of the study was to analyze the effect of twelve (12) weeks of Yoga on Anthropometrical and Physiological variables of college going male students.

MATERIALS & METHODS:-

SUBJECTS: - Total 60 subjects were taken for the study from Fakir Chand College (Calcutta University), Diamond Harbour, South 24 Parganas, West Bengal, Pin-743331. The Anthropometrical and Physiological parameters were Age, Height, weight, BMI and Fat (%) and Pulse Rate, S.B.P and D.B.P which were measured by reputed Physian. The subjects were randomly selected for the study. To measure the blood pressure mercury sphygmomanometer was used and pulse was recorded after a rest for 30 minutes in right radial artery by Placatory method. For statistical analysis and Interpretation of data 't' test was conducted at 0.05 level of significance. The random sampling method and random group design were used for the study.

VARIABLES AND INSTRUMENTS:-

On the basis of available literature and the researcher's own understanding the following Anthropometric and Physiological variables were selected.

They are-	i) Age	i) Pulse Rate
	ii) Height	ii) S.B.P
	iii) Weight	iii) D.B.P.
	iv) BMI	
	v) Fat (%)	

The selected Anthropometrical and Physiological variables and their measuring instruments and units of measurement are given in Table No -1.

Table No -1.

Sl. No.	Variable	Instrument	Unit
1.	Height	Stadiometer	cm
2.	Weight	Weighing machine	kg
3.	BMI	Carat scan	Kg/m ²
4.	Fat (%)	Skin Fold Caliper	cm
5.	Pulse Rate	Palpatory Method	Beats/min
6.	S.B. P	Sphygmomanometer	Mm of Hg
7.	D.B. P	Sphygmomanometer	Mm of Hg

PROCEDURE:-

The Anthropometrical and Physiological parameters were Age, Height, Weight, BMI, Fat (%) & Pulse rate and Blood pressure (S.B.P and D.B.P) respectively. The investigators were measured the following parameters before and after giving the yoga training programmes. He demonstrated the various tests with respect to the selected Anthropometrical and Physiological variables to the students. Before recording the above parameters, the subjects were asked to relax physically and mentally for 30 minutes. The height and weight were measured with the help of Stadiometer and weighing machine respectively. All the subjects were investigated by the same expert under the similar conditions of rest and fasting. The pre-test and post-test were taken of all the parameters (Anthropometrical and Physiological) before and after the twelve (12) weeks of yoga training. The weight was measured by weighing Machine, Height and Weight were measured for the calculation of Body Mass Index ($BMI = \text{Weight in kg/Height in meter}^2$) and for measuring the percentage of Body Fat, Skin Fold Caliper was used. Similarly, the physiological parameters were assessed by recording the blood pressure (S.B.P and D.B.P) and pulse rate before and after the twelve (12) weeks of regular yogic exercise or training. To measure the blood pressure mercury sphygmomanometer was used and the pulse was recorded after a rest for 30 minutes in right radial artery by Placatory method. For statistical analysis and Interpretation of data 't'-test was conducted.

STATISTICAL ANALYSIS:-

To analyze the effect of Yoga on Anthropometrical and Physiological variables of the college going students within the age group of 18-21 years. The Independent 't' test was used at 0.05 level of significance. To get the final result Mean, Standard Deviation, Difference and t'-test were calculated.

SCHEDULE OF YOGA PRACTICES:-

1. Bhujangasana 9. Halasana, 2. Ardh-Shalabhasana 10. Ardh-Matsyendrasana
3. Ardh-Halasana 11. Shalabhasana, 4. Vakrasana 12. Viparitarani
5. Chakrasana 13. Naukasana, 6. Paschimottan 14. Parvatasana
7. Dhanurasana 15. Makrasana, 8. Shavasana 16. Kapalbhathi
17. Anulom-Vilom, 18. Meditation.

RESULTS:-

The present study reveals that there was significant difference found in reduction of the pulse rate, Systolic Blood Pressure and diastolic Blood Pressure & weight, BMI, and Fat (%) after the twelve (12) weeks of yoga practice. The mean pulse rate (beats/minute) before yoga practice was (74.60 ± 2.28). It was reduced highly significant to (72.10 ± 2.06) ($P > 0.001$). The Systolic Blood Pressure (mm of Hg) before yoga practice was (124.30 ± 2.42). It was reduced highly significant level to (120.28 ± 2.25) ($P > 0.001$). The mean Diastolic Blood Pressure (Mm of Hg) before yoga practice was (84.40 ± 1.98). It was reduced highly significant level to (80.10 ± 2.12) ($P > 0.001$) after twelve weeks of yoga practice. The Independent paired 't'-test was used at 0.05 level of significance.

Similarly, The Anthropometrical variables i.e Weight, BMI and Fat (%) were (51.60 ± 2.50), (47.90 ± 2.35) and (19.50 ± 2.25), (16.90 ± 2.15) and (24.40 ± 1.62), (21.80 ± 2.28) respectively. The weight, BMI and Fat (%) were also reduced significantly after the twelve (12) weeks of yoga practice. The Independent paired 't'-test was used at 0.05 level of significance.

Table-1: Significant difference between Pre-test and Post-test Mean on Anthropometrical Variables within the age group of 18-

21 years male students.

Sl. No	Anthropometrical Variables	Test	Mean	SD	MD	t-test	Sig.
1	Weight (In KG)	Pre-test	51.60	2.50	3.70	3.06	0.05
		Post-test	47.90	2.35			
2	BMI	Pre-test	19.50	2.25	2.60	2.54	
		Post-test	16.90	2.15			
3	Fat (%)	Pre-test	24.40	2.62	3.60	3.02	
		Post-test	21.80	2.28			

*Significant at 0.05 level

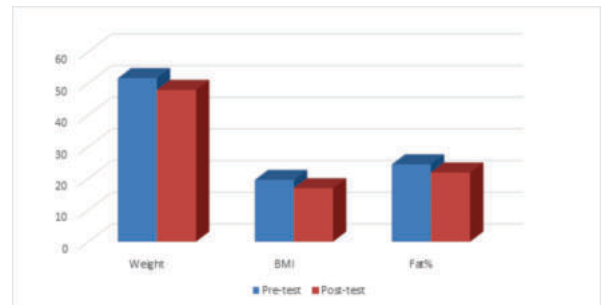


Fig.1 Graph Showing the Pre-test and Post-test Mean within the age group of 18-21 years male on Anthropometrical Variables.

Table- 1: Results of the study have been shown in Table-1. It revealed that there were Significant difference in Weight, BMI and Fat (%) within the age group of 18-21 years male students because the calculated value of 't' (3.06), (2.54) & (3.02) were more than the tabulated value at 0.05 level of significance. So, the result is significant.

TABLE NO:- 2

Table No:- 2. Significant difference between Pre-test and Post-test Mean within the age group of 18-21 years male on Physiological Variables.

SL.NO	Physiological Variables	Test	Mean	SD	MD	t-ratio	Sig.
1.	Pulse Rate (Beats/min)	Pre-test	74.60	2.28	2.50	2.56	0.05
		Post-test	72.10	2.06			
2.	SBP (mm of Hg)	Pre-test	124.30	2.42	4.02	3.35	
		Post-test	120.28	2.25			
3.	DBP (mm of Hg)	Pre-test	84.40	1.98	4.30	3.62	
		Post-test	80.10	2.12			

*Significant at 0.05 level

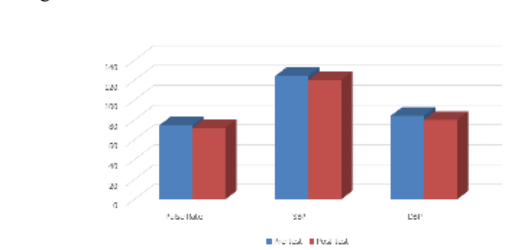


Fig. 2: Graphs Showing the Physiological variables within the age group of 18-21 years male students regarding Mean and SD.

Table-2: Results of the study have been shown in Table-2. It revealed that there was significant difference in Pulse Rate, Systolic Blood Pressure and Diastolic Blood Pressure of 18-21 years male students because the calculated value of 't' (2.56), (3.35) & (3.62) were more than the tabulated value at 0.05 level of significance. So, the result is significant. Graphical representation (Fig.2) also indicates the similar trend of this study.

DISCUSSION:-

From the result of the study, it has been observed that there was significant difference found in the Anthropometrical and Physiological variables. On analyze the effect of Yoga on selected Anthropometrical

and Physiological variables of college going male students; the results revealed that there was highly significant reduction in the pulse rate, Systolic Blood Pressure and Diastolic Blood Pressure (mm of Hg) after the twelve (12) weeks of yoga practice. A significant improvement in the level of blood pressure and body mass index after three (3) months residential training consisting of vegetarian diet and Kriya yoga (Swami Satyananda Saraswati 2001). The mechanism of reduction of blood pressure has been considered to be restoration of bar receptor sensitively by yoga (Twari 1983 and Tulpule (1980). The data indicates that 12 weeks of yoga training reduce the heart rate among the college going boys. The blood pressure (S.B.P & D.B.P) was decreased continually after the twelve (12) weeks of yoga practice. The mean pulse rate (beats/minute) before yoga practice was (74.60 ± 2.28) . It was reduced highly significant to (72.10 ± 2.06) ($P > 0.001$). The Systolic Blood Pressure (mm of Hg) before yoga practice was (124.30 ± 2.42) . It was reduced highly significant level to (120.28 ± 2.25) ($P > 0.001$). The mean Diastolic Blood Pressure (Mm of Hg) before yoga practice was (84.40 ± 1.98) . It was reduced highly significant level to (80.10 ± 2.12) ($P > 0.001$) after twelve weeks of yoga practice. The Independent paired't'- test was used at 0.05 level of significance.

Similarly, The Anthropometrical variables i.e Weight, BMI and Fat (%) were (51.60 ± 2.50) , (47.90 ± 2.35) and (19.50 ± 2.25) , (16.90 ± 2.15) and (24.40 ± 1.62) , (21.80 ± 2.28) respectively. The weight, BMI and Fat (%) were also reduced significantly after the twelve (12) weeks of yoga practice. The Independent paired't'- test was used at 0.05 level of significance

CONCLUSION:

The findings of the study revealed statistically significant in the respect of all selected anthropometric and physiological variables. On the basis of the results obtained from the present empirical investigation and within the limitation, the following conclusions are drawn after giving the twelve (12) weeks of yoga practice.

- 1) The Anthropometrical parameters i.e the Weight, BMI and Fat (%) were significantly reduced after giving the twelve (12) weeks of yoga practice.
- 2) The Physiological parameters i.e the Pulse Rate, Systolic Blood Pressure and Diastolic Blood Pressure were significantly reduced after giving the twelve (12) weeks of yoga practice.

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