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Influence of practising Pranayama on selected physiological variables of adolescent Swimming players of District Kurukshetra

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Abstract

Yoga has become the essence of every individual in modern time. People are surrounded by a number of diseases such as obesity, diabetes, cardiovascular problem and many more hypokinetic problems. Every individual wants to get rid of these diseases very quickly. Therefore, yoga has become popular everywhere. Because Yoga can be performed anywhere. There is no huge space require to perform this. Anyone can perform Yoga easily. Yoga is also popular among the sportspersons. Every athlete performs Yoga in order to keep himself fit and in order to enhance his sports performance. Yoga is also very popular among swimming players. Because Yoga improves the lung capacity of the swimmers. This study focused to see the influence of practising pranayama on selected physiological variables of swimming players. To conduct this research 30 adolescent players both boys and girls, aged between 14 to 19 years, from district Kurukshetra (Haryana) were selected. Selected physiological variables were Total Lung Capacity (TLC), Breath-Holding Capacity (BHC) and Resting Pulse Rate (RPR). Pre-tests were conducted on all the players in order to take initial reading. After that pranayama practising were performed for 45 days and after that post-tests were conducted to check the effect of pranayama on the physiological profile of swimmers. After taking all the readings statistical measures such as mean, standard deviation (SD) and t-test used to compare the results of pre-test and post-test. At last, it's found that calculated t-value is greater than table value or critical value at degree of freedom 29 (df) taking significant level 0.05. It shows that there is a clear statistically significant difference between the scores of pre and post-tests. Hence this research clearly indicates that practicing pranayama improves the selected physiological variables.

Introduction

The 'Yoga' word is derived from the Sanskrit word 'Yuja' which means joining or union or merging. Here the joining meant by the joining of human soul with the God or merging within the God. To attain this joining is the ultimate goal of yoga. Yoga has become popular everywhere because, Yoga can be performed anywhere. There is no huge space require to perform this. Anyone can perform Yoga easily. A person can maintain excellent health and a long life by doing this. Yoga is also popular among the sportspersons. Every athlete performs

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Yoga in order to keep himself fit and in order to enhance his sports performance. Yoga poses aid in developing the physical and mental abilities needed to calm the mind and manage the faculties. It appears that the body is becoming more adaptable. Yoga asanas of all kinds clean the blood in the veins and strengthen the physiological profile of individuals. There are 8 steps (in sequential manner) to reach this target. These steps include Yama, Niyama, asana, pranayama, pratyahara, dharna, dhyana and samadhi. Out of these eight steps Pranayama is the fourth step of Ashtang Yoga. Pranayama word is made up of two words 'Prana' which means breath and 'Ayama' means to control. Pranayama means, 'control of breathing' or control over inhalation and exhalation.


Pranayama is breathing techniques that enhance the volume of lungs. Pranayama controls inspiration (inhalation) and expiration (exhalation). Inspiration includes inhalation of 'Prana' Vayu or a fresh or oxygenated air while the expiration includes the exhalation of 'Apana'vayu or deoxygenated air. Pranayama optimizes a person's body's general functionality and respiratory capacity. Practicing regular pranayama, promotes the lungs' functioning. Benefits of various pranayama are extensively documented and have a solid scientific foundation. During pranayama, the diaphragm and abdominal muscles are effectively used. In order for the chest and lungs to expand and contract to the largest extent feasible, the respiratory muscles must be strengthened through yoga in order for them to function to their fullest potential. It was the pranayama practice which served as Oxygen level enhancer and immunity booster during the worst pandemic situation of covid-19. Pranayama and yoga contribute people to maintain their oxygen (spo2) level to the normal. Yoga keeps the body active and energetic. Pranayama is performed in three steps- Purak- Inhalation, Kumbak - Retention or holding of breath (through bandhas) and Rechaka- exhalation. There are many types of Pranayama such as Suryabhedhi, Ujjai, Sheetali, Sheetkari, Moorchha, Plavani, Bhastrika, Bhramari and Nadi Shaudhan. Out of these Pranayama only three Pranayama i.e. Bhastrika, Bhramari, Anulom Vilom (Nadishuddhi) and one shuddhikriya Kapalhatitaken into consideration for this study.

Objective of the Study

The objective of the study is to check the influence of practising pranayama on selected physiological variables of swimming players.

Research Hypothesis

- 1) There would be no significant difference between the scores of pre and post-tests of Breath-Holding Capacity (BHC) physiological variable of swimming players.
- 2) There would be no significant difference between the scores of pre and post-tests of Resting Pulse Rate (RPR) physiological variable of swimming players.
- 3) There would be no significant difference between the scores of pre and post-tests of Total Lung Capacity (TLC) physiological variable of swimming players.

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Methodology

Selection of Subjects-This sample is taken after consulting with the senior coaches, experts and physical education teachers. For this study 30, District and state level swimming players both boys and girls, aged between 14 to 19 years (adolescent), from district Kurukshetra (Haryana) were selected randomly as a sample. This sample consist of heterogeneity as it includes both the genders; district and state level swimmers; beginners and experienced (elite) players of swimming, a good variation in their body mass index.

Selection of Variables-After analysing relevant scientific information from periodicals, journals, and books while keeping the feasibility standards in mind, dependent variables (physiological variables) were selected as Total Lungs Capacity (TLC), Breath-Holding Capacity (BHC) and Resting Pulse Rate (RPR)

for the purpose of this study. Whereas the selected independent variables (manipulating variables) were the four Pranayamas such as Bhastrika, Bhramari, Anulom Vilom (Nadi Shuddhi), Kapalbhathi (Shuddhi Kriya).

Resting Pulse Rate (RPR)

This variable is used to record the resting pulse rate, the digital oximeter was used. Before using this device for our study, it was well checked by technicians about its validity and reliability. Before assessing the resting pulse rate, it was ensured that all the swimmers were totally relax. Before taking the reading of their pulse rate the swimmers were asked to sit on the chairs and relax for some time. The swimmers were called one by one. The swimmers were asked to place the device either on the index or middle finger. It was kept for 1 minute and reading was noted down. For cross checking the reading was counted manually as well. In the manual way, to record the pulse rate the fingertips were placed on the radial artery near the wrist in such a way that pulsation was clear and number of pulses counted for 30 seconds and after that it was multiplied by 2, for getting exact pulse rate for one minute.

Total Lungs Capacity (TLC)

This variable is used to measure the amount of air that can be retained by the lungs or to measure Total lungs capacity. Total lungs capacity was measured with the help of 'Spirometer'. Before using the spirometer for our study, it was well checked by technicians about its validity and reliability. The swimmers were called one by one. For taking reading swimmers were asked to sit up and hold the device. The swimmers were asked to place the mouthpiece spirometer into the mouth and make sure that it made a good seal over the mouthpiece with their lips, further asked to inhale slowly and deeply through mouthpiece to raise the indicator and hold the breath for 3 seconds exhale normally. The procedure was repeated for three times and the average of all the three attempts was taken for consideration.

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Breath-Holding Capacity (BHC)

This variable is used to measure the ability to hold the breath for longer time or assessing Breath-Holding Capacity, we used very simple approach and measured it manually with the help of a stopwatch. Before assessing the Breath-Holding Capacity it was ensured that all the swimmers were totally relax, if they were not at ease, it might affect the reading. The swimmers were called one by one. The swimmers were stood at ease and inhaled deeply after which they held their breath for a length of time as they could. Index finger of the respondent worked as an indicator for the investigator to know the start and end of the recording time. The middle finger and thumb were used to hold the nose to avoid passing the air through the nostrils. The swimmers were requested not to let the air out through the opening of mouth which recording the breath holding time. The time of holding the breath till the swimmers let the air out was noted by using the stopwatches to the nearest one-tenth of a second as the breath holding time.

Whereas the selected independent variables were the four Pranayamas such as Bhastrika, Bhramari, Anulom Vilom (Nadisuddhi) and Kapalbhathi (Shuddhi Kriya).

Training Procedure after taking the initial readings (pre-test), selected yogic training was given to the sample of 30 swimming players for 45 days. The time of pranayama practice was from 5:30 AM to 6:20 AM.

Kapalbhathi- Kapalbhathi Pranayama is a type of breathing exercise and shuddhi kriya (to exhale deoxygenated air) that helps us to get rid of various diseases over a period of time. 'Kapal' means forehead and "bhathi" means shining and its complete implied meaning is the breathing exercise which provides glow to our forehead/ face. Kapalabhati is performed in a sitting posture. It Focus mainly on 'exhaling'. Inhale normally and exhale forcefully by the using contraction of abdomen muscles. Kapalbhathi training was provided to swimmers for 45 days for 5 minutes each day.

Anulom Vilom (Nadisuddhi)- With your right thumb, pinch your right nose shut. Now take a deep, steady breath through your left nostril to fill your lungs. After inhaling, slowly exhale by opening the right nostril and closing the left nostril with the ring finger of your right hand. After a full exhale, breathe in again through your right nostril while covering it with your thumb. Open your left nostril now and take a deep breath out. This is one round of Anulom Viloma or Nadisuddhi Pranayama. Swimmers were given Nadisuddhi training for 5 minutes daily for 45 days.

Bhastrika- 'Bhastrika' is a Sanskrit word which means 'bellows'. In Bhastrika pranayama, the breathing pattern looks blowing of bellows. In Bhastrika pranayama, we thoroughly

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breathe in and out to ensure that our bodies receive the most oxygen possible. Swimmers were given Bhastrika training for 5 minutes daily for 45 days.

Bramhari-The word ‘Bramhari’ comes from the Sanskrit word ‘bhramar’ which is ‘humming black bee’.The fight-or-flight reaction is diminished and the mind is kept calm through bramhari pranayama practise.When performing this pranayama, the throat is used to exhale and inhale while producing the sound of ‘Bhramar’. This sound is akin to chanting "Om," particularly the lengthy mmmm. The sound should be steady,deep and smooth. Swimmers were given Bramhari training for 5 minutes daily for 45 days.

Results and statistical analysis of data

For statistical analysis of data Mean was used for measuring central tendency, standard deviation was used for measures of variability and after that T-statistics was used to check the significant difference of means between two groups at significant level 0.05.

Table – 1

Descriptive statistics Pre and Post Test for **Resting Pulse Rate** of Swimming Players.

GROUPS	NUMBERS	AVERAGE (bpm)	STD. DEVIATION	DF	T STATS (Paired)
PRE-TESTS	30	68.26	4.43	29	3.08
POST TESTS	30	66.76	4.07		

*Significant 0.05 level.

Table value of students t- test df (29) is 2.045

Calculated T-value is greater than tabulated or critical t-value (df 29) so there is a significant difference between the mean of two groups.

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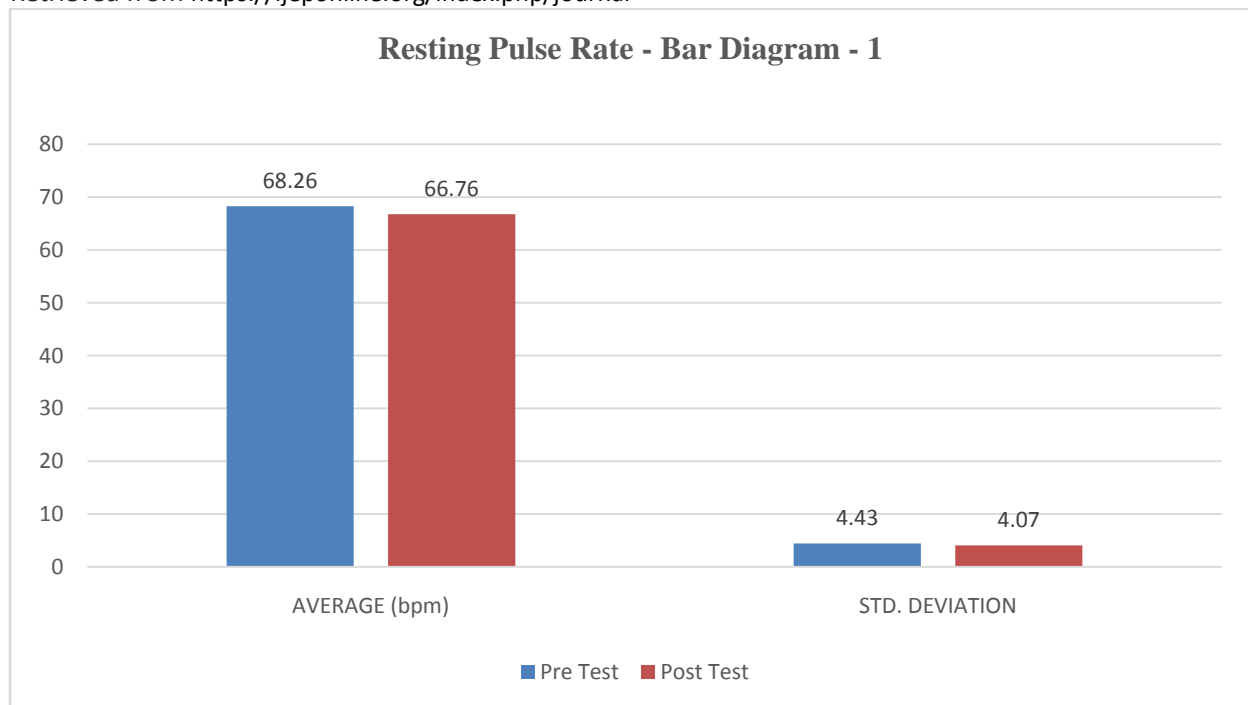


Table-1& Bar Diagram -1:indicate that the results of pre and post-test for Resting Pulse Rate of Swimming Players. The mean and SD of pre-test is 68.26 and 4.43 respectively. Whereas the mean and SD of post-test is 66.76 and 4.07 respectively. Calculated t - value is 3.08,which is more than table value df (29) is 2.045. Hence there exist a significant difference between the means of pre-test and post-test of swimming players in terms of their Resting Pulse Rate.

Table – 2

Descriptive statistics Pre and Post Test for **Total Lungs Capacity** of Swimming Players.

GROUPS	NUMBERS	AVERAGE (Litres)	STD. DEVIATION	DF	T STATS (Paired)
PRE-TESTS	30	4.68	0.61	29	3.79
POST TESTS	30	4.76	0.62		

*Significant 0.05 level.

Table value of students t- test df (29) is 2.045

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Calculated T-value is greater than tabulated or critical t-value (df 29) so there is a significant difference between the mean of two groups.

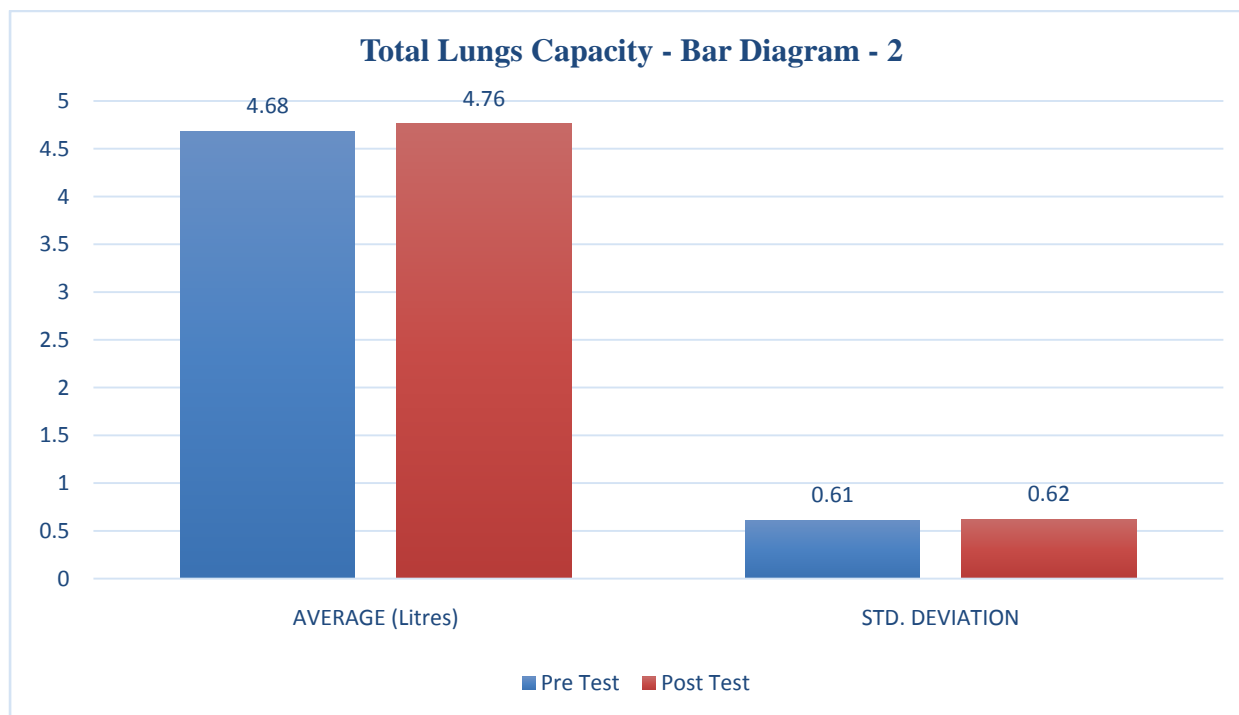


Table-2 & Bar Diagram - 2: indicate that the results of pre and post-test for Total Lungs Capacity of Swimming Players. The mean and SD of pre-test is 4.68 and 0.61 respectively. Whereas the mean and SD of post-test is 4.76 and 0.62 respectively. Calculated t - value is 3.79, which is more than table value df (29) is 2.045. Hence there exist a significant difference between the means of pre-test and post-test of swimming players in terms of their Total Lungs Capacity.

Table – 3

Descriptive statistics Pre and Post Test for **Breath-Holding Capacity** of Swimming Players.

GROUPS	NUMBERS	AVERAGE (seconds)	STD. DEVIATION	DF	T STATS (Paired)
PRE-TESTS	30	47.50	6.29	29	5.41
POST TESTS	30	49.17	6.98		

*Significant 0.05 level.

Table value of students t- test df (29) is 2.045

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Calculated T-value is greater than tabulated or critical t-value (df 29) so, there is a significant difference between the mean of two groups.

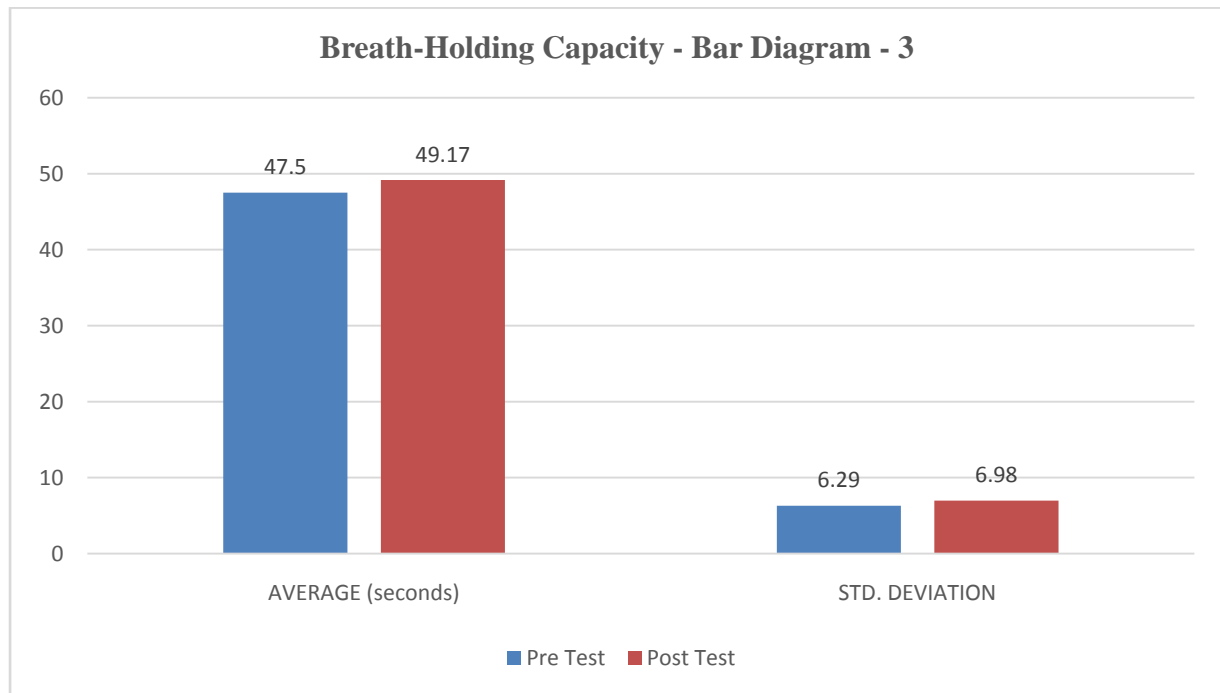



Table-3 and Bar Diagram - 3: indicate that the results of pre and post-test for Breath-Holding Capacity of Swimming Players. The mean and SD of pre-test is 47.50 and 6.29 respectively. Whereas the mean and SD of post-test is 49.17 and 6.98 respectively. Calculated t - value is 5.41, which is more than table value df (29) is 2.045. Hence there exist a significant difference between the means of pre-test and post-test of swimming players in terms of their Breath-Holding Capacity.

Conclusion and Finding

From the above results and statistical findings, it can be concluded that there exists a significant improvement in Resting pulse count, Total Lungs capacity and Breath holding capacity of the adolescent swimmers due to the influence of Practising Pranayama for 45 days. Hence our all the null hypothesis, that there would be no significant difference between the scores of pre and post-tests of physiological variables - Total Lungs Capacity (TLC), Breath-Holding Capacity (BHC) and Resting Pulse Rate (RPR) of swimming players rejected. It can be concluded that Pranayama practising is quite important to the swimmers in order to enhance their performance by enhancing their lung capacities and volumes. Yoga especially Pranayama can be effective for the players of those sports in which functioning of lungs play an important role. These games may be Marathon, half marathon, cross country race, cycling, football, hockey, basketball, handball, Kho-Kho and more similar sports.

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