

Comparative Study Of Selected Physiological And Physical Fitness Parameters Between Short Distance Swimmers And Sprinters

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Abstract

The motive behind the study was to compare selected physiological and physical fitness parameters between short distance swimmers and sprinters. The study was carried out in 20 males, 10 swimmers and 10 athletes from Degree College of Physical Education (HVPM) Amravati between the age group of 18-25yrs. The selected variables were examined statistically by applying independent t-test. In conclusion the study showed that there was significance difference observed in vital capacity, flexibility, maximum strength, cardiovascular endurance and in thigh fat % but insignificance difference observed in resting pulse rate, SPO₂ and in abdomen and biceps fat %. Swimmers have shown significantly less flexibility as compared to sprinters, so the researchers suggested focusing on flexibility during training for better performance.

Keywords: *physiological, physical, parameters, short distance swimmers and sprinters.*

1. INTRODUCTION

Sports physiology is the study of the long-and short-term effects of training and conditions on athletes. This specialized field of study goes hand in hand with human anatomy. Anatomy is about structure, where physiology is about function. Sport Physiology further applies these concepts from exercise physiology specifically to training the athlete and enhancing athlete performance within a specific sport. Exercise and sport physiology is about improving performance, by knowing how the body functions during exercise, and using scientific principles to allow your body to train better, perform better and recover quicker. Studies in exercise physiology help athletes achieve greatness e.g. it is now known that Olympic weightlifting and plyometric training are two methods to increase vertical jump height. Athletics is a collection of sporting events that involve competitive running, jumping, throwing, and walking. The most common types of athletics competitions are track and field, road running, cross country running, and walking race. Swimming is consistently among the top public recreational activities and in some countries; swimming lessons are a compulsory part of the educational curriculum. As a formalized sport, swimming features in a range of local, national, and international competitions, including every modern Summer Olympics.

Significance of the Study

1. The present study has highlighted the difference of physiological parameters among short distance runner and swimmers.

2. The result of study would be helpful in diagnostic purpose.
3. It would help to motivate the players to improve their required physiological as well as physical fitness component.
4. The knowledge of the health related physical fitness of the players would help the teacher of physical education to design and plan their training and other curriculum programmers' accordingly.

Objectives of Study

To compare physiological and physical fitness component between sprinters and short distance swimmers.

Hypothesis

1. The researcher hypothesized that the selected physiological parameters of swimmers would be better than athletes.
2. It was also hypothesized that there would be better physical fitness parameters of athletes than swimmers

3. METHODOLOGY

Sources of data

Required data to examine the test were collected from Degree College of Physical Education, Amravati.

Selection of the subjects

1. For the study the subject were selected from Amravati and Degree College of Physical Education, Amravati. Ten (10) swimmers and ten (10) athletes were selected from Maharashtra and Degree College of Physical Education, Amravati. Age was ranging from 18 to 25.

Sampling procedure

Simple random sampling method was adopted for selection of subjects.

Criterion Measures

1). To Test Vital-Capacity:

Instrument- Wet- Spirometer

Aim- To measure the vital capacity (maximum expiration) of swimmers and athletes

Test Administration- The subject is asked to stand near the spirometer. Demonstration is given by the tester. The subject will put the blowing pipe of the spirometer in his mouth and will inhale to the maximum and exhale through mouth to the full extends within 5 seconds. The meter of the spirometer will show the reading of the exhalation in units of liter which will be the score of the vital capacity of individual.

2) **To Test Resting Pulse Rate Instrument-**Pulse-Oximeter

Aim- To measure the pulse rate of swimmers and athletes

Test Administration- The subject is asked to stand near the Pulse Oximeter. Demonstration is given by the tester. Pulse oximeter will be fixed into the fingers of the subject and the subject will be asked to sit on chair in normal pose. The meter will show the reading of the pulse of the individual (Pulse rate). The reading will be noted as the score of the pulse rate count.

3) *To Test- Saturated Oxygen Level Instrument- PulseOximeter*

Aim- To measure the Spo₂ of swimmers and athletes

Test Administration- The subject is asked to stand near the Pulse Oximeter. Demonstration is given by the tester. Pulse oximeter will be fixed into the fingers of the subject and the subject will be asked to sit on chair in normal pose. The meter will show the reading of the Spo₂ of the individual). The reading will be noted as the score of the Spo₂count.

3) *Name of test- Harvard StepTest*

Instrument- Harvard step table, metronome, stopwatch

Aim- To measure the cardiovascular endurance of the swimmers and athletes

Test Administration- First of all the demo of stepping up and down must be given to the individual in the height of the bench 20 inch. When the subject stands near the bench the signal “go” is given and timing is started. The metronome was started to provide the rhythm of 30 times per minutes for 5 minutes. After completion of 5 minutes “stop” command will be given

Scoring: After the command “stop” let the subject allow sitting on bench and check the pulse, exactly one minutes after the exercise.

4) *To Test- Flexibility of Individuals Instrument-Flexometer*

Aim- To measure the flexibility of swimmers and athletes

Test Administration- The subject is asked to sit near the flexometer with extended leg. Folding of the legs are not allowed from the knees. The subject will form overlapping position from the arms and will bend forward and will place his arms on the sit and reach table. The maximum distance covered by the individual will be marked as the final point

Scoring- The distance between the initial point from the foot to the final point will be considered as the score. The reading will be in unit of inch.

5) *Test- Fat%*

Instrument- Skin Fold Caliper

Aim- To measure the fat% of swimmers and athletes

Test Administration- The subject will be asked to stand simply in anatomical position and the tester will measure the fat percentage with the help of skin fold caliper from three different points of the body which are abdomen, biceps, and thigh.

Scoring- The measurement shown on the skin fold caliper will be the score of the test

6) *To Test LegStrength.*

Equipment required: Leg dynamometer.

Purpose: This test measures back and leg strength.

Procedure: Make sure the dial is reset to zero before you start. Stand upright on the base of the dynamometer with your feet shoulder width apart. Let your arms hang straight down to hold the center of the bar with both hands, and with the palms facing toward the body. Adjust the chain so that the knees are bent at approximately 110 degrees. In this position your back should be bent slightly forward at the hips, your head should be held upright, and you should look straight ahead. Then without bending your back, pull as hard as possible on the chain and try to straighten your legs, keeping your arms straight. Pull against the weight steadily

(no jerky movements), keeping the feet flat on the base of the dynamometer. Maximum performance will result when your legs are almost straight at the end of the lift. If not, adjust the chain length and starting position.

Scoring: Read the result from the dynamometer

Collection of Data

The necessary scores refers to the examination were collected and before the administration of test, clear instruction was made to all the subjects about the test.

Analysis of Data

The data pertaining to study were examined statistically by applying independent t-test in order to resolve the significance of difference if any. The level of significance to test the hypothesis was set at .05.

Table-1

Description of Mean, Standard Deviation, Mean Difference and t-Ratio Data Analysis on the Following Physiological and Physical Fitness Variables Of Group Showing Significant Value

VARIABLE	MEAN OF		STANDARD DEVIATION OF		MEAN DIFFERENCE	STANDARD ERROR OF MEAN DIFFERENCE	T-RATIO
	SWIMMERS	ATHLETES	SWIMMERS	ATHLETES			
Spirometer	3.178	3.71	0.45	0.48	0.532	0.207	2.57*
Flexometer	1.686	14.103	6.41	6.222	12.414	2.824	4.395*
Dynamometer	115.5	137.1	16.36	12.58	22.6	6.526	3.463*
Harvard step	95.55	85.868	8.05	9.373	9.69	3.907	2.48*

SkinFold(Thigh)	15.7	9.8	6.34	4.512	5.9	2.46	2.398*
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*Significant at .05 level

Tabulated $t_{.05(9)} = 1.833$

It is quite comprehensive from the above findings that spirometer ($t=2.57$), flexibility ($t=4.395$), leg strength ($t=3.463$), cardiovascular endurance ($t=2.48$) and fat% thigh ($t=2.398$) are greater than the tabulated t-value of 1.833 at .05 level for the 9 degree of freedom which indicates that the difference between swimmers and athlete's physiological and physical fitness variables. It is also understood from the above findings that there is no significant difference between swimmers and athlete's physiological and physical fitness variables of resting pulse rate ($t=0.752$), SPO2 ($t=1.372$), Fat% Abdomen ($t=0.897$) Fat% Biceps ($t=0.68$), because all the obtained t-values are less than that of required tabulated t-values of 1.833 at .05 level for the 9 degree of freedom. Mean Comparison has been shown graphically in Fig.1

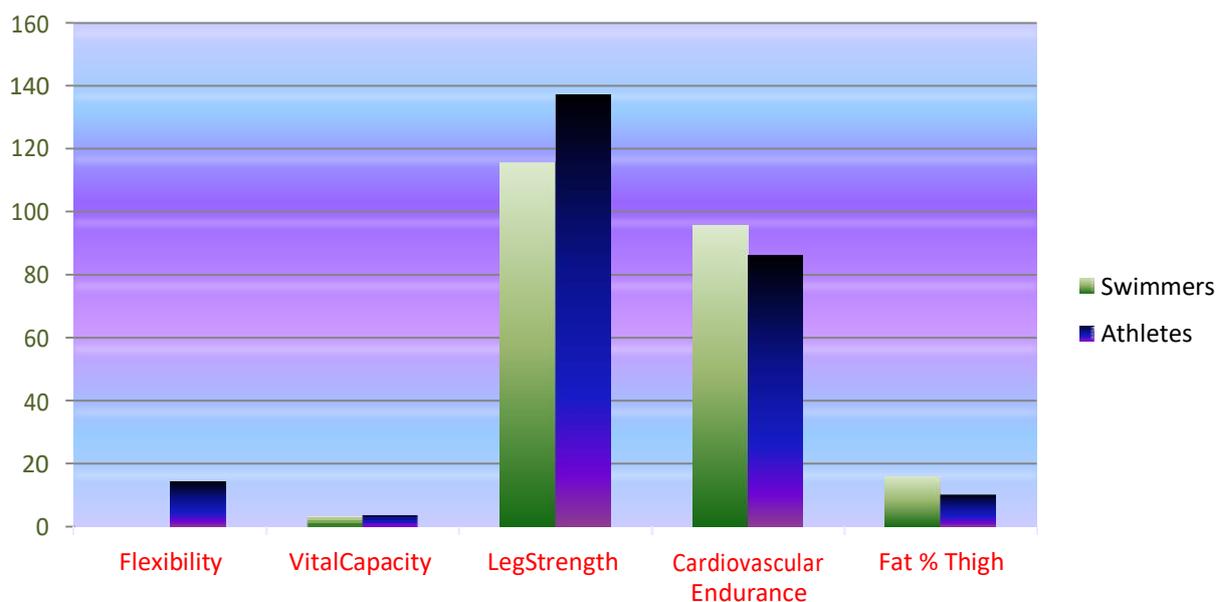


Fig. 1 – Difference between selected physiological and physical fitness variables Mean of swimmers and athletes

Table - 2
Description Of Mean, Standard Deviation, Mean Difference And t-Ratio Data Analysis On The Following Physiological And Physical Fitness Variables OfGroup Which Shows Not Significant Value.

VARIABLE	MEAN OF	RD DAVIATION OF	MEAN DIFFEREN CE	STANDAR D ERROR OF MEAN DIFFEREN CE	T- RATIO		
-----	SWIMME RS	ATHL ETES	SWIMMERS	ATHLET ES	-----	-----	
Resting pulse rate	72.8	70.60	7.85	4.882	2.2	2.923	0.752
SPO2	97.2	96.8	0.6	0.707	0.4	0.291	1.372
Skin Fold (abdomen)	11.5	9.6	5.40	3.953	1.9	2.116	0.897
SkinFold(Biceps)	5.7	5.1	2.36	1.496	0.6	0.882	0.68

@ Not significant at .05 level

Tabulated $t_{.05(9)} = 1.833$

Findings of the above table indicate that there is no significant difference between the swimmers and athlete's physiological and physical fitness variables means of resting pulse rate ($t=0.752$), SPO2 ($t=1.372$), Fat% Abdomen ($t=0.897$), and Fat% Biceps ($t=0.68$) because all the above mentioned calculated t-values are lower than the tabulated t-value of 1.833 at .05 level for the 9 (nine) degree of freedom. Comparison of means has been graphically presented in Fig.2.

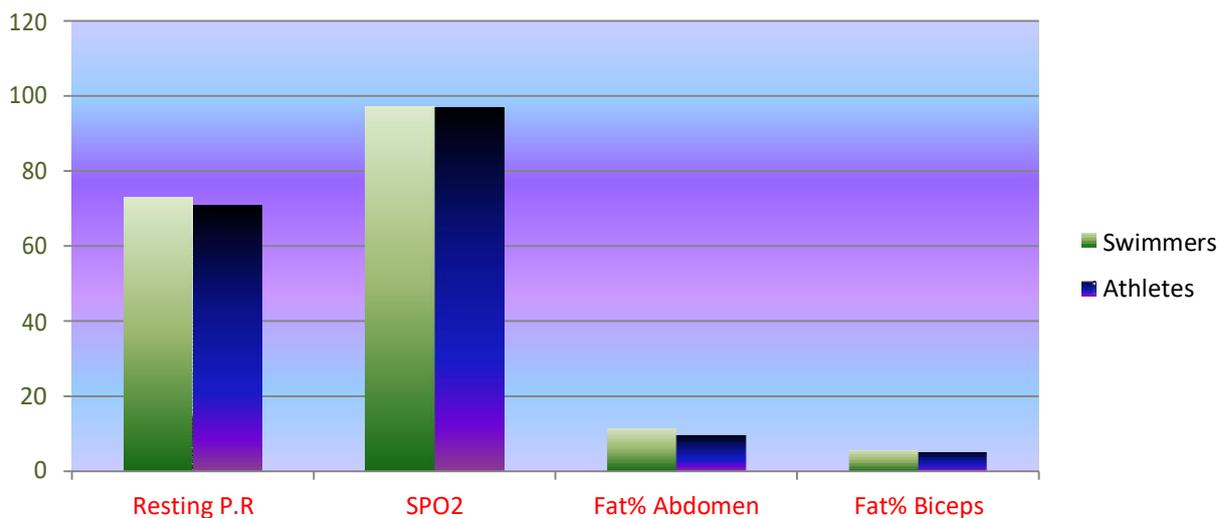


Fig. 2– Difference between selected physiological and physical fitness variables Mean of swimmers and athletes.

Discussion of findings

On the basis of findings from Table 1 & 2 it is understood that there was significant difference observed in physiological and physical fitness variables on flexibility, vital capacity, cardiovascular endurance, leg strength and fat% of thigh of swimmers and athletes whereas insignificant difference was found on resting pulse rate, SPO₂ and fat% of abdomen of the same group.

Discussion of hypothesis

In the beginning of the study it was hypothesized that there would be significant difference in the selected physiological parameters between athletes and swimmers. The result revealed that the selected physiological parameters i.e. resting pulse rate and SPO₂ there was no significant difference observed between athletes and swimmers but in case of vital capacity the athletes shows significant difference. Hence the hypothesis stated earlier is rejected in all the selected physiological parameters. It was also hypothesized that the selected physical fitness parameters i.e. flexibility, fat% and maximum strength, significant difference was observed therefore the hypothesis stated earlier is accepted. In case of cardiovascular endurance insignificant difference was observed which means swimmers were showing better cardiovascular endurance. Therefore, the hypothesis stated earlier is rejected.

4. CONCLUSIONS

Within the limitations of the present study and on the basis of the test following conclusions are drawn:

- 1) Subjects have shown significant difference in vital capacity, flexibility, maximum strength, cardiovascular endurance and in thigh fat %.
- 2) Subjects have shown non-significant difference in resting pulse rate, SPO₂ and in abdomen and biceps fat%.
- 3) Swimmers need practice for improving their flexibility level which can further help in performance.

- 4) Swimmers need practice for improving their vital capacity which can further help in performance.

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