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COMPARISON BETWEEN SELECTED PHYSIOLOGICAL AND PHYSICAL FITNESS VARIABLES AMONG SWIMMERS, ATHLETES AND SEDENTARY PEOPLE

Mahendra Kumar Singh And Arvind Bahadur Singh

Abstract: Today modernization has made human life easier as most of the work is performed by the machines. The sedentary life style of man has reduced the efficiency of humans. The less working capacity of humans has caused many problems like weakness, illness, chronic diseases, etc. In past our ancestors were quite healthy and fit. The big reason was that they had to perform a lot of hard physical activity like running, walking, jumping etc. The level of physical fitness varies from person to person. It depends upon the nature of work, size, shape, structure, age, sex and adaptability of an individual. Different games require different levels of physical fitness depending upon the type of activity, event, games and sports. Physical fitness requires efficient motor mechanism (movement of body), efficient organic mechanism (physiological functioning) and efficient mental functioning (psychological set-up).

Sixty subjects were selected from different Sports Club, Sports Academy and Shopkeeper from Bilaspur District, Chhattisgarh as sources of data. The purposive sampling method was applied to select 20 swimmers, 20 athletes and 20 Sedentary People for this study. The physiological variables were Hemoglobin percentage, Pulse Rate and Exhale capacity and Physical fitness variable were Arm and Shoulder Strength, Abdominal Strength, Explosive Strength, Agility, Endurance and Speed for this study. Result showed that there is significant difference in exhale capacity, Physical Fitness except hemoglobin percentage of swimmers, athlete and sedentary subjects.

Key words: Physiological, Physical Fitness, Athletes, modernization.

INTRODUCTION:

Today modernization has made human life easier, as most of the work is performed by the machines. The sedentary life style of man has reduced the efficiency of humans. The less working capacity of humans has caused many problems like weakness, illness, chronic diseases, etc. In past our ancestors were quite healthy and fit. The big reason was that, they had to perform a lot of hard physical activity, like running, walking, jumping etc. The environment in past was less polluted. Moreover, they had less stresses in their life. It is all opposite now a days, i.e., physical activity is less, environment is polluted, unhygienic conditions exist all around, life is full of stresses, unbalanced diet etc. All these factors have reduced the efficiency of humans. Today, we desperately require physical fitness not only to improve our abilities but also to improve our health and wellness. This will also help to develop healthy environment around us along with community health, thus nation will be benefited.

Man is said to be the 'man of action'. It is the pride of the nation that a healthy and fit society also fulfills the W.H.O. objective. "Live most and serve best". By means of physical fitness programmer performance of games and sports is also improved. Every country is struggling hard for the apex position in games and sports. To achieve this top

position every effort is made. The scientific and systematic ways of training are followed to improve the standards of physical fitness, so that the best result could be achieved. Apart from this, a healthy living also makes a person a good citizen. One has rightly said "Physical fitness is one's richest possession; it cannot be purchased but it has to be earned through daily routine of physical exercises."

The level of physical fitness varies from person to person. It depends upon the nature of work, size, shape, structure, age, sex and adaptability of an individual. Different games require different levels of physical fitness depending upon the type of activity, event, game and sports. Physical fitness requires efficient motor mechanism (movement of body), efficient organic mechanism (physiological functioning) and efficient mental functioning (psychological set-up).

Hypothesis: It was hypothesized that there would be significant difference in some Physiological Variables and Physical Fitness of Swimmers, Athletes and Sedentary People.

METHODOLOGY

Sixty subjects were selected from different Sports Club, Sports Academy and Shopkeeper from Bilaspur District, Chhattisgarh as sources of data. The purposive

sampling method was applied to select 20 swimmers, 20 athletes and 20 Sedentary People for this study.

Criterion Measures:

The Hemoglobin was measured by using Shali's Haemometer in gm/100ml, Exhale capacity was measured by using Peak Flow Meter in Liters and blood pressure was measured by using Sphygmomanometer in mm Hg and Physical Fitness was measured by using Indiana fitness Test. For testing the hypothesis the level of significance was set at 0.05 level of confidence. The physiological variable and Physical Fitness Variable were :

Physiological variables:

- 1. Hemoglobin 2. Pulse Rate 3. Exhale capacity

Physical fitness variables:

- 1. Arm and Shoulder Strength 2. Abdominal Strength
- 3. Explosive Strength 4. Agility
- 5. Endurance 5. Speed

FINDINGS AND DISCUSSION

The results are showed in tables and discussed as follows:

Table 1
Mean Value of Hemoglobin Percentage of Swimmers, Athletes and Sedentary Subjects

Name of the Group	Mean
Swimmers	13.95
Athletes	13.55
Sedentary	13.6

As shown in Table 1 the mean value of swimmer, athletes and sedentary subjects were 13.95, 13.55 and 13.6 respectively. To find the mean difference F test was applied as indicated in Table 2.

Table 2
ANOVA Table Showing Mean difference of Swimmers, Athletes and Sedentary Subjects

Source of Variance	df	Sum Squares	Mean Variance	F Calculated	F Tabulated
Between Groups	K-1 3-1=2	1.8994	0.9497		
Within Groups	N-K 60-3=57	114.7002	2.0123	0.4720	3.15

F at 2 & 52 degree of freedom at 0.05 Level of Significance is 3.15.

Table -2 reveals that there is significant difference between the means of Swimmers, Athletes and Sedentary subjects of Hemoglobin percentage. Calculated F (0.4720) is less than the Tabulated F (3.15) which is insignificant. Therefore post hoc test was not required.

Table 3
Post Hoc Table Showing Mean Difference of Hemoglobin Percentage of Swimmers, Athlete and Sedentary Subjects

Group	Mean	Group	Mean	Mean Diff.	Cri. Diff.
Swimmers	13.9500	Athletes	13.5500	0.4000	1.1259
Swimmers	13.9500	Sedentary	13.6000	0.3500	1.1259
Athletes	13.5500	Sedentary	13.6000	0.0500	1.1259

Table- 3 shows the mean difference between Swimmers, Athletes and Sedentary Subjects .The mean value of swimmers was 13.9500 and the mean value of athletes was 13.55. The mean difference between swimmers and Athlete subjects was 0.4000 which is less than critical difference i.e., 1.1259. This shows no significant difference. The mean value of swimmers is 13.95 and the mean value sedentary is 13.60. The mean difference between swimmers and sedentary is 0.3500 which is less than critical difference. Where as critical difference is 1.1259. This indicates no significant difference. The mean value of Athletes is 13.5500 and the mean value sedentary is 13.6000. The mean difference between Athletes and sedentary is 0.0500 which is less than critical difference. Where as critical difference is 1.1259 this again show no significant difference.

Graph 1
A Graph Showing Mean Difference of Swimmers, Athletes and Sedentary People in Hemoglobin Percentage

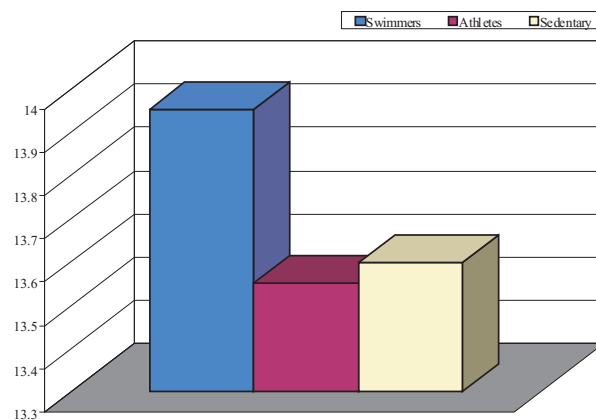


Table 4
Mean value of Pulse Rate of Swimmers, Athletes and Sedentary Subjects

Name of Group	Mean
Swimmers	73.4
Athletes	74.95
Sedentary	78.4

Table 4 shows the mean value of various groups in the Pulse Rate. The mean value of swimmer is 73.4 , mean value of athlete is 74.95 and mean value of sedentary subjects is 78.4 To find the mean difference F test was applied .The next following table shows the mean difference obtain by applying F test .

Table 5
ANOVA Table showing Mean difference of Swimmers, Athletes and sedentary Subject

Source of Variance	Df	Sum of Squares	Mean Variance	F Calculated	F Tabulated
Between Groups	K-1 3-1=2	262.0313	131.0156		
Within Groups	N-K 60-3=57	1406.5630	24.6765	5.3093	3.15

F at 2 & 52 degree of freedom at 0.05 level of significance is 3.15

Table -5 reveals that there is significant difference between the means of Swimmers, Athletes and Sedentary Subjects in the variable Pulse Rate. Calculated F 5.3093 is greater than the Tabulated F 3.15 which indicates significant relationship of Swimmers, Athletes in the variable Pulse Rate. Therefore; post hoc test was not required.

Table 6
Post Hoc Table Showing Mean Difference of Exhale Capacity of Swimmers, Athlete and Sedentary Subjects

Group	Mean	Group	Mean	Mean Diff.	Cri. Diff.
Swimmers	73.4000	Athletes	74.9500	1.5500	3.9429
Swimmers	73.4000	Sedentary	78.4000	5.0000	3.9429
Athletes	74.9500	Sedentary	78.4000	3.4500	3.9429

F at 2 & 52 degree of freedom at 0.05 level of significance is 3.15

Table- 6 shows the mean difference between Swimmers, Athletes and Sedentary Subjects .The mean value of swimmers is 73.40 and the mean value of Athletes is 74.950. The mean difference between swimmers and Athlete subjects is 1.55 which is less than critical difference. Where critical difference is 3.94. This shows no significant difference. The mean value of swimmers is 73.400 and the mean value sedentary is 78.40. The mean difference between swimmers and sedentary is 5.00 which is more than critical difference. Where critical difference is 3.94. This shows the significant difference. The mean value of athletes is 74.950 and the mean value sedentary is 78.40. The mean difference between athletes and sedentary is 5.00 which is more than critical difference. Where critical difference is 3.450. This shows no significant difference.

Graph 2
A Graph Showing Mean Difference of Swimmers, Athletes and Sedentary People in Pulse Rate

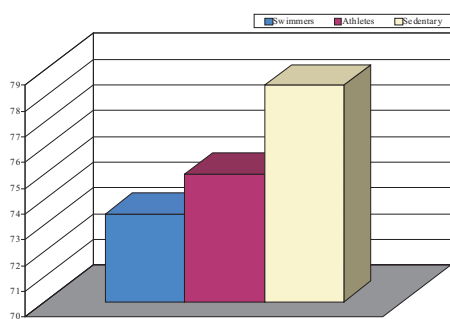


Table 7
Mean Value of Exhale Capacity of Swimmers, Athletes and Sedentary Subjects

Name of Group	Mean
Swimmer	419.50
Athletes	364.50
Sedentary	346.00

Table 7 Shows the mean value of the various groups in the exhale capacity .The mean value of swimmer is 419.50, mean value of athlete is 364.50 and mean value of sedentary subjects is 346.00 .To find the mean difference F test was applied .The following table shows the mean difference obtain by applying F test .

Table 8
ANOVA Table Showing Mean Difference of Swimmers, Athletes and Sedentary Subjects

Source of Variance	df	Sum of Squares	Mean Variance	F Calculated	F Tabulated
Between Groups	K-1 3-1=2	58463.0000	29231.5000		
Within Groups	N-K 60-3=57	89470.0000	1569.6490	18.6230	3.15

F at 2 and 52 degree of freedom at 0.05 level of significance is 3.15.

Table-8 reveals that there is significant difference between the means of swimmers ,athletes and sedentary subjects of Exhale Capacity .The Calculated F (18.6230) is greater than the Tabulated F (3.15) which shows significant in Swimmers, Athletes Subjects of Exhale capacity .Therefore post hoc test was not required.

Table 9
Post Hoc Table Showing Mean Difference of Exhale Capacity of Swimmers, Athlete And Sedentary Subjects

Group	Mean	Group	Mean	Mean Diff.	Cri. Diff.
Swimmers	419.5000	Athletes	364.0000	55.0000	31.4465
Swimmers	419.5000	Sedentary	346.0000	73.5000	31.4465
Athletes	364.0000	Sedentary	346.0000	18.5000	31.4465

F at 2 & 52 degree of freedom at 0.05 level of significance is 3.15

Table 9 shows the mean difference between swimmers, athletes and sedentary subject's .The mean value of swimmers is 419.50 and the mean value of athletes is 364.00. The mean difference between swimmers and athlete subjects is 55.00 which is greater than critical difference. Where critical difference is 31.44. This shows significant difference. The mean value of swimmers is 419.500 and the mean value sedentary is 346.00. The mean difference between swimmers and sedentary is 73.50 which is more than critical difference. Where critical difference is 31.44 this indicates the significant difference. The mean value of athletes is 364.00 and the mean value sedentary is 346.00. The mean difference between athletes and sedentary is 18.50 which is more than critical difference (31.44) and this shows no significant difference.

Graph 3A
Graph Showing Mean Difference of Swimmers, Athletes and Sedentary People in Exhale Capacity

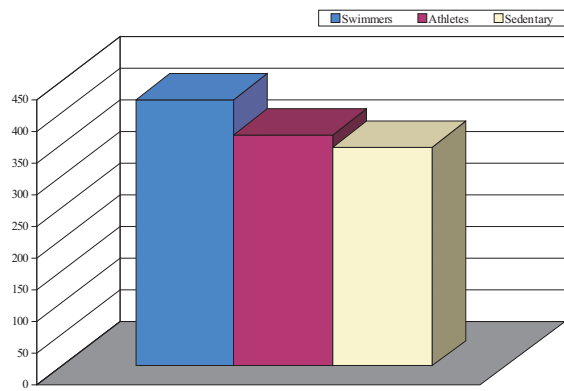


Table 10
Mean Value of Physical Fitness of Swimmers, Athletes and Sedentary subjects

Name of the Group	Mean
Swimmers	37.5000
Athletes	30.5000
Sedentary	18.2500

Table 10 shows the mean value of the various groups in the physical fitness. The mean value of swimmer subjects is 37.500; mean value of athlete subjects is 30.5000 and mean value of sedentary subjects is 18.50. To find the mean difference F test was applied. The following table shows the mean difference obtain by applying F test.

Table 11
ANOVA Table showing Mean difference of Swimmers, Athletes and sedentary Subjects

Source of Variance	Df	Sum of Squares	Mean Variance	F Calculated	F Tabulated
Between Groups	K-1 3-1=2	3797.500	1898.7500		
Within Groups	N-K 60-3=57	4683.7500	82.1711	23.1073	3.15

F at 2 & 52 degree of freedom at 0.05 level of significance is 3.15

Table 11 reveals that there is significant difference between the means of Swimmers, Athletes and Sedentary Subjects in Physical fitness. The Calculated F 23.1073 is greater than the Tabulated F 3.15 which shows the significant difference in Swimmers, Athletes and Sedentary Subjects of Physical fitness.

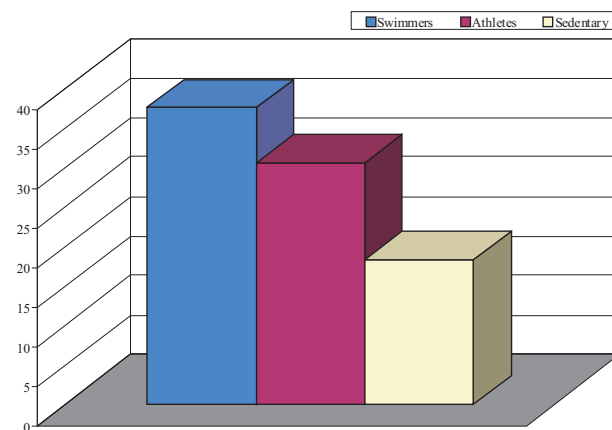
Table 12
Post Hoc Table Showing Mean Difference of Physical fitness of Swimmers, Athlete and Sedentary subjects

Group	Mean	Group	Mean	Mean Diff.	Cri. Diff.
Swimmers	37.500	Athletes	30.500	7.000	7.1950
Swimmers	37.500	Sedentary	18.25	19.250	7.1950
Athletes	30.500	Sedentary	18.25	12.250	7.1950

F at 2 and 52 degree of freedom at 0.05 level of significance is 3.15

Table 12 shows the mean difference between swimmers, athletes and sedentary subjects. The mean value of swimmers is 37.500 and the mean value of athletes is 30.50. The mean difference between swimmers and athlete subjects is 7.000 which is less than critical difference 7.1950. This shows no significant difference in swimmers and athletes in physical fitness. The mean value of swimmers is 37.700 and the mean value sedentary is 18.25. The mean difference between swimmers and sedentary is 19.25 which is more than critical difference. Where as critical difference is 71.950 this show the significant difference in physical fitness of swimmers and sedentary subjects. The mean value of athletes is 30.500 and the mean value sedentary is 18.25. The mean difference between swimmers and sedentary is 12.25 which is more than critical difference. Where as critical difference is 71.950 this show the significant difference in athletes and sedentary subjects.

Graph 4
A Graph Showing Mean Difference of Swimmers, Athletes and Sedentary People in Physical Fitness.



JUSTIFICATION OF HYPOTHESIS:

In the beginning it was hypothesized that there may be significant difference between some physiological variables and physical fitness of swimmers, athletes and sedentary people. But after analysis and interpretation of data by applying F test it showed significant difference in some physiological variables and physical fitness of swimmers, athletes and sedentary peoples. Hence, the hypothesis was accepted.

CONCLUSION:

On the basis of finding and within the limitation of present study the following conclusions are drawn:
· There was no significant difference in hemoglobin

percentage of swimmers athlete and sedentary subjects.
There was significant difference in pulse rate of swimmers athlete and sedentary subjects
There was a significant difference in exhale capacity of swimmers athlete and sedentary subjects.
There was significant difference in physical fitness of swimmers athlete and sedentary subjects.

RECOMMENDATIONS:

The following Recommendations are made on the basis of the results from the study which may be useful for the future research work.

The study may be repeated to other physiological and physical fitness variables on the same subjects.

The study may be repeated to other physiological and physical fitness variables on different parameters.

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