



A COMPARATIVE STUDY OF PHYSIOLOGICAL PARAMETERS OF SCHOOL LEVEL SWIMMERS

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ABSTRACT

The purpose of the present study was to investigate and compare the Effect of Swimming Training on Cardio-Pulmonary Index of School Going Students. For the present study, researcher selected 40 male swimmers from Govt. Model Senior Secondary School, Port Blair, A & N Island. The age of the subjects were varied from 14 to 16 years. The Resting pulse rate, Maximum breath holding time , Systolic blood pressure, Diastolic blood pressure , Vital capacity and Maximum expiratory pressure were selected. To assess the physiological parameters of male competitive and recreational swimmers: mean, standard deviation and t-ratio were computed. Cardio-pulmonary index (CPI) was calculated by Hyman formula - $C.P.I = V.C + M.B.H + M.E.P + Age / S.P. + D.P. + P.R.$ The results of the study concluded that competitive and recreational Male swimmers did not differ significantly on age, pulse rate, systolic blood pressure exerted in arteries, maximum expiratory pressure, and maximum breathing holds parameters of human physiology. Competitive male swimmers were found higher in age, greater amount of pulse rate, blood pressure and maximum respiratory pressure than their counter parts. Recreational Male swimmers had greater amount of maximum breath hold capacity, vital capacity and CPI than did male competitive swimmers.

Keynotes: Male, Swimming, competitive, recreational, Physiological Parameters

INTRODUCTION

Now a day's sport is a wide term which includes games athletics, swimming, sports are generally individualistic, games are team activities where the movement of the body change from one games like football, hockey etc in these games all of a sudden they require more elaborate organization and strategies based in these competition.

The innovation of 'modern age swimming' started from 1896 when it was came in 'Olympic sports' in Athens and since it has been organized in every fourth year, and thus began the official start of modern sports of swimming with suitable measurements of pools i.e. (50m in length and 20m in breadth) with proper maintenance and providing proper officials It was Baron-de-Coubertin's determination and organizational genius, who gave full flow to the modern Olympic movement. Modern swimming includes fitness, recreational and sport swimming such as in Olympics, as well as in Asian games. Soon it was started in schools, colleges, universities and in other private sectors to teach the students and people how to swim by the help of qualified teachers and coaches in proper manner.

Many researchers had conducted study on physical, physiological and anthropometric aspects of swimmers. Certain flexibility measures were significantly related to swimming time (Scott, 2005). Treading water was best related with their body height (Carlin, 2006). Foot length and biceps size as the most consistent physical measures. Each was found significant in at least one analysis for each stroke. In each case longer feet were associated with slower times and larger biceps were associates with faster times (Sprague, 2004). Significant relationship was not found between the swimming success and selected variables i.e. height, weight, upper-arm length, lower arm length torso length, bust height, arm spare chest normal, chest expanded chest deflated and foot area, body surface area ankle flexion and hip flexion (Albrecht , 2009). Shoulder rotation, should extension strength, hip extension strength and body compositions were not significant factors in the performance of crawl stroke. A significant relationship was indicated between swimming anxiety and the ability to perform the crawl stroke (Crites, 2009). In order to predict the crawl stroke swimming speed ability on the basis of most contributing anthropometric and physiological variables i.e. vital capacity, maximum expiratory pressure, maximum breath holding capacity, peak flow, and pulse rate. arm, leg speed. Regression equation was developed by combining these all variables (Dubey, 2009). Very strong associations were found between exerted forces and swimming performance, when controlling the isolated effect of symmetry index. Results indicates that force asymmetries occur in the majority of the swimmers, and that these asymmetries are most evident in the first cycles of a whole bout. Symmetry index influences the contribution of tethered forces over swimming performance ([Morouco](#) et. al., 2004).

Young swimmers training up to the eleventh years includes primarily teaching of technique. Improvement of basic swimming endurance, reaction time, short-time acceleration, all around co-ordination and flexibility. It should not be forgotten that at this age, the muscular strength of all parts of the body should be uniformly promoted by general strengthening exercise and other sports. The increase in strength at this age is based mainly on improved co-ordination within the individuals muscles. The flexibility of the muscles should also be regularly performed stretching exercise. The purpose of the

present study was to investigate and compare the effect of Swimming Training on Cardio-Pulmonary Index of School Going Students.

METHODOLOGY

Selection of the Subjects:

For the present study, researcher selected 40 male swimmers from Govt. Model Senior Secondary School, Port Blair, A & N Island. The age of the subjects were varied from 14 to 16 years. The 40 Forty school level male swimmers from Govt. Model Senior Secondary School, Port Blair, A & N Island were divided in two equal groups i.e. Competitive Swimmers Group (N=20) and Recreational Swimmers Group (N=20).

Selection of Variables:

The Resting pulse rate, Maximum breath holding time , Systolic blood pressure, Diastolic blood pressure , Vital capacity and Maximum expiratory pressure were selected.

Criterion Measures:

Pulse rate was counted as number of heart beats per minute. Maximum breath holding capacity was taken as the duration in seconds. Systolic pressure was measured by the help of stethoscope and Sphygmomanometer and was recorded nearest full number from the monometer dial in mmHg. Diastolic pressure was measured by the help Stethoscope and Sphygmomanometer and recorded nearest full number from the monometer in mmHg. Vital capacity was measured by the help of Wet Spirometer and recorded in litre/ml from the dial. Maximum expiratory pressure was measured by blow into rubber bulb of Sphygmomanometer in mmHg. The age was recorded in completed years.

Statistical Analysis:

To assess the physiological parameters of male competitive and recreational swimmers: mean, standard deviation and t-ratio were computed. Cardio-pulmonary index (CPI) was calculated by Hyman formula - $C.P.I = V.C + M.B.H + M.E.P + Age / S.P. + D.P. + P.R.$ Significant level was set at .05 level of confidence.

RESULTS AND DISCUSSION

To find out the significance of differences between school level male competitive swimmers and recreational swimmers on selected physiological parameters, mean, standard deviation and t-ratios were computed with the help of SPSS 16.0 software and data pertaining to this has been presented in Table 1 to 8.

TABLE 1
SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF AGE OF COMPETITIVE AND RECREATIONAL MALE SWIMMERS

Variable	Swimmer's Group	Mean	MD	σ DM	t-ratio
CHRONOLOGICAL AGE	Competitive	15.05	0.10	0.26	0.38
	Recreational	14.95			

Insignificant at .05 level $t_{.05}(38) = 2.02$

Table 1 reveals that the male competitive and recreational swimmers did not differ significantly in chronological age , as the obtained t-value of 0.38 was much less than the required value of $t_{.05}(38) = 2.02$. This implies that both the groups are homogeneous with respect to chronological age.

TABLE 2
SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF RESPIRATORY PULSE RATE OF COMPETITIVE AND RECREATIONAL MALE SWIMMERS

Variable	Swimmer's Group	Mean	MD	σ DM	t-ratio
RESPIRATORY PULSE RATE	Competitive	76.70	2.15	2.54	0.85
	Recreational	74.55			

Insignificant at 0.05 level.
 $t_{.05 (38)} = 2.02$

Table 2 reveals that the male competitive and recreational swimmers did not differ significantly in respiratory pulse rate, as the obtained t-value of 0.85 was less than the required value of $t_{.05 (38)} = 2.02$. This implies that both the groups are homogeneous with respect to pulse rate .

TABLE 3
SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF SYSTOLIC BLOOD PRESSURE OF COMPETITIVE AND RECREATIONAL MALE SWIMMERS

Variable	Swimmer's Group	Mean	MD	σ DM	t-ratio
SYSTOLIC BLOOD PRESSURE	Competitive	114.80	3.86	2.94	1.68
	Recreational	111.70			

Insignificant at 0.05 level. $t_{.05 (38)} = 2.02$

Table 3 reveals that the male competitive and recreational swimmers did not differ significantly in respiratory pulse rate, as the obtained t-value of 1.68 was less than the required value of $t_{.05 (38)} = 2.02$. This implies that both the groups are homogeneous with respect to systolic blood pressure .

TABLE 4
SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF DIASTOLIC BLOOD PRESSURE OF COMPETITIVE AND RECREATIONAL MALE SWIMMERS

Variable	Swimmer's Group	Mean	MD	σ DM	t-ratio
DIASTOLIC BLOOD PRESSURE	Competitive	74.60	1.70	0.53	2.04*
	Recreational	72.90			

*Significant at 0.05 level. $t_{.05 (38)} = 2.02$

Table 4 reveals that the male competitive and recreational swimmers differ significantly in diastolic blood pressure , as the obtained t-value of 2.04 was higher than the required value of $t_{.05 (38)} = 2.02$. This implies that both the groups have dissimilarity with respect to diastolic blood pressure .

TABLE 5
SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF MAXIMUM EXPIRATORY PRESSURE OF COMPETITIVE AND RECREATIONAL MALE SWIMMERS

Variable	Swimmer's Group	Mean	MD	σ DM	t-ratio
MAXIMUM EXPIRATORY PRESSURE	Competitive	76.85	2.90	3.80	0.76
	Recreational	73.95			

Insignificant at 0.05 level.

$t_{.05}(38) = 2.02$

Table 5 reveals that the male competitive and recreational swimmers did not differ significantly in maximum expiratory pressure, as the obtained t-value of 0.76 was less than the required value of $t_{.05}(38) = 2.02$. This implies that both the groups are homogeneous with respect to maximum expiratory pressure.

TABLE 6
SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF MAXIMUM BREATHING HOLD OF COMPETITIVE AND RECREATIONAL MALE SWIMMERS

Variable	Swimmer's Group	Mean	MD	σ DM	t-ratio
MAXIMUM BREATHING HOLD	Competitive	34.40	3.86	2.29	1.68
	Recreational	38.26			

Insignificant at 0.05 level.

$t_{.05}(38) = 2.02$

Table 6 reveals that the male competitive and recreational swimmers did not differ significantly in maximum breathing hold, as the obtained t-value of 1.68 was less than the required value of $t_{.05}(38) = 2.02$. This implies that both the groups are homogeneous with respect to maximum breathing hold.

TABLE 7
SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF VITAL CAPACITY OF COMPETITIVE AND RECREATIONAL MALE SWIMMERS

Variable	Swimmer's Group	Mean	MD	σ DM	t-ratio
VITAL CAPACITY	Competitive	18.50	3.05	0.90	3.38
	Recreational	21.55			

*Significant at 0.05 level. $t_{.05}(38) = 2.02$

Table 7 reveals that the male competitive and recreational swimmers differ significantly in vital capacity, as the obtained t-value of 3.38 was higher than the required value of $t_{.05}(38) = 2.02$. This implies that both the groups have dissimilarity with respect to vital capacity.

TABLE 8
SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN SCORES OF CARDIO-RESPIRATORY INDEX OF COMPETITIVE AND RECREATIONAL MALE SWIMMERS

Variable	Swimmer's Group	Mean	MD	σ DM	t-ratio
CARDIO- RESPIRATORY INDEX	Competitive	0.54	0.02	0.022	0.73
	Recreational	0.56			

Insignificant at 0.05 level. $t_{.05}(38) = 2.02$

Table 8 reveals that the male competitive and recreational swimmers did not differ significantly in Cardio-Pulmonary Index, as the obtained t-value of 1.68 was less than the required value of $t_{.05}(38) = 2.02$. This implies that both the groups are homogeneous with respect to Cardio-Pulmonary Index.

DISCUSSION OF HYPOTHESIS

It was hypothesized that there would be significant difference between competitive and recreational male swimmer of school level on physiological parameters is partially accepted, as the significant differences were not observed on chronological age, pulse rate, systolic blood pressure, maximum expiratory pressure, maximum breathing hold, and CPI.

The mean scores on selected physiological parameters of school level male competitive and recreational swimmers belong to Govt. Model Senior Secondary School, Port Blair (A.N.) have been depicted in figure 1 to 7.

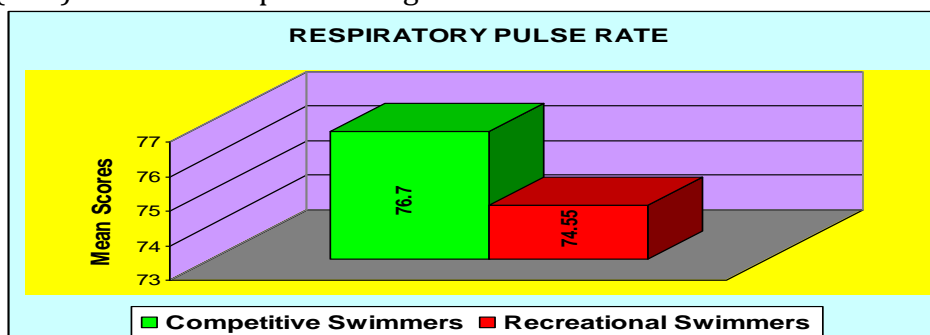


Figure :1- Mean Scores on Pulse rate of competitive and recreational Swimmers

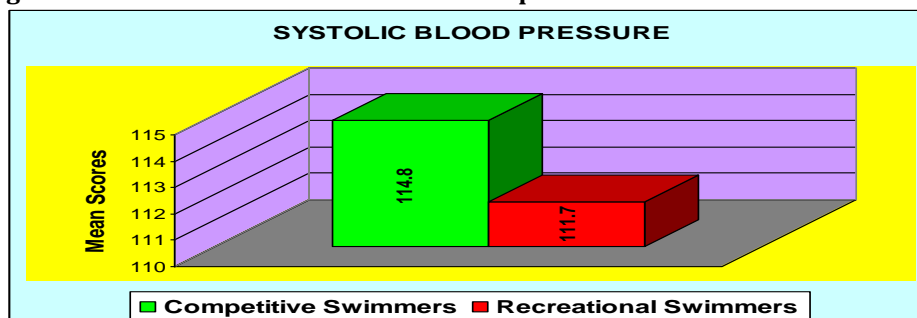


Figure :2- Mean Scores on Systolic Blood Pressure of competitive and recreational Swimmers

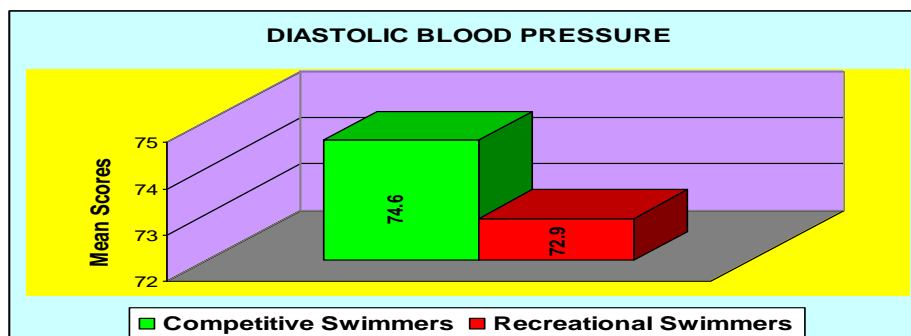


Figure :3- Mean Scores on Diastolic Blood Pressure of competitive and recreational Swimmers

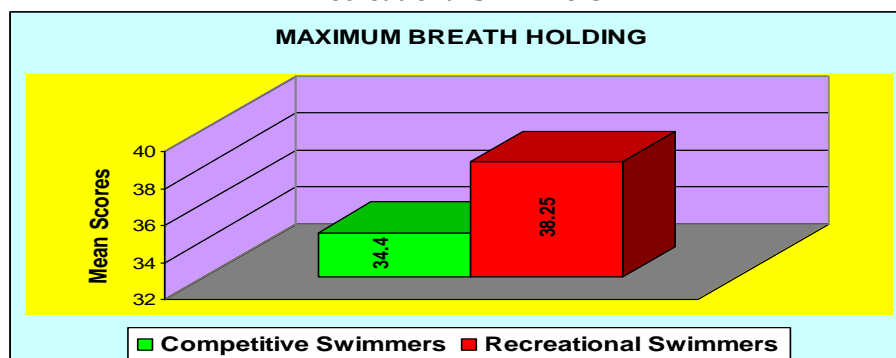


Figure :4- Mean Scores on Maximum Expiratory Pressure of competitive and recreational Swimmers

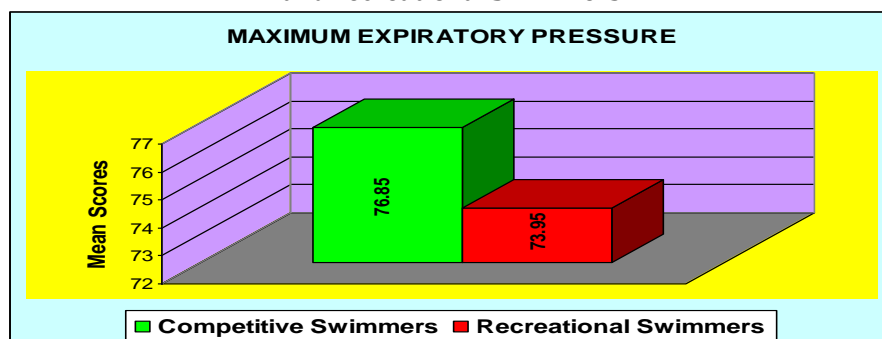


Figure :5- Mean Scores on Maximum Breath Holding of competitive and recreational Swimmers

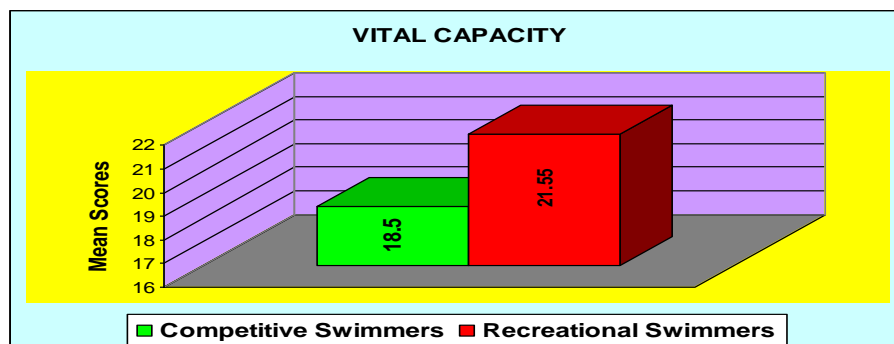


Figure :6- Mean Scores on Vital Capacity of competitive and recreational Swimmers

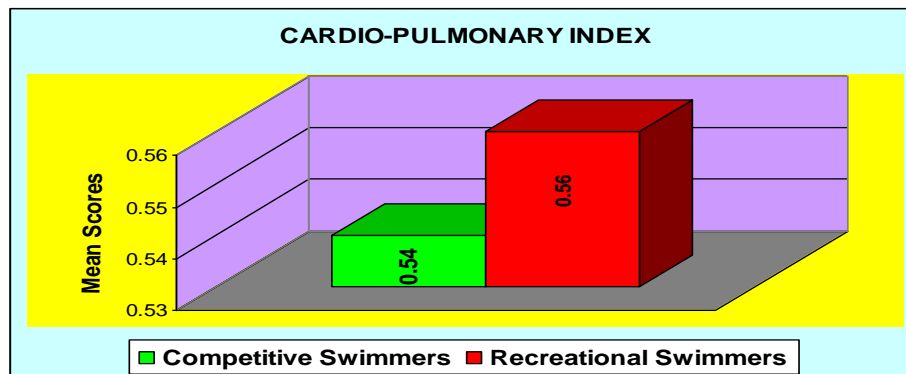


Figure :7- Mean Scores on Cardio-pulmonary Index of competitive and recreational Swimmers

CONCLUSIONS

1. Competitive and recreational Male swimmers did not differ significantly on age, pulse rate, systolic blood pressure exerted in arteries, maximum expiratory pressure, and maximum breathing holds parameters of human physiology.
2. Dissimilarity was observed between competitive and recreational Male swimmers on diastolic blood pressure and vital capacity parameters of human physiology.
3. Competitive male swimmers were found higher in age, greater amount of pulse rate, blood pressure and maximum respiratory pressure than their counter parts.
4. Recreational Male swimmers had greater amount of maximum breath hold capacity, vital capacity and CPI than did male competitive swimmers.

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