



**EFFECT OF CIRCUIT TRAINING AND ENDURANCE TRAINING ON
SELECTED VARIABLES OF SCHOOL OBESE BOYS**

Kandasamy Kuganesan¹ Dr. (Mrs) Bhavani.Ahilan²

Affiliations:

- ¹ Physical Education Teacher, Jaffna Central College, Sri Lanka
- ² Senior Lecturer, Sports Science Unit, University of Jaffna, Sri Lanka

ABSTRACT

The purpose of the study was to examine the effect of circuit and endurance training on selected variables of school obese boys. To achieve this study, the investigator has randomly assigned ninety (N=90) obese school students, age range of the students were between 16 and 18. They were equally divided into three groups such as Endurance Training (ET), Circuit Training (CT) & Control Group (CG) and recruited subjects have undergone 12 weeks of ET & CT. Cycling was considered as Endurance Training and Circuit Training consisted resistance and aerobic training. Control group does not engage any kind of physical activity during this study. Pre test and post test data's were collected from following variables such as Resting Heart Rate (RHR), Body Mass Index (BMI), High Density Lipoprotein (HDL), and VO₂max. T test was administered to find out the significant differences between pre test and post test. ET group had significant differences on all the variables and CT group also had significant differences excepted HDL but Control group does not have any significant level so further ANOVA was used to find out the significant on each variables among groups. There, each variable had significant level of differences among groups. It revealed that ET group had significant level of improvement on RHR, HDL and VO₂max compared to CT and CG but BMI level showed significant level of improvement in ET and CT compare to CG therefore they can consider the endurance training an appropriate and non medication training package to prevent the cardiovascular disease and obesity related disease.

Keywords- Circuit Training, Endurance Training, RHR, BMI, HDL, VO₂max

INTRODUCTION

The prevalence of obesity of adolescence has reached epidemic proportion worldwide (Ogden, et.al.,2006). This epidemic can be observed among boys and girls of all socioeconomic class people. This proportion is high among adolescences and children therefore in future, they may be become obese adults. Institute of Medicine of the National Academies (2005) study showed that these trends have led some observers to predict that the overall adolescence life expectancy may decrease due to the enhancing the prevalence of obesity related disease such as type 2 diabetic, cardiovascular diseases and cancer. Wagner,et.al.,(2005) recent study found that gradually changes have occurred in the health status of adolescence due to wrong lifestyle and food habits. Moreover Matton et.al., (2007) recent study found that physical fitness and involving in physical activity have declined worldwide in the last decades among adolescence therefore obesity proportion has been increasing worldwide.

Sri Lanka is a middle income country used to utilize human physical energy by most population and people are middle income family although obesity proportion is increasing. Deurenberg.et.al. (2002) study stated that South Asian adolescents are having high proportion of body fat and abdominal obesity. It was ensured in global health observatory (Gho, 2012) study showed that Sri Lankan adults overweight and obesity proportion were 25.2% and 9.2% respectively. There is no more research studies conducted in Jaffna district among obese. Jaffna district health department make alarm among adolescence to engage any kind of physical activity to control the non communicable diseases of obese adults. Physical activity is a major modifiable determinant of chronic disease (Physical Activity Guidelines Advisory Committee, 2008). The Australian National Physical Activity Guideline(1999) recommended that at least 30 minutes of moderate intensity of physical activity is good for healthy life.

Obesity is characterized by excess fat storage in adipose tissue which is a major cause for cardiovascular disease. Cardiovascular disease is associated with high blood lipids profile such total cholesterol, low density lipoprotein and triglycerides. Those are major risk factors for coronary heart diseases (Wooten, et.al., 2008). Previous research studies have ensured that high level of blood cholesterol can lead to secondary heart disease (Durrington,et.al.,2003) on other hand high level of high density lipoprotein(HDL) prevent from arthrosclerosis and coronary heart disease(Chapman,2006). Previous studies found that an increased percentage of body fat can predict an increased low density lipoprotein (LDL)(Mosca L,1997). Elevated concentration of LDL is associated with coronary heart disease. Regular exercise is remedy to control the LDL. Regular endurance exercise has raised the plasma HDL cholesterol level (Hardman ,el.al., & Tambalis et al., 1999). Kang and Jung, et.al.,(2003) studies reported that 12 weeks of aerobic exercise significantly increased HDL cholesterol in contrast resistance training showed no significant changes after 8 weeks on lipids profiles (Elliott,et.al.,2002). Benz et.al.(2003) study compared the advantages of resistance and endurance training concluded that aerobic exercise lead to enhance performance and had useful impact on individual susceptible to cardiovascular disease. Endurance exercise with proper intensity and duration are more effective than resistance training in increasing the HDL cholesterol. Sallinen et al.,(2007) showed that chronic resistance training schedules by 21 weeks(80% of 1-RM) don't improve blood lipid profile but muscles strength was improved.

Body mass index (BMI) is used to assess the body fat proportion and lean mass. Increasing the BMI reduces the volume of lungs in obese adolescence thus distribution of body fat should be modified because high BMI lead to negative impact on health related parameters. Obesity developing the thoracic and abdominal fats which are affecting the downward movement of the diaphragm on chest wall therefore $VO_2 \text{ max}$ consumption is affected by obesity. Endurance and resistance training decrease the fat mass and increase total lean mass (Moro,et.al,(2005): Nindl.et.al,(2000)). Broeder (1992)& Kwon(2010) studies proved that resistance training helps to build fat-free mass as well as promoting positive changes in body fat. High intensity Circuit Training (HICT) can be a fast and efficient way to lose excess body weight and body fat (Gibala, 2006; Murphy, 1992). Aerobic training is also the most recommended type of exercise in the treatment of obesity (Paoli, 2010). Previous studies found that significant decreases in body weight, body mass index, abdominal fat in aerobic and resistance groups compared to control group (Sigal et.al, 2007).

An increasing in RHR can be harmful to the heart because it can shorten the diastolic period in the cardiac cycle, decreases coronary flow increasing cardiac workload and promote build up of atherosclerotic plaque (Perski A,1988). Always emphasized to reduction of RHR. Reduction of RHR ensured the improvements of physical fitness especially in cardiovascular system. Cardiovascular fitness is good indicator on RHR range. Moreover endurance exercise decrease activation of the sympathetic nervous system, while rising the activity of the parasympathetic nervous system resulting in dropped RHR (Gielen .et.al,2001). Low RHR is associated with physical fitness, and the RHR can be declined through improving physical fitness (Plasqui,2005). Dashti (2011) recent study found that selected 8 weeks of endurance training significantly changes on RHR.

American college of sports medicine study (2009) found that endurance training had a greater effect on maximum oxygen uptake ($VO_2\text{max}$) and associated cardiopulmonary parameters, which effectively modifies cardiovascular disease risk factor associated with the development of coronary artery disease on other hand that combined exercise may not effect on $VO_2\text{max}$ improvements due to simultaneously resistance and endurance training. Santos, (2011) study found that $VO_2\text{max}$ increased significantly only in the endurance training group after 8 weeks.

Obese adolescence need to select appropriate type of training package which must be possible to obese adolescences therefore cycling is a possible method of training and subjects may involve with enthusiasm further improve better cardio respiratory fitness than other type of exercise and has high compliance for obese boys to prevent from non communicable disease. Circuit exercise is taxing less nature of aerobic to working muscles. So circuit type of exercise may be appropriate to obese subjects to do efficient work moreover circuit type of training improve the muscular efficiency and decrease the fat mass therefore aim of the present study was to examine the effect of endurance and circuit training on health variables among obese school boys. This study hypothesize that endurance training may have positive impact on $VO_2\text{max}$ and HDL on other hand the circuit exercise may have optimistic effect on muscular strength and BMI.

METHODOLOGY

Subjects

The school obese boys, who's followed their studies in Jaffna zonal schools. They were recruited for this study by school advertisement. The random obese subjects were answered a questionnaire, which possesses information about personal data, sports participation, and medical history. Recruited subjects have completed a preliminary medical history, exercise questionnaire and written informed consent from participants and parents. According to questionnaire reports, 17 subjects were excluded from study due to recently surgery, unwillingness, arthritis, physical abnormalities. After the medical screening, each potential subjects were examined by physician specializing in family practice and sports medicine, who excluded 12 subjects from this study due to abnormal heart rate, hypertension and chest pain. Finally ninety one (90) healthy obese school boys were assigned for this study. Assigned subjects were healthy and untrained. They were randomly divided into three groups such as Endurance Training (ET=30), Circuit Training (CT=30) & Control group (CG=30). Subjects age ranges were between 16 and 18 years.

Endurance Training Protocol

Endurance training session started with 5-10 minutes warm up. Participants performed cycling training 3 days (Monday, Wednesday, Friday) per week consecutive for 12 weeks under the guidance of qualified trainee in sports science and supervised by researcher. Subjects used Lumula products gents bicycle. Cycling training performed in free pathway road which don't have traffic jam or rush in certain place. Intensity of cycling training was 50% to 60% until 30 minutes duration. Exercise duration has been increased by 5 minutes in every couple weeks until 12 weeks. Subjects wore Polar Finland monitor (Polar USA, Inc, Woodbury, NY) to measure the heart rates during training. 6 polar Finland tools used in one time for 6 subjects, their heart rate was recorded then replaced other 6 subjects this system followed for entire subjects. To design intensity of aerobic exercise that investigator has used the maximum heart rate secured during maximal graded test. During the test, during the training to assess exercise intensity investigator used Karvonen formula to establish the heart rate reserve (HRR).

Circuit Training Protocol

Circuit training was preceded by 5 to 10 minutes warm up performed 3 alternative days (Tuesday, Thursday, Friday) of a week. Circuit training consisted aerobic and resistance type of exercise. Subjects were taught appropriate circuit training technique. All exercises were fully demonstrated by trainee to subjects of CT group. They attempted some trails before starting the first session of intervention. Ten stations were engaged in one session of circuit, subjects performed 30 second exercise in a station followed 30 second recovery. During exercise the subjects have to complete as many repetitions as possible in 30 second. 5 minutes rest was allotted to subjects after successfully completed one circuit of ten stations. One circuit session started from 25 minutes to lasted 55 minutes.

Statistical Analysis

All the value of selected parameters was expressed as mean and standard deviation. T test was used to find out significant differences between pre test and post of all the variables further Analysis of Variance (ANOVA) test was administered among group to find

out the significant differences. In each case the significant level was chosen at 0.05 levels. All the data was interpreted by using Minitab-14 version of statistical software.

RESULTS

RHR, BMI, HDL&VO₂max were recorded in pre and post test of training, which test means(M), standard deviation(S.D), P values and F values are shown in table I.

TABLE- I

RHR, BMI, HDL&VO₂ MAX DESCRIPTIVE STATIC, F & P VALUES ARE SHOWN

Variables	Type of Group	Pre-test M±SD	Post-test M±SD	T-test P Value	F-Value	P-Value
Resting Heart Rate(RHR)	ETG	80.23±3.99	69.93±3.24	0.000	38.84	0.000
	CTG	80.03±4.98	73.83±4.96	0.000		
	CG	78.70±3.95	79.00±3.57	0.455		
Body Mass Index(BMI)	ETG	36.30±4.25	27.73±3.61	0.000	42.82	0.000
	CTG	38.30±3.33	28.03±4.19	0.000		
	CG	36.90±5.10	37.30±5.61	0.206		
High Density Lipoprotein (HDL)	ETG	23.83±3.51	31.46±5.15	0.000	14.74	0.000
	CTG	26.03±3.59	24.70±6.82	0.374		
	CG	25.16±3.86	25.33±3.49	0.646		
VO ₂ Max	ETG	35.90±3.85	56.13±5.82	0.000	100.5	0.000
	CTG	37.06±3.29	43.40±5.31	0.000		
	CG	37.16±4.77	37.43±4.43	0.368		

TABLE II

RESTING HEART RATE OF INDIVIDUAL 95% CIS MEAN FOR BASED ON POOLED STANDARD DEVIATION

	N	Mean	St.Dev	Individual 95% CIs Mean for Based on Pooled St Dev			
				+	+	+	+
				69.0	72.0	75.0	78.0
ET	30	69.933	3.248	(------*-----)			
CT	30	73.833	4.963	(-----*-----)			
CG	30	79.000	3.572	(-----*-----)			

TABLE III

BODY MASS INDEX OF INDIVIDUAL 95% CIS MEAN FOR BASED ON POOLED STANDARD DEVIATION

	N	Mean	St.Dev	Individual 95% CIs Mean for Based on Pooled St Dev			
				+	+	+	+
				28.0	31.5	35.0	38.5
ET	30	27.733	3.610	(------*-----)			
CT	30	28.033	4.198	(-----*-----)			
CG	30	37.300	5.615	(-----*-----)			

TABLE IV
HIGH DENSITY LIPOPROTEIN OF INDIVIDUAL 95% CIS MEAN FOR BASED ON POOLED STANDARD DEVIATION

	N	Mean	St.Dev	Individual 95% CIs Mean for Based on Pooled St Dev			
				+	+	+	+
				24.0	27.0	30.0	33.0
ET	30	31.467	5.151	(-----*-----)			
CT	30	24.700	6.819	(-----*-----)			
CG	30	25.333	3.497	(-----*-----)			

TABLE V
VO2 MAX OF INDIVIDUAL 95% CIS MEAN FOR BASED ON POOLED STANDARD DEVIATION

	N	Mean	St.Dev	Individual 95% CIs Mean for Based on Pooled St Dev			
				+	+	+	+
				36.0	42.0	48.0	54.0
ET	30	56.133	5.818	(---*-----)			
CT	30	43.400	5.315	(-----*-----)			
CG	30	37.433	4.431	(-----*-----)			

According to this table, significance ($P < 0.05$) differences observed between pre test and post test of ET and CT group, excepted HDL of CT. There were no significant differences between pre and post test of CG. ET (80.23) and CT(80.03) baseline mean of RHR were similar but ET(69.93) and CT(73.83) intervention results were significant difference, which is shown in Table II. Significant level of differences could be observed in BMI parameter between pre and post test of ET and CT. After intervention BMI mean value decreased among ET and CT but there were no significant differences between ET and CT but both(ET&CT) had significant difference compared to CG. HDL of CT does not have significant differences between pre and post test but ET had significant level of differences between pre test and post test, ET had significant level of difference compared to CT and CG.VO₂ max was significant differences between pre and post test of ET and CT. both group had significant differences compared to CG, further significant difference observed between ET and CT in VO₂.max.

DISCUSSION

Resting Heart Rate (RHR) is an important indicator of cardiovascular disease and a powerful marker of cardiovascular health (Palatini, 1997). A low RHR indicates the good health condition. Whereas higher values are apparently related to a higher mortality risk (Greenland, 1999). Exercise and weight reduction are ways to reduce the RHR as well as ET also has reduced heart rate (Iaia,2009; Ricci, 1982; Swank,2010).It was ensured in present study that ET and CT groups BMI level also significantly reduced which significantly decreased the RHR and increased VO₂max capacity. However Table II is showing, there were significant differences between ET &CT.

According to Suzanne Steinbaum (2014) an untrained healthy person average RHR is 50 to 70, in this study that ET had good positive impact on RHR (69.93) after 12 weeks as well as CT group also had significant level of improvement on RHR (73.83) but which is beyond the normal range. According to Harvard Health Publication (2009) heart rate higher than 76 beats per minutes at resting, which may be linked to a higher risk of heart disease and indicate the degree of aerobic condition. Peterson (1988) showed that heart

rate was directly related to the percentage of body fat. There is evidence that elevated resting heart rate (>80-85 beats/min) is directly associated with risk of developing atherosclerosis, hypertension, and plaque disruption leading to various cardiovascular events (Palatini, 2009). Objective of this study is to identify the suitable training package for reducing the heart rate because positive reduction of heart rate, which is highly correlated with VO_2 max improvement if the VO_2 max had significant improvement definitely there should be weight reduction on subjects, it was ensured in present study, the study revealed that weight reduction led to low RHR. On other hand high proportion of body fat is a big barrier to promote the RHR and VO_2 max. Vanderburgh, (1996) & Nevill (1992) studies revealed that negative correlation between body weight and VO_2 per unit of body weight. Welsman (1996) highlighted this relationship ensured that heavier person has lower oxygen uptake and hence, low aerobic condition which increase RHR. Further Table IV is showing that RHR had significant differences among group particularly ET group which had good improvement than CT group, it indicates that low RHR is associated with good cardiovascular fitness and low or lack of cardiovascular fitness is associated with heart disease so obese person or overweight person may have low cardiovascular fitness so this study make alarm that they have to involve endurance activity. Dashti (2011) reported that 8 weeks of selective endurance exercise decreased the RHR.

High BMI value (more than 25) and obesity are highly associated with heart diseases and reduced the life expectancy. Most of the obese adolescences were not born with obese. When they fall into adolescence then BMI proportion dramatically increased. Colditz (1990) study makes alarm that weight is gained after 18 years of age, which increases cardio-vascular risk. BMI is a numerical representation of the weight to height and helps determine the lean tissue to fat ratio in your body. High BMI may affect the heart and respiratory system through its influence on known risk factor like dyslipidemia, hypertension, glucose intolerance, inflammatory marks, obstructive, sleep apnea, hypoventilation and prothrombotic.

Obesity has negative effects on respiratory well being too because which decrease the lung volume. Besides the obesity ensure high fat in abdominal and thoracic fat that affect downward movement of the diaphragm and on chest wall properties. In present study BMI level significantly controlled by ET and CT but range was more than (>25) which stage is not a healthy stage however during 12 weeks significant level was reduced. Based on BMI we can predict recovery rates of exercise. Recovery rate is associated with heart rate and heart rate determines the fitness level. Reduced aerobic fitness and exercise capacity are closely related with the level of cardiopulmonary fitness and commonly observed finding in patients with high body mass index (BMI)(Rowland, 1991;Reybrouck et al., 1997). Despres et al. (1990) & Young et al. (1995) studies ensured that adolescence proved the aerobic fitness is associated with reduction in risk related to later cardiovascular system. Cardiovascular disorder due to obesity result in increased morality from complication such as coronary artery disease, heart failure, arrhythmias and sudden death. Thyagarajan et al. (2008) confirmed that individual with a BMI $\geq 26.4\text{kg/m}^2$ had reduction in force expiratory volume (FEV).There is negative relationship between the overweight and force vital capacity. Thyagarajan (2008) confirmed that who gain more weight they drop in force vital capacity(FVC) and decreased the total lungs capacity too(Saliman(2008);Zerah (1993); Jones (2006) but who is normal weight had significant increment in total lungs capacity compared to those moderate or morbid obesity.

Endurance exercise is mostly proposed for obese to have good effect on physical characters it was confirmed in this study and Choi, Kang (2000) ;Sung et al. (2001) studies which have shown that continuous aerobic exercise can help obese people to lose weight and body fat but obese subjects naturally have poor aerobic condition compared to normal range of BMI (>25). Previous studies recommend that resistance training may offer a more accepted form of training to children and adolescence. This study author agreed with his study because CT had good impact on BMI parameter in this study and no significant differences were observed between CT and ET on BMI parameter.

Lipid profile is one of the signals for cardiovascular disease. It can be maintained by healthy food and exercise, there are five types of lipids available in human body. It is classified as high density of lipoprotein (HDL), low density lipoprotein (LDL), very low density lipoprotein (VLDL), triglyceride (TG) and total cholesterol (TC). Among this cholesterol, the LDL is one of the dangerous substances for cardiovascular disease. There is relationship between LDL and HDL because increasing the HDL decreased the LDL and other cholesterol effect. High levels of HDL cholesterol are an indicator of a healthy cardiovascular system (Carroll 2012). Balas-Nakash et al. (2010) research studies showed that endurance exercise improve the lipid profile than other type of exercise it was confirmed in present study that there were significant differences between ET& CT, CG but there were not any significant level differences between CT and CG. Sallinen, (2007) showed that resistance training does not improve lipids profile due to limited improvements in VO_2 max, which was confirmed in present study that highlighted high VO_2 max has positive correlation with HDL level. Several studies confirmed similar result on endurance exercise which reduced total cholesterol triglyceride, and LDL and increased HDL but resistance training were negative effect on lipids profile (Kelley,2008). Elliott, Sale, & Cable (2002) conducted an 8 week of resistance exercise that showed no significant improvement on lipid profile.

Després (1991) confirmed that regular endurance exercise is a widely recognized modality to raise HDL cholesterol level. Low HDL is independent risk factor for cardiovascular disease. It was proved in Franceschini, (2001)& Boden (2000) studies which expressed the low blood levels of High Density Lipoprotein cholesterol (HDL-C) are independent risk factor for CVD. Some studies proved that reducing the abdominal fat which improves the HDL cholesterol. Kokkinos (1991) study ensured that strength type of exercise result were no beneficial changes in lipids profile. According to several research studies that lipids profile changes are depend on length of exercise it was confirmed in kikkinos (1995) study which proved the significant level of HDL improvement could be observed whose average run 7 to 10 miles per week further he reported that better HDL improvement could be observed on weekly mileage than exercise intensity further it proves that VO_2 max and HDL have significant level of correlation. Increased exercise practice, particularly endurance exercise, has been considered one of the best non-pharmacological strategies in preventing and treating cardiovascular disease. In present study the HDL level had significant level of differences between ET and CT due to cardiovascular capacity. It is now fairly well recognized that endurance exercise training can increase plasma HDL cholesterol (Durstine, 1994). Another finding proved that trained endurance athletes have higher HDL_C values compared to sedentary population (Haskell, 1984).

VO₂max is one of the important indices to assess the obese cardio vascular fitness because low cardiovascular fitness may lead to cardiovascular disease. Low cardiovascular fitness may be linked with high proportion of body fat or BMI. Chatterjee, et.al., (2005) studies also proved that high proportion of fat deposit decreased the VO₂ max improvement and withdrawal of fat proportion increased the VO₂ max (Bandyopadhyay, et.al., 2003) it could be observed in present study that BMI proportion was reduced by ET & CT and those group significantly improved VO₂max. Heyward, V (1998) & Jump up Guyton, (2011) recommend that untrained healthy male will have VO₂max approximately 40mL/(kg·min). According to appendix- D ET & CT group of VO₂max is under healthy stage but significant differences can be observed between ET and CT group. It is unclear because BMI level does not have significant differences between ET and CT but VO₂max level contrast further research is necessary. Some investigators found that type of training may be influenced on VO₂max. Hill et. al., (2007) & Tomassoni et al., (1985) studies found that improving body composition, BMI and muscles mass by training which proved improvement on VO₂max.

CONCLUSION

Obesity leads to many non communicable disease therefore appropriate of exercise may prevent from the diseases. Endurance and circuit training are one of effective packages on health variables. Endurance training has been greater impact on all the variables compare to CT and CG. However CT had improved significant level in BMI but it has not showed better improvement than ET on VO₂max, HDL and RHR therefore present study revealed that endurance training showed better improvement on selected variables which detect from heart disease.

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A STUDY OF HEALTH RELATED PHYSICAL FITNESS OF FOOTBALL PLAYERS AT DIFFERENT PLAYING POSITIONS

Sukanta Panja & Dr. B. John

Affiliations:

- ¹ M. PHIL Student, Dr. C. V. Raman Dr. C. V. Raman University, Kota, Bilaspur (C. G.)
- ² Assistant Professor, Physical Education, Dr. C. V. Raman Dr. C. V. Raman University, Kota, Bilaspur (C. G.)

ABSTRACT

The purpose of the study was to investigate and compare the Health related fitness of football players at different playing positions. A total of fifty male football players aged ranged 18-25 years from different colleges of West Bengal were selected to participate in the study. Health-related physical fitness was assessed through the sit-and-reach test for flexibility, modified sit-ups test in one-minute for strength/muscular endurance and 12 minute run/walk test for cardio-respiratory endurance and a sum of triceps and sub-scapular skin-folds in actual millimeters was recorded for body composition. . To analyse the Health-related physical fitness parameters of male football players, means, standard deviations, and ANOVA were computed. Results of the study revealed that the cardio-respiratory endurance of the offensive football players was greater than midfielder followed by defensive football players. Abdominal strength and endurance of midfielder in football was found more than offensive followed by defensive football players. The flexibility was found better in offensive football players than midfielder followed by defensive football players. The accumulated fat was greater in defensive football players than offensive football players followed by midfielder players.

Keywords- Health, physical Fitness, Football, Playing positions, Male players

INTRODUCTION

Football, formally known as Association Football, having begun in England in 1848, it is now being played in more than 210 countries throughout the world and more than 150 countries being registered with Federation International de Football Association, the international governing body, which was itself established in 1904. It is considered to be the most popular sport in the world, both in terms of participation, and as a spectator sport. It was estimated that in 1984, there were 60 million licensed, and an equal number of unlicensed players. Since that time, the game's popularity has increased in continents of Africa and Asia.

Football has become one of the most widely played sports in the world (Inkelaar, (1994); Tumilty, D, (1993) and Nabhendra Singh (2010). It is characterized by short sprints, rapid acceleration or deceleration, turning, jumping, kicking, and tackling, (Bangsbo, J and L.Michalsik (2002); Wisloff, U., J. Helgerud and J. Hoff (1998). Football may be played competitively or for fun, as a career, a means of keeping fit or simply a recreational pursuit (Reilly, (1996). Football is popular because of the fact it is a simple game requiring very few equipment and infrastructure. The game consists of two equal periods of 45 minutes, with a fifteen minutes break between. Eleven players from each team will be on the field. The Players may be classified into four categories: goalkeepers, defenders, midfielders, and forwards. During the game, players are required to perform activities like jogging, running (forward, backward and sideways), kicking, turning, heading and throwing. Leonardo et al (2007), having studied the fitness profile of under fifteen years soccer players from Brazil by field position have reported insignificant difference in the field position in 30 meters sprint, Squat jump and counter movement jump.

Football is most popular sport in the world, played practically in every nation at different levels. Football may be played competitively or for fun, as a career, means to keep fit or simply a recreational pursuit (Reilly,1996). Modern football is very fast in its nature. The audiences and the footballer enjoy the game of football with a great amount of joy. It is a game of action and continuous adaptation to change in situations by the team as a whole as well as by the individual players. Although it is a team game, there is an ample room for players to show their intelligence through team play involving improvisation and tactical knowledge.

In recent years, the performance standard of soccer have also developed which led the sports scientists and coaches to find out the various possible ways for further improvement in the field of performance. The difference between the victory and defeat in competitive sports can be a matter of few distance and seconds, some accurate passes and some deadly shots on the target. However, sports performance depends on many factors such as motor abilities, physiological variables, technical abilities, tactical abilities, psychological maturity, kin-anthropometric characteristics, socio economic status and some external factors.

Many factors are important in determining the success of a football player or a team. Football players have to adapt to the physical requirements of the game, which consisted of multi-factorial. Players may not need to have an extraordinary capacity within any one of the areas of physical performance but must possess a reasonably high level within all areas. Morphological characteristics, body composition and somatic dimensions play a vital role in determining the success of an athlete (Carter and Heath, 1990 and Duquet et.al., 2001).

The purpose of the study was to investigate and compare the Health related fitness of football players at different playing positions.

METHODOLOGY

Selection of Subjects:

A total of fifty male football players aged ranged 18-25 years from different colleges of West Bengal were selected to participate in the study. The subjects of the present study were purposively selected from the male football players of different colleges of West Bengal during the year 2015-2016. The mean age \pm SD of defender, midfielder and offender male football players were 19.70 ± 2.40 , 19.27 ± 1.10 and 19.42 ± 1.62 respectively.

Selection of Variables:

A feasibility analysis as to which of the variables could be taken up for the investigation, keeping in view the availability of equipment, acceptability to the subjects and the legitimate time, the following health related physical fitness tests were selected.

Tools Used:

The following tools were used for the purpose of conducting this study:

TABLE.1

TOOLS AND MEASUREMENT UNITS OF TESTS OF HEALTH RELATED FITNESS

S.No.	Fitness Component	Test	Unit of Measurement
1.	Cardio-respiratory endurance,	Cooper's Twelve Minute Distance Run/Walk Test	Distance in Km/Meters
2	Muscular strength/ endurance of abdomen	Sit-Ups Test	Number of sit in 60 Seconds
3.	Flexibility	Sit and Reach Test	cm
4.	Body Composition	Skin-Fold Caliper	mm

Criterion Measure:

Health-related physical fitness was assessed through the sit-and-reach test for flexibility, modified sit-ups test in one-minute for strength/muscular endurance and 12 minute run/walk test for cardio-respiratory endurance and a sum of triceps and sub-scapular skin-folds in actual millimeters was recorded for body composition. .

Statistical Analysis:

To analyse the Health-related physical fitness parameters of male football players, means, standard deviations, and ANOVA were computed. For the computation of collected data, SPSS software 16.0 was used. The level of significance was set at 0.05.

RESULTS

To determine the significance of difference among mean scores of male football players at different playing positions in four components of health related physical fitness components, the mean, standard deviations and One Way Analysis of Variance (ANOVA) were computed and data pertaining to this has been presented in table 2 to 3

TABLE 1
DESCRIPTIVE STATISTICS ON FOUR COMPONENTS OF HEALTH RELATED PHYSICAL FITNESS AND BODY COMPOSITION AT DIFFERENT PLAYING POSITIONS

S.No	Components	Playing Positions	Mean	SD
1	Cardio-respiratory endurance	Defender	2.52	3.71
		Midfielder	2.66	3.14
		Offender	2.76	3.31
2	Muscular strength/ endurance of abdomen	Defender	27.87	4.24
		Midfielder	30.00	3.84
		Offender]	28.17	3.61
3	Flexibility	Defender	17.17	5.45
		Midfielder	19.80	4.41
		Offender	16.83	5.89
4	Body Composition	Defender	20.13	8.69
		Midfielder	17.73	5.39
		Offender	18.83	6.93

The mean scores on health related fitness components and body composition of male football players of West Bengal have been depicted in figure 1 to 4.

Figure 1: Mean Scores of Cardio-respiratory Endurance of Male Football Players at Three different playing Positions

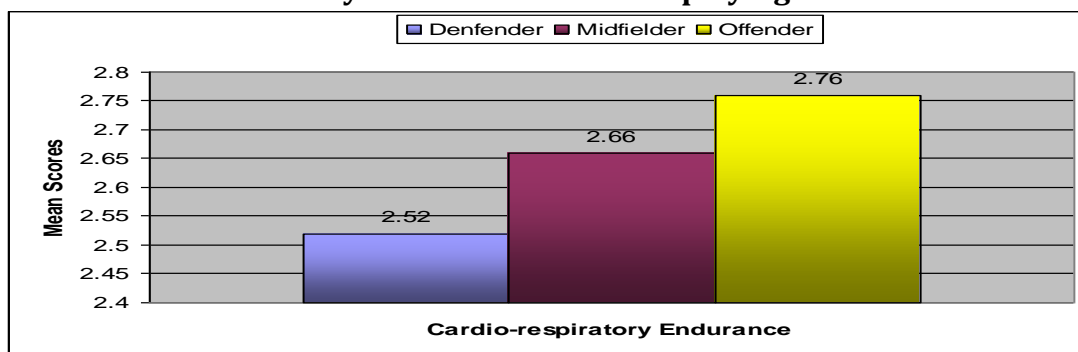


Figure 2 :Mean Scores of Strength and Endurance of Abdominal Muscles of Male Football Players at Three different playing Positions

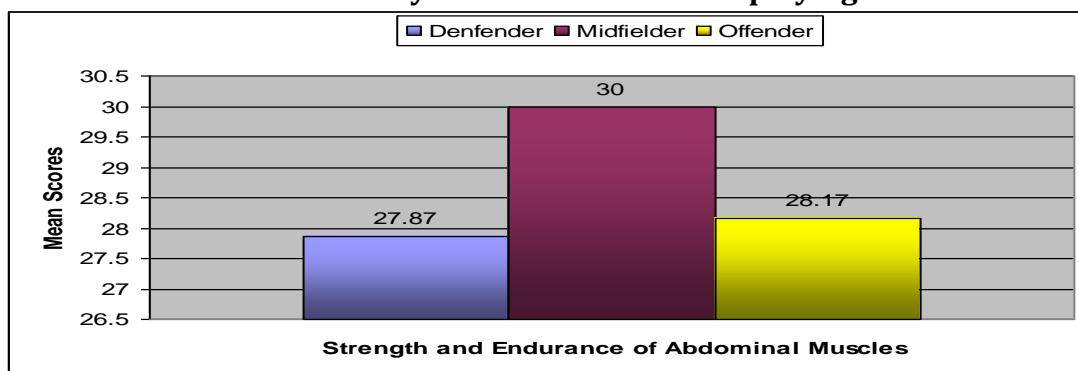


Figure 3: Mean Scores of Flexibility of Male Football Players at Three different playing Positions

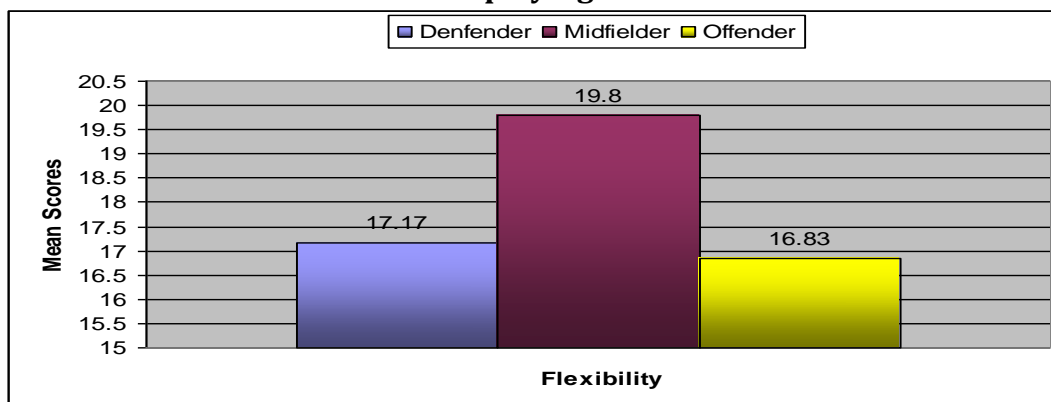


Figure 4: Mean Scores of Body Composition of Male Football Players at Three different playing Positions

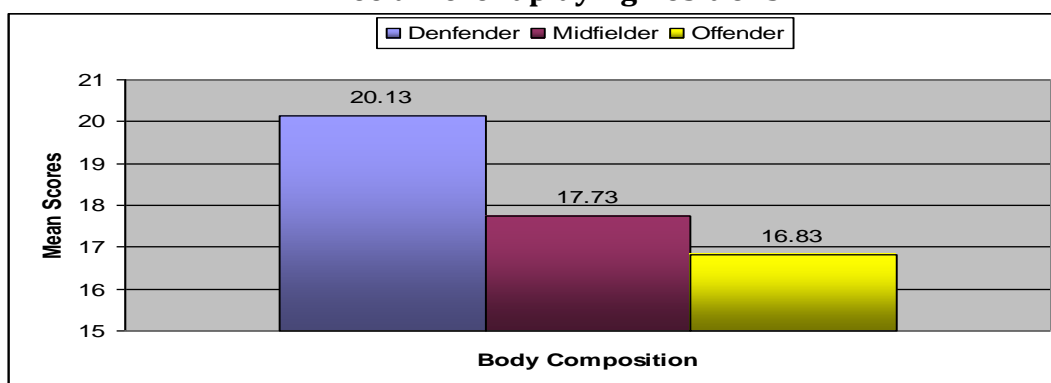


TABLE 7

ANALYSIS OF VARIANCE ON HELATH RELATED PHYSICAL FITNESS COMPONENTS OF MALE FOOTBALL PLAYERS AT DIFFERENT PLAYING POSITIONS

S. NO.	Component	Source of variance	df	Sum of Squares	Mean of Square	F-value
1	12 Minutes Run/Walk	Between groups	2	493370.88	246685.44	2.06
		Within group	47	5618857.12	119550.18	
2	Modified Sit-ups	Between groups	2	43.91	21.95	1.32
		Within group	47	780.28	16.60	
3	Sit and reach	Between groups	2	79.91	39.95	1.44
		Within group	47	1307.37	27.81	
4	Body composition	Between groups	2	102.57	51.29	0.93
		Within group	47	2587.21	55.05	

Insignificant at .05 level

$F_{.05}(2, 47) = 3.18$

It is clearly evident from table 7, that there were no significant differences among male football players at different playing positions on different test of health related physical fitness i.e. 12 minute run/walk, modified sit-ups, sit and reach and body composition, as the obtained F-values of 2.06, 1.32, 1.44 and 0.93 respectively were lesser than the require value of $F_{.05}(2, 47) = 3.18$.

DISCUSSION

Findings of descriptive data of male football players of West Bengal on health related fitness indicated that cardio-respiratory endurance of the offensive football players was greater than midfielder followed by defensive football players. The abdominal strength and endurance of midfielder in football was found more than offensive followed by defensive football players. The flexibility was found better in offensive football players than midfielder followed by defensive football players. The accumulated fat was greater in defensive football players than offensive football players followed by midfielder players.

The results of one way analysis of variance (ANOVA) on four components of health related physical fitness did not expressed variations among male football players of West Bengal. This may be due to similarity in training and coaching, positive feedback, social support and eating habits.

CONCLUSIONS

Within the limitation of the present study, following conclusions were drawn :

1. Cardio-respiratory endurance of the offensive football players was greater than midfielder followed by defensive football players.
2. Abdominal strength and endurance of midfielder in football was found more than offensive followed by defensive football players.
3. The flexibility was found better in offensive football players than midfielder followed by defensive football players.
4. The accumulated fat was greater in defensive football players than offensive football players followed by midfielder players.

RECOMMENDATIONS

The study may be replicated on male football layers at different age groups , which were not taken in this investigation. The study may be replicated on an investigation of dietary habits to determine whether or not there is a correlation between their diet and health related physical fitness as well as anthropometric parameters.

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HIDDEN SPORTS TALENT IN THE RURAL AND URBAN AREA BOYS OF HIMACHAL PRADESH

Dr. Anil Kumar¹ & Dr. Sanjay Sharma²

Affiliations:

¹Assistant Professor: Physical Education, Shaheed Bhagat Singh College, Delhi University.

²Assistant Professor: Physical Education, Himachal Pradesh University, Summer Hills, Shimla-5

ABSTRACT

The purpose of the present study was to explore and compare the hidden sports talent in the rural and urban areas of Himachal Pradesh and to scout the explored hidden sports talent with respect to selected variables as per SAI norms. The sample of present investigation comprised of 360 school going boys of 14 years i.e. 180 each from rural and urban areas of Himachal Pradesh. Anthropometric measurements i.e. height and weight and motor ability variables viz. speed, explosive leg strength, explosive arm and shoulder strength, agility, flexibility, explosive leg strength and extensibility of hip muscles and endurance were selected as the criterion measures for talent identification and comparison. Data regarding anthropometric and motor ability variables was assessed using SAI National Sports Talent Contest Battery. The collected data were analyzed and interpreted statistically by using the method of frequencies and percentages. The results of the investigation shows that on the selected talent scouting criterion measures, majority of the rural as well as urban area boys of Himachal Pradesh were found to have only three of the criterion measures viz. standard height, weight and agility according to SAI norms. Moreover, among the rural and urban area students, who were found to have criterion measures as per sports authority of India norms, it was also revealed that the majority of the explored hidden sports talent with respect to selected variables was found to be at satisfactory standard as per sports authority of India norms.

Keywords: Sports Talent, Talent Exploration, Sports Authority of India, National Sports Talent Contest Battery.

INTRODUCTION

Sports are a worldwide phenomenon today. Considering the importance of sports competitions, one can say that it has become a social need of the present civilization, which must be met by the societies and the government. However, it is important to mention here that for a healthy and bumper yield for any crop, the farmer must select seeds or saplings of a very good quality and that can be done with the help of agricultural scientist after years of laboratory work. Similar is the case with sports also where in order to produce world class athletes, systemic Talent Identification programmes using science and psychology are to be devised. Although, the concept of Talent Identification is not new to the field of sports and physical education and it has been used worldwide since 1970's but in India it was visualized since past two to three decades, which gained a high degree of momentum in last decade only. The rates of success for talent identification and development of programs have been assessed rarely and the validity of the models applied remains highly debated. When talent identification is undertaken in terms of chronological age and biological development of an athlete, is a typical issue (Alabin et.al, Baur 1988, Bompa 1985, Ghita 1994, Peltola 1992, Thomson et.al 1985 and Wu 1992). This indicates the different opinions as to the precise timing for screening of talent identification. Bompa (1985) feels that comprehensive talent identification needs to be carried out a number of years with 3 main phases. The first phase of talent identification should occur during the years 3-8 and needs to be dominated by a physician's examination, which aimed at detecting body malfunctions and physical deficiencies which may restrict future sporting endeavors. The secondary phase of talent identification should be conducted between the age of nine to seventeen years, however this age range will vary between sports e.g. nine to ten years for gymnastics, 10 to fifteen years for girls and 10-17 for boys in other sports. This phase of talent identification needs to be conducted on athletes who have already experienced organized training and require a comprehensive assessment of physiological and anthropometric parameters. Psychological assessment and profiling starts in this phase. The third phase of talent identification is primarily concerned with high caliber athlete's e.g. national team members. Talent identification in this phase needs to be very sport specific and painstaking.

Talent identification produce world class athletes through systemic talent identification programme using science and psychology. Considering that without talent identification, talent development would be a waste of time and resources. It is easy to see why talent identification is a term that is often confused with the term talent development (Peltola 1992, Hoare 1995), so there is need to explore these hidden sports talent. It has only been relatively recent that systematic talent identification has become a part of sports around the world (Baur 1988, Hahn 1990, Hoare 1995 and Bompa 1985). Eastern block countries like the G. D. R, Russia, Bulgaria and Romania are examples of countries that the concerned state run systematic talent identification programs as early as the 1960's and 70's (Baur 1988, Bompa 1985, Thomson 1992 and Thomson et.al 1985). While western countries such as Australia and the U. S. have critically attempted to have systems in place to develop talented individuals after they have identified themselves through competition in their chosen sports (Peltola 1992). Scientific talent identification, a critical factor in the development of world-class athletes is not in question (Alabin et.al 1980, Bompa 1985, Hahn 1990 and Wu 1992).

During the post-independence era in India, the government has made efforts to preserve and nurture the awesome cultural heritage, by setting up a number of new incentives, and by heightening media exposure at the national level, to circulate and popularize indigenous games. Since independence, the Government of India has launched several programmes through Sports Authority of India which is actively engaged in implementing schemes to develop physical fitness, sports awareness and also encourage sports in the country. However, we are yet to achieve a place of pride in international sports, even among the Asian countries. This indicates that implementation of sports programmes in the country leaves for much space for progress.

The sports talent identification drive in the State of Himachal Pradesh is also not having a long history, as the department of youth services and sports was created during early eighties only. The state government has not launched many programs or policies to encourage sports in the state. The sportsmen of Himachal Pradesh are lagging far much behind from the other states of country in terms of sports facilities, infrastructure and even planned and scientific sports talent. Although, Himachal Pradesh is having extensive and countless avenues for the promotion of sports but the energetic, physically and mentally tough and hard striving youth of the state is provided with scanty opportunities for the fulfillment of their natural urge for sports in a scientific and a planned manner. Sportsperson of this state have also won Arjuna Awards and Padamshree and a few have excelled themselves individually in various team games. Himachal Pradesh is having much space for implementation of planned and scientific sports talent research and search programs. A conceptual framework that acknowledges both genetic and environmental influences and considers the dynamic and multidimensional nature of sport talent needs to be developed and set in action. Considering these entire aspects researcher visualized a research gap in the talent identification of rural and urban areas of Himachal Pradesh and hence, undertook the present research.

The purpose of the study was to explore and compare the hidden sports talent of the rural and urban areas in Himachal Pradesh with respect to selected variables as per SAI norms. It was hypothesized that the majority of the hidden sports talent in the rural and urban areas of Himachal Pradesh with respect to selected variables would not be as per sports authority of india norms. It was also hypothesized that the majority of the identified hidden sports talent in the rural and urban areas of Himachal Pradesh with respect to selected variables would be at satisfactory standard as per sports authority of india norms.

METHODOLOGY

Selection of Subjects:

A total sample of 360 boys (Rural =180, Urban = 180) was selected randomly. The present study was confined to rural and urban areas school going boys consisted of 14 years of age belong to four districts of rural and urban areas schools of Himachal Pradesh. i.e. Bilaspur, Hamirpur, Kangra and Mandi of Himachal Pradesh.

Criterion Measures:

Hidden sports talent was confined to nine criterion measures viz; two anthropometric variables i.e. height and weight and seven motor ability variables i.e. speed, explosive leg strength, explosive arm and shoulder strength, agility, flexibility, explosive leg strength and extensibility of hip muscles and endurance.

Collection of Data:

Data regarding the hidden sports talent were collected personally by the investigator himself using Sports Authority of India's (SAI) Sports Talent Contest Battery. The investigator gathered all the subjects in the center place within the premises of the concerned schools of the respective areas, explained them about the various anthropometric and motor ability measurements to be taken from them and their purpose and then administered the various tests for the purpose of collecting the relevant data. While collecting the data, the procedure specified in the National Sports Talent Contest Battery was strictly followed.

TABLE 1
SPORTS AUTHORITY OF INDIA'S NATIONAL SPORTS TALENT CONTEST BATTERY

Sr. No.	Test items	Sports Talent factor
1.	To Measure Standing Height	Height
2.	To Measure Body Weight	Weight
3.	30 Meter Flying Start	Speed
4.	Standing Broad Jump	Explosive Strength of Legs
5.	Standing Vertical Jump	Explosive Strength of Legs and Extensibility of Hip Muscles
6.	6x10 Meter Shuttle Run	Agility
7.	Medicine Ball Put	Explosive Arms and Shoulder Strength
8.	Flexibility Test (Bend & Reach)	Flexibility
9.	800 Meter Run	Endurance

Source: Sports Authority of India

Statistical Technique:

The collected data was statistically analyzed and compared using Percentage method. In order to correct the sampling errors in the entire measurement process, the level of significance was set at 0.05 level of confidence.

RESULTS AND DISCUSSION

To find out the difference among mean scores of male students of rural and urban area schools, percentage and frequency were calculated and data pertaining to this has been presented in table 2 to 5 as per sports authority of indianorms.

TABLE 2
FREQUENCY AND PERCENTAGE OF RURAL AND URBAN AREAS STUDENTS IN
RELATION TO HEIGHT AND WEIGHT AS PER NORMS OF
SPORTS AUTHORITY OF INDIA

Variable	Area	Criterion Measures as per SAI Norms		Criterion Measures not as per SAI Norms	
		Frequencies (F)	Percentage (%)	Frequencies (F)	Percentage (%)
Height	Rural (N=180)	119	66.11%	61	33.89%
	Urban (N=180)	127	70.56%	53	29.44%
Weight	Rural (N=180)	103	57.22%	77	42.78%
	Urban (N=180)	123	68.33%	57	31.67%

Source: Primary Data.

Table-2 reveals that the height of two third (66.11%) rural area male students and more than two third (70.56%) urban area male students were found as per sports authority of india norms. The weight of more than half (57.22 percent) of the rural area male students and a little more than two third (68.33 percent) urban area male students were found as per sports authority of india norms.

Hence the formulated hypothesis “The majority of the hidden sports talent in the rural and urban areas of Himachal Pradesh would not be as per sports authority of india norms” rejected. Because of differetiation that was observed in the height and wieght of rural and urban area male students as per SAI norms.

TABLE 3
FREQUENCYAND PERCENTAGE OF HEIGHT AND WEIGHT STANDARDS OF RURAL AND
URBAN AREA STUDENTS CLASSIFIED AS PER NORMS OF
SPORT AUTHORITY OF INDIA

Variable	Height				Weight			
	Rural (N=119)		Urban (N=127)		Rural (N=103)		Urban (N=123)	
Areas Standards	F	%	F	%	F	%	F	%
Very Good	2	1.68%	1	0.79%	3	2.92%	10	8.13%
Good	36	30.25%	52	40.94%	13	12.62%	31	25.20%
Satisfactory	81	68.07%	74	58.27%	87	84.46%	82	66.67%

Source: Primary Data.

Table-3 shows that height of about two third (68.07 percent)of the male students from rural and more than half (58.27 percent) of male students from urban areas were found to be of satisfactory standard. In case of weight, majority of the male students (84.46 percent)from rural areas and more than two third (66.67 percent) male students from urbanareas were found to have a weight of satisfactory standard as per sports authority of india norms.

Hence, the formulated hypothesis for the present investigation i.e. “the majority of the identified hidden sports talent in the urban and rural areas of Himachal Pradesh with respect to anthropometric variable height and weight would be at satisfactory standard as per norms of sports authority of india” is accepted.

TABLE 4
FREQUENCY AND PERCENTAGE OF RURAL AND URBAN AREAS STUDENTS IN
RELATION TO THEIR MOTOR ABILITIES AS PER NORMS OF
SPORTS AUTHORITY OF INDIA

Variable	Area	Criterion Measures as per SAI Norms		Criterion Measures not as per SAI Norms	
		Frequency	Percentage (%)	Frequency	Percentage (%)
Speed	Rural (N=180)	27	15%	153	85%
	Urban (N=180)	50	27.78%	130	72.22%
Exp. Leg Sth.	Rural (N=180)	25	13.89%	155	86.11%
	Urban (N=180)	40	22.22%	140	77.78%
Exp. Arm and Shoulder Sht.	Rural (N=180)	57	31.67%	123	68.33%
	Urban (N=180)	74	41.11%	106	58.89%
Agility	Rural (N=180)	104	57.78%	76	42.22%
	Urban (N=180)	104	57.78%	76	42.22%
Flexibility	Rural (N=180)	66	36.67%	114	63.33%
	Urban (N=180)	36	20%	144	80%
Exp. Leg Sth. and Ext. of Hip	Rural (N=180)	32	17.78%	148	82.22%
	Urban (N=180)	30	16.67%	150	83.33%
Endurance	Rural (N=180)	48	26.67%	132	73.33%
	Urban (N=180)	55	30.56%	125	69.44%

Source: Primary Data.

Table-4 reveals that majority of students of rural and urban areas have their frequency and percentage with respect to Motor Ability Variables i.e. Speed (Rural 85.00% and Urban 72.22%); Explosive Leg Strength(Rural 86.11% and Urban 77.78%); Explosive Arm and Shoulder Strength (Rural 68.33% and Urban 58.89%); Flexibility (Rural 63.33% and Urban 80.00%); Explosive Leg Strength and Extensibility of Hip muscle (Rural 82.22% and Urban 83.33%)and; Endurance(Rural 73.33% and Urban 69.44%)fall below than Sports Authority of India norms. However, in case of Motor ability variable i.e. Agility more than half of the students (57.78 percent) each from rural and urban areas in Himachal Pradesh were found to have standard agility according to the Sports Authority of India norms.

Hence the formulated hypothesis “The majority of the hidden sports talent in the rural and urban areas of Himachal Pradesh would not be as per SAI norms” is rejected for all the motor ability variables except agility particularly because of differentiation observed in them as per sports authority of india norms.

TABLE 5
FREQUENCIES AND PERCENTAGE OF RURAL AND URBAN AREAS STUDENTS IN
RELATION TO MOTOR ABILITIES CLASSIFIED AS PER NORMS OF
SPORTS AUTHORITY OF INDIA

Variable	Area	Very Good		Good		Satisfactory	
		F	%	F	%	F	%
Speed	Rural(N=27)	-	0 %	4	14.82%	23	85.18%
	Urban (N=50)	4	8%	4	8%	42	84%
Ex. Leg Strength.	Rural(N=25)	1	4%	3	12%	21	84%
	Urban (N=40)	2	5%	8	20%	30	75%
Ex. Arm and Shoulder Strength.	Rural(N=57)	4	7.02%	10	17.54%	43	75.44%
	Urban (N=74)	4	5.41%	28	37.84%	42	56.75%
Agility	Rural(N=104)	22	21.16%	24	23.07%	58	55.77%
	Urban (N=104)	32	30.77%	29	27.88%	42	41.35%
Flexibility	Rural(N=66)	10	15.15%	21	31.81%	35	53.04%
	Urban (N=36)	0	0%	7	19.44%	29	80.56%
Ex. Leg Strength. and Ext. of Hip	Rural(N=32)	0	0%	8	25%	24	75%
	Urban (N=30)	0	0%	2	6.67%	28	93.33%
Endurance	Rural(N=48)	4	8.33%	10	20.83%	34	70.84%
	Urban (N=55)	5	9.09%	13	23.64%	37	67.27%

Source: Primary Data.

Table-5 reveals that the majority of students of rural and urban areas having motor ability variables as per Sports Authority of India norms, have Speed (Rural 85.15% and Urban 84.00%); Explosive Leg Strength (Rural 84.00% and Urban 75.00%); Explosive Arm and Shoulder Strength (Rural 75.44% and Urban 56.75%); Flexibility (Rural 53.03% and Urban 80.56%); Explosive Leg Strength and Extensibility of Hip muscle (Rural 75.00% and Urban 93.33%)and; Endurance(Rural 77.84% and Urban 67.27%)at satisfactory standard under Sports Authority of India norms. However, in case of Motor ability variable i.e. Agility more than half of the students (55.71 percent) from rural and less than half of the students (41.35 percent) from urban areas in Himachal Pradesh were found to also have standard agility at satisfactory level according to the Sports Authority of India norms.

Hence, the formulated hypothesis for the present investigation i.e.“the majority of the identified hidden sports talent in the rural and urban areas of Himachal Pradesh with respect to motor ability variable speed; explosive leg strength; explosive arm and shoulder strength; agility; flexibility; explosive leg strength and extensibility of hip muscle and; endurance would be at satisfactory standard as per norms of sports authority of india” is accepted.

DISCUSSION

Himachal Pradesh is lagging far much behind from the other states of country in terms of sports facilities, infrastructure and even planned and scientific sports. Although, Himachal Pradesh is having extensive and countless avenues for the promotion of sports but the energetic, physically and mentally tough and hard striving youth of the state is provided with scanty opportunities for the fulfillment of their natural need for sports in a scientific and a planned manner.

CONCLUSIONS

The explored percentages of the identified hidden sports talent of the rural and urban areas in Himachal Pradesh and their respective comparisons with respect to selected anthropometric and motor ability variables as per sports authority of india norms given below:

1. Majority of the students were scouted under the satisfactory standard in relation to height and weight as per sports authority of india norms. The standard height and weight were in the order of rural area students followed by urban area students.
2. In case of all motor ability variables except agility, majority of the students were found to have a standard speed, explosive leg strength, explosive strength of arms and shoulder, flexibility, and extensibility of hip muscle and endurance was below the SAI norms.
3. Majority of the students were scouted under the satisfactory standard in motor abilities as per sports authority of india norms.

PRACTICAL APPLICATION

The present research would be helpful in identifying and channelising the neglected and hidden sports talent in Himachal Pradesh and also provide a platform for such children to get channelised and contribute for their development and nation as well. It would contribute greatly in enhancing the standard of sports by picking up talented children from rural and urban, areas of Himachal Pradesh. The present study also will be greatly helpful to physical education teachers, coaches and all those who are associated with the training and coaching in games and sports in a sort of guidance for screening players and athletes for different events and achieving a high level of performance.

FUTURE DIRECTION FOR RESEARCH

The results of the study might help the physical educationists and the coaches to assess and investigate the potentials of the different areas boys of Himachal Pradesh to spot out the talent. Keeping in mind, the Geographical conditions of Himachal Pradesh, the separate norms of National Sports Talent Contest test battery of sports talent for different age group can be developed to identify the sports talent of Himachal Pradesh. A special training programme in sports may be developed, so that the sportsmen of Himachal Pradesh can be developed according to the sports authority of india norms of sports talent. It is recommended to replicate the study for different age group and both of the categories boys and girls of Himachal Pradesh. The results of the study can also be used for the self-evaluation by the boys and girls in Himachal Pradesh. Keeping in mind, the results of the study, a special attention should be paid to the different areas of Himachal Pradesh in order to develop sports talent.

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A COMPARATIVE STUDY OF PHYSIOLOGICAL PARAMETERS OF SCHOOL LEVEL SWIMMERS

Nimish Majumdar¹ & Dr. Jaishankar Yadav

Affiliations:

- ¹ M.Phil. Student, Dr. C.V. Raman University, Kota Bilaspur C.G.
- ² Assistant Professor, Department of Physical Education, Dr. C.V. Raman University, Kota Bilaspur C.G.

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.

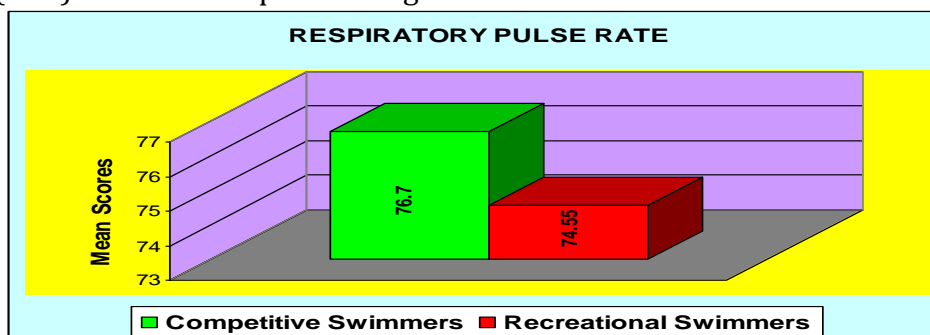


Figure :1- Mean Scores on Pulse rate of competitive and recreational Swimmers

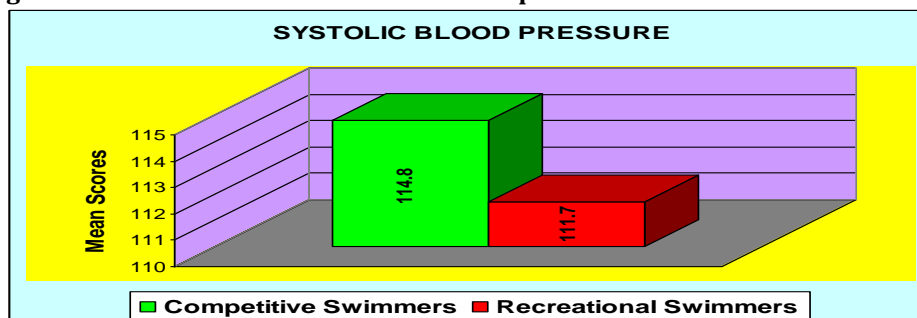


Figure :2- Mean Scores on Systolic Blood Pressure of competitive and recreational Swimmers

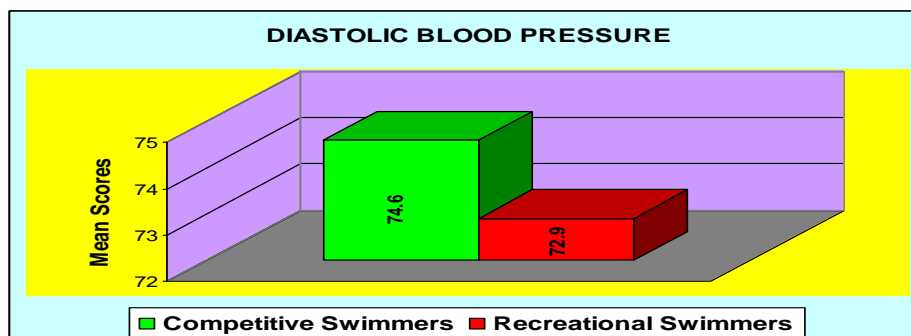


Figure :3- Mean Scores on Diastolic Blood Pressure of competitive and recreational Swimmers

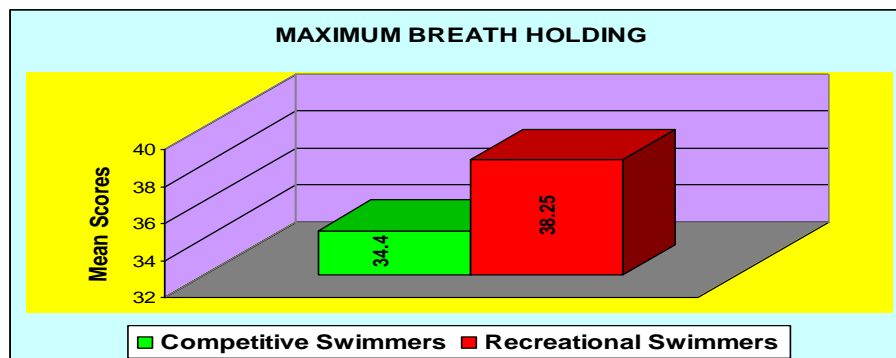


Figure :4- Mean Scores on Maximum Expiratory Pressure of competitive and recreational Swimmers

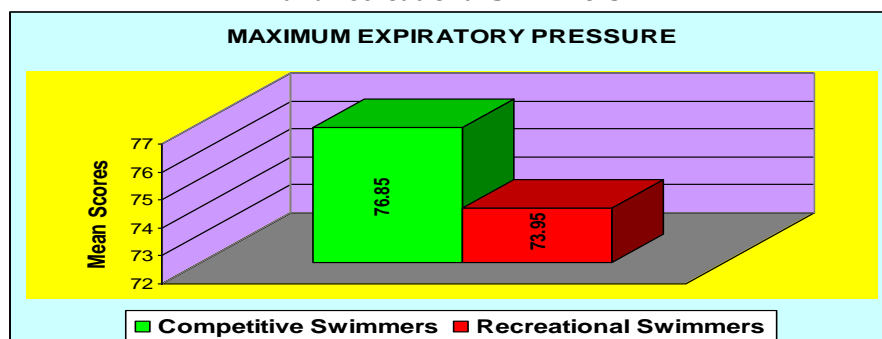


Figure :5- Mean Scores on Maximum Breath Holding of competitive and recreational Swimmers

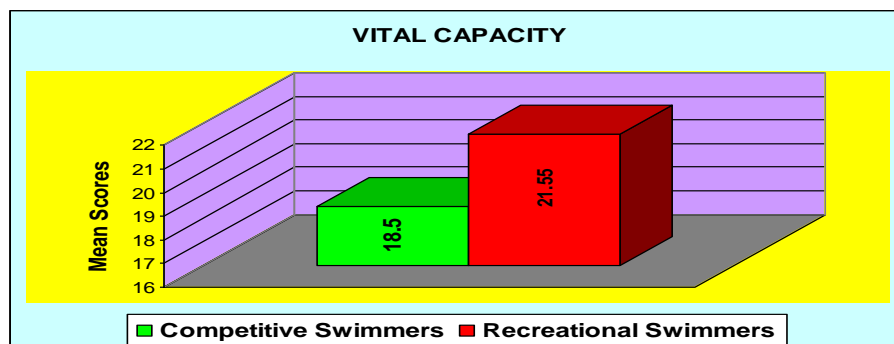


Figure :6- Mean Scores on Vital Capacity of competitive and recreational Swimmers

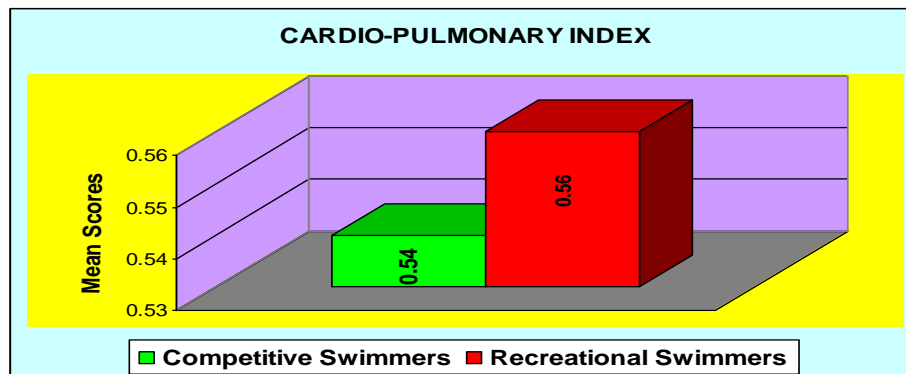


Figure :7- Mean Scores on Cardio-pulmonary Index of competitive and recreational Swimmers

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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EFFECT OF PARTICIPATION IN SPORTS ON FRUSTRATION TOLERANCE CAPACITY OF SECONDARY STUDENTS

Saleem Jaffer¹ Dr. Sudhir Rajpal²

Affiliations:

¹ M.Phil. Student, Dr. C.V. Raman University, Kota Bilaspur C.G.

² Assistant Professor, Department of Physical Education, Dr. C.V. Raman University, Kota Bilaspur C.G.

ABSTRACT

The aim of the present study is to compare frustration tolerance capacity of secondary students on the basis of their participation in sports. 50 secondary student athletes (Ave. age 17.41 yrs) were selected from secondary schools of Bilaspur city. To fulfil the objectives of the present study, another set of 50 non player secondary students (Ave. age 16.92 yrs) were also selected. The criterion for selection of athletes was participation in district/state level tournaments in any sporting event. Random sampling method was used for selection of sample in the present study. To assess frustration tolerance capacity of selected secondary student athletes and non athletes, Reactions to frustration scale, prepared by Dixit and Shrivastava (2011) was the preferred choice. It consists in all 40 items which assess aggression, resignation, fixation and regression. The reliability of this test is 0.79. Lower the score superior is the frustration tolerance capacity of the subject is the direction of scoring. Results indicate that frustration tolerance capacity of secondary student athletes was far more superior as compared to secondary student non athletes. On the basis of results and associated discussion it was concluded that participation in competitive sports may be incorporated in curriculum so that secondary students frustration tolerance capacity can be enhanced

Key words: Kabaddi Performance, Physical Fitness, Cardiovascular Endurance, Strength, Agility, Speed.

INTRODUCTION

Frustration tolerance comes under normal cognitive development. It occurs when a person while pursuing his goals cannot achieve it due to some internal or external factors. In sporting sense when injury occurs to a sports person he can get frustrated. In theoretical terms, frustration tolerance is an individual's capacity to withstand frustration without failure of psychological adjustment i.e. without resorting to inadequate modes of behaviour (Rosenweig, 1944).

Baldwin (1949) conducted a study on school children to study their home atmosphere and its effect on child behaviour and concluded that children from democratic homes were more competitive, active, outgoing, resourceful and hence less stressed and frustrated. Mohsin (1954) found the effect of frustration on problem solving behaviour, repeated experience of failure of goal directed activity produces frustration. Mithal (1975) found that the frustrated students indicated their aggression mainly towards the external environment or towards self. Balbir. (1987) studied that over chosen children are less frustrated. They possess a power of abstract thinking and socially desirable traits. They possess a power of socially desirable traits and abstract thinking. They are emotionally stable, most zestful and like group action. They are submissive as well as adjustable. Under selected students possess socially undesirable traits. They are affected by feeling emotionally stable. In order to get attention they become aggressive, dominant and stubborn. Kashyp, V (1989) reported that adolescent problems were positively related to anxiety, frustration insecurity and emotional immaturity and negatively to intelligence. Monaco, Linda (1999) revealed that disruption of family, marital discord, frustration, social life and financial strain commonly result for the obsessive compulsive disorder or stress places on the family. Regression analysis revealed the depression. Disengagement coping strategies mediated the relationship between psychological adjustment variables and hope. Chadha, M (2003) concluded that psychosocial correlates the achievement, anxiety and adjustment of an environment of family contribute to 97% of the frustration in students of professional schools.

Adolescence is a crucial stage of life in terms of future development. In adolescence secondary students have to cope with many adversities ranging from physical changes to academics. To address this issue, participation in sports has been advocated by many educationists, physical educationists for overall development of students during adolescence.

It has also been noticed in the past that athletes are somewhat different from non-athletes in terms of psychological and social behaviour [Kaur, Manpreet, 2014; Nirmal and Ahmad, 2014; Rathe, 2009] but surprisingly frustration tolerance capacity, an important marker for adjustment and development has not been explored in the light of participation in sports among secondary students, hence the present study was planned.

HYPOTHESIS

Significant difference will be observed in frustration tolerance capacity of selected secondary student athletes and non-athletes.

METHODOLOGY

Sample :-

For present study, 50 secondary student athletes (Ave. age 17.41 yrs) were selected from secondary schools of Bilaspur city. To fulfil the objectives of the present study,

another set of 50 non player secondary students (Ave. age 16.92 yrs) were also selected. The criterion for selection of athletes was participation in district/state level tournaments in any sporting event. Random sampling method was used for selection of sample in the present study.

Tools:

To assess frustration tolerance capacity of selected secondary student athletes and non athletes, Reactions to frustration scale, prepared by Dixit and Shrivastava (2011) was the preferred choice. It consist in all 40 items which assess aggression, resignation, fixation and regression. The reliability of this test is 0.79. Lower the score superior is the frustration tolerance capacity of the subject is the direction of scoring.

Procedure:

Reactions to frustration scale, prepared by Dixit and Shrivastava (2011) was administered to each subject. After this, the scoring was completed according to the scoring system prescribed by the authors of the scale. After scoring, the data was tabulated according to their groups. The data so obtained for two groups i.e. secondary student athletes and non-athletes was compared with the help of 't' test. The statistical results are depicted in table no. 1.

RESULT & DISCUSSION

TABLE 1
COMPARISON OF FRUSTRATION TOLERANCE BETWEEN SECONDARY STUDENT ATHLETES AND NON-ATHLETES

Groups	Frustration Tolerance		Mean Diff.	't'
	Mean	S.D.		
Secondary Student Athletes (N=50)	92.56	21.01	11.74	3.63 (p<.01)
Secondary Student Non- Athletes (N=50)	104.30	8.96		

Results presented in table 1 indicate that frustration tolerance capacity of secondary students who participate in competitive sports was found to be significantly superior (M=92.56) as compared non-athletes secondary students (M=104.30). The calculated t=3.63, is statistically significant at .01 level also gives statistical weightage to this finding.

CONCLUSION

The result of the present study once again highlights the importance of participation in sports on psychological well-being. The findings of the present study indicate that participation in sports enhances the frustration tolerance capacity of student athletes and the results are not surprising. The results are consistent with the previous findings which suggest that participation in sport is a good tool to enhance the psychological qualities such as frustration tolerance.

On the basis of results and associated discussion it was concluded that participation in competitive sports may be incorporated in curriculum so that secondary students frustration tolerance capacity can be enhanced.

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**COMPARATIVE STUDY OF SPORTS EMOTIONAL INTELLIGENCE
AMONG BADMINTON PLAYERS ON THE BASIS OF THEIR
LEVEL OF PARTICIPATION**

Rakhi Kumari¹ and Sudhir Rajpal²

Affiliations

¹ M.Phil. Student, Dr. C.V. Raman University, Kota Bilaspur C.G.

² Assistant Professor, Department of Physical Education, Dr. C.V. Raman University, Kota Bilaspur C.G.

ABSTRACT

The aim of the present study is to compare sports emotional intelligence of national, state and district level male badminton players. 40 national level male badminton players (Ave. age 23.12 yrs.), 40 state level male badminton players (Ave. age 21.82 yrs.), 40 district level male badminton players (Ave. age 21.02 yrs.) were selected as sample. The sample was collected through convenience sampling method. To assess sports emotional intelligence, five dimensional sports emotional intelligence test prepared by Agashe and Helode (2008) was adopted. Results indicate that sports emotional intelligence was found to be superior in national male badminton players as compared to state and district level male badminton players but the difference in mean scores were not significant for every group. On the basis of results and associated discussion it was concluded that superior sports emotional intelligence is a major variable that influence the performance of male badminton players.

Keywords: Sports, Emotional intelligence, Badminton, National Level, Males

INTRODUCTION

Goleman and his colleagues have suggested that EI is 'a convenient phrase with which it is easier to focus attention on human talent. Even though it is a simple phrase, it incorporates the complexity of a person's capability'. Based on extensive research Goleman (1995, 1998) has proposed five dimensions of EI consisting of 25 competencies namely:

1. Self awareness: Accurate self-assessment, emotional self-awareness and self confidence. 2. Self regulation: Trustworthiness, self-control, conscientiousness, adaptability, and innovation. 3. Self motivation: Commitment, achievement drive, initiative and optimism. 4. Empathy: Developing others, understanding of others, service orientation, political awareness and leveraging diversity 5. Social skills: influence, communication, conflict management, d. leadership, e. change catalyst f. building bonds g, collaboration and cooperation, and h. team capabilities.

Physical chess is another name for badminton. It means that badminton is like playing chess with strength. In badminton great importance is assigned to biomechanical, physiological and psychological parameters. Although researcher worked extensively on psychological factors associated with sports achievement in badminton, sports emotional intelligence has not been explored in the light of sports achievement. To fill this void, the present study is planned.

Meyer & Fletcher, (2007) stated that the use of different conceptualizations, definitions and assessment inventories may yield various emotional intelligence profiles of the same individual or team, Wielinga et al., (2011) stated that stay motivated and setting a strong goals and targets is necessary for all the athletes and are contributing for prediction of performance for athletes. James (1982) revealed that the components of muscular endurance and muscular strength increases self-concept. Physical exercise has been linked to good mental health and positive self-concepts Friel (2009) expressed that most of the coaches trained their athletes through vigorous and various training methods for success but mental skill is also an important aspect to develop confidence, positive thought, motivated and focused which help to achieve the target goals. Austin et al. (2012) stated that if the body is strong but the mind is weak, all physical gains are lost. Ruggedness, courage, intelligence, exuberance, buoyancies, emotional adjustment, optimism, conscientiousness, alertness, loyalty and respect for authority are Characteristics of the great athletes. Gill (1986) indicated that the successful athletes did indeed possess more positive mental health characteristics and fewer negative mental health characteristics than the general population. Successful athletes were above the waterline (population norm) on vigor, but below the surface on the more negative moods of tension, depression, anger, fatigue and confusion

Although researchers like Sorenson (2010), Attri (2013), Hasan et al. (2015) have extensively studied sports emotional intelligence but surprisingly sports emotional intelligence has not been explored among male badminton players on the basis of level of participation, hence this study was conducted. It was also hypothesized that the sports emotional intelligence in national, state and district level male badminton players will differ significantly with each other.

METHODOLOGY

Sample:

For present study, 40 national level male badminton players (Ave. age 23.12 yrs.), 40 state level male badminton players (Ave. age 21.82 yrs.), 40 district level male badminton players (Ave. age 21.02 yrs.) were selected as sample. The sample was collected through convenience sampling method.

Instrumentation:

To measure emotional intelligence, sports emotional intelligence test prepared by Agashe and Helode (2008) was used for the purpose of data collection. The test-retest reliability coefficient of S.E.I. is 0.71, which was significant and indicates very high level of reliability of the inventory scores through "stability" indices. This Hindi Inventory comprises of in all 15 items in which 3 items each for tapping self-motivation, self-awareness, self-regulation, social skills and empathy respectively..

Collection of Data:

After establishing a good rapport with the subjects they were assured that their responses and their identities will be kept under strict confidence and will not be disclosed anywhere. Sports emotional intelligence test prepared by Agashe and Helode (2008) was administered to each subject. After this, the scoring was completed according to the scoring system prescribed by the authors of the scale. After scoring, the data was tabulated according to their groups. When the data were tabulated according to pre-defined groups was compared with the help of 't' test. The statistical results are depicted in table no. 1, 2 and 3.

RESULT & DISCUSSION

TABLE 1
DESCRIPTIVE STATISTICS OF SCORES ON SPORTS EMOTIONAL INTELLIGENCE IN A GROUP OF NATIONAL, STATE AND DISTRICT LEVEL MALE BADMINTON PLAYERS

Groups	N	Mean	SD
National level	40	218.25	30.85
State level	40	211.50	36.86
District level	40	197.75	39.25

TABLE 2
ANNOVA SUMMARY

Sources of Variance	df	Sum of Square	Mean Squares	F-ratio
Between Groups	2	8731.667	4365.833	3.40*
Within Groups	117	150235.000	1284.060	
Total	119	158966.670		

*Significant at .05 level

Results obtained through One Way ANOVA indicate that sports emotional intelligence in national level male badminton players, state level male badminton players and district level male badminton players did differ significantly with each other. The F ratio of 3.40, which is statistically significant at .05 level, confirms this finding.

The obtained results shown in table 1 and 2 were also confirmed by Least Significant Difference Test presented in table no. 3.

TABLE 3
COMPARISON OF PAIRED MEAN SCORES ON SPORTS EMOTIONAL INTELLIGENCE OF MALE BADMINTON PLAYERS AT DIFFERENT LEVELS OF THEIR

Mean Scores Of Badminto Players			
National Level	State Level	District Level	Paired mean difference
218.25	211.50	-	6.75
218.25	-	197.75	20.50*
-	211.50	-	13.75

* Significant at .05 level

The sports emotional intelligence of national male badminton players (M=218.25) was found to be significantly superior as compared to district level male badminton players (M=197.75). The mean difference of 20.50 was found to be statistically significant at .05 level.

Non-significant difference was observed in sports emotional intelligence between national level male badminton players (M=218.25) and state level male badminton players (M=211.50). The mean difference of 6.75 was not found to be statistically significant at .05 level.

No significant difference was observed in sports emotional intelligence between state level male badminton players (M=211.50) and district level male badminton players (M=197.75). The mean difference of 13.75 was not found to be statistically significant at .05 level of significance

CONCLUSION

The results indicate that national male badminton players are much more efficient in coping with emotions and this enables them to perform at the highest level. Previous studies in this area also justify the finding of the present work. On the basis of results and associated discussion it was concluded that superior sports emotional intelligence is a major variable that influence the performance of male badminton players.

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