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Comparative Study on Physical Fitness of Volleyball and Football Players in University Level

Ajoy Bag,[1] Dr. Aloke Sen Borman, [2] Suprakash Das[3] and Dr. Binod Chawdhury [4]

[1.] *CWTT, Govt. Approved, Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur, W.B., India.*
[2.] *Asst. Professor, Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur, Pin-721505,W.B., India.*
[3.] *CWTT, Govt. Approved, Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur, W.B., India.*
[4.] *HOD, Phy.Edu. Dept., Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur, Pin-721505, India.*

Abstract:
Background: *Physical fitness is an essential first and foremost criterion in every game. Without having physical fitness no one can elicit his amble performance level. Therefore it is essential to investigate that in which game among Volleyball and Football, the level of physical fitness is more essential.* ***Aim:*** *The purpose of this study was to investigate the level of physical fitness of volleyball player and football player in university level.* ***Methodology:*** *For the present study 15 male volleyball players and 15 male football players were selected randomly and they had participated in university competition in 2004 from Jadavpur University. Age group of the subjects was 18-24 years. To find out the physical fitness APHERED Youth Physical Fitness Test were conducted.* ***Statistics:*** *For comparison of various physical fitness components of volley ball players and football player independent t-test has done and level of significance has verified at 0.05 levels.* ***Result:*** *Finding reveals that muscular strength of football player (5.33 times/min. pull ups) was higher than volley ball player (4.87 times/min. pull ups), the muscular endurance of football player (39.86 times sit ups) was higher than volleyball player (38.73 times sit ups), agility of football player (19.32 sec.) was higher than volleyball player (19.78 sec.), explosive leg strength of football player (6.90 mts.) was higher than volleyball player (6.78 mts.), Speed of football player (6.70 sec.) was higher than volley ball player (6.99 sec.) and also cardiovascular endurance of football player (1.82 min.) was higher than volleyball player (1.82 min.) but the difference in agility and speed were significant at 0.05 level.* ***Conclusion:*** *The physical fitness of football player was higher than the volleyball player.*

Keywords*: Physical fitness- volleyball- football.*

I. Introduction:

Physical fitness is the ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to engage in leisure pursuits and to meet emergency situations. **Meckel Y et.al.(2015)** determined performance indices of a repeated sprint test (RST), and examine their relationships with performance indices of a repeated jump test (RJT) and with aerobic fitness among trained volleyball players. No significant correlations were found between performance indices of the RST and RJT. Significant correlations were found between PD, IS, and TS in the RST protocol and predicted peak VO2. No significant correlations were found between performance indices of the RJT and peak VO2. The findings suggest that a selection of repeated activity test protocols should acknowledge the specific technique used in the sport, and that a distinct RJT, rather than the classic RST, is more appropriate for assessing the anaerobic capabilities of volleyball players. The findings also suggest that aerobic fitness plays only a minor role in performance maintenance throughout characteristic repeated jumping activity of a volleyball game. **Davila-Romero C et.al. (2015)** identified fitness and game performance profiles, assessed the relationship between these profiles, and also assessed the relationship between individual player profiles and team performance during play. They showed a relationship between both types of profile. Then, linear regression revealed a moderate relationship between the number of players with a high volleyball fitness profile and a team's results in the championship. They concluded that their findings may enable coaches and trainers to manage training programs more efficiently in order to obtain tailor-made training, identify volleyball-specific physical fitness training requirements and reach better results during competitions. **Woods MA et.al. (2015)** examined factors contributing to jump performance in professional Australian Rules Football (ARF) players. Physical measures included mass, height, age, lower body strength, eccentric utilization ratio and leg stiffness. The HC group demonstrated a higher CMJ velocity and CMJ power when compared to the LC group. Further, the HC group demonstrated 7.5% higher Kleg than the LC group. Spearman's rho correlations demonstrated moderate-large relationships between jump height and strength, velocity and power, while the regression analysis revealed velocity was the sole predictive variable of jump performance. Jumping performance clearly differs within a group of professional ARF athletes. Movement

velocity appears to be an important factor contributing to jump performance; however, lower body power and Kleg are also important for jump performance. **Battaglia G et.al.(2014)** evaluated the influence of 3 years of sport-specific training background (SSTB) on vertical jumping and throwing performance in young female basketball and volleyball players. They reported that During SJ and CMJ with and without arm swing VP group showed a higher vertical jump performance than BP and C ones. In particular we showed that VP exhibited a higher flight time and jump height than C in SJ, CMJ and CMJ-AS tests. Players showed higher performances than C in SCPT and SBOMBT. However, they found only a significant difference in the comparison between BP and C during SCPT. Moreover, we found significant correlations between SBOBMT performances and CMJ-AS jump heights in C and VP groups compared to BP one. They suggest that 3 years of SSTB might be able to promote significant neuromuscular adaptations in volleyball and basketball athletes' maximal power compared to age-matched control subjects. **Sterkowicz P. K. et.al.(2014)** investigated that whether and how age, body height, body mass, body mass index and results from fitness tests are related to sport skill level and gender of the participants of the Olympic volleyball tournament. A significant advantage over the groups B and C was found for attack height and block height. In the group A, the differences between the results obtained for women and men in the ranges of attack and block with respect to the net height were not significant. Mean range of block jump did not match up to attack jump, particularly in women. The application of PNN network showed that age, BMI, relative attack jump and block jump are good predictors of sport results. The percentage of properly classified players in the group of men was lower than in women. Big differences were found at the lower level of sport results: A, B and C. They concluded that selection for national teams should take into consideration the players with long competitive experience with adequate weight/height ratios, who exhibit good training adaptations to jumping exercise. **Dal Pupo J et.al. (2014)** showed excellent test-retest reliability for the maximal jump height, mean vertical jump height and fatigue index. Peak lactate showed moderate reliability. Large correlations were found between the mean height of the first four jumps of CJ30 and the peak power of the Wingate, between the mean vertical jump height of CJ30 and the mean power of the Wingate and between the lactate peak of CJ30 and Wingate. A moderate correlation of fatigue index between CJ30 and the Wingate was found. The continuous jump is a reliable test and measures some of the same anaerobic properties as WAnT. The correlations observed in terms of anaerobic indices between the tests provide evidence that the CJ30 may adequately assess anaerobic performance level. **Carling C and Collins D (2014)** placed more in the context of the physical testing and subsequent benchmark profiling of the youth player within elite academy talent identification and development processes. This point is further strengthened by the current media debate at the time of writing on the development of elite youth football players in England and the Elite Player Performance Plan or EPPP(Elite Player Performance Plan. London: Author) published by the English Premier League as part of a vision for the future development of youth football in the League and throughout the English professional game. The EPPP recommends the implementation of a national database to enable comparison of Academy player performances against national physical testing "benchmark" profiles. In continuing the above debate, this letter questions the real-world utility and potential pitfalls of nationwide athletic benchmark profiling programmes for elite youth football. **Robertson S et.al.(2014)** develop a physiological performance and anthropometric attribute model to predict Australian Football League draft selection. Data was obtained from three Under-18 Australian football competitions between 2010 and 2013. Logistic regression models showed multistage fitness test, height and 20m sprint time as the most important attributes in predicting Draft success. Rule induction analysis showed that players displaying multistage fitness test scores of >14.01 and/or 20m sprint times of <2.99s were most likely to be recruited. High levels of performance in aerobic and/or speed tests increase the likelihood of elite junior Australian football players being recruited to the highest level of the sport. **Nikolaidis PT (2013)** examined the prevalence of overweight/obesity, and the relationship between body mass index (BMI), body fat percentage (BF) and physical fitness in adolescent and adult female volleyball players. They showed BMI cut-off points, 27.5% of adolescent and 12.3% of adult participants were classified as overweight, with the prevalence of overweight being higher in girls than in women. BMI was correlated with BF in both age groups. Normal participants had superior certain physical and physiological characteristics than those who were overweight. For instance, normal girls and women had higher mean power during WAnT than their overweight counterparts. Except for flexibility, BMI and BF were inversely related with physical fitness.The findings confirmed the negative effect of overweight and fatness on selected parameters of physical fitness. The prevalence of overweight in adolescent volleyball players was higher than in general population, which was a novel finding, suggesting that proper exercise interventions should be developed to target the excess of body mass in youth volleyball clubs.

II. Methods:

Selection of sample: For the present study 15 male volleyball players and 15 male football players were selected randomly and they had participated in university competition in 2004 from Jadavpur University. Age group of the subjects was 18-24 years. To find out the physical fitness APHERED Youth Physical Fitness Test were conducted.

III. Criteria Of Measurement Of Physical Fitness:

01. Muscular Strength: Strength is the ability to overcome resistance or to act against resistance (Hardayal Singh, 1991). Maximal contraction power of the muscles is known as muscular strength. The muscular strength is usually measured with respect to individual group of muscles acting together. Muscular strength is tested with the help of dynamometers and/or tensiometers which measure the amount of force exerted in a single effort by a particular group of muscles. The reliable and valid evaluation of hand strength provide an objective index of general upper body strength. The power grip is the result of forceful flexion of all fingers joint with the maximum voluntary force that the subject is able to exert under normal bio-kinetic conditions. The synergistic action of flexor and extensor muscles and the interplay of muscle group is an important factor in the strength of resulting grip. Many factors influences the strength of the grip, including muscles strength, hand dominance, fatigue, time of day, age, nutritional status, restricted motion and pain. **Test**: Pull Ups for Boys (AAHPER test item) **Purpose**: To measure arm and shoulder strength. **Facilities and equipments**: A metal bar approximately 1.5 inches in diameter is placed at a convenient height. However, for the lower age levels a door way gym bar can be used. All times it may be necessary to improvise by using such equipement as a basketball goal support or a ladder. **Procedure:** The bar is adjusted to such height that the student can hang free of the floor. The student should grasp the bar with his palms facing away from his body (overhand grasp). The student should then raise his body until his chin is over the bar and then lower it again to the starting position with his arms fully extended. **Instructions**: You must lift your knees or assist your pull-up by kicking. You must return to the hang position with the arms fully straight. You will not be permitted to swing or snap your way up. **Scoring**: One point is scored each time the student completes a pull up. Part scores do not count, and only 1 trail is permitted unless it is obvious the student did not have a fair chance on his first trial. **Testing personnel**: Researcher conducting the test and one assistant recorded it. (Nelson and Johnson, 1982).

02. Muscular Endurance: The duration for which the muscle groups may perform work maximally is known as muscular endurance. Muscular endurance, depending upon the category of muscular wok, is also divided in two types: endurance of isometric and isotonic muscular contraction. **Test**: bent knee sit ups. **Purpose:** To measure abdominal muscle endurance. **Facilities and equipments:** Mat was used. **Procedure:** The student lies flat on the back knees bent and feet on the floor with the heels no more than 1 foot from the buttocks. The knee angle should be no less than 90 degrees. The fingers are interlocked and placed behind the neck with the elbows touching the floor. The feet are held securely by a partner. The students then curls up to a sitting position and touch the elbows to the knees. This exercise is repeated as many times as possible in the time requirement. **Instructions:** 1. Subject's fingers must remain interlocked and in contact with the back of the subject's neck at all times. 2. Subject's curl up from the starting position, but they may not push off the floor with elbow. 3. When they return to the starting position their elbows must be flat on the floor or mat. **Scoring:** One point is scored for each correct sit-up. The score is the maximum number of sit-ups completed. The score is the maximum number of sit ups completed in one time continuously. Three trails were given. Best of three trails was final score in number. **Testing personnel**: Researcher was conducting the test and an assistant recorded it. (Nelson and Johnson, 1982; Barrow and McGee 1979).

03. Cardiovascular Endurance: Cardiovascular endurance may be defined as the ability of heart and lungs to take in and to transport adequate amount of O2 to the working muscles for activities that involved large muscle masses to be performed over long periods of time. Cardiovascular endurance has many synonyms like cardio-respiratory endurance, circulatory respiratory endurance, cardiopulmonary endurance etc. (Kansal, 1996) The direct testing of cardio-vascular endurance is made by measuring one's aerobic power or maximum oxygen uptake while indirectly it is measured with the help of long duration activities like middle/long distance running, cycling, swimming etc. **Test**: 600 yards run and walk test. **Purpose:** To measure cardiovascular endurance. **Facilities and equipment:** A football field, four stamp and stopwatch. **Procedure:** Students run in group of six persons. Students may inter space running with periods of walking and should be encouraged to pace themselves. **Instructions:** Run 3 times around the square which had 50 yard arm starting and finishing line is at same point. **Scoring:** The score is the elapsed time in minutes and seconds. **Testing Personnel:** One starter gave start, six trained testers operate the stopwatch and call out the times and one assistant was recorded all the scores. (Barrow and McGee 1979)

04. Speed: One's ability to perform successive movement of the same pattern at a fast rate is speed. Speed may also be defined as rapidity with which a movement or successive movements of the same kind may be performed by an individual. Speed of muscle contraction is an inherited quality but it can be greatly improved

through training by proper techniques and practicing speedy movement and their proper coordination. Speed is measured by dividing distance by time in short runs. **Test:** Speed for 50 -Yard Dash (AAHPER youth fitness test Item). **Purpose:** To measure speed. **Facilities and Equipment:** A football field with same starting line, and finishing line of a 50 yards course and two stopwatches. **Procedures:** i) After a short warm up period the student take a position behind the starting line. For best result 2 students run at the same time in a competitive mood. ii) The starter uses the command, "Are you ready?" and "Go!" The latter is accompanied by a downward sweep of the arm as a signal to the timer. iii) The students run across the finish line. iv) 1 trail is permitted. **Instructions:** 1. Student may take any position behind the starting line as they wish. 2. On the command, "Go!" the student can run as fast as he can to cross the finish line. 3. Do not slow up until across the finish line. Then student may slow down gradually. **Scoring:** The score was the elapsed time as indicated in stopwatch between the starting signal and the student crosses the finish line. **Testing personnel**: One starter and 2 timers are needed to administer this test. One assistant scorer did record the times. (Barrow and McGee,1979)

05. Agility: The speed with which an individual may change his body positions or fastness in changing directions while moving is known as agility. It may be defined as one's controlled ability to change body position and direction rapidly and accurately. **Test:** Shuttle Run. (**AAHPER youth fitness test**) **Purpose:** To measure the agility. **Facilities and Equipments:** Two lines 30 feet apart and parallel to each other are placed on the field. Since the student must overrun both of these lines, it is necessary to have several feet more of space at either end. Four blocks of wood, 2 by 2 by 4 inches and stopwatch. **Procedure:** i) The student stands at starting and the lines with the 2 blocks placed at the opposite line. ii) On the signal to start, the student runs to the block, takes one, and returns to the starting line, and places the blocks behind that line. iii) He then returns to the second block, which is carried across the starting line on the way back. iv) Two students run at the same time two trails are permitted. **Instructions**: i) On the signal to "Go!" run as fast as the student can to the opposite line and pick up a block. ii) Student should return the block over the second line where student place it on the floor. iii) Do not throw it. iii) Return for the second block, and this time student may run across the starting line as fast as student can without placing the blocks on the ground. **Scoring:** The score is the elapsed time recorded in seconds, for the better of two trails. **Testing personnel:** One starter starts this. Two trained tester taken time and one assistant record the score. (Barrow and McGee 1979)

06. Power: Ability to release maximum muscular force in an explosive manner in the shortest duration is known as muscular power, for example, standing broad jump or vertical jump performance. **Test**: Standing Long Jump. **Purpose:** To measure power. **Facilities and Equipment:** A measuring tape and a mat. Space on the floor or an outdoor jumping pit. **Procedure:** The student stands behind a take off line with his feet several inches apart. Before jumping the student dips at the knees and swings the arms backward. He then jumps forward by simultaneously extending the knees and swinging the arms forward. Three trails are permitted.

Measurement is form the closest heel mark to the takeoff line. Indoor administration is best accomplished by placing a tape measure on the floor at right angles to the takeoff line and permitting the student to jump along the line. Measurement can then be made by sighting across the tape to the point of the jump. **Instructions:** Must take off from both feet simultaneously, jump as far forward as possible, and land on both feet. Try not to fall backward after the landing. You can jump further by crouching before the jump and swinging your arms. **Scoring:** The score is the distance between the take off line and the nearest point where any part of the students body touches the floor. It is measured in feet and inches to the nearest inch. Only the best trail is recorded. **Testing personnel**: Two testers needed to administer this test and one scorer did record the distance. (Barrow and McGee 1979)

IV. Statistical Analysis:

To find out the relationship of Kabaddi performance to selected coordinative abilities namely orientation ability, differentiation ability, reaction ability, balance ability and rhythmic ability. Product moment correlation was computed. For testing the hypothesis the level of significance was set at 0.05.

V. Results:

Findings regarding selected physical fitness components is presented in the following table.

TABLE -1: Mean of components of physical fitness of Volleyball and football players

	Pull ups	Sit ups	Shuttle run	Standing broad Jump	50 Yard run	600 yard run & walk
Volleyball Player	5.33	39.86	19.32	6.90	6.7	1.82
Football Player	4.87	38.73	19.78	6.78	6.99	1.85

Figure - 01: Mean comparison of physical fitness variables

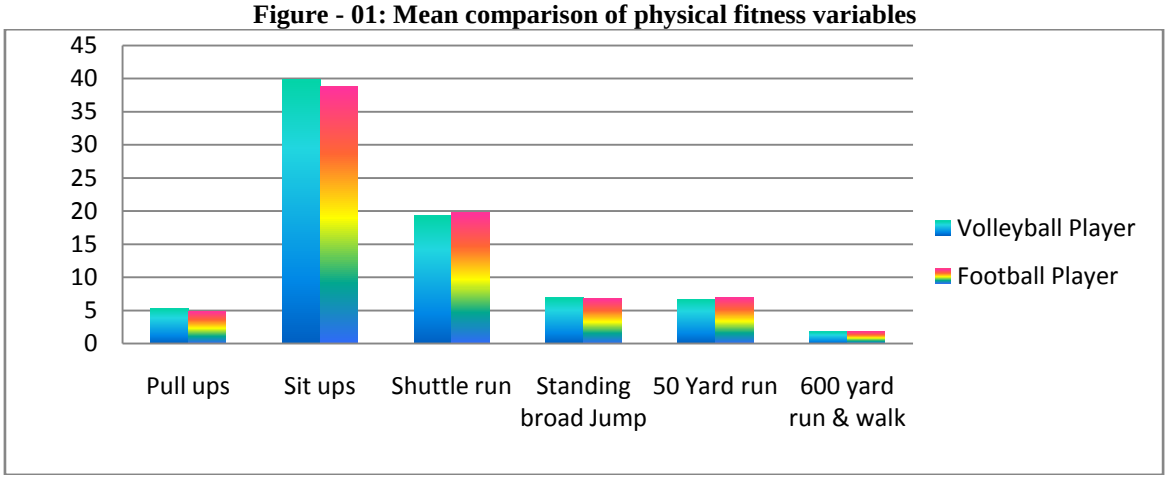

TABLE -2: t-value of components of physical fitness of Volleyball and football players

	Pull ups	Sit ups	Shuttle run	Standing broad Jump	50 Yard run	600 yard run & walk
t-value	0.8692	0.8309	1.3529	0.5985	2.0878	0.2740

VI. Result And Discussion:

Finding reveals that muscular strength of football player (5.33 times/min. pull ups) was higher than volley ball player (4.87 times/min. pull ups), the muscular endurance of football player (39.86 times sit ups) was higher than volleyball player (38.73 times sit ups), agility of football player (19.32 sec.) was higher than volleyball player (19.78 sec.), explosive leg strength of football player (6.90 mts.) was higher than volleyball player (6.78 mts.), Speed of football player (6.70 sec.) was higher than volley ball player (6.99 sec.) and also cardiovascular endurance of football player (1.82 min.) was higher than volleyball player (1.82 min.) but the difference in agility and speed were significant at 0.05 level. The result may be due to more involvement in more labour intensive activity of football players than volleyball players.

VII. Conclusion

The physical fitness of football player was higher than the volleyball player.

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