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Original Research Article

A Study on Physical Fitness and Cardiovascular Endurance of U-17 Subroto Cup Boys Football Player of West Bengal

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Abstract

Objective: The main objective of this study was to measured and to analysed the status of selected Physical Fitness and Cardiovascular Endurance of Subroto Cap football players. ***Subjects:*** Total 22 Boys Subroto Cup football players were randomly selected from Bari High School, purulia, in West Bengal. ***Methods:*** The present study was conducted on 22 Boys Subroto Cop football players of Bari High School, Purulia in West Bengal. The age group of subjects was from 14 to 17 years. The Physical Fitness (Speed, Explosive Strength, and Agility) and Cardiovascular Endurance was measured through several standardized field tests. ***Statistical analysis:*** The statistics procedures were followed to study the selected Physical Fitness and Cardiovascular Endurance variables of football players. As statistical calculation, Mean and Standard Deviation test was used through SPSS. ***Result:*** The findings indicate that the Physical Fitness (Speed, Explosive Strength and Agility) was 7.36 ± 0.48, 1.86 ± 0.22 and 24.79 ± 0.60. The Mean ± SD of Cardiovascular Endurance was 89.36 ± 5.35. The result shows the Subroto Cup Boys Football Players were average in Physical Fitness however found strong in Aerobic capacity. ***Conclusion:*** Overall, the study concludes that Physical Fitness, and Cardiovascular Endurance of Subroto Cup football players of Bari High School demonstrate strong Cardiovascular Endurance. They show comparatively weaker performance in Speed, Explosive Strength, and Agility. Thus, the findings highlight the importance of designing balanced training programs that emphasize sprint training, plyometric exercises, and agility drills, while maintaining endurance levels.

Key words: Physical Fitness, Cardiovascular Endurance, under-17 years Subroto Cup Boys, football players.

INTRODUCTION

Physical Fitness:

Physical Fitness is used in the context of two meanings- General fitness (a state of health and well-being) and Specific fitness (the ability to perform specific sports of occupational skills) Physical Fitness can be further subdivided into five categories Cardiovascular Endurance, Muscular Endurance, Muscular Strength, Flexibility, and Body Composition. Physical fitness is the capacity of the heart, blood vessels, lungs, and muscles to function at optimum efficiency (Tony Callin, 2019).

Emphasizing Physical Fitness in education promotes overall well-being, reduces health risks enhance mental health, and instils lifelong habits for maintaining a healthy lifestyle. Football is one of the most popular Games and Sports physically demanding in the world. It requires high levels of aerobic endurance, speed, strength, agility, and skilful coordination. At the grassroots and youth level, especially in the under 17 (U-17) category, the development of physical fitness and cardiovascular endurance plays a significant role in long-term performance enhancement. (Thomas, 1964).

Flexibility:

Flexibility is the ability to stretch muscles, tendons and ligaments to maximum which connect the bones with joints. Good flexibility refers a wide range of movement and the ability to move the different joints without restriction. (Mondal, Lepcha, & Bapari, 2025).

Balance:

Balance **is** the part of physical activity that focuses on maintaining balance both while standing still and while moving. Improving our balance can help us to

avoid falls and potential injury. The static balance of children of the age group of 14 years. Significantly improve of with their age and the improvement of balance of boys is higher than girls**.** (Saibya, Lepcha, & Ch. Ghosh 2024).

Cardiovascular Endurance:

Football players need to be at the highest level of cardiovascular endurance due to the demands of their sport. It is very important for a player's physical ability to manage in producing high intensity intermittent bouts during games that last for 60-120 minutes (Harrison, 2015).

Objective of the Study:

The main objective of this study was to measured and analysed the status of Physical Fitness and Cardiovascular Endurance of U-17 Year Subroto Cup Boys Football players of West Bengal.

METHODOLOGY

Subject of the Study

The present study was conducted on 22 Boys Subroto cup football players of Bari High School, Purulia in West Bengal. The age group of subjects was from 14 to 17 years. The selected subjects were the active footballers and had represented their school in the Subroto Cup Football Championship. The participants were physically active, regularly attending training sessions, and having no major health issues. The Physical Fitness (Speed, Explosive Strength, and Agility) and Cardiovascular Endurance was measured through several standardized field test.

The selected criterion measures are categorized as Personal Data and Physical Fitness.

Table No-1: Personal Data

Variables	Instrument Used	Unite of Measurement
Age	Birth Certificate	Year (Year)
Height	Stadiometer, Measuring tape	Centimetre (Cm)
Weight	Digital Weighing Machine	Kilograms (Kg)

Table No-2: Physical Fitness Component Represented the Physical Fitness Components and Physiological Fitness Components

Variables		Test Administered	Instrument	Unit of Measurement
Physical Fitness Component	Speed	50 M Dash	Stopwatch Cones	Seconds (s)
	Explosive Strength (Leg Power)	Standing broad jump	Measuring tape chalk	meters (m)
	Agility	Zig –Zag run test	Stopwatch Cones	Seconds (s)
Physiological Fitness Component	Cardiovascular Endurance	Harvard steps test	Step/platform(20inches) Stopwatch	Fitness Index

Table No-3: Scoring of the Physical Fitness and Physiological Fitness Component

Variables		Table Scores					Reference
		Excellent	Above Average (Good)	Average	Lower Average	Poor	
Physical Fitness Component	Speed	> 6.5	6.6-7.0	7.1-7.5	7.6-8.0	<8.5	AAHPERD
	Explosive Strength (Leg Power)	>250	231-250	211-230	191-210	<190	AAHPERD
	Agility	>16.1	16.1-16.7	16.8-18.2	18.3-19.3	<19.3	Mackenzie, B. (2005)
Physiological Fitness Component	Cardiovascular Endurance	>96	83-96	68-82	54-67	<54	Brouha *et al.,* (1943)

Design of the Study

The present study was designed to evaluate the Physical Fitness Components and Cardiovascular Endurance of 22 Boys Subroto Cup football players aged 14 to 17 years. A descriptive survey research design was adopted as it aimed to collect, analyse and interpreted date regarding the current status of the players' fitness levels without manipulating any variables.

Procedure for Collecting Data

The data collection procedure was conducted methodically to ensure the accuracy, reliability and validity of the results. All data were collected on the school playground of Bari High School, Purulia in West Bengal under standardized conditions. Through the following steps were followed during the data collection process.

Preparation before data collection

- **Permission:** Formal permission was obtained from the school authorities to all Study.
- **Briefing of Subject:** The objectives and procedure of the test were explained to all 22 participants to ensure their cooperation and understanding.
- **Health Check:** players were asked to confirm they were free from any injury or illness.
- **Equipment Setup:** all tools such as stopwatch, measuring tapes cons, and weighing machine were checked for proper functioning.
- **Warm-up session:** Each participant performed a 10-minute general warm-up before starting the tests.

Statistical Analysis:

The following statistics procedures were followed to analysed the selected Physical Fitness and Cardiovascular Endurance Variables of football players. As statistical calculation, Mean and Standard Deviation test was used by using SPSS.

RESULT

The result of the study of selected physical fitness and cardiovascular endurance and the statistical analysis of Subroto Cup boys football players, (Age Group 14-17 years).

Table-4: Descriptive Statistic (Mean ± SD) of Personal Data of Subroto cup football players

Subject (22)	Variables	Mean	SD
Subroto cup football players	Age (years)	15.59	0.98
	Height (cm)	163.41	6.27
	Weight(kg)	52.20	5.95

Thus table -4, Shows the Mean ± SD value of Age, Height, and Weight of Subroto Cup Football Players were 15.59 ± 0.98, 163. 41± 6.27 and 52.20 ± 5.95 respectively.

Graphical representation of Mean and SD value of personal data of Subroto cup football players.

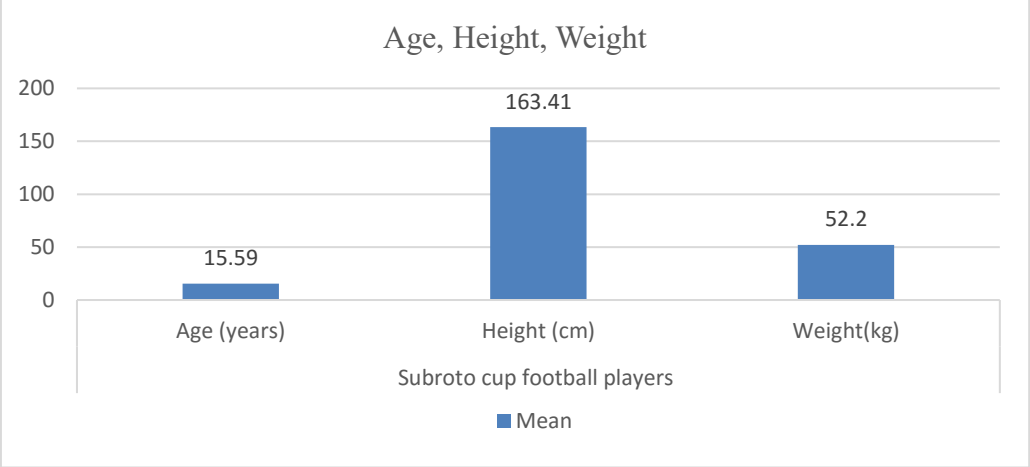

Figure No-4: Graphical Presented of Age, Height & Weight Mean and SD value of Personal Data of Subroto Cup football players

4.2 Physical Fitness Components and Physiological Fitness Components

The Mean, SD and Maximum and Minimum Physical Fitness and Physiological Fitness it is components of Subroto Cup boys football players were presented in table no 5.

Table No-5: Descriptive Statistic (Mean ± SD) of Physical Fitness and Physiological Fitness Components of Subroto cup football players

Name of the variables		Mean	SD	Maximum	Minimum
Physical Fitness Component	Speed (s)	7.36	0.48	8.50	6.50
	Explosive Strength (m)	1.86	0.22	2.26	1.17
	Agility (s)	24.79	0.60	25.69	22.94
Physiological Fitness Component	Cardiovascular endurance	89.38	5.35	96.77	79.15

It appears from table no-5 that the Mean ± SD value and maximum and minimum of Speed, Explosive strength, Agility and Cardiovascular Endurance of Subroto cup boys football players were 7.36 ± 0.48, 1.86 ± 0.22, 24.79 ± 0.60 and 89.38 ± 5.35 respectively.

Figure-5

Graphical Representation of Mean, SD, Minimum & Maximum value of Speed, Explosive Strength, Agility and Cardiovascular endurance of Subroto cup boys football players.

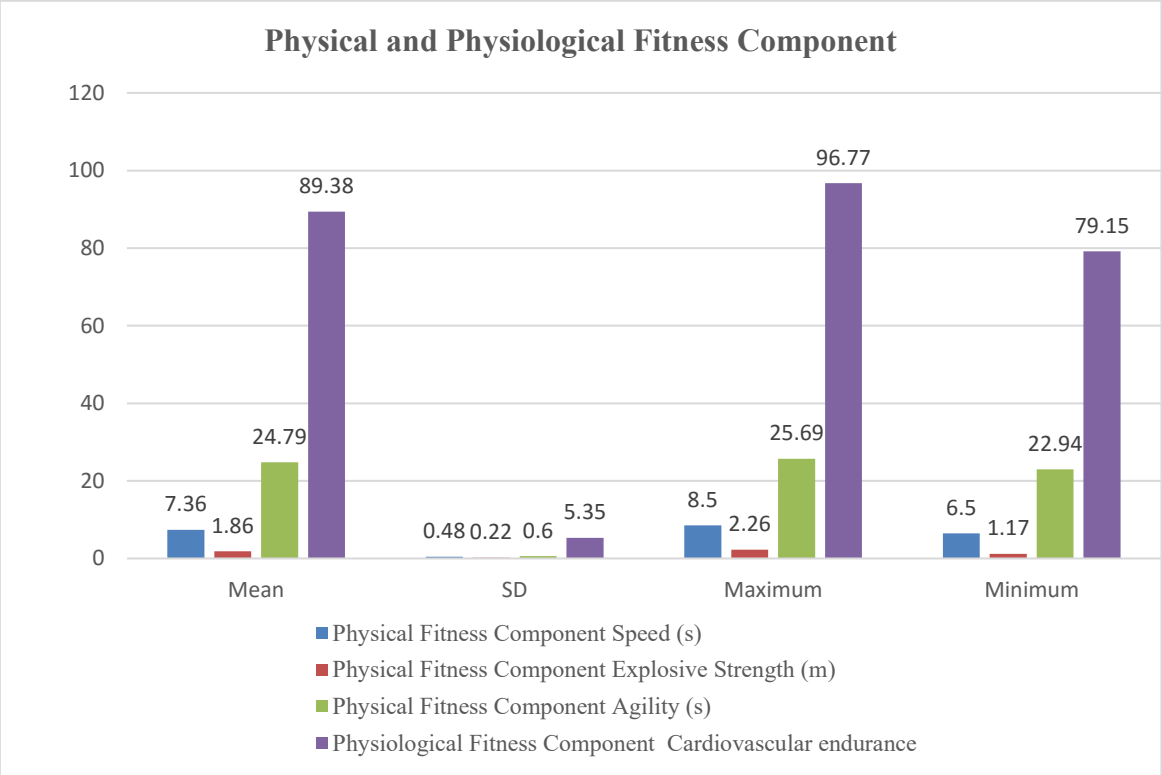

Figure No-5: Graphical Presented of Speed, Explosive Strength, Agility and Cardiovascular Endurance Mean and SD value of Subroto cup football players

DISCUSSION

The present study assessed the Physical Fitness and Cardiovascular Endurance of U-17 subroto Cup football players from Bari High School, Purulia in West Bengal. The components examined included speed, explosive strength, agility, and cardiovascular endurance. The findings provide important insights into the overall fitness profile of the players.

Speed (50 m dash): The Mean sprinting time was found 7.36 seconds, with a Standard Deviation which 0.48, indicates that the players performed at an average level when compared with reported benchmarks for youth football players. Elite U-17 players often achieve times below 7 seconds, suggesting that the participants require further sprint-specific training to match higher competitive standards. The relatively low standard deviation highlights a uniform level of performance among the group (AAHPERD, 1885).

Explosive strength (standing broad jump):

The average jump distance of 1.86 meters reflects moderate lower-body power. This value is below the distances typically reported in elite youth football populations, which frequently exceed 20 meters. Explosive strength is essential for acceleration, vertical jumping, and overall dynamic performance in football. And similarly, the plyometric training could further enhance performance (AAHPERD, 1885).

Agility (zig-zag run):

The mean agility score was 24.79 seconds, with a standard deviation of 0.60. This indicates average agility performance, with most players clustered near the mean. The minimum (22.69 sec) and maximum (25.59 sec) values suggest consistency but also highlight a performance gap that may be reduced through agility drills, coordination training, and sports specific movement exercises. (Mackenzie 2005).

Cardiovascular endurance (Harvard Step Test):

The mean endurance score of 89.38, with a standard deviation of 5.35, indicates a relatively strong aerobic capacity among the players. Cardiovascular Endurance is critical for maintaining performance throughout a 90-minute match. (Brouha, 1943).

CONCLUSION

The present study was undertaken to evaluate the Physical Fitness and Cardiovascular Endurance of U-17 Subroto Cup football players of Bari High School, Purulia. A total of 22 players were tested on selected components of physical fitness, namely speed, explosive strength, agility, and cardiovascular endurance

Speed:

The players recorded a mean sprinting time of 7:36 seconds in the 50 meters is classified as lower than the standard value, normative data (where score above 7.6-8.0) This indicates that the players require improvement in speed performance (AAHPERD, 1885).

Explosive Strength (Leg Power): The mean of standing broad jump distance score of 1.86 meters is classified as lower than the benchmark, normative data (where score above 191-210) suggesting a deficiency in explosive strength of the legs. (AAHPERD, 1885).

Agility:

The mean agility score of 24.79 seconds is classified as 'Poor' according to the Mackenzie (2005) normative data (where scores above 19.3 seconds), indicating a clear need for targeted agility training.

Cardiovascular Endurance:

The mean Cardiovascular Endurance score of 89.18 is classified as 'Good' according to the (Brouha 1943) (rating score between 83- 96), indicating that the players possess good aerobic capacity and can sustain prolonged activity.

Overall, the study concludes that the U-17 Subroto Cup football players of Bair High School demonstrate strong cardiovascular endurance, they show comparatively weaker performance in speed, explosive strength, and agility.

Thus, the findings highlight the importance of designing balanced training programs that emphasize sprint training, plyometric exercises, and agility drills, while maintaining endurance levels. Improving these components will contribute to better match performance and overall physical development of the players.

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