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Comparative study on selected physical fitness variables among different team games players

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Abstract
Purpose of the study was to compare the physical fitness variables of team game playesrs i.e. soccer, cricket, and field hockey intercollegiate 45 male players. The age of the subjects were ranging 18-25 years and the selected three groups (soccer, cricket and field hockey) containg 15 subjects from H.N.B.G.U. Srinagar Garhwal in each group. Collected data on the Physical Fitness variables i.e. muscular strength, muscular endurance, agility, and speed was analysed through descriptive statistics, one-way anova, and post-hoc (LSD) test at the level of confidence 0.05. No significant differences were founded in physical fitness variable i.e. muscular endurance, speed, and agility whereas significant differences was founded only in muscular strength between soccer, cricket, and field hockey male intercollegiate players. On the basis of the results and findings it was concluded that cricket players have better muscular strength in comparison to soccer and field hockey male intercollegiate players.

Keywords: Fine motor skills, fitness orgasm, physical condition, sports performance

Introduction
There are numerous factors which are responsible for the performance of a sportsmen in team games. Likewise, human body composition and physical fitness factors that plays a governing role in team game sports performance at elite as well as professional level. Further, the success of team sports also involves physiological and physical well-being factors which are prerequisite for excellence in sports. In realism, the combination of physical fitness aspects related to health and skills are influencing sports and team games aspirants. Unlike, most of the team game sports performance demands are depending upon a greater amount of collective and co-operative fitness orgasm in addition to accurate, correct and fine motor skills, tactical qualities, playing style, seasonal time, and individual and team morale respectively. But, "The complex nature of physical fitness includes muscular strength, muscular endurance, cardiorespiratory endurance and the most important of them is the cardiorespiratory endurance" (Karpovich and Wayne, 1971) [13]. Further, Das and Sharma (2016) [2] also described the difference in endurance in different team games (Football, Volleyball, Basketball). Whereas, Secora *et al*., (2004) [15] repoted about the physical abilities varriations between the national collegiate football players as per their playing positions by matching them with normative data i.e., from 1987 to 2000.
However, Jameel *et al*., (2019); Kariyawasam (2019) [6]; Mandrekar (2017) [8]; Abdullah *et al*., (2016); Mishra *et al*, (2015) [9]; and, Gaurav *et al*., (2011) [20] were investigated and compared the physical fitness components and sports performance variables among different team games respectively. And, the results and findings of the above mentioned studies were also stressed on the related evidences that every team game required different combination of dominat physical fitness variables as per the pace and play of the game in contrast to, this oppinionnaire and understanging that every team game has similar kind of physical fitness combinations. Singh and Rajan (2015) also determinded that the players of different team games i.e., soccer and volleyball were having similar cardiovascular endurance status. Furthermore, Kumar *et al*., (2018) compared the physical fitness variables between university and intercollegiate basketball players and identified that university basketball players have better physical fitness than intercollegiate players which means different level of game demands different level of

physical fitness condition. Daulatabad *et al*., (2020) [3] founded better upper body strength and endurance in basketball players and sprinters were having better lower body strength respectively. Ananth (2018) [1] reported the differences between the field hockey and cricket school level players in speed, agility, leg explosive power and cardiorespiratory endurance.

In fact, the team games requires distinctive skills, tactics, and movement patterns, they may all have similar physiological demands such as high aerobic power, high agility, muscular strength and increased anaerobic capacity. Moreover, the certain physical fitness components such as motor skills, speed, body flexibility, endurance, body strength, explosive power, agility, and leg strength can provide effective performance in sports such as football, cricket, and field hockey. For this reason, the main purpose of this study was to compare the selected physical fitness variables between soccer, cricket and field hockey inter-college players of Hemvati Nandan Bahuguna Garhwal University, Srinagar, (Uttrakhand).

Purpose

The purpose of the study was to compare the selected physical fitness variables i, e., muscular strength, muscular endurance, speed, and agility between male soccer, cricket, and field hockey intercollegiate players of Hemvati Nandan Bahuguna Garhwal University, Srinagar, (Uttarakhand).

Hypotheses

It is hypothesized that, there will be no significance difference on selected physical fitness variable viz. muscular strength, muscular endurance, speed, and agility among male soccer, cricket and field hockey players at intercollegiate level.

Methodology

Design: Cross sectional study design was consisting of equal numbers of subjects i.e. cricket, soccer and field hockey (n = 45 intercollegiate sportsmen and 15 subjects in each group).

Selection of Subject: Total 45 male subjects were selected from three groups that were cricket, soccer & field hockey players at intercollegiate level of H.N.B.G.U. studying at Birla Campus Srinagar (15 from each game) was selected as subjects. The age of subjects ranged from 18-25 years. The purposive sampling technique was used in selection of subjects in the aspects of the physical fitness measurements.

Inclusion & Exclusion Criteria

Inclusion Criteria

- Sample: Team Game Players
- Game: Cricket, Soccer and Field Hockey players
- Gender: Male
- Age Range: 18-25 Years
- Level of Participation: Intercollegiate
- Institution: H.N.B.G.U. Srinagar Garhwal (Birla Campus)
- Language of Research: English

Exclusion Criteria

- Sample: Individual game players
- Game: Other than cricket, soccer and field hockey players
- Gender: Female
- Age Range: Less than 18 years & more than 25 years
- Level of Participation: Less & more than intercollegiate level
- Institution: Other than H.N.B.G.U. Srinagar Garhwal (Birla Campus)
- Language of Research: Non-English

Selection of Variables

S. No.	Dependent Variables	Independent Variables
1.	Muscular Strength	Team Games
2.	Muscular Endurance	Soccer
3.	Speed	Cricket
4.	Agility	Field Hockey

Criterion Measures

S. No.	Variable	Tests	Scoring
1.	Muscular Strength	Pull-ups Test	Repetitions
2.	Muscular Endurance	One Minute Sit-ups Test	Repetitions
3.	Speed	50 Yard Dash	Nearest to 0.01 Seconds
4.	Agility	10 Meters X 4 Shuttle Run Test	Nearest to 0.01 Seconds

Collection of Data

Physical fitness variables data were taken on the athlectic ground of the university with the permission of the university authorities. Further, the data on selected physical fitness variables tests were collected in a structured manner by considering the subjects engagement in the university.

Statistical Technique

Descriptive statistics, one-way anova, and post-hoc (LSD) test were applied to assess and compare the selected physical fitness variables between cricket, soccer and field hockey intercollegiate male players and the level of significance was set at 0.05 level respectively.

Table 1: Analysis of Physical Fitness Variables between Soccer, Cricket and Field Hockey Intercollegiate Players of H.N.B.G. University

Variable	Games	Mean	S.D.	Degree of Freedom		*F*-ratio
				Between Group	Within Group	
Muscular Strength	Soccer	12.80	6.30	2	42	6.08
	Cricket	7.46	2.09			
	Field Hockey	8.60	3.77			
Muscular Endurance	Soccer	32.26	6.58	2	42	1.62
	Cricket	35.06	5.71			
	Field Hockey	30.80	7.40			
Speed	Soccer	6.80	0.29	2	42	0.72
	Cricket	6.91	0.30			
	Field Hockey	6.81	0.24			

Agility	Soccer	9.97	0.50	2	42	2.24
	Cricket	10.15	0.44			
	Field Hockey	9.81	0.37			

N=45

*Significant at 0.05 level. F 0.05 (2, 42) = 3.23

Table-1.0 hilights the mean and standard deviation of muscular strength (12.80±6.30), mean and standard deviation of muscular endurance (32.26±6.58), mean and standard deviation speed (6.80±0.29), and mean and standard deviation of agility (9.97±0.50) of physical fitness variables of soccer intercollegiate players. further, the table highlights the mean and standard deviation of muscular strength (7.46±2.09), mean and standard deviation of muscular endurance (35.06±5.71), mean and standard deviation of speed (6.91±0.30), and mean and standard deviation of agility (10.15±0.44) of cricket intercollegiate players. further, the table also highlights the mean and standard deviation of muscular strength (8.60±3.77), mean and standard deviation of muscular endurance (30.80±7.40), mean and standard deviation of speed (6.81±0.24), and mean and standard deviation of agility (9.81±0.37) of field hockey intercollegiate players. Furthermore, the analysis of one way ANOVA of selected physical fitness variables between soccer, cricket and field hockey intercollegiate players as indicated in table no – 1.0 were found to be insignificantly on muscular endurance, speed and agility, as the obtained F – value of muscular endurance (1.62), speed (0.72), and agility (2.24), were lesser than the required value of 3.23 at 0.05 level of confidence but found significant on muscular strength, as the obtained F-value (6.08) is higher than required value 3.23 at 0.05 level of confidence.

Thus, no significant difference was found between the soccer, cricket and field hockey intercollegiate players on muscular endurance, speed and agility but found significant difference on physical fitness variable muscular strength.

Further, the graphical representation of selected physical fitness variables i.e., muscular strength, muscular endurance, speed, and agility of physical education intercollegiate and non-physical education intercollegiate sportsmen are shown in figure no. 1.0, 1.1, 1.2, and 1.3 respectively.

Table 1.1: Post-Hoc (LSD) on Muscular Strength among male Soccer, Cricket and Field Hockey Intercollegiate Players of H.N.B.G. University

Dependent Variable	(I) game	(J) game	Mean Difference (I-J)	Standard Error	C.D.
Muscular Strength	Soccer	Cricket	-4.20*	1.61	0.013
		Hockey	1.13	1.61	0.486
	Cricket	Soccer	4.20*	1.61	0.013
		Hockey	5.33*	1.61	0.002
	Field Hockey	Soccer	-1.13	1.61	0.486
		Cricket	-5.33*	1.61	0.002

Post-Hoc pair-wise mean comparison through LSD of the variable muscular strength among soccer, cricket and field hockey intercollegiate level players of H.N.B.G. University is exhibited in Table no 1.1. The critica difference values which are less than 0.05 in bold figures with * denotes that the mean of cricket players less than the mean of soccer players and hockey players on the variable muscular endurance at the level of significance 0.05. Further, it was interpreted that the muscular strength of male intercollegiate cricket players is greater than soccer and field hockey players of H.N.B.G. University Srinagar Garhwal. Whereas, there is no statistically significant difference between male soccer and field hockey player on their muscular strength at intercollegiate level.

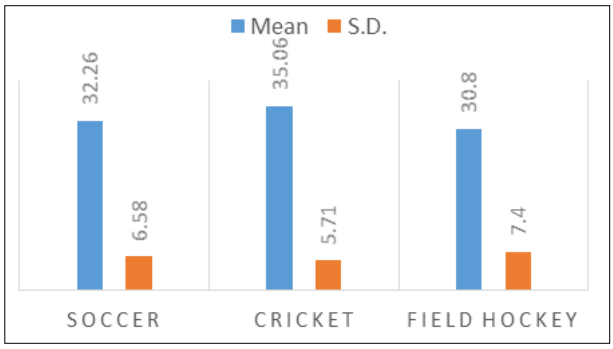

Fig 1.1: Graphical Representation of Mean and Standard Deviation on Muscular Endurance between Soccer, Cricket and Field Hockey Intercollegiate Players

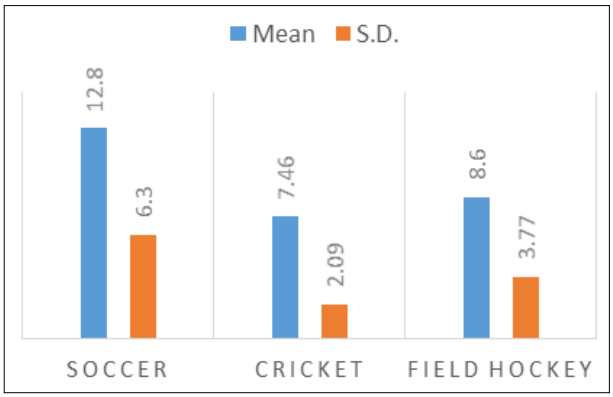

Fig 1: Graphical Representation of Mean and Standard Deviation on Muscular Strength between Soccer, Cricket and Field Hockey Intercollegiate Players

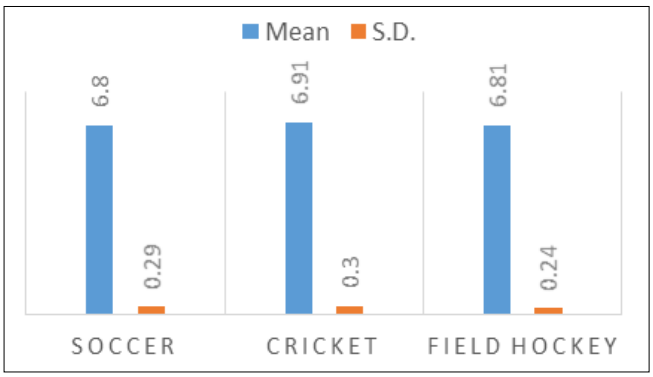

Fig 1.2: Graphical Representation of Mean and Standard Deviation on Speed between Soccer, Cricket and Field Hockey Intercollegiate Players

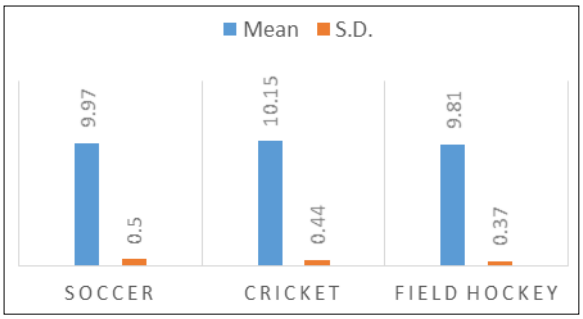

Fig 1.3: Graphical Representation of Mean and Standard Deviation on Agility between Soccer, Cricket and Field Hockey Intercollegiate Players

Discussion of Findings

This study was conducted to compare the physical fitness variables of team game players i.e. soccer, cricket and field hockey among male intercollegiate players of Hemvati Nandan Bahuguna Garhwal University, Srinagar, Uttarakhand (India). The descriptive statistics of table-1.0 exibited that the soccer male subjects were founded higher mean value on muscular strength. While, cricket players have higher mean value on muscular endurance, speed, and agility with respect to soccer and field hockey players. Further, the analysis of ANOVA revealed no significant difference between soccer, cricket and field hockey players on muscular endurance, speed and agility variables. Conversly, a significant difference was found on muscular strength among male soccer, cricket and field hockey intercollegiate players of H.N.B.G.U. university at 0.05 level of confidence, from table no. – 1.0. Furthermore, after applying LSD post-hoc test it was founded that male cricket players have better muscular strength in comparison to male soccer and field hockey intercollegiate players of H. N. B. G. U. university from table no. 1.1. This significant difference in physical fitness variables between selected team games was due to the nature of the activities of these games. As, Mandrekar (2017) [8] identified the similar findings on muscular strength variable that cricket players are better than soccer players at the intercollegiate level. In cricket Muscular strength of shoulder is a very essential component to excel and achive the excellence in batting, bowling and fielding performances. Every cricketer i.e., batsman, bowler, wicket-keeper, and feilder required a great amount of shoulder strength to clear the boundaries, to bowl fast and quick, to catch and recive the ball repeatedly, and to throw accurately from long boundaries respectively. November and Leach (2020) [12] also reviewed the relationship between shoulder strength and throwing velocity in club cricketers and concluded that concentric shoulder strength correlated significantly with throwing velocity. Furthermore, Anand *et al.* (2017) identified that internal rotation and adduction of shoulder plays an important role in bowling and increasing the speed of a bowler. Additionally, a study conducted by Taliep *et al.* (2010) [19] also identified the positive correlation between upper body muscle strength and maximum hitting distance by batsmen.

Practical Application

Fndings of this study will help all the strength conditioning coaches, sports trainers, and sports physiotherapists engaged in cricket to recognise about the fact that upper body strength is more specific for cricketers and in cricket training periodization give preferences to specific shoulder core strength gain.

Conclusion

The findings of this study revealed a statistically insignificant difference founded among selected male subjects in in their physical fitness variables i.e., speed, muscular endurance and agility respectively. Further, the results and findings of this study was concluded that male intercollegiate cricketers' shoulder muscular strength conditioning was better in contrast to field hockey and soccer intercollegiate male players.

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