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Analysis of the Selected Physical Fitness Variables of Winners in Coimbatore District Zonal Team Games on Republic Day

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Abstract

The purpose of the study is to find out the analysis of the selected physical fitness variables of winners Coimbatore District Zonal Team Games on republic day. To achieve the purpose of the present study, Coimbatore District Zonal Team games winners of hockey, football, basketball and handball on the republic day games are selected as subjects at random and their ages ranged from 13 to 17 years The Speed and leg explosive power are selected for this study. The collected data are statistically analyzed by using two way ANOVA 4 x 4 factorial design it is computed and further simple effect test is used. To test the obtained results on the variables, level of significance 0.05 is chosen and considered as sufficient for the study. The result reveals that there is a significant difference in the explosive strength and insignificant differences on the speed among the hockey, football, basketball and handball players of Republic day games. There is a significant difference in the explosive strength and the insignificant differences on speed among the north, south, east and west zones winners of Republic day games. There is a significant interaction difference in the speed and explosive strength and insignificant differences on flexibility among the north, south, east and west zones and zonal winners of hockey, football, basketball and handball players of Republic day games. The 50 metre run and Sargent Vertical Jump *tests are used to measure the selected Physical fitness variables of the players*.

Keywords: Hockey, Football, Basketball and Handball Speed and Leg explosive power.

Introduction

Physical fitness is a crucial pillar contributing a lot for the health of an individual so that it affects our ability to function and be physically active and, at poor levels, is associated with such health outcomes as diabetes and cardiovascular diseases (Institute of Medicine, 2012). Hockey is a popular sport played in more than 132 countries by either sex. The official name is hockey, however, in some countries in order to differentiate from ice hockey it was termed as field hockey. In hockey the players attempt to place a ball into their opponent's goal using wooden sticks. Historical records show that game was played in various antique civilizations and believed to be an ancient sport. The evidences of 4,000 year old drawings in Beni Hasan tombs, in Nile Valley, Egypt confirmed the sport has been played. The Persians, the Romans, the Ethiopians, as well as the Aztecs were played their own variation of the game. Football is also referred to as soccer in some parts of the world, is a high-energy athletic team sport in this new age. It would be a joy to trace the birth and growth of this popular sport. It said that the number of countries that are FIFA members even outnumber the members of United Nations Organizations – another undeniable proof of the game's popularity. Since 1900, football has also been integral part of the greatest sports extravaganza in the world, the Olympics. The game, as we know it today, has been followed in a feverish fashion in Europe, especially in England, for centuries. In fact, the game has been followed by men and women throughout the world. The first recorded game took place as early as A.D. 217 in the town of Derby in England. This particular game was once part of a grand festival that was celebrated by the local folk after the victory over the invading Romans. The tradition bound English men also conducted annual football events ever since. One of them is the Shrove Tuesday football game being played since 1175.

Basketball which originated from America and has been most popular in that country has now become a game of international repute. It is played nearly everywhere in the world. Basket ball is a game much similar to the one played in ancient times by Mayas of Mexico. Basketball was invented by *Dr.James Naismith* in 1891. The first tournament was conducted in the year 1892. The first professional league was formed in the United States in 1899. A soccer ball was earlier used. By 1941, in was changed to the present day molded ball. The courts have also undergone many changes. The

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courts were small and irregular in the beginning. In 1915, the National Joint rules committee was formed to set up single code governing the game. Handball is one of the fastest indoor sports. It has developed from a number of similar games, which were in existence at the start of the 20th century. Handball is a popular team sport played at International level and has been played by both men and women throughout the world. In year of 1898 the Dane Holger Nielson drew up the rules and regulation for modern Handball and published them in 1906, who is known as the "Father of Handball" and he invented the game. These games were played in Central and Northern Europe and in 1926 Standard International Rules were established. In 1928 the International Amateur Handball Federation was established by 11 countries during the Summer Olympic Games. This body later became the present International Handball Federation.

Methods and Materials

The purpose of the study was to find out the analysis of selected physical fitness variables of Coimbatore district Zonal team games winners in republic day games. To achieve the purpose of the present study, Coimbatore district Zonal team games winners of hockey, football, basketball and handball in republic day games were selected as subjects at random and their ages ranged from 13 to 17 years. Only two physical fitness variables were tested to collect the data by using 50 metres run (speed). Standing broad jump (Sargent Vertical Jump) and the data was collected during Coimbatore district inter zone school level tournament. The collected data were statistically analyzed by using Two way ANOVA 4 x 4 factorial design was computed and further simple effect test was used.

Results

The results were presented in the following tables,

Speed

The mean and standard deviation values on speed of different games (Hockey, Football, Basketball & Handball) and different zones (North, South, East and West) have been analyzed and presented in table 1.

Table 1

The mean and standard deviation on speed of different games and different zones

		North	South	East	West
Hockey	**Mean**	7.16	7.20	7.22	7.14
	SD±	0.16	0.15	0.17	0.15
Football	**Mean**	7.12	7.25	7.24	7.18
	SD±	0.15	0.18	0.20	0.16
Basketball	**Mean**	7.38	7.08	7.21	7.20
	SD±	0.06	0.17	0.16	0.19
Handball	**Mean**	7.18	7.15	7.21	7.36
	SD±	0.17	0.16	0.20	0.16

(Scores on 'Speed' are expressed in seconds)

Table 2

Two-factor anova on speed of different games and different zones

Source of Variance	Sum of Squares	df	Mean Squares	Obtained F-ratio
A factor (Games)	0.079	3	0.026	0.907
B factor (Zone)	0.100	3	0.033	1.152
AB factor (Interaction) (Games and Zone)	1.134	9	0.126	4.354*
Error I	6.948	240	0.029	

*Significant at 0.05 level

(Table values required for significance at 0.05 level with df 3 & 240; 3 & 340; and 9 & 112 are 2.64, 2.64 and 1.91 respectively.)

From the above Table, the obtained F-ratio for Factor A (Games) is 0.907, which is lesser than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence. The result of the study indicates that there is insignificant difference between the means of Factor A (Games) on speed. Table above shows that the obtained F-ratio for Factor B (Zone) is 1.152, which is lesser than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence. The result of the study indicates that there is insignificant difference among the means of Factor B (Zone) on speed.

From the above Table, the obtained F-ratio value of interaction factor A x B (Games x Zone) is 4.354, which is greater than the table value of 1.91 with df 9 and 240 required for significance at 0.05 level of confidence. The result of the study shows that there is a significant difference among the means of interaction factor A x B (Games x Zone) on speed. As the main focus is usually on the interaction, it is sufficient to discuss the interaction effect only. Hence, the interaction effect only is discussed. The results of the study indicate that there was a significant difference in the interaction effect [between rows (Games) and columns (Zone)] on speed. Since the interaction effect is significant, the simple effect test is applied as follow-up test and the results are presented in Table 3.

Table 3
The simple effect test scores of four games (rows) and four zones (columns) on speed

Source of Variance	Sum of Squares	df	Mean Squares	Obtained F-ratio
North Zone	0.520	3	0.173	5.989*
South Zone	0.214	3	0.071	2.459
East Zone	0.015	3	0.005	0.169
West Zone	0.465	3	0.155	5.351*
Hockey	0.067	3	0.022	0.774
Football	0.193	3	0.064	2.222
Basketball	0.522	3	0.174	6.015*
Handball	0.426	3	0.142	4.909*
Error	6.948	240	0.029	

*Significant at 0.05 level of confidence
(Table values required for significance at 0.05 level with df 3 and 240 is 2.64)

Table above shows that F-ratio values obtained for north and west zone were 5.989 and 5.351, which was higher than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence. And the F-ratio values obtained for south and east zone were 2.459 and 0.169, which was lesser than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence The result of the study indicates that there was a significant difference between the means of north zone and south zone on speed. The table above shows that the obtained F-ratio value for basketball and handball are 6.015 and 4.909 respectively, which are greater than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence. And the obtained F-ratio value for hockey and football are 0.774 and 2.222 respectively, which are lesser than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence. The result of the study indicates that there is significant difference between the means of basketball and handball teams on speed. As four games and four zones were compared and the obtained F-ratio value is found to be significant in the simple effect for columns and rows, the Scheffe's test is applied as post hoc test to find out the means difference, if any, and the result is presented in Table 4.

Table 4
The scheffe's test for the differences between means of tests on speed (north zone)

Means				Mean Difference	Confidence Interval
Hockey	**Football**	**Basketball**	**Handball**		
7.16	7.12	--	--	0.04	0.21
7.16	--	7.38	--	0.22*	0.21
7.16	--	--	7.18	0.02	0.21
--	7.12	7.38	--	0.26*	0.21
--	7.12	--	7.18	0.06	0.21
--	--	7.38	7.18	0.20	0.21

* significant at 0.05 level

The multiple comparisons showed in table proved that there existed significant differences between the means of football and basketball (0.36). There was no significant difference between hockey and football (0.04), hockey and basketball (0.22), hockey and handball (0.02), football and handball (0.06) and basketball and handball (0.20) at 0.05 level of confidence with the confidence interval value of 0.21.

Table 5
The scheffe's test for the differences between means of tests on speed (west zone)

Means				Mean Difference	Confidence Interval
Hockey	**Football**	**Basketball**	**Handball**		
7.14	7.18	--	--	0.04	0.21
7.14	--	7.20	--	0.06	0.21
7.14	--	--	7.36	0.22*	0.21
--	7.18	7.20	--	0.02	0.21
--	7.18	--	7.36	0.18	0.21
--	--	7.20	7.36	0.16	0.21

* significant at 0.05 level

The multiple comparisons showed in table proved that there existed significant differences between the means of hockey and handball (0.22). There was no significant difference between hockey and football (0.04), hockey and basketball (0.06), football and basketball (0.02), football and handball (0.18) and basketball and handball (0.16) at 0.05 level of confidence with the confidence interval value of 0.21.

Table 6
The scheffe's test for the differences between means of tests on speed (basketball)

Means				Mean Difference	Confidence Interval
North	**South**	**East**	**West**		
7.38	7.08	--	--	0.30*	0.21
7.38	--	7.21	--	0.17	0.21
7.38	--	--	7.20	0.18	0.21
--	7.08	7.21	--	0.13	0.21
--	7.08	--	7.20	0.12	0.21
--	--	7.21	7.20	0.01	0.21

* significant at 0.05 level

The multiple comparisons showed in table proved that there existed significant differences between the means of north and south (0.30). There was no significant difference between north and east (0.17), north and west (0.18), south and east (0.13), south and west (0.12) and east and west (0.01) at 0.05 level of confidence with the confidence interval value of 0.21.

Table 7
The scheffe's test for the differences between means of tests on speed (handball)

Means				Mean Difference	Confidence Interval
North	South	East	West		
7.18	7.15	--	--	0.03	0.21
7.18	--	7.21	--	0.03	0.21
7.18	--	--	7.36	0.18	0.21
--	7.15	7.21	--	0.06	0.21
--	7.15	--	7.36	0.21*	0.21
--	--	7.21	7.36	0.15	0.21

* significant at 0.05 level

The multiple comparisons showed in table proved that there existed significant differences between the means of south and west (0.21). There was no significant difference between north and south (0.03), north and east (0.03), north and west (0.18), south and east (0.06) east and west (0.15) at 0.05 level of confidence with the confidence interval value of 0.21.

Explosive Strength

The mean and standard deviation values on speed of different games (Hockey, Football, Basketball & Handball) and different zones (North, South, East and West) have been analysed and presented in table 8.

Table 8
The mean and standard deviation on explosive strength of different games and different zones

		North	South	East	West
Hockey	**Mean**	0.22	0.23	0.21	0.22
	SD±±	0.01	0.01	0.01	0.01
Football	**Mean**	0.23	0.23	0.25	0.22
	SD±	0.01	0.02	0.02	0.02
Basketball	**Mean**	0.23	0.24	0.22	0.21
	SD±	0.01	0.01	0.01	0.01
Handball	**Mean**	0.23	0.21	0.22	0.21
	SD±	0.01	0.01	0.01	0.02

(Scores on 'Explosive strength' are expressed in centimeters)

The data on explosive strength are analyzed by two-way factorial ANOVA (4x4) and the obtained results are presented in Table 9.

Table 9
Two-factor anova on explosive strength of different games and different zones

Source of Variance	Sum of Squares	df	Mean Squares	Obtained F-ratio
A factor (Games)	0.006	3	0.002	6.422*
B factor (Zone)	0.006	3	0.002	5.990*
AB factor (Interaction) (Games and Zone)	0.016	9	0.002	5.500*
Error I	0.078	240	0.000	

*Significant at 0.05 level

(Table values required for significance at 0.05 level with df 3 & 240; 3 & 340; and 9 & 112 are 2.64, 2.64 and 1.91 respectively.)

From the above Table, the obtained F-ratio for Factor A (Games) is 6.422, which is greater than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence. The result of the study indicates that there is significant difference between the means of Factor A (Games) on explosive strength. Table above shows that the obtained F-ratio for Factor B (Zone) is 5.990, which is greater than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence. The result of the study indicates that there is a significant difference among the means of Factor B (Zone) on explosive strength.

From the above Table, the obtained F-ratio value of interaction factor A x B (Games x Zone) is 5.500, which is greater than the table value of 1.91 with df 9 and 240 required for significance at 0.05 level of confidence. The result of the study shows that there is a significant difference among the means of interaction factor A x B (Games x Zone) on explosive strength. As the main focus is usually on the interaction, it is sufficient to discuss the interaction effect only. Hence, the interaction effect only is discussed. The results of the study indicate that there was a significant difference in the interaction effect [between rows (Games) and columns (Zone)] on explosive strength. Since the interaction effect is significant, the simple effect test is applied as follow-up test and the results are presented in Table 10.

Table 10
The simple effect test scores of four games (rows) and four zones (columns) on explosive strength

Source of Variance	Sum of Squares	df	Mean Squares	Obtained F-ratio
North Zone	0.001	3	00.00	0.221
South Zone	0.005	3	0.002	4.678*
East Zone	0.015	3	0.005	15.107*
West Zone	0.003	3	0.001	2.916*
Hockey	0.002	3	0.001	2.356
Football	0.010	3	0.003	9.865*
Basketball	0.006	3	0.002	6.595*
Handball	0.003	3	0.001	2.792*
Error	0.078	240	0.000	

*Significant at 0.05 level of confidence

(Table values required for significance at 0.05 level with df 3 and 240 is 2.64)

Table above shows that F-ratio values obtained for south, east and west zone were 4.678, 15.107 and 2.916, which was higher than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence. And the F-ratio values obtained for north zone was 0.221, which was lesser than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence The result of the study indicates that there was a significant difference between the means of north zone and south zone on speed. The table above shows that the obtained F-ratio value for football, basketball and handball are 9.865, 6.595 and 2.792 respectively, which are greater than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence. And the obtained F-ratio value for hockey are 2.356, which are lesser than the table value of 2.64 with df 3 and 240 required for significance at 0.05 level of confidence. The result of the study indicates that there is significant difference between the means of basketball and handball teams on speed. As four games

and four zones were compared and the obtained F-ratio value is found to be significant in the simple effect for columns and rows, the Scheffe's test is applied as post hoc test to find out the means difference, if any, and the result is presented in Table 11.

Table 11
The scheffe's test for the differences between means of tests on explosive strength (south zone)

Means				Mean Difference	Confidence Interval
Hockey	**Football**	**Basketball**	**Handball**		
0.23	0.23	--	--	0.00	0.01
0.23	--	0.24	--	0.01*	0.01
0.23	--	--	0.21	0.02*	0.01
--	0.23	0.24	--	0.01*	0.01
--	0.23	--	0.21	0.02*	0.01
--	--	0.24	0.21	0.03*	0.01

* significant at 0.05 level

The multiple comparisons showed in table proved that there existed significant differences between the means of hockey and basketball (0.01), hockey and handball (0.02), football and basketball (0.01), football and handball (0.02), basketball and handball (0.03). There was no significant difference between hockey and football (0.00), at 0.05 level of confidence with the confidence interval value of 0.01.

Table 12
The scheffe's test for the differences between means of tests on explosive strength (east zone)

Means				Mean Difference	Confidence Interval
Hockey	**Football**	**Basketball**	**Handball**		
0.21	0.25	--	--	0.04*	0.01
0.21	--	0.22	--	0.01*	0.01
0.21	--	--	0.22	0.01*	0.01
--	0.25	0.22	--	0.03*	0.01
--	0.25	--	0.22	0.03*	0.01
--	--	0.22	0.22	0.00	0.01

* significant at 0.05 level

The multiple comparisons showed in table proved that there existed significant differences between the means of hockey and football (0.04), hockey and basketball (0.01), hockey and handball (0.01), football and basketball (0.03), football and handball (0.03). There was no significant difference between and basketball and handball (0.00) at 0.05 level of confidence with the confidence interval value of 0.01.

Table 13
The scheffe's test for the differences between means of tests on explosive strength (west zone)

Means				Mean Difference	Confidence Interval
Hockey	**Football**	**Basketball**	**Handball**		
0.22	0.22	--	--	0.00	0.01
0.22	--	0.21	--	0.01*	0.01
0.22	--	--	0.21	0.01*	0.01
--	0.22	0.21	--	0.01*	0.01
--	0.22	--	0.21	0.01*	0.01
--	--	0.21	0.21	0.00	0.01

* significant at 0.05 level

The multiple comparisons showed in table proved that there existed significant differences between the means of hockey and basketball (0.01), hockey and handball (0.01), football and basketball (0.01), football and handball (0.01). There was no significant difference between hockey and football (0.00), basketball and handball (0.00) at 0.05 level of confidence with the confidence interval value of 0.01.

Table 14
The scheffe's test for the differences between means of tests on explosive strength (football)

Means				Mean Difference	Confidence Interval
North	**South**	**East**	**West**		
0.23	0.23	--	--	0.00	0.01
0.23	--	0.25	--	0.02*	0.01
0.23	--	--	0.22	0.01*	0.01
--	0.23	0.25	--	0.02*	0.01
--	0.23	--	0.22	0.01*	0.01
--	--	0.25	0.22	0.03*	0.01

* significant at 0.05 level

The multiple comparisons showed in table proved that there existed significant differences between the means of north and east (0.02), north and west (0.01), south and east (0.02), south and west (0.01) and east and west (0.03). There was no significant difference between north and south (0.00). at 0.05 level of confidence with the confidence interval value of 0.01.

Table 15
The scheffe's test for the differences between means of tests on explosive strength (basketball)

Means				Mean Difference	Confidence Interval
North	South	East	West		
0.23	0.24	--	--	0.01*	0.01
0.23	--	0.22	--	0.01*	0.01
0.23	--	--	0.21	0.02*	0.01
--	0.24	0.22	--	0.02*	0.01
--	0.24	--	0.21	0.03*	0.01
--	--	0.22	0.21	0.01*	0.01

* significant at 0.05 level

The multiple comparisons showed in table proved that there existed significant differences between the means of north and south (0.01), north and east (0.01), north and west (0.02), south and east (0.02), south and west (0.03) and east and west (0.01) at 0.05 level of confidence with the confidence interval value of 0.01.

Table 16
The scheffe's test for the differences between means of tests on explosive strength (handball)

Means				Mean Difference	Confidence Interval
North	South	East	West		
0.23	0.21	--	--	0.02*	0.01
0.23	--	0.22	--	0.01*	0.01
0.23	--	--	0.21	0.02*	0.01
--	0.21	0.22	--	0.01*	0.01
--	0.21	--	0.21	0.00	0.01
--	--	0.22	0.21	0.01*	0.01

* significant at 0.05 level

The multiple comparisons showed in table proved that there existed significant differences between the means of north and south (0.02), north and east (0.01), north and west (0.02), south and east (0.01), east and west (0.01). There was no significant difference between south and west (0.00) at 0.05 level of confidence with the confidence interval value of 0.01.

Conclusions

From the analysis of the data, the following conclusions were drawn:

1. There was significant difference in explosive strength and insignificant differences on speed among hockey, football, basketball and handball players of Republic day games.
2. There was significant difference in the explosive strength, insignificant differences on speed among north, south, east and west zones winners of Republic day games.
3. There was significant interaction difference in the speed and explosive strength among north, south, east and west zones and zonal winners of hockey, football, basketball and handball players of Republic day games.

The physical fitness training preparation of hockey, football, basketball and handball players must be taken into serious consideration during the coaching procedure. Professional help and programming of the training schedule preparation of the players and observation of their expressive condition before and during a game is necessary to improve the speed contribute to the high effectiveness of hockey, football, basketball and handball players.

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