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Hockey playing ability with relation to selected physical fitness physiological and skill variables

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Abstract

To determine the relationship study on the hockey playing ability with selected physical fitness physiological and skill variables. Hundred subjects selected from District level Hockey players for the study. All the players were selected for this study were Puducherry. All the selected players were with good physique and training status. The main aim of this study was to appraise the selected physical fitness components namely, speed and agility, physiological variables namely, resting pulse rate and vital capacity, and skills (dribbling and hitting and dribbling and shooting) as prerequisites for hockey performance. The following statistical applications were employed to analyze the data. Pearson's product moment correlation and multiple correlations were used to find out the relationship of playing ability with selected physical, physiological and skill variables. The results proved that the selected skill variables namely, dribbling and hitting, dribbling and goal shooting were significantly correlated with the criterion variable hockey playing ability as the obtained r values -0.597 and 0.745 respectively were greater than the required r value 0.195 to be significant at 0.05 level. The results proved that the selected physical fitness variables, namely agility and speed were significantly correlated with the criterion variable hockey playing ability as the obtained r values -0.777 and -0.666 respectively were greater than the required r value 0.195 to be significant at 0.05 level. The results proved that the selected physiological variables namely vital capacity and resting pulse rate were significantly correlated with the criterion variable hockey playing ability as the obtained r values -0.520 and -0.828 respectively were greater than the required r value 0.195 to be significant at 0.05 level.

Keywords: skill, hockey playing ability, physical fitness, physiological.

1. Introduction

Life will not be life without physical activities. Through physical activities alone people were able to survive in this world. The story of evolution throws some light on the nature and types of activities which are an essential part of modern physical activities which are to be fit for day-to-day existence and to meet the occasional emergencies that arise. Whatever may be the emergency that trust itself on individuals the human beings have to readjust and carry on. Research in the field of Physical Education and Sports is highly demand of the day. Researches in this field brought so many technologies in and equipments manufacturing. We can say that the progress of the field directly linked with research. It is fact that at present situation research in Physical Education and Sports is an important area of study to improve the sports performance. The past decades have seen the rise of an area of study called futurism or futuristic, which attempts to scientifically examine the future. The sports scientists have tried to predict the success of sports performance during competition (Jackson, Andrew S., and Ted A. Baumgartner, 1987) ^[1].

A good hockey player must have the following qualities. He must have the technical ability to perform the various skills that the game of hockey requires. These include scooping, passing, pushing, lifting and dribbling with precision accuracy and confidence. Perfection in pushing, hitting, scooping and dribbling is most important for all good players irrespective of the position they play except the goal keeper. Hodson (1971) ^[2] says that "to play hockey well it also calls for intelligence, keen eyes, powerful wrists, physical fitness and the speed of mind and body. This shows that the game hockey is of great skills, concentration of the ball and body control and determination. Ability to execute all strokes with real skill and necessary speed are the essential qualities for a top player.

According to Terry Podesta (1974) dribbling is moving with the ball under control and the control over the ball will be lost unless otherwise blade and ball are kept closely together while dribbling the ball. Pushing was described by Clarke (1976) ^[3] as the quickest and easiest method of passing the ball to the partner. According to Podesta (1974) the stroke called the "hit" is the most powerful of all. Its advantage lie in speed at which it can be made to travel. Scooping is the ability of the players to shovel the ball over the opponent to achieve height. The aim is to lift the ball well clear over the heads of opponents so that it falls in an open space for a team mate to run on to. Tackling in field hockey is essential to having a strong defense, and there are subtleties that a defender must know when attempting to

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tackle without being penalized. There are different ways of attacking or tackling the opponent. Physical fitness is the utilization of excessive calories by a cardiovascular and muscular process, bringing the body to optimum efficiency (Kennedy, 1958). Physical fitness components are strength cardiovascular endurance, muscular endurance, speed, agility, flexibility, power and coordinative abilities. It is a combination of several components rather than a single component.

Methodology

Hundred subjects selected from District level Hockey players for the study. All the players were selected for this study were puducherry. All the selected players were with good physique and training status. The main aim of this study was to appraise the selected physical fitness components namely, speed and agility, physiological variables namely, resting pulse rate and vital capacity, and skills (dribbling and hitting and dribbling and shooting) as prerequisites for hockey performance. The following statistical applications were employed to analyze the data. Pearson’s product moment correlation and multiple correlations were used to find out the relationship of playing ability with selected physical, physiological and skill variables. Physical fitness, physiological and skill variables were considered as dependent variables, whereas hockey playing ability was considered as criterion variable. Independent variables are physical fitness components namely, speed and

agility, physiological variables namely, resting pulse rate and vital capacity. To find out the reliability of the test and testers competency were assessed by test and retest method. The performance of selected variables of selected twelve men hockey players were recorded twice by the investigator. The scores obtained were correlated using Pearson’s Product Moment correlation and it is presented in Table-II and there the testers established competency and reliability of the test. The entire instruments used for this study were high standard and it was enough to occur the reliable data for the study.

The criterion variable for this study was the playing ability of men hockey players. To determine the pre-requisites for hockey three experts assessed performance through their playing ability during the inter-district men Hockey tournaments. The playing ability of the players’ was determined individually by subjective rating during the competition. The criteria for subjective rating for men hockey playing ability was done by using ten-point rating scale. For individual 50 marks and team coordination 50 marks totally 100 marks.

Results and Discussions

The results on the descriptive statistics consisting of mean, standard deviation and range of the selected physical, physiological and skill variables of women hockey players are presented in Table IV.

Table IV: Descriptive Statistics on Selected Physical, Physiological and Skill Variables of Hockey Men Players

S. No	Variables	Mean (M)	Standard Deviation(SD)	Range
1.	Agility	10.44	±0.97	9.10-12.35
2.	Speed	7.30	±0.77	6.10-8.96
3.	Vital capacity	3735	±468.91	2800-4500
4.	Resting Heart Rate	67.17	±3.58	60-72
5.	Dribbling and Hitting	12	±0.91	11.01-14.48
6.	Dribbling and Goal Shooting	29.85	±3.41	22-38
7.	Playing Ability	67.13	±7.21	50-85

The results presented in Table IV proved that the agility of the subjects was 10.44 seconds with a standard deviation of + 0.97. The mean value of speed was 7.30 seconds with standard deviation of + 0.77. The mean value of vital capacity of the subjects was 3735 milliliters with standard deviation of + 468.91. The mean value of resting pulse rate of the subjects was 67.17 beats / minute with standard deviation of + 3.58. The mean value of dribbling and hitting was 12 seconds with

standard deviation of + 0.91. The mean value of dribbling and goal shooting was 29.85 points with standard deviation of + 3.41. The mean 136 scores of playing ability of the subjects was 67.13 points with standard deviation of + 7.21.

In order to find out the simple relationship between playing ability and selected physical, physiological and skill variables zero order correlation was computed and the results presented in Table V.

Table V: Pearson’s product moment correlation between Playing ability and Selected Physical, Physiological and Skill Variables

S. No	Variables	Correlation Coefficient	Required ‘r’
	Playing Ability vs		
1.	Agility	-0.777*	0.195
2.	Speed	-0.666*	
3.	Vital capacity	0.520*	
4.	Resting Heart Rate	-0.828*	
5.	Dribbling and Hitting	-0.597*	
6.	Dribbling and Goal shooting	0.745*	

*Significant at 0.05 level

In Table V the Pearson correlation of the criterion variable Hockey ability with the predictor variables are presented in the following order namely dribbling and hitting, dribbling and

goal shooting, agility, speed, vital capacity, resting pulse rate. The results proved that the selected skill variables namely, dribbling and hitting, dribbling and goal shooting were

significantly correlated with the criterion variable hockey playing ability as the obtained r values -0.597 and 0.745 respectively were greater than the required r value 0.195 to be significant at 0.05 level. The results proved that the selected physical fitness variables namely agility and speed were significantly correlated with the criterion variable hockey playing ability as the obtained r values -0.777 and -0.666 respectively were greater than the required r value 0.195 to be significant at 0.05 level. The results proved that the selected physiological variables namely vital capacity and resting pulse rate were significantly correlated with the criterion variable hockey playing ability as the obtained r values -0.520 and -0.828 respectively were greater than the required r value 0.195 to be significant at 0.05 level.

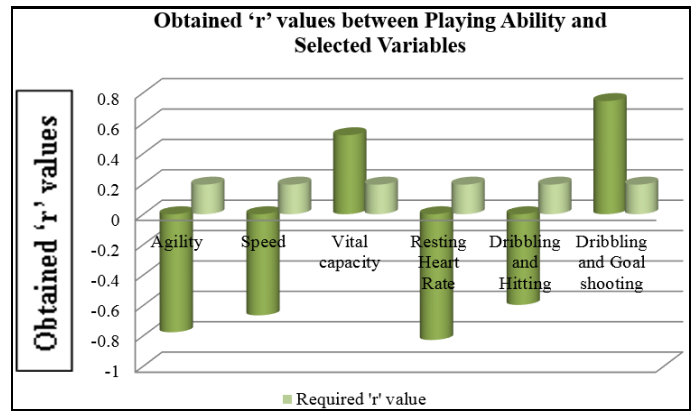


Table VI: Partial Correlation between Playing Ability and Agility (Variable) with other variables (Controls)

Variable	Control variable	Partial correlation coefficient
Playing ability & Agility		-0.772
	Dribbling & hitting	-0.453
	Dribbling & hitting Dribbling & Goal shooting accuracy	-0.337
	Dribbling & hitting Dribbling & Goal shooting accuracy Speed	-0.153
	Dribbling & hitting Dribbling & Goal shooting accuracy Speed Vital capacity	-0.083
	Dribbling & hitting Dribbling & Goal shooting accuracy Speed Vital capacity Resting pulse rate	-0.079

The above table VI shows the results of relationship between hockey playing ability and agility by partial ling out the influence of other variables namely, dribbling and hitting, dribbling and goal shooting accuracy, speed, vital capacity and resting pulse rate among men hockey players. The zero order correlation coefficient between playing ability and agility was -0.772 which shows that they were negatively correlated and it was significant at 0.05 level. To find out the actual relationship between playing ability and agility initially, the effect of dribbling and hitting was eliminated using partial correlation method. Subsequently other variables namely, dribbling and

hitting, dribbling and goal shooting accuracy, speed, vital capacity and resting pulse rate were also eliminated one by one using partial correlation method. The above table shows that 32% was the influence of dribbling and hitting on the hockey playing ability and agility. The influence of dribbling and goal accuracy on playing ability and agility was approximately 12%. The influence of speed on playing ability and agility was 18%. The influence of vital capacity on playing ability and agility was approximately 7%. The resting pulse rate had no influence on playing ability and agility.

Table VII: Partial Correlation between Playing Ability and Speed (Variable) with other variables (Controls)

Variable	Control variable	Partial correlation coefficient
Playing ability & Speed		-0.763
	Dribbling & hitting	-0.585
	Dribbling & hitting Dribbling & Goal shooting accuracy	-0.476
	Dribbling & hitting Dribbling & Goal shooting accuracy Agility	-0.385
	Dribbling & hitting Dribbling & Goal shooting accuracy Agility Vital capacity	-0.364
	Dribbling & hitting Dribbling & Goal shooting accuracy Agility Vital capacity Resting pulse rate	-0.238

The above table VII shows the results of the relationship between hockey playing ability and speed by partial ling out the influence of other variables namely, dribbling and hitting, dribbling and goal shooting accuracy, agility, vital capacity and resting pulse rate among men hockey players. The zero order correlation coefficient between playing ability and agility was -0.763 which shows that they were negatively correlated and it was significant at 0.05 level. To find out the actual relationship between playing ability and speed initially, the effect of dribbling and hitting was eliminated using partial correlation method. Subsequently other variables namely,

dribbling and hitting, dribbling and goal shooting accuracy, agility, vital capacity and resting pulse rate were also eliminated one by one using partial correlation method. The above table shows that 18% was the influence of dribbling and hitting on the hockey playing ability and speed. The influence of dribbling and goal accuracy on playing ability and speed was approximately 11%. The influence of agility on playing ability and speed was 9%. The influence of vital capacity on playing ability and agility was approximately 2%. The resting pulse rate had 12% influences on playing ability and speed.

Table VIII: Partial Correlation between Playing Ability and Vital capacity (Variable) with other variables (Controls)

Variable	Control variable	Partial correlation coefficient
Playing ability & Vital capacity		0.766
	Dribbling & hitting	0.471
	Dribbling & hitting Dribbling & Goal shooting accuracy	0.383
	Dribbling & hitting Dribbling & Goal shooting accuracy Agility	0.343
	Dribbling & hitting Dribbling & Goal shooting accuracy Agility Resting heart rate	0.274
	Dribbling & hitting Dribbling & Goal shooting accuracy Agility Speed Resting pulse rate	0.243

The above table VIII shows the results of relationship between hockey playing ability and vital capacity by partial ling out the influence of other variables namely, dribbling and hitting, dribbling and goal shooting accuracy, agility, speed and resting pulse rate among men hockey players. The zero order correlation coefficient between playing ability and vital capacity was 0.766 which shows that they were positively correlated and it was significant at 0.05 level. To find out the actual relationship between playing ability and vital capacity initially, the effect of dribbling and hitting was eliminated using partial correlation method. Subsequently other variables

namely, dribbling and hitting, dribbling and goal shooting accuracy, agility and resting pulse rate were also eliminated one by one using partial correlation method. The above table shows that 36% was the influence of dribbling and hitting on the hockey playing ability and vital capacity. The influence of dribbling and goal accuracy on playing ability and vital capacity was approximately 8%. The influence of agility on playing ability and vital capacity was 4%. The influence of speed on playing ability and vital capacity was approximately 6%. The vital capacity had 3% influences on playing ability and vital capacity.

Table IX: Partial Correlation between Playing Ability and Resting Pulse Rate (Variable) with other variables (Controls)

Variable	Control variable	Partial correlation coefficient
Playing ability & Resting heart rate		-0.828
	Dribbling & hitting	-0.642
	Dribbling & hitting Dribbling & Goal shooting accuracy	-0.531
	Dribbling & hitting Dribbling & Goal shooting accuracy Agility	-0.464
	Dribbling & hitting Dribbling & Goal shooting accuracy Agility Speed	-0.374
	Dribbling & hitting Dribbling & Goal shooting accuracy Agility Speed Vital capacity	-0.353

The above table IX shows the results of relationship between hockey playing ability and Resting pulse rate by partialling out the influence of other variables namely, dribbling and hitting, dribbling and goal shooting accuracy, agility, speed and vital capacity among men hockey players. The zero order correlation coefficient between playing ability and Resting pulse rate was -0.828 which shows that they were negatively correlated and it was significant at 0.05 level. To find out the actual relationship between playing ability and Resting pulse rate initially, the effect of dribbling and hitting was eliminated using partial correlation method. Subsequently other variables

namely, dribbling and hitting, dribbling and goal shooting accuracy, agility and vital capacity were also eliminated one by one using partial correlation method. The above table shows that 18% was the influence of dribbling and hitting on the hockey playing ability and Resting pulse rate. The influence of dribbling and goal accuracy on playing ability and Resting pulse rate was approximately 11%. The influence of agility on playing ability and Resting pulse rate was 6%. The influence of speed on playing ability and Resting pulse rate was approximately 9%. The vital capacity had 2% influences on playing ability and resting pulse rate.

Table X: Partial Correlation between Playing Ability and Dribbling and Hitting (Variable) with other variables (Controls)

Variable	Control variable	Partial correlation coefficient
Playing ability & Dribbling & hitting		-0.758
	Dribbling & Goal shooting accuracy	-0.517
	Dribbling & Goal shooting accuracy Agility	-0.310
	Dribbling & Goal shooting accuracy Agility Speed	-0.305
	Dribbling & Goal shooting accuracy Agility Speed Vital capacity	-0.256
	Dribbling & Goal shooting accuracy Agility Speed Vital capacity Resting heart rate	-0.221

The above table X shows the results of relationship between hockey playing ability and dribbling and hitting by partial ling out the influence of other variables namely, dribbling and goal shooting accuracy, agility, speed, vital capacity and resting pulse rate among men hockey players. The zero order correlation coefficient between playing ability and dribbling and hitting (-0.758) was negatively correlated and it was significant at 0.05 level. To find out the actual relationship between playing ability and dribbling and hitting, initially the effect of dribbling and goal shooting accuracy was eliminated

which shows that 24% was the influence of dribbling and goal shooting accuracy on the hockey playing ability and dribbling and hitting. The influence of agility on playing ability and dribbling and hitting was approximately 21%. The influence of speed on playing ability dribbling and hitting was 1%. The influence of vital capacity on playing ability dribbling and hitting was approximately 5%. The resting pulse rate had approximately 4% influence on playing ability dribbling and hitting.

Table XI: Partial Correlation between Playing Ability and Dribbling and Goal Shooting (Variable) with other variables (Controls)

Variable	Control variable	Partial correlation coefficient
Playing ability & Dribbling & Goal shooting accuracy		0.745
	Dribbling & hitting	0.481
	Dribbling & hitting Agility	0.377
	Dribbling & hitting Agility Speed	0.283
	Dribbling & hitting Agility Speed Vital capacity	0.254
	Dribbling & hitting Agility Speed Vital capacity Resting heart rate	0.164

The above table XI shows the results of relationship between hockey playing ability and dribbling and goal shooting accuracy by partial ling out the influence of other variables namely, dribbling and hitting, agility, speed, vital capacity and resting pulse rate among men hockey players. The zero order correlation coefficient between playing ability and dribbling and goal shooting accuracy was 0.745 which shows that they were positively correlated and it was significant at 0.05 level. To find out the actual relationship between playing ability and dribbling and goal shooting accuracy, initially the effect of dribbling and hitting was eliminated using partial correlation method. Subsequently the other variables also eliminated using partial correlation technique. From the table, we infer that 26% was the influence of dribbling and hitting on the hockey playing ability and dribbling and goal shooting accuracy. The influence of agility on playing ability and dribbling and goal shooting accuracy was approximately 10%. The influence of speed on playing ability and dribbling and goal shooting accuracy was 9%. The influence of vital capacity on playing ability dribbling and goal shooting accuracy was approximately 3%. The resting pulse rate had approximately 9% influence on playing ability and dribbling and goal shooting accuracy.

The results of this study proved that agility was significantly related with the playing ability ($r=-0.777$) and speed was significantly related with the hockey playing ability of the women hockey players (-0.666). The findings of this study further proved that vital capacity was significantly related with playing ability of women hockey players and the obtained 'r' value 0.520 was significant at 0.01 level. It was also found that the physiological variable, resting pulse rate was significantly related with the playing ability of women hockey players as the obtained 'r' value of -0.828 was greater than the required 'r' value of 0.194 to be significant at 0.05 level. The results of this study proved that there was significant negative relationship between playing ability and dribbling and hitting as the obtained 'r' value of -0.597 was greater than the required 'r' value of 0.194 to be significant at 0.05 level. There was a positive relationship between playing ability and dribbling and goal shooting accuracy of the women hockey players as the obtained 'r' was 0.745. The findings of this study are in agreement with the previous studies cited.

Conclusions

Within the limitations and delimitations of the study, the following conclusions were drawn:

1. There was significant relationship between hockey playing ability and physical fitness variables agility and speed of the men hockey players.
2. It was concluded that the hockey playing ability of men hockey players highly relationship with agility and speed.
3. There was significant relationship between hockey playing ability and physiological variables vital capacity and resting pulse rate of the men hockey players.
4. It was concluded that the hockey playing ability of men hockey players highly relationship with vital capacity and resting pulse rate.
5. There was significant relationship between hockey playing ability and skill variables dribbling and hitting of the men hockey players.
6. It was concluded that the hockey playing ability of men hockey players highly relationship with dribbling and hitting.
7. There was a significant relationship between hockey playing ability and skill variables dribbling and goal shooting accuracy of the men hockey players.
8. It was concluded that the hockey playing ability of men hockey players highly relationship with dribbling and goal shooting accuracy.

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