ANALYTICAL STUDY OF SELECTED PHYSICAL FITNESS AND ANTHROPOMETRIC VARIABLES OF OFFENSIVE AND DEFENSIVE FEMALE HOCKEY PLAYERS

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ABSTRACT

The purpose of this study is to examine the anthropometric profiles and physical fitness attributes of female hockey players in Northern India, with a focus on the positions of offensive and defensive. Convenience selection, a method used in many North Indian universities, produced a total of (N=50) female hockey players. These players are divided into two positions offensive (n^1=25) and defensive (n^2=25). The participants were split up into multiple playing status groups, with ages ranging from 18 to 25. Physical fitness attributes including speed, agility and shoulder strength, and anthropometric measurements like the circumference of the thigh, mid-upper arm, and calf were measured using conventional equipment. After collecting the data, statistical techniques such as descriptive statistics and 't'-test were utilized to analyze the data. When analyzing the physical fitness variables, the results showed that the offensive female hockey players demonstrate significantly higher levels in speed ('t' =2.34, sig. 0.02) and insignificantly higher in agility ('t' =1.13, sig. 0.26) as compared to defensive female hockey players. Further in the case of shoulder strength ('t' =0.38, sig. 0.70) defensive female hockey players insignificantly higher as compared to offensive female hockey players. In the case of anthropometric variables, the results of the present study revealed that defensive female hockey players are significantly higher only for their calf circumference ('t' =2.69, sig. 0.01) and insignificantly higher for their thigh circumference ('t' =0.83, sig. 0.41) and mid upper arm circumference ('t' =1.63, sig. 0.11) as compared to offensive female hockey players.

KEYWORDS: Anthropometric, Physical fitness attributes, Offensive and Defensive position.

INTRODUCTION:

India's national sport is hockey, which is played all around the world. Since the hockey globe is always expanding, a detailed examination of expert performance is required to assess its usefulness. **(R Kaur, D Thakur).** Two teams of eleven players, including the goalies, compete in the game of hockey. Round, firm rubber-like balls are struck with short wooden or fiberglass sticks. No left-handed sticks are permitted to be used. The set includes studs, shin guards' jerseys, shorts, or skirts. The game is played worldwide at the start of the twenty-first century, particularly in Western Europe and Asia. The phrase "field hockey" is

mostly used in Eastern Europe, the United States, Canada, and other countries where ice hockey is more popular**.** Whether playing as a forward, midfielder, defender, or goalkeeper, each position requires specific skills, tactical awareness, and physical attributes to contribute effectively to the team's success. (Hockey Articles - dummies, 2023, Mr. Shafi Mohamma). The defenders and custodian defend their own goal; the midfielders initiate offensive play and support the defenders; and the forwards attempt to score goals. **(Kawałek K)** A hockey player may average up to 10 km throughout a game; sprints are the only shorter distances. The maximum distance can be covered by jogging or strolling. The quickest players are the forwards, while the slowest guys are the defenders. Dribbling, passing, and shooting are hockey's three primary technical aspects. **(R Kaur)**. Cardiovascular endurance is the most crucial component of overall fitness. Other names for cardiovascular endurance include cardio-respiratory endurance, cardiovascular fitness, aerobic capacity, and aerobic fitness. The term "endurance" is also occasionally used to refer to cardiovascular endurance. while the term "endurance" may also refer to a muscle's capacity to do repeated tasks without becoming tired. It may be described as the heart's and lungs' capacity to take in and transfer sufficient quantities of oxygen to the working muscles throughout prolonged periods for tasks requiring big muscle masses. 3)The ability to brake quickly and effectively, change directions, and accelerate again while retaining motor control in either a vertical or horizontal motion is known as agility. **(D Thakur).** An object's speed can be described as its rate of motion or its speed. The definition of performance is the combination of one's technique, skill level, and effort level. **(Kawałek K)**. Anthropometry is the measuring of bodily composition and structure. It is often used as one of the crucial factors that make up the selected diagnostics of any sport. Anthropometric measurement will receive a correlation between body structure physical characteristics and sports capabilities. coaches while selecting their teams for participation in tournaments given due consideration to the skill possessed by their players and at the same time they provide due weightage to various anthropometric measurements, such as height, weight, arm length, leg length, etc. **(Mr. Shafi Mohammad).** To sum up, the connection between anthropometry and hockey is a complicated and multifaceted topic that needs careful consideration and study. Coaches, scientists, and players may get important insights to maximize performance and succeed in the sport by learning more about anthropometric data and its implications for hockey. Trainers and coaches must consider how anthropometry affects hockey performance and adjust training regimens appropriately.

MATERIALS AND METHODS:
SELECTION OF THE SUBJECT

To conduct the current investigation, two positional groups were selected. The study included fifty (N=50) female hockey players, divided into two categories: offensive (n^1 25) and defensive (n^2 25). These subjects are selected from only universities of Northern India who participated in Northern and All India Inter Universities and their age group of 18 to 25 years.

SELECTION OF VARIABLE AND TOOLS:
TABLE 1: TEST AND CRITERION MEASURES FOR THE SELECTED VARIABLES.

S. No.	Variables	Test/Tools Administered	Unit of Measurement
PHYSICAL FITNESS VARIABLES			
1.	Speed	50 Meters Dash	Seconds
2.	Agility	Shuttle Run	Seconds
3.	Shoulder Strength	Chin-up	Seconds
ANTHROPOMETRIC VARIABLES			
S. No.	**Variables**	**Test/Tools Administered**	**Unit of Measurement**
1.	Thigh Circumference	Steel Tape	Centimeters
2.	Calf Circumference	Steel Tape	Centimeters
3.	Mid Upper Arm Circumference	Steel Tape	Centimeters

STATISTICAL TECHNIQUE

For the purpose of present study besides descriptive statistics and "t" test was applied to compare the anthropometric and physical fitness variables of offensive and defensive female hockey players.

RESULTS
TABLE 2: DESCRIPTIVE STATISTICS AND 't'-VALUES FOR SELECTED PHYSICAL FITNESS VARIABLES

Variable	Group	Mean	SD	't'-value	Sig.
Speed	Offensive Hockey Players	8.12	2.10	2.34	0.02*
	Defensive Hockey Players	9.59	3.25		
Agility	Offensive Hockey Players	11.49	2.16	1.13	0.26
	Defensive Hockey Players	12.43	3.38		
Shoulder Strength	Offensive Hockey Players	26.21	11.41	0.38	0.70
	Defensive Hockey Players	27.42	12.32		

*Significant at 0.05 level

Table 2 shows the mean and standard deviation of selected physical fitness variables. Mean and standard deviation of speed in offensive and defensive hockey players are 8.12 ±

2.10 and 9.59 ± 3.25 respectively. Mean and standard deviation of agility in offensive and defensive hockey players are 11.49 ± 2.16 and 12.43 ± 3.38 respectively. Mean and standard deviation of shoulder strength in offensive and defensive hockey players are 26.21 ± 11.41 and 27.42 ± 12.32 respectively. It also shows that there is a significant difference between offensive and defensive hockey players in case of speed ('t' =2.34, sig. 0.02). It also shows that there is an insignificant difference between offensive and defensive hockey players in case of agility ('t' =1.13, sig. 0.26). It also shows that there is an insignificant difference between offensive and defensive hockey players in case of shoulder strength ('t' =0.38, sig. 0.70).
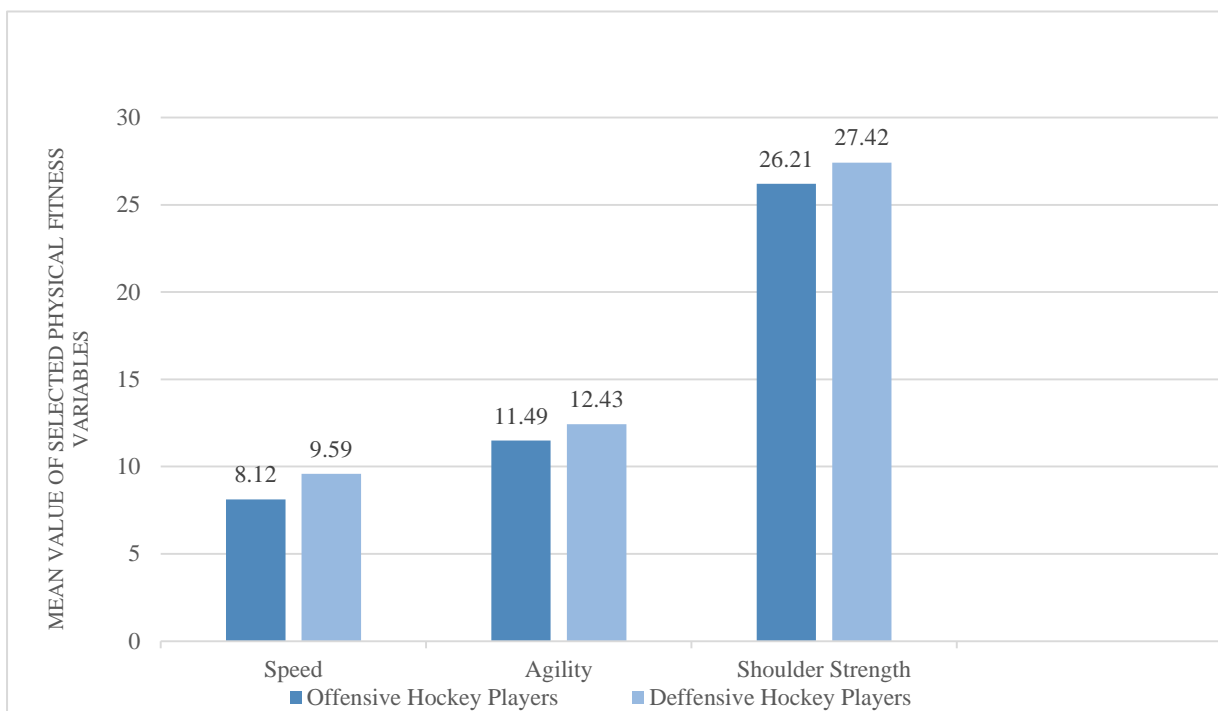

FIGURE I
DESCRIPTIVE STATISTICS FOR SELECTED PHYSICAL FITNESS VARIABLES

TABLE 3: DESCRIPTIVE STATISTICS AND 't'-VALUES FOR SELECTED ANTHROPOMETRIC VARIABLES

Variable	Group	Mean	SD	't'-value	Sig.
Thigh Circumference (TC)	Offensive Hockey Players	18.78	2.15	0.83	0.41
	Defensive Hockey Players	19.20	1.49		
Calf Circumference (CC)	Offensive Hockey Players	10.85	2.94	2.69	0.01*
	Defensive Hockey Players	12.59	0.83		
Mid Upper Arm Circumference (MUAC)	Offensive Hockey Players	9.22	0.81	1.63	0.11
	Defensive Hockey Players	10.79	4.90		

*Significant at 0.05 level

Table 3 shows the mean and standard deviation of selected anthropometric variables. Mean and standard deviation of thigh circumference in offensive and defensive hockey players are 18.78 ± 2.15 and 19.20 ± 1.49 respectively. Mean and standard deviation of calf circumference in offensive and defensive hockey players are 10.85 ± 2.94 and 12.59 ± 0.83 respectively. Mean and standard deviation of mid upper arm circumference in offensive and defensive hockey players are 9.22 ± 0.81 and 10.79 ± 4.90 respectively. It also shows that there is an insignificant difference between offensive and defensive hockey players in case of thigh circumference ('t' =0.83, sig. 0.41). It also shows that there is a significant difference between offensive and defensive hockey players in case of calf circumference ('t' =2.69, sig. 0.01). It also shows that there is an insignificant difference between offensive and defensive hockey players in case of mid upper arm circumference ('t' =1.63, sig. 0.11).
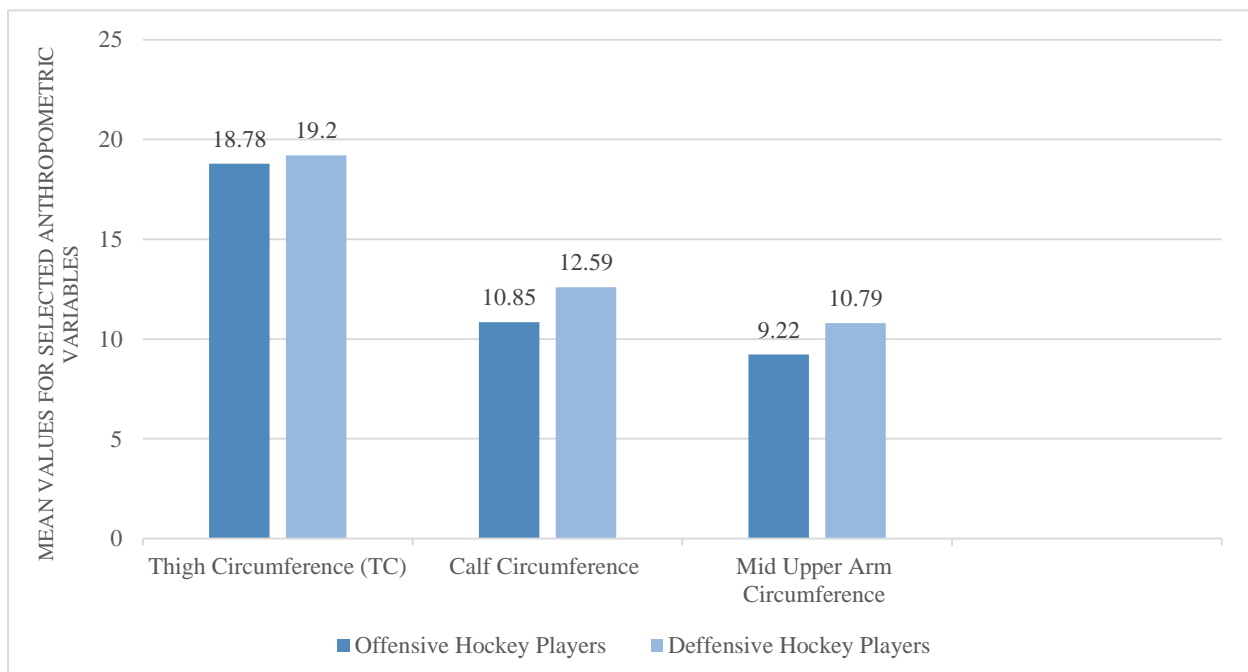
FIGURE II
DESCRIPTIVE STATISTICS FOR SELECTED ANTHROPOMETRIC VARIABLES

DISCUSSION

The objective of this study was to examine the disparities in physical fitness and anthropometric variables among female hockey players in offensive and defensive positions. Three physical fitness variables speed, agility, shoulder strength and three anthropometric variables: thigh circumference, calf circumference, and mid upper arm circumference were taken for this study.

When analyzing the physical fitness variables, the results showed that the offensive female hockey players demonstrate significantly higher levels in speed ('t' =2.34, sig. 0.02) and insignificantly higher in agility ('t' =1.13, sig. 0.26) as compared to defensive female hockey players. Further in the case of shoulder strength ('t' =0.38, sig. 0.70) defensive female hockey players insignificantly higher as compared to offensive female hockey players. In the case of anthropometric variables, the results of the present study revealed that defensive female hockey players are significantly higher only for their calf circumference ('t' =2.69, sig. 0.01) and insignificantly higher for their thigh circumference ('t' =0.83, sig. 0.41) and mid upper arm circumference ('t' =1.63, sig. 0.11) as compared to offensive female hockey players. The result of this finding is supported by the study conducted by Gil et al. (2007) who found that there was a significant difference in physiological and anthropometric characteristics of young soccer players according to their playing position.

CONCLUSION

This study showed that there was a significant difference in speed and calf circumference variables among defensive and offensive female hockey players. Thus, we may conclude that anthropometric and physical fitness differences exist among hockey players who play in different positions. These differences fit with their different workload in a game. Therefore, training programs should include specific sessions for each positional role.

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