

PHYSIOLOGICAL AND PHYSICAL FITNESS CHARACTERISTICS OF NATIONAL-LEVEL AND STATE- LEVEL FEMALE FIELD HOCKEY PLAYERS

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ABSTRACT

The objective of this study is to evaluate the physiological and physical fitness characteristics of female hockey players competing at the National and State levels. A purposive sampling method selected a total (N= 40) of female hockey players from Punjab State. These players are then divided into two groups: National level Players (n1=20) and State level Players (n2=20). The study focuses on measuring physiological variables such as breath-holding capacity, and resting pulse rate, as well as physical fitness variables including speed, and agility. Statistical techniques such as Mean, Standard Error of Mean, and Mean difference are used to analyze the collected data Variables. According to the study's results, national-level female hockey players ranked higher than their state-level female hockey in all physical activity categories and all physical fitness categories.

Keywords: Physiological and Physical Fitness, National-level player, and State-level Player.

INTRODUCTION

Field hockey can be best described as a stick and ball field-based sport comprised of both technical and tactical components that are completed at moderate to high speeds. (Gabbett, Macutkiewicz, McGuinness) Physique and body composition play important roles in field hockey (Montgomery DL, Quinney HA). Since lots of movements and skills are involved in playing field hockey, therefore, a high level of physical demand is required for match play (Montgomery DL, Bloomfield J). As the players have to cover a big area in the ground during attack and defense, therefore, the game demands aerobic as well as anaerobic fitness (Montgomery DL, Elferink-Gemser MT). Field hockey is a team sport with heavy demands on the player's physiology (Reilly T, Borrie A, Spencer, M). A high number of accelerations and decelerations, associated with the large number of changes in the direction of play create an additional load on the muscles involved as in field hockey, those players better suited to cope with the demands of the game reach the elite level

(Montgomery DL, Elferink-Gemser MT). Moreover, power and strength have a great impact on the game, which is required during sprinting and in the execution of various skills with the ball (Montgomery DL, Bloomfield J). Strength training is an important training component of field hockey (Spencer M, Ebben WP). Modern field hockey is a fast, physically, and technically demanding sport. Success in field hockey is ultimately depending on a cluster of factors among which we may include different components of physical fitness such as speed, endurance, strength, flexibility, agility, coordination, etc. Many coaches include fitness testing among their training control strategies to detect strong and weak points both at individual and group levels. Field hockey is a highly structured analytical game in which players constantly have to deal with a complex and rapidly changing environment (Starkes JL) To be successful, they have to perform the right action at the right moment. Therefore, they have to acquire great tactical skills. Tactical expertise is a requisite for expert performance in virtually all achievement domains (Janelle and Hillman, 2003). The current study compares and measures the physical fitness characteristics (i.e. speed, and agility) and physiological variables (i.e., breath-holding capacity and resting pulse rate) of female hockey players competing at the national and state levels.

OBJECTIVE OF THE STUDY

1. To assess the physiological Variable (Viz. breath-holding capacity and resting pulse rate) of National and state-level female hockey players.
2. To measure the Physical Fitness Variables (Viz. Speed, and Agility) of National and State Level female hockey players.
3. To compare the Physiological and Physical Fitness Variables of National and State Level female hockey players.

SELECTION OF SUBJECT

The population under investigation for this study consisted of female hockey players who were trainees at the Sports Department of Punjab dormitory. Using a purposive sample method, A total Number of female hockey players (N= 40) were chosen from the sports dormitory. Two groups of subjects were formed: (n1=20) National Players and (n2=20) State Players. National-level hockey players were those who had competed in school national games and other junior national levels; state-level players, on the other hand, were those who had gone as far as state-level hockey events. These players are under the control of the Sports Department of Punjab.

SELECTION OF VARIABLES & CRITERION MEASURES

The following “Physical Fitness Variable” mentioned in Table No. 1 were selected for the study.

Table 1: Test and Criterion Measures for the Selected Variables

PHYSICAL FITNESS VARIABLES			
S. No.	Variables	Test/Tools Administered	Unit of Measurement
1.	Speed	50 Meters Dash	Seconds
2.	Agility	Shuttle Run	Seconds

The following “Physiological Variables” mentioned in Table No. 2 were selected for the study.

Table 2: Test and Criterion Measures for the Selected Variables.

PHYSIOLOGICAL VARIABLES			
S. No.	Variables	Test/Tools Administered	Unit of Measurement
1.	Resting Pulse Rate	Palpation of radial artery	Numbers
2.	Breath-holding capacity	Stop Watch and Nose Clip	Seconds

STATISTICAL TECHNIQUE

Descriptive statistics i.e., mean and standard deviation were calculated. To investigate the differences between physiological and physical fitness variables of female hockey players, a ‘t-test’ was applied with the help of SPSS-software version 23.

RESULT

Table 3: Descriptive Statistics of Physiological variable of National Level Hockey Players

Variables	Mean	SD	SEM
RPR	60.2	8.941918	1.999474
BHC	72	16.9022	3.779446

Table 3: Shows the mean performance of Physiological Variable Viz, Body Resting Pulse Rate (RPR), and Breath-holding capacity (BHR) of National Hockey players. It was 60.2(SD=8.94) and 39.8sec (SD=17.09sec) respectively

Table 4: Descriptive Statistics of Physiological Variable of State-Level Hockey Players

Variables	Mean	SD	SEM
RPR	71.8	7.045715	1.57547
BHC	39.8	17.09378	3.822286

Table 4: It was evident from Table no. 2 that, the mean performance of Physiological Variable Viz, Resting pulse rate (RPR), and Breath-holding capacity (BHR) of State Hockey players. It was RPR mean 71.8 no. (SD=7.04 no.), and BHC mean 72 sec (SD=16.90 sec) respectively.

Table 5: Comparison of Physiological variables of National Level & State Level Hockey Players

Variables	National Level Hockey Players	State-Level Hockey Players	T-test	Sig. (2tailed)	Mean Difference
RPR	60.20	71.80	3.903	0.0010	11.50
BHC	72	39.80	6.097	0.0001	32.20

Table 5: Presents a comparison of the Physiological components between national and state hockey players. The analysis revealed there was a low Resting pulse rate of national-level female hockey as compared to state-level female hockey players. However, the

't' value of RPR is 3.903 significance at the 0.05 level. On the other hand, the national players exhibited higher BHC compared to their state-level counterparts, with a significant 't' value of BHC 6.097 at the 0.05 level of significance.

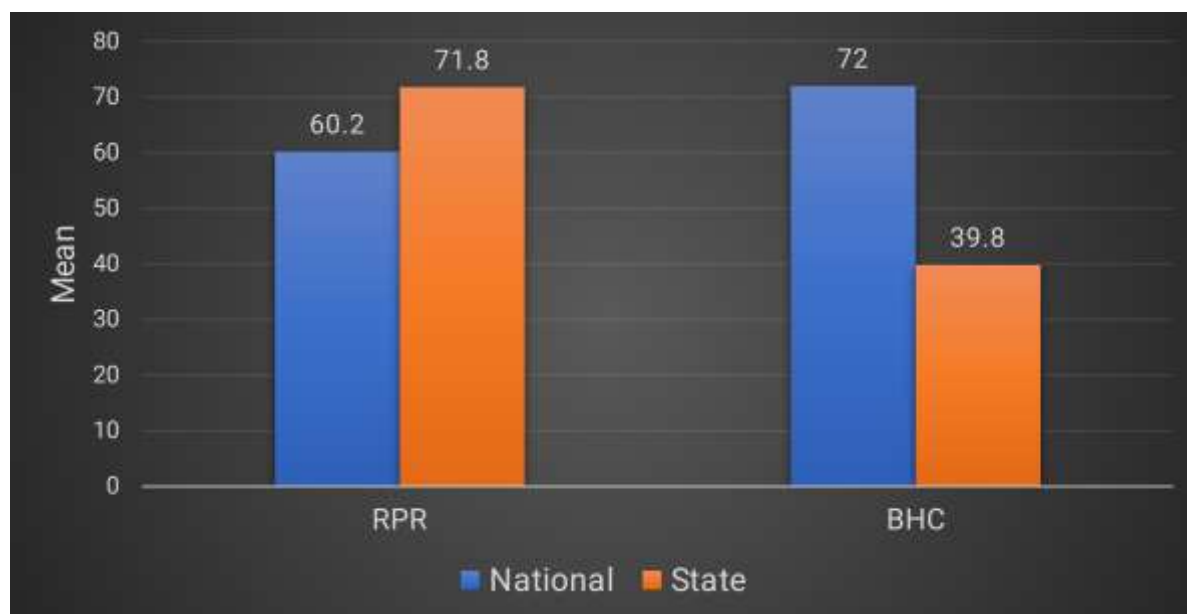


Fig 1. Comparison of Physiological Variables of National Level & State Level Hockey Players

Table 6: Descriptive Statistics of Physical Fitness Profile of National-Level Hockey Players

Variables	Mean	SD	SEM
Speed	7.47	0.56	0.12
Agility	11.38	1.11	0.24

Table 6: Shows the mean performance of Physical fitness Profile Viz, Speed, and Agility of National Level Hockey players. It was Speed mean of 7.47 Sec. (SD=0.12 sec.), and Agility mean of 11.38 sec. (SD=0.24 Sec.) respectively.

Table 7: Descriptive Statistics of Physical Fitness Profile of State-Level Hockey Players

Variables	Mean	SD	SEM
Speed	11.01	2.00	0.44
Agility	17.88	1.85	0.41

Table 7: It was evident from Table 5 the mean performance of Physical Fitness Profile Viz, Speed, and Agility of State Level Hockey players. It was 11.01Sec. (SD=2.00 sec.) and 17.88 (SD=1.85) and 11.84 Sec. respectively.

Table 8: Comparison of Physiological variables of National Level & State Level Hockey Players

Variables	National Level Hockey Players	State-Level Hockey Players	T-test	Sig. (2tailed)	Mean Difference
Speed	11.01	7.47	7.628	0.0001	3.52
Agility	17.88	11.38	14.155	0.0001	16.4

Table 8 presents a comparison of the physical fitness components between National level and State level Hockey Players. It was observed that the national-level players exhibited

greater speed, with a significant 't' value of 7.628 at a 0.05 level of significance. Similarly, the national-level players were also found to be more agile than the state-level hockey players, with a significant 't' value of 14.155 at a 0.05 level of significance.

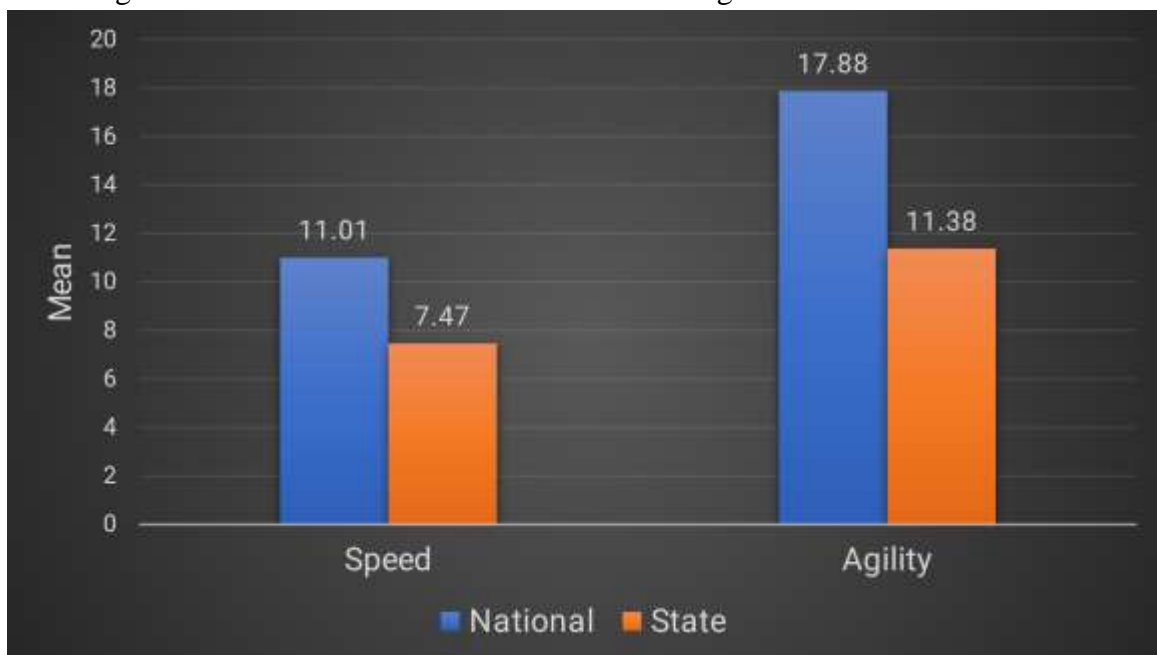


Fig 2. Comparison of Physiological variables of National Level & State Level Hockey Players

DISCUSSION

The purpose of the present study was to investigate the differences between physiological and physical fitness variables of State-level and National-level female hockey players.

The results of the present study revealed that there was a low Resting pulse rate of national-level female hockey as compared to state-level female hockey players. However, the 't' value of RPR is 3.903 significance at the 0.05 level.

On the other hand, the results also showed that national-level female hockey players exhibited higher Breath-holding capacity as compared to state-level female hockey players counterparts, with a significant 't' value of BHC 6.097 at the 0.05 level of significance.

In the case of physical fitness components, it was observed that the national-level female hockey players exhibited greater speed, with a significant 't' value of 7.628 at a 0.05 level of significance.

Similarly, the national-level female hockey players were also found to be more agile than the state-level female hockey players, with a significant 't' value of 14.155 at a 0.05 level of significance.

CONCLUSION

The current investigation, with certain constraints, justifies the subsequent findings:

- ❑ Female hockey players at the National level female hockey exhibited superior performance in Physiological variables (specifically BHC and RPR) compared to their counterparts at the State level female hockey.

- Additionally, National-level female hockey players demonstrated better performance in all Physical Fitness Variables (such as Speed and Agility) in comparison to state-level female hockey players.

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