Comparison of Physical Fitness Variables among Hockey Players in Relation to their Playing Position

Gaurav Bhardwaj[1], Dr Hari Singh[2], Dr. Manohar Lal[3]

ABSTRACT

The present investigation has been conducted on 100 Hockey players with an aim to find out differences in physical fitness variables among the forwards (n=30), halfbacks (n=30), fullbacks (n=30) and goalkeepers (n=10). The data for the present study were collected in the inter-college competition organized by Himachal Pradesh University, during the session 2011-2012. AAHPER Physical Fitness Test (AAHPER, 1976) was used to assess the physical fitness level. Analysis of variance (ANOVA) was used to find out significant difference among the Hockey players. In case of any significance of mean difference, Scheffee's post hoc't' test was applied for further analysis. From the findings, It has been found that forwards players possess greatest value for arm and shoulder strength endurance, abdominal strength endurance and leg explosive strength; halfbacks possess greatest value for speed; and goalkeepers possess greatest value for agility, whereas halfbacks possess lowest value for arm and shoulder strength endurance and agility; and goalkeepers possess lowest value for abdominal strength endurance and leg explosive strength; and fullbacks possess lowest value for speed among the Hockey players. There was significant difference among the players of Hockey game in arm and shoulder strength endurance and speed and do not show significant differences in abdominal strength endurance, agility and leg explosive strength.

KEYWORDS

Physical fitness, Forwards, halfbacks, fullbacks and Goal keepers.

1. Research scholar, Deptt of Physical Education, Himachal Pradesh University, Shimla
2. Assistant Professor, Deptt of Physical Education, Himachal Pradesh University, Shimla
3. Assistant Professor, Deptt of Physical Education, Lovely Professional University, Phagwara

INTRODUCTION

Physical fitness is a state of well-being that comprises skill and health-related components. Fitness is a condition in which an individual has sufficient energy to avoid fatigue and enjoy life. It is necessary for elderly people to maintain and improve their physical fitness in order to satisfy healthy, high quality of daily life (Tanaka et al., 2004). Skill-related physical fitness refers to an individual's athletic ability in sports such as Tennis and encompasses skill-related attributes like dynamic balance, power, speed and agility; the health-related aspect is a measure of cardiovascular endurance, muscle strength, endurance and flexibility and body composition (Hopkins & Walker, 1988). Physical fitness is measured by functional tests that are specific and usually normative-based, rather than criterion-based, thereby leaving unanswered as to how much of a specific fitness factor (e.g. muscular endurance) is required for a good quality of life (Chia, M., 2007).

The performance of a sportsman, in any game or event, also depends on physical fitness. The physical fitness or condition is the sum total of five motor abilities namely muscular strength, agility, power, speed and cardiovascular endurance. Therefore, the sports performance, in all sports, depends to great extent on these abilities. Improvement and maintenance of physical fitness is the most important aim of sports training (Uppal, 1980). Man's existence and effectiveness depends upon his physical fitness. Even now, physical fitness really implies more than the ability to do a work without much efforts. Physical fitness affects ones life's activities not only the physical well-being and mental effectiveness but also the personal and social adjustment. Singh (1986) reported that sport is competitive in nature and every sportsman strives to better the previous records; and records are broken more rapidly nowadays. "Sports" he states, "is an ideal character building school for youth. The very nature of sport requires certain amount of skill and physical fitness.

It has been due to the growing change in the competitive philosophy of sports that a close liaison has developed among sports scientist, team physician, athletic trainers, coaches and athletes, to investigate modern scientific technique in terms of selection of athletes. The performance of a sportsman in any game or event also depends on muscular strength, agility, power, speed and cardiovascular endurance. Along with these physical variables, physiological and psychological components also play an important role in the execution of the performance. Best suited activity and new training methods achieve excellence. The aim of the present study was to determine the differences in physical fitness variables among Hockey players.

METHODOLOGY

To achieve the purpose of this study 100 Hockey players i.e. forwards (n=30),

halfbacks (n=30), fullbacks (n=30) and goal keepers (n=10), who participated in the inter-college competition organized by Himachal Pradesh, University during the session 2011-2012, were randomly selected and used as subjects in this study. Age group ranged from 18-25 years. AAPHER Physical Fitness Test (AAHPER 1976) was used to assess the physical fitness. Pull ups were used to measure the arm and shoulder strength endurance. One point was scored each time a pull-up was completed. Total number of pull-ups performed by the subjects was taken as score for pull-ups. Bend knee sit ups were used to measure the abdominal strength endurance. The score of the test is the number of correctly executed sit-ups performed by the subjects in 60 second. Shuttle Run test was used to monitor the agility of the subjects. The time taken by the subjects between the audible signal 'start' and the finishing of the run was recorded to be the score. The time was recorded correct in sec. The standing broad jump was used to assess explosive strength of the legs. A 50 yard dash was used to estimate speed. The time taken by the subjects to complete the test in sec was the net score of the subjects.

To test the significance of mean difference among the Hockey players, namely forwards, halfbacks, fullbacks and goal keepers, analysis of variance (ANOVA) was used. In case of any significance of mean difference on the criterion measure to find out which pair of group was better among the other, the Scheffee's post-hoc't' test was applied.

RESULT & DISCUSSION

Table 1: Mean, standard deviation and F values of physical fitness variables among forwards, halfbacks, fullbacks and goal keepers of hockey

Parameters	Forwards (n=30)	Halfbacks (n=30)	Fullbacks (n=30)	Goal keepers (n=10)	Fvalue
	Mean ± S.D	Mean ± S.D	Mean ± S.D	Mean ± S.D	
Arm and shoulder strength endurance (In counts)	10.87 ± 1.78	8.03 ± 1.84	8.47 ± 1.67	8.6 ± 2.17	7.59**
Abdominal strength endurance (In counts)	36.93 ± 6.02	36.83 ± 4.22	33.1 ± 6.34	34.3.64 ± 7.29	1.99
Agility (sec)	8.24 ± .51	8.43 ± .50	8.13 ± .55	8.06 ± .67	.75
Leg explosive strength (cm)	220.33 ± 19.40	213.13 ± 11.99	216.57 ± 25.97	212.6 ± 17.31	.43
Speed (sec)	7.09 ± .13	7.56 ± .47	6.69 ± .63	7.24 ± .42	.5.30**

* Significant at .05 level; ** Significant at .01 level

Table 1 represents the comparison of mean, standard deviation and level of significance of arm and shoulder strength endurance, abdominal strength endurance, agility, leg explosive strength and speed among Hockey players, with respect to their playing position. Forwards possess greatest arm and shoulder strength endurance (10.87) and halfbacks possess least (8.03) among the Hockey players. The statistical differences, when observed among the Hockey players revealed that the 'f ' ratio is significant at the level of P<.01. Abdominal strength endurance was found more forwards (36.93) and less in fullbacks (33.1) among the Hockey players, with respect to their playing positions. The statistical differences, when observed among the Hockey players revealed that the 'f ' ratio is non-significant at the level of P<.05. For agility, the goalkeepers possess greatest value (8.06) and halfbacks possess the smallest value (8.43) among the Hockey players, with respect to their playing positions. The statistical differences, when observed among the Hockey players, revealed that the 'f ' ratio is non-significant at the level of P<.05. Forwards possess more leg explosive strength (220.33) and goalkeepers possess the lowest (212.60) among the Hockey players, with respect to their playing positions. The statistical differences, when observed among the Hockey players, revealed that the 'f ' ratio is non-significant at the level of P<.05. It has been observed that halfbacks take more time to complete 50 yard dash (7.56) and fullbacks take the less time to complete (6.99) among the Hockey players, with respect to their playing positions. The difference was found to be statistically significant, at the level of P<.01.

Table-2: Post hoc 't' values for comparing arm and shoulder strength endurance and speed among Hockey players, with respect to their playing position

Parameters	t value					
	Forwards Vs Halfbacks	Forwards Vs Fullbacks	Forwards Vs Goalkeepers	Halfbacks Vs Fullbacks	Halfbacks Vs Goalkeepers	Fullbacks Vs Goalkeepers
Arm & Shoulder strength endurance	2.53*	4.57**	2.89**	2.05*	1.11	.34
Speed	3.36**	.71	.73	2.64**	3.10**	1.23

* Significant at .05 level; ** Significant at .01 level

From Table 2, it was observed that there was a significant mean difference between the forwards and fullbacks (t=4.57; p< .01), having the maximum value followed by forwards and goalkeepers (t=2.89; p< .01), forwards and halfbacks (t=2.53; p< .05), and then halfbacks and fullbacks (t=2.05; p< .05) in arm & shoulder strength endurance; but insignificant mean difference was observed between halfbacks and goalkeepers, and fullbacks and goalkeepers. In speed, it was clearly noticed that there was significant mean difference between forwards and halfbacks (t=3.36; p< .01), having the maximum value followed by halfbacks and goalkeepers (t=3.10; p< .01) and then halfbacks and fullbacks (t=2.64; p< .01); but insignificant mean difference was observed between forwards and fullbacks, followed by forwards and goalkeepers and then fullbacks and goalkeepers.

It has been found that forwards players possess greatest value for arm and shoulder strength endurance, abdominal strength endurance, leg explosive strength and cardio-vascular endurance; halfbacks possess greatest value for speed; and goalkeepers possess greater value for agility; whereas halfbacks possess lowest value for arm and shoulder strength endurance, and agility; and goalkeepers possess lowest value for abdominal strength endurance, leg explosive strength and cardio-vascular endurance; and fullbacks possess lowest value for speed among the Hockey players. There was significant difference among the players of Hockey game in arm and shoulder strength endurance and speed, and do not show significant differences in abdominal strength endurance, agility and leg explosive strength. Further, on applying post hoc 't' test for arm and shoulder strength endurance, it was found that forwards possess significantly greater arm and shoulder strength endurance than halfbacks, fullbacks and goalkeepers, respectively. Similarly, halfbacks possessed significantly greater arm and shoulder strength endurance than fullbacks. For speed, it was found that halfbacks were significantly less speedy than forwards, fullbacks and goalkeepers, respectively. These results are in conformity with the study conducted by Das, et al. (2000) to compare the physical fitness components of junior Hockey players of Kolkata, in relation to their playing position. Results revealed that there existed significant difference in arm and shoulder strength endurance and speed, and there was not any significant difference in abdominal strength endurance, agility, and explosive strength of legs, cardio vascular endurance and flexibility among forwards, halfbacks, fullbacks and goalkeepers.

CONCLUSIONS

1. Statistically significant difference exists among the Hockey players in arm and shoulder strength endurance.
2. A significant difference in arm and shoulder strength exists between

forwards and full back, forwards and halfbacks, forwards and goalkeepers, halfbacks and fullbacks, halfback and goalkeepers and between fullbacks and goalkeepers.

3. It has been observed that players of Hockey game do not differ significantly from each other in abdominal strength endurance.
4. Hockey players, playing at different positions, do not differ significantly from each other in agility.
5. It has been observed that players of Hockey game do not differ significantly from each other in leg explosive strength.
6. A statistically significant difference exists among Hockey players of different positions in speed.
7. A significant difference exists between forwards and halfbacks, fullbacks and halfbacks and halfbacks and goalkeepers in running speed.

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