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Kalaiselvan R
Ph.D. Scholar, Department of
Physical Education, TNPESU,
Chennai, Tamil Nadu, India

Dr. P Rajinikumar
Assistant Professor, Department
of Sports Biomechanics and
Kinesiology, TNPESU, Chennai,
Tamil Nadu, India

Correlation of goalkeeping performance in relation to anthropometric and physical fitness variables in field hockey

Kalaiselvan R and Dr. P Rajinikumar

Abstract

The purpose of the study was to predict the field hockey goalkeeping performance in relation to their anthropometric and physical fitness variables. To achieve the purpose of this study, fifteen Inter-Collegiate goalkeepers were selected as subjects from Chennai and age group was ranged from 19 to 25 years. The height, arm length, agility and flexibility were selected as independent variables. The overall goalkeeping performance of the goalkeeper was measured using the 10 point scale which consists of five penalty shootout. Each goalkeeper was given five trials only. The successful trials of each goalkeeper were digitized and analyzed by taking the mean values. The selected anthropometric variables height was measured in centimeters by stadiometer and arm length was measured in centimeters by steel tape. The selected physical fitness variables agility was measured in seconds by agility and flexibility was measured in centimeters by flexibility test. The collected data were statistically analyzed by using Pearson product moment correlation and the level of significance was fixed at 0.05 level. It was concluded that the flexibility, height and arm length has significant and positive correlation with performance of goalkeeper significant at 0.05 level. Agility has negatively significant correlated with performance in goalkeeper at 0.05 level.

Keywords: Height, arm length, agility, flexibility, goalkeeping

Introduction

Hockey is a dynamic field game, played by both sexes, requiring high level skills, excellent conditioning and well co-ordinated team efforts (Dubey, H.C. 1999) [1]. Field hockey, a team sport is played comparatively on a large population for active as well as secondary participation.

Anthropometry is the science that deals with measurements of size, weight and proportions of human body. It provides scientific methods and observations on the living humans. Anthropometric techniques (skinfold fat, circumference and diameter measurements) are popular for predicting body composition because they are not much expensive, require little space and can be performed easily (Behenke and Willmore, 1974 and Pollock and Willmore, 1990) [2]. Anthropometry is oftenly used in physical education, sports science, physical activity and biomedical sciences.

The study was investigated the relationship of anthropometric measurements, strength and flexibility of lower limbs to the skating speed of 17 university hockey players. The tests conducted were leg strength, grip strength, lower limb flexibility, skating speed test and anthropometry of legs. The results revealed that the flexibility was considered a necessary factor to each and a general skating body type. Flexibility was found to be correlated with strength but anthropometry and flexibility were not related to skating speed (Reid, 1978) [8].

Investigated the national football and hockey players with regard to their aerobic power and body composition according to their field positions. It was found that the players of different positions were quite similar in body mass, body weight and aerobic power (Kansal. *et al.*, 1980a) [3]. Further suggested that the body proportions of defenders and offenders did not differ much. The two groups showed significant difference in body size and other body measurements (Kansal *et al.*, 1980b) [4]. Conducted a study to determine the level of physical fitness of trained university athletes, form body composition, static strength and

Correspondence
Kalaiselvan R
Ph.D. Scholar, Department of
Physical Education, TNPESU,
Chennai, Tamil Nadu, India

cardio-vascular efficiency and came to know the conclusion that Indian sports man of university/state/national level had optimum body fat which is lower than the normal sedentary persons (Khanna, *et al.*, 1986) [5]. The study was analysed physical, physiological and motor skill determinants of volleyball game with one hundred, thirty five male school volleyball players who participated in the state level school volleyball tournaments. He found that age, height and weight were influencing anthropometric measurements for volleyball playing ability. He further concluded that speed, arm explosive strength, agility, dynamic balance, trunk flexibility and shoulder flexibility were significantly correlated with volleyball playing ability (Rawat, 1988) [7].

The study analyses three methods of teaching physical fitness and their effects on strength, flexibility and cardiovascular endurance. To determine these effects, group means on hand strength, leg strength, flexibility and cardiovascular test were found out. Physical fitness changes from pre testing to post testing where determined for the total group, females and males, physical education majors and majors in other disciplines, married and single subjects on each physical fitness test. Means were tested utilizing the SPSS dependent „t“-test method of data analysis (Starks, 1990) [9].

Methodology

Fifteen inter-Collegiate level male field hockey goalkeepers were selected for the study. The age of subjects ranged from 19 to 25 years. The scores of the subject in goalkeeping performance were used as the criterion in the study. Subjects were instructed to react as fast as possible to the signal and to use their normal save movement when completing each trial. Each subject wore their full goalkeeping gear as used in games (pads, kickers, helmet, gloves protective equipment and stick) and performed simulated saves. From this penalty shootout, each goalkeeper's performance was analyzed by the experts in subjective rating of their goalkeeping performance. Each goalkeeper was given five trials only. For each save, 2 points were awarded and the average rating of five penalty shootout on the overall goalkeeping performance was considered as the final score of subjects. The successful trials of each goalkeeper were digitized. The Collected data were analyzed through Pearson product moment correlation. The level of significance was fixed at 0.05.

Results and discussion

Table: Showing the Pearson Correlation of selected Independent Variables and goal keeping performance

Variables	Pearson Correlation (r)
Height	.431
Arm length	.677*
Flexibility	.732*
Agility	-.919*

*Significant at 0.05 level, df (13) = 0.514

Table indicates that co-efficient of correlation of standing height (.431) and total arm length (.677*) have significant and positive correlation with performance in goalkeeper category significant at 0.05 level. Table reveals that co-efficient of correlation of performance in goalkeeping shows that physical fitness variables agility (-.919*) have significant and negative correlation with performance in goalkeeper at 0.05 level. Flexibility (.732*) has positive and significant correlation with performance at .05 level.

From the analysis of the results it is clear that co-efficient of correlation of standing height and total arm length have

significant and positive correlation with performance in goalkeeper significant at 0.05 level. so, these significantly correlated variables contribute to the performance in goalkeeper category and other variables have no significant correlation and therefore goalkeepers who got highest score on the performance test has significant relationship between the selected anthropometric variables. It is proved that standing height and total arm length also help to increase the performance of goal keepers.

Among the physical fitness variables co-efficient of correlation of performance in goal keeping agility have significant and negatively correlated with performance in goalkeeper category at 0.05 level. Flexibility has positively and significant correlation with performance at 0.05 level. Goalkeepers who got highest score on the performance test have significant relationship between the agility, flexibility and selected anthropometric variables. It is proved that Agility and flexibility also help to increase goalkeeping performance.

Conclusion

It was concluded that height and arm length significantly correlated with goal keeping performance in field hockey.

It was concluded that flexibility and agility significantly correlated with goal keeping performance in field hockey.

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