

**COMPARISON OF ANTHROPOMETRIC & PSYCHOLOGICAL  
CHARACTERISTICS AMONG HOCKEY & FOOTBALL  
GOALKEEPERS**

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**ABSTRACT:**

The purpose of the study was to compare anthropometric & psychological characteristics of Hockey & Football male Goalkeepers. 32 goalkeepers of Hockey & Football, 16 from Hockey & 16 from Football, who participated in All-India Inter-University Hockey & Football championship for the year 2001-02, were taken as the subjects for the study. Height, weight, arm-length, thigh-girth, leg-length, fore leg-length, calf-girth, ponderal index and crural index were selected as the anthropometric variables and sport competition anxiety, aggression and achievement motivation were selected as the psychological variables. The height, arm-length, thigh-girth, leg-length, fore leg-length and calf-girth were measured by a steel-tape and recorded in nearest centimeters. The weight was measured by weighing machine and measured in nearest kilogram. For the psychological variables, the sport competition anxiety questionnaire was administered to get the level of sports competition anxiety while using Sports Competition Anxiety Test (SCAT) developed by Rainer and Martens, the aggression questionnaire was administered to get the level of aggression by using Sports Aggression Inventory developed by A. Kumar and P.S. Shukla and the achievement motivation questionnaire was administered to get the level of achievement motivation by using the Sports Achievement Motivation Test constructed by M.L. Kamlesh. All the necessary data were collected from the subjects during All-India Inter-University Hockey championship and All-India Inter-University Football championship for the year 2001-02, held at Gwalior and Kolkata respectively.

**INTRODUCTION:**

Sports have become cultural phenomena of great magnitude and complexity in the present world. Sports have almost become a social institution, permeating education, economics, arts, politics, law, mass communication and international diplomacy. Its scope is awesome; nearly everyone has become involved in some way or the others. The modern age is an age of competition. We have to compete in all walks of life, and games and sports are no exception. Every nation competes with

others in different games and sports for excellence in international sports competition. Hockey and Football got its popularity because of its similarity with daily life doings. It is known fact that soon after infant learns to move, to crawl, to walk he takes interest in hitting, throwing, kicking etc., which appeals him. Since the game of Hockey and Football and other sports involve the fundamental movements, they soon find their place in the lives of young aspirant youth. Hockey and Football have become popular games in the world and of all the major games, Hockey is the only one that has remained entirely amateur, a status that is jealously preserved by all those who play or support it. It must also be one of the oldest games from which the present one originated. It is generally accepted as having been played for over two thousand years. Its popularity has, no doubt, always owed much to the fascination man finds in hitting a ball with a stick. Today, Hockey and Football is essentially team games, and has developed into a fast and highly skillful one. Anthropometric measurements consist of objective measurements of structures and functions of the body. The measurements of structures include such items as weight, total height, width, depth and the girth. As a sports science, the role of sports anthropology is highly applicable in identification of individuals, at a relatively younger age, which could be ideal for a specific sports event, through different body measurements.

**DELIMITATIONS:**

The study was delimited to only male Hockey and Football goalkeepers of All- India Inter-University level. The study was also delimited to age group of 18-25 years. Further, the study was delimited to the following anthropometric & psychological variables:

1. anthropometric variables:
  - i. Height
  - ii. Weight
  - iii. Arm-length
  - iv. Thigh-girth
  - v. Thigh-length
  - vi. Leg-length
  - vii. Fore leg-length
  - viii. Calf-girth
  - ix. Ponderal index
  - x. Crural index
2. psychological variables:

- i. Sports competition anxiety
- ii. Aggression
- iii. Achievement motivation

**LIMITATIONS:**

Non-availability of some of sophisticated instruments for measuring different anthropometric variable was considered as a limitation of the study.

The authenticity of the response given by the subjects in questionnaire techniques was considered as a limitation of the study.

**HYPOTHESIS:**

It was hypothesized that there would be no significant difference between anthropometric variables & psychological variables of Hockey and Football goalkeepers.

**SIGNIFICANCE OF THE STUDY:**

1. The findings if the study may help to know the psychological characteristics of Hockey and Football goalkeepers.
2. The knowledge of the anthropometric characteristics of goalkeepers of both games may help to diagnose the basic difference among them.
3. The finding of the study may help the goalkeepers to self-evaluate themselves and thereby improve upon their weak points.
4. The result of the study may be beneficial for talent identification of respective goalkeepers.

**SELECTION OF THE SUBJECTS:**

Thirty-two male goalkeepers of Hockey & Football, 16 each from Hockey and Football, who participated in All-India Inter-University Hockey & Football championship for the year 2001-02, were selected for the study.

**SELECTION OF VARIABLES:**

1. Anthropometric variables:
  - i. Height
  - ii. Weigh
  - iii. Arm-length
  - iv. Thigh-girth
  - v. Thigh-length
  - vi. Leg-length
  - vii. Fore leg-length
  - viii. Calf-girth
  - ix. Ponderal index
  - x. Crural

2. Psychological variables:
- i. Sports competition anxiety
  - ii. Aggression
  - iii. Achievement motivation

**STATISTICAL ANALYSIS:**

To compare the anthropometric and psychological variables of goalkeepers of Hockey and Football, the student's t-test was applied and level of significance was set at 0.05.

**FINDINGS:**

**Table: 1**  
**SIGNIFICANT DIFFERENCES OF MEANS FOR HOCKEY & FOOTBALL GOALKEEPERS ON ANTHROPOMETRIC VARIABLES**

Variance	Groups	Means	S.D.	M.D.	S.E.	t-ratio
Height	Hockey	169.06	2.27	8.40	0.56	6.53*
	Football	177.65	4.61		1.15	
Weight	Hockey	168.43	8.00	4.37	2.00	0.79
	Football	172.81	20.53		5.13	
Arm-length	Hockey	76.05	3.19	2.76	0.79	2.50*
	Football	78.82	3.05		0.76	
Thigh-girth	Hockey	53.44	2.04	0.49	0.51	0.50
	Football	53.94	3.35		0.83	
Thigh-length	Hockey	39.86	4.37	0.065	1.09	0.05
	Football	39.92	1.75		0.43	
Leg-length	Hockey	92.87	2.90	0.95	0.72	0.75
	Football	93.82	4.11		1.02	
Fore leg-length	Hockey	44.88	2.95	1.11	0.73	1.23
	Football	46.00	2.08		0.52	
Calf-girth	Hockey	34.33	1.82	0.50	0.45	0.57
	Football	34.84	3.00		0.75	
Ponderal index	Hockey	12.25	0.20	0.56	0.050	4.93*
	Football	12.81	0.40		0.10	
Crural index	Hockey	1.06	0.036	0.062	0.009	5.24*
	Football	1.12	0.030		0.007	

\*Significant at 0.05 level.  $t_{.05} (30) = 2.04$

It is evident from the table 1 that mean difference between Hockey & Football goalkeepers on height, arm length, ponderal index and crural index were significant at 0.05 level as the computed 't' ratio 6.53, 2.50, 4.93 and 5.24 respectively were much higher than the required value of the 't' ratio (2.04) to be significant at 30 ( $N_1 + N_2 - 2$ ) degree of freedom. However, all other remaining variables namely weight, thigh girth, fore leg-length, thigh-length, leg-length and calf-length were not found significant as computed 't' ratio 0.79, 0.50, 0.05, 1.23, 0.75 and 0.57 respectively were lesser than the required value 2.04.

**Table: 2**

**SIGNIFICANT DIFFERENCES OF MEANS FOR HOCKEY & FOOTBALL GOALKEEPERS ON PSYCHOLOGICAL VARIABLES**

Variance	Groups	Mean	S. D.	M. D.	S. E.	t-ratio
Aggression	Hockey	13.81	3.78	3.68	0.94	2.87*
	Football	10.12	3.46		0.86	
Anxiety	Hockey	19.12	3.13	3.00	0.78	2.64*
	Football	16.12	3.28		0.82	
Achievement Motivation	Hockey	31.12	2.41	2.37	0.60	2.23*
	Football	28.75	3.49		0.87	

\*Significance at 0.05 level,  $t_{.05} (30) = 2.04$

It is evident from the table 2 that mean difference between Hockey and Football goalkeepers on aggression, anxiety and achievement motivation were significant at 0.05 level as the computed 't' ratio 2.87, 2.64 and 2.23 respectively were higher than required value of the 't' ratio (2.04) to be significant as 30 ( $N_1 + N_2 - 2$ ) degree of freedom.

**DISCUSSION OF FINDINGS:**

**Anthropometric variables**

Significant difference between height of Hockey goalkeepers and Football goalkeepers may be due to the fact that greater height is needed for Football goalkeepers because of the nature of the game. In Football the height of goal-post is more than the height of goal-post of Hockey. Further, a Football goalkeeper is required to either catch an aerial ball or to punch an aerial ball out of the danger zone. The specific demands of the game of Football require that a goalkeeper has to be taller in order to play effectively. In case of Hockey, the height of the goal-post is

comparatively lower than of Football and any individual having a normal height can cover the goal-post. Since the width of the Hockey goal-post is smaller in comparison to Football, a player with an average height can cover it, where as in Football one needs greater height to cover the goal-post.

Football goalkeepers had significantly greater arm-length than Hockey goalkeepers, because the limbs are generally proportional to the stature of the individual. As the Football goalkeepers were found to be taller than the Hockey goalkeepers, the arm-length was also greater. Arm-length plays a dominant role in Football as a goalkeeper is expected to use arms very often either to catch or throw the ball.

Ponderal index of Football goalkeepers is significantly better than Hockey goalkeepers, because height place a dominant role in the computation of ponderal index. Since the height of Football goalkeepers was significantly better than Hockey goalkeepers, it is logical that ponderal index too should be more for Football goalkeepers. Normally, it is seen Football goalkeepers are taller and lean whereas Hockey goalkeepers are comparatively short but well-built. The structure of Football goalkeepers and Hockey goalkeepers must be reason behind this significance of ponderal index in favour of Football goalkeepers.

The Crural index of Football goalkeepers is significantly better than Hockey goalkeepers, because this ratio is related to the height of the individual as the Football goalkeepers are taller, it seems natural and logical that crural ratio will be greater in Football goalkeepers.

The insignificant difference between Football and Hockey goalkeepers in weight, thigh-girth, thigh-length, leg-length, fore leg-length and calf-girth may be because Hockey and Football goalkeepers generally follow a similar effect on the girth of different body segments. With respect to anthropometric variables the insignificant differences may be due to the sample, which was considered in the study.

### **Psychological Variable**

Hockey goalkeepers are found to posses significantly greater aggression than Football goalkeepers, because usually Hockey goalkeepers confine themselves to shooting circle. In a one to one situation, a goalkeeper usually pounces on the attacker so that the attacker may force to get rid off the ball. In comparison, penalty area is much bigger than the shooting circle and goal can be scored from anywhere within the field. Moreover, during penalty corner, a Hockey goalkeepers advances

forward and quickly covers the goal in order to stop the ball going to the goal-post. Further, during penalty stroke, a goalkeeper's behaviour is fairly aggressive which at times may demoralize the attackers. Hence, aggression level of Hockey goalkeepers was higher than Football goalkeepers.

Football goalkeepers had a significantly lower anxiety than Hockey goalkeepers, because in a game of Hockey the shooting area is smaller than that of Football. At times the goalkeeper's view is obstructed by his own team-mates. Further in modern Hockey we use sticks which are fitted with fiber-glass, carbon etc. by which ball moves very fast as when it is hit by the players. Moreover, in artificial turf, the ball moves faster than the natural turf. All these things put extra pressure on the goalkeepers to save a goal and this result in higher anxiety score. In case of Football goalkeeper the anxiety level is lower because the players usually shot from a far-off distance, which give ample time to goalkeeper to stop the ball. Over and above this, offside rule still applicable in Football and rarely these may be one to one situation between attacker and goalkeeper. The above mentioned reasons may cause lower anxiety score for Football goalkeepers.

Achievement motivation of Hockey goalkeepers is significantly higher than Football goalkeepers, because Hockey is our national game and in comparison to Football, Hockey team is performing better than Football team at International level. Hockey players have comparatively more opportunities to participate at International level than Football players as our Hockey team participated in Olympics, World Cup etc. Hockey goalkeepers has higher achievement motivation level reflects that they wish to represent the country in various International level tournaments, because of availability of opportunities.

**CONCLUSION:**

1. Football goalkeepers taller than Hockey goalkeepers
2. Arm-length of Football goalkeepers is greater than Hockey goalkeepers
3. Football goalkeepers posses higher ponderal-index than Hockey Goalkeeper
4. Crural-index of Football goalkeepers is greater than Hockey goalkeepers
5. No difference has been found between Hockey & Football goalkeepers in eight, thigh-girth, thigh-length, leg-length, fore leg-length and calf-girth
6. Aggression level of Hockey goalkeepers is greater than Football goalkeepers
7. Anxiety level of Hockey goalkeepers is greater than Football goalkeepers
8. Hockey goalkeepers posses higher achievement motivation than Football goalkeepers

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