



## RELATIONSHIP OF SELECTED ANTHROPOMETRIC AND PHYSIOLOGICAL VARIABLES TO KABADDI PLAYING ABILITY

**N. Jeyaraj and P. Gopinathan**

Kho-Kho and Kabaddi Coach, Sports Authority of India & Part Time Ph.D Scholar.  
Assistant Professor , Sports Psychology and Sociology, Tamil Nadu Physical Education and Sports University, Chennai.

**Abstract:-**The purpose of the study was to determine the relationship of anthropometric and physiological variables to Kabaddi playing ability. To achieve the objectives of the study four anthropometric and four physiological variables were selected as independent variables and playing ability as dependent variable, which was assessed through subjective rating by three experts during the tournaments. Forty men Kabaddi players took part in the Tamil Nadu Physical Education and Sports University Inter-Collegiate Kabaddi tournaments in the 2013-2014 sessions were selected as subjects. Pearson's product moment correlation (Zero order) was used as a statistical tool to find out the result of the study and significant level was fixed at 0.05. The result of the study reveals that the selected anthropometric variables of height, weight, arm length and leg length and the physiological variables of resting heart rate, breath holding time, and vital capacity were significant relationship with Kabaddi playing ability and only respiratory rate was not significant relationship with Kabaddi playing ability.

**Keywords:**Anthropometric, Physiology, Kabaddi.

### INTRODUCTION

Kabaddi is our indigenous game, which requires skill and power. It is one of the major games in India. Kabaddi combines the characteristics of wrestling and rugby. Earlier it is played by only rural peoples in particularly during the festive days. Now many numbers of rural peoples as well as urban peoples are playing this game and tournaments are conducted various levels. It is added in the Asian games and our team brought laurels to our nation and also conducted world championship. Kabaddi is the National game of Iran and Bangladesh and the State game of Punjab, Tamil Nadu, and Andhra Pradesh. In India Kabaddi is a major sport, which is played all over the India. At present Kabaddi is played in more than sixty five countries an especially Asian country.

There are numerous factors which are responsible for the performance of Kabaddi players. The physique and body composition including the size, shape and form are a significant role in this aspect. In general at the time of selection of players due important are given the body constitution of players and efficiency of various organs of our body. The selected anthropometric and physiological variables are explained below.

### ANTHROPOMETRY VARIABLES

Anthropometry is a branch of anthropology that is concerned with the measurement of human body. The measurement of the human body, its component parts and relative dimensions, such as body weight, height, length of arms and legs, pelvic bones, etc., is known as anthropometry. It is widely used a tool to identify the potential of the players in different sports and games. Anthropometry is a scientific tool presently used in several fields including medicine, anthropology, archeology, and forensic science to study and compare relative body proportions of peoples.

### STANDING HEIGHT

Height is an important factor to change the playing performance and execute the fundamental skills for the Kabaddi players. Particularly more advantages for offensive and defensive players during their raid and catching. The raider with long

leg can easily cross the bonus line and baulk line and with long hands he can easily touch the opponents and center line. Moreover the foot movements are made by the raider with the length of his legs. Foot work movement differs depending upon the technique utilized and other factors, such as body height of the raider.

## **WEIGHT**

Weight is one of the important factors for the player to perform the game Kabaddi. Optimum weight is desirable to become a Kabaddi player. The heavier weight player can easily catch the opponent while the opponent raid and also during their raid in escaping from the opponent catch. Force, strength and power are possible through healthier weight of every Kabaddi player. Every one afraid of the heavier person and it is psychologically to play well.

## **ARMLENGTH**

Arm length is also another important factor to play the Kabaddi game effectively. The raiders having long arm can easily touch the defensive player and thereby they can get more points. Even the raider can touch the center line easily in extending his hands while the opponent catches. Longer arm length is very useful for defensive player in many ways in performing the skills such as ankle catch, waist catch, knee catch, blocking, wrist catch and thigh catch.

## **LEGLength**

Longer Leg length is advantage for Kabaddi players to increase their performance by easily crossing the bonus line, baulk line, to execute kicking, jumping during the opponent catch and toe touch. The raider can easily release him from the defensive catch by using the escaping skill of sliding to cross the center line.

## **PHYSIOLOGICAL VARIABLES**

Different sports have distinct physical and physiological characteristics which contribute to the success of sports persons, in that particular sports discipline. The measurement of player's physiological characteristics has high lightened position specific attributes. The physiological efficiency of various organs is helpful in doing the activity with vigor and more enthusiasm. More and more training is helpful to be stronger physiological efficiency. The most important muscle that adapts to training is the heart. During exercise, it pumps blood containing oxygen, fluids and nutrients to the active muscles. Blood flow then drains the metabolic waste products away. The more blood pumped, the more oxygen is available to the exercising muscles. More and more the muscles train, they're better able to extract and use the oxygen to produce more work. The heart adapts to aerobic exercise over time so it can pump more blood per stroke. Physiological efficiency of various organs plays a vital role in the performance Kabaddi.

## **RESTING HEART RATE**

Lesser the resting heart rate is the indication of higher the physiological efficiency. It is found out through the research studies that the top level athletes having even 30 beats per minute during the resting period. Healthy adults are having 60 to 80 beats per minute. In sedentary, middle aged individuals it may be as high as 100 beats/min. In elite endurance athletes heart rates as low as 28 to 40 beats/min have been recorded. Before exercise even begins heart rate increases in anticipation. This is known as the anticipatory response. After the initial anticipatory response, heart rate increases in direct proportion to exercise intensity until a maximum heart rate is reached. Maximum heart rate is estimated with the formula  $220 - \text{age}$ . But this is only an estimation, and not particularly accurate. The only direct method for determining maximum heart rate is to exercise at increasing intensities until a plateau in heart rate is found despite the increasing work rate. During prolonged steady-state exercise, particularly in a hot climate, a steady-state heart rate will gradually increase. This phenomenon is known as cardiac drift and is thought to occur due to increasing body temperature. Heart rate is more connected the persons cardiorespiratory efficiency.

## **RESPIRATORY RATE**

Human respiration rate is measured when a person is at rest and involves counting the number of breaths for one minute by counting how many times the chest rises. It is observed that in normal 10 years child 15–20 breaths per minute and adults having 18–22 breaths per minute. Cardiorespiratory fitness refers to the ability of the circulatory and respiratory systems to supply oxygen to skeletal muscles during sustained physical activity. The trained person's respiratory rate in resting condition is very low in comparison with untrained person. Generally, a breathing rate while at rest is much slower than during intense physical activity. Breathing rate can vary according to your overall health, physical fitness and the geographic altitude. We use about 12 liters of air when at rest, and about 100 to 150 liters of air while exercising. To perform a successful Kabaddi skills are requires efficiency in respiration and this respiratory rate more related to performance of the players.

## BREATH HOLDING TIME

In Kabaddi players are to continue the raid with uttering an approved word of “Kabaddi” repeatedly without break within the course of one respiration shall be called a cant. It is based on their capacity to hold the breath in longer duration. Two teams occupy opposite halves of a field and take turns sending a "raider" into the other half, in order to win points by tagging or wrestling members of the opposing team; the raider then tries to return to his own half, holding his breath and chanting "Kabaddi, Kabaddi, Kabaddi" during the whole raid. The name often chanted during a game derives from a Tamil word Kabaddi meaning "holding of breath", which is indeed the crucial aspect of play. More and more time keeping the respiration helpful to extend the raiding time and it is possible through the ability of a player in having better breath holding time.

### Vo<sub>2</sub> max

Fitness can be measured by the volume of oxygen consumed while exercising at the maximum capacity. VO<sub>2</sub> max is the maximum amount of oxygen in milliliters, one can use in one minute per kilogram of body weight. Those who are fit have higher VO<sub>2</sub> max values and can exercise more intensely than those who are not as well conditioned. Numerous studies show that one can increase his VO<sub>2</sub> max by working out at an intensity that raises his heart rate between 65 and 85% of its maximum for at least 20 minutes three to five times a week. ([www.brianmac.co.uk/hrm1.htm](http://www.brianmac.co.uk/hrm1.htm)). A mean values of VO<sub>2</sub> max for male athletes are about 3.5 liters/minute and for female athletes it is about 2.7 liters/minute. It is best test to find out the efficiency of the lungs. Increased exercise intensity ultimately corresponds to an increased Vo<sub>2</sub>.

### Purpose of the study

In considering the importance of the above anthropometric and physiological variables the present study was undertaken with the ultimate aim to determine and identify the relationship of selected anthropometric and physiological variables with Kabaddi playing ability.

## METHODOLOGY

The selection of subjects, variables and statistical procedure were explained.

### Selection of subjects

Forty Kabaddi Players from Tamil Nadu Physical Education and Sports University inter collegiate competition in the 2013-2014 sessions were selected as subjects. The subjects were belonged the age group of 19 to 28 years.

### Selection of variables

The anthropometric variables of height, weight, arm length and leg length and physiological variables of resting pulse rate, breath holding time, respiratory rate, and vital capacity were selected in this study. The entire test was conducted with standardized testing procedure.

The dependent variable was playing ability includes the ability of positional play, initiate hold, team support, raiding, difference touch, tactics of raid, tactic of defend, general behavior, communication and analyze the opponents, which was assessed through subjective rating by three experts. The average of three experts was the individual criterion score.

### Statistical Procedure

Pearson's product moment correlation (Zero order) was used as a tool to find out the relationship of selected anthropometric and physiological variables with Kabaddi playing ability. The level of significance was set at 0.05 and SPSS package was used for statistical analysis.

## RESULTS AND DISCUSSIONS

**Table – I**  
**Coefficients of anthropometric variables with Kabaddi playing ability**

S.No.	Anthropometric Variables Correlated	Correlation Co-efficient (r)
1.	Height and playing ability	0.586*
2.	Weight and playing ability	0.498*
3.	Arm length and playing ability	0.762*
4.	Leg length and playing ability	0.455*

\*Significant at 0.05 level  $r_{.05}(38) = 0.31$

Table I – had shown the relationship of selected anthropometric variables with Handball playing ability. All the obtained correlation values were above the table value of 0.313. In this analysis all the selected variables were significant relationship with playing ability. Among the anthropometric variables arm length was found the highest relationship with Handball playing ability ( $r = 0.764$ ). Longer arm length is useful to extend the hand to touch the opponent during raid and catch while during the opponent raid. The other anthropometric variables of height (0.586), weight (0.498) and leg length (0.455) also significant relationship with Kabaddi playing ability. The result of the study were supported the studies conducted by the previous studies Bindu (2002), Bright Selva Kumar (2002), Chauhan (2003), Devaraju and Needhiraja (2012), and Gopinathan (2007).

**Table–II**  
**Coefficients of Physiological variables with Kabaddi Playing Ability.**

S.No.	Physiological Variables Correlated	Correlation Co-efficient (r)
1.	Resting pulse rate and playing ability	-0.458*
2.	Breath holding time and playing ability	0.764*
3.	Respiratory rate and playing ability	0.311
4.	Vital capacity and playing ability	0.690*

\*Significant at 0.05 level  $r_{.05}(38) = 0.313$

Table-II had shown the relationship of selected physiological variables with Kabaddi playing ability. All the obtained correlation values were higher the table value of 0.313. In this analysis all the selected variables were significant relationship with playing ability and among this breath holding time ((0.764) having highest relationship and other variables vital capacity (0.690) and resting pulse rate (-0.458). Only respiratory rate (0.311) was not significant relationship with Kabaddi playing ability. The present result of the study was supported by Chaouachi et al (2009) and Dey et al. (1993).

**CONCLUSION**

From the above results and discussions the following conclusions were drawn

The selected anthropometric variables of height, weight, arm length and leg length having significant relationship with Kabaddi playing ability

In the selected physiological variables resting heart rate, breathe holding time and vital capacity having significant relationship with Kabaddi playing ability and respiratory rate not having significant relationship with Kabaddi playing ability.

The result of the study proved the important of anthropometric and physiological variables for Kabaddi players.

Further the result of the study is helpful to the coaches to select the Kabaddi players by giving importance in body physique and physiological efficiency of various organs.

**REFERENCES**

1. Bindu, C.M (2002). A Study of selected Anthropometric and physiological variables on the performance of Inter-University

Women Cross country Runners, Unpublished Master's Thesis, University of Kerala

2. Bright Selva Kumar (2002). Prediction of Soccer Playing Ability from selected physical Fitness, Physiological, Psychological and Game Skill Variables, Unpublished Ph.D Dissertation, University of Madras.

3. Chaouachi, A., Brughelli, M., Levin, G., Boudhina, N. B., Cronin, J., & Chamari, K. (2009), Anthropometric, physiological and performance characteristics of elite team-handball players, Journal of Sports Sciences, 15, 27(2), 151-7.

4. Chauhan, M.S (2003). Correlation between selected Anthropometric variables and Middle Distance Running Performance, Journal of Sports and Sports Sciences, 26(3); 42-48.

5. Devaraju, K and Needhiraja, A, (2012). Prediction of Kabaddi playing ability from selected anthropometrical and physical variables among college level players no restriction, International Journal of Advanced Research in Engineering and Technology (IJARET), International Journal of Advanced Research, 3(1):118-124

6. Dey, S.K., Khanna, G.L, and Batra, M (1993). Morphological and physiological studies on Indian national Kabaddi players, Britain Journal of Sports Medicine, 27(4): 237-242.

7. Gopinathan, P (2007). Appraisal of Selected Anthropometric Physical Fitness and Physiological Variables as Prerequisites to Handball Performance, Unpublished Ph.D Dissertation, University of Madras.

8. <http://www.nriol.com/indianparents/kabbadi.asp>

9. <http://www.enotes-com/forensic-science/anthropology>

10. <http://www.brianmac.co.uk/hrm1.htm>

11. [www.enotes-com/forensic-science/anthropology](http://www.enotes-com/forensic-science/anthropology)



**N. Jeyaraj**

Kho-Kho and Kabaddi Coach, Sports Authority of India & Part Time Ph.D Scholar.



**P. Gopinathan**

Assistant Professor, Sports Psychology and Sociology, Tamil Nadu Physical Education and Sports University, Chennai.