

## Comparative study on body segments and BMI between indigenous and non-indigenous game players

Mahesh M Pujari<sup>1</sup> Dr. Madan Singh Rathore<sup>2</sup>

<sup>1</sup>Phd Scholar, Lakshmibai National Institute of Physical Education

<sup>2</sup>Assistant Professor, Lakshmibai National Institute of Physical Education

**Abstract** The purpose of the study is to compare Body segment and BMI of indigenous and non-indigenous game players. **Material and Methods:** This study was carried out on 100 indigenous and 100 non-indigenous game players in the age group between 16 to 25 years. The Body segment were recorded with the measurement tapes and BMI were recorded with formula (weight in kg/height in m<sup>2</sup>). Independent t-test was used as a statistical test. P < 0.05 was considered statistically significant. **Result:** The mean value of height, weight, BMI, arm length and leg of indigenous and non-indigenous game players were 168.90 and 171.92, 58.20 and 60.63, 20.70 and 21.2460, 76.32 and 78.44, 84.82 and 87.61 respectively. There was significant difference in Height, arm length and leg length between indigenous and non-indigenous game players. And there was no significant difference in Weight and BMI among indigenous and non-indigenous game players. **Conclusion:** Body segments vary from one sport to other as each sport demands different type of body segment to reach peak performance. This reveals Body segment has a direct bearing on activity status.

**Keywords:** Body Max Index; Health; Sports; Fitness; Athletes

**Corresponding Author:** mahesh.pujari986@gmail.com

### Introduction

Anthropometry refers to the measurement of the human individual. It involves the systematic measurement of the physical properties of the human body, primarily dimensional descriptors of body size and shape. It involves making precise, highly standardized measurements so that size and shape can be described objectively (Mrityunjay Biswas & Sangita Halder, 2015).

Various athletic events require different body types to achieve maximum performance. Since each sport has its own specific demands, every athlete should have specific anthropometrical characteristics and body composition figures for his own sports discipline (Masanovic et al., n.d.). Contemporary sport science is designed to improve performance and to identify talents as precisely as possible and for athletes at all age levels. Many studies have shown that specific anthropometric characteristics are significantly associated with sports results (Bojan Masanovic et al., 2019)

Indigenous games are a part of symbolic patrimonial heritage of the indigenous people. The word indigenous is actually derived from the Latin word “indigena” that means “native”. Indigenous actually pertains to some specific geographical area that may or may not be huge. India has its own history of games and sports that had been an integral part of the country during

ancient times. Some of the ancient games have either disappeared from rural and urban lives while some are played in the country even today. some indigenous and traditional games that owe their origin in India became popular and universal, those are kabaddi, kho-kho, wrestling and archery etc. (Dhanjal, 2022).

Kho-Kho ranks as one of the most popular traditional sports in India. It is an extremely complicated and tactical sport (Jaiswal, 2014) and Kabaddi is aptly known as the “Games of The mass” due to its popularity, simple, easy to comprehend rules, and public appeal (Singh, 2013). both are popular indigenous games of india and both players requires some similar anthropometric and physical variables.(Singh, 2013) (Dr. S Muniraju & Santhosha C, 2019) (Dr. Baldev Singh, 2017) found there is no significant difference in BMI, leg length, upper arm length, girth measurement on fore arm, arm flexed, thighs and calf girth among kabaddi and kho-kho players. If a player has good height and arm length he can take advantages during the game by increasing the reach level of the players to touch the opponents players(Kerketta & Singh, 2016)

Indian non-indigenous games are sports and recreational activities that were not originally native to India but have been adopted and widely played in the country. These games have been introduced from outside sources and have gained popularity among Indians. Some of the prominent Indian non-indigenous games include handball, basketball, cricket, football (soccer), hockey and badminton.

Team handball is one of the fastest and the most endurance required team sports and is epitomized by special maneuvers such as jumping, shooting under the pressure, faking against hard defense players and attempting fast breaks despite all the fatigue (Bilge, 2013). Basketball has been described as an intermittent sport, being physically very demanding, requiring players to permanently repeat bouts of intense actions like sprinting, shuffling, jumping with jogging, walking (Masanovic, 2018). Both handball and basketball games are non-indigenous and both are required almost same type of physical and anthropometric variables to reach high performance. According to (Bayios et al., 2006) (Talekar, 2018) there is no significance difference in BMI, hand length and some physiological variables among handball and basketball players. Anthropometric parameters such as height and arm length are most important and advantageous for the players to perform any skill easily and accurately. Players can take advantages during shooting and passing the ball during the match in the dodging of opponents(Kerketta & Singh, 2016).

Many previous studies have evaluated anthropometric variables of soccer, handball, basketball, hockey, cricket, volleyball, kabaddi and kho-Kho players (Talekar, 2018) (Singh, 2013) (Bojan Masanovic et al., 2019) (Deba Pasad Sahu, 2014) (Bojan Masanovic et al., 2019). But there is not a single study has been done on anthropometric variables of indigenous and non-indigenous game players

Hence, the purpose of this study was to describe Body segments and BMI of indigenous and non-indigenous game players.

## Objective of the study

To compare Body segments and BMI of indigenous and non-indigenous game players

## Materials and Methods

### Selection of subjects

Total two hundred male players acted as subjects in this study (100 indigenous game players and 100 non-indigenous game players) from north part of Karnataka. Indigenous games were kabaddi and kho-kho whereas handball and basketball games were taken as non-indigenous games. 50 players were taken from each game. The subjects were ranged from 16 to 25 years. All the players of different sports were engaged either in the preparation of inter-varsity competition or in regular practice under different sports academies for various tournaments.

### Selection of variables and materials

The anthropometric variables on which data collected were Height, Weight, Leg Length, Arm length and BMI. Stadiometer, weighing machine, measuring tape were used record height, weight, arm length, leg length. BMI was measured with the help of the  $(\text{Weight}/\text{Height}^2)$  formula (Deba Pasad Sahu, 2014).

### Data Analysis

Statistical Analysis: For data analysis responses were expressed as mean and standard deviation. Independent 't' test was performed for comparison between indigenous and non-indigenous game players,  $p < 0.05$  was considered statistically significant. Data analysis was performed using SPSS 26 software under windows.

## Result

Table 1: Mean, Standard deviation and 't' test of Height, Body Weight, BMI, Leg Length, Arm Length between indigenous and non-indigenous game players.

Variable	Indigenous (Mean)	Non-indigenous (Mean)	Indigenous (S.D)	Non-indigenous (S.D)	t-value
Height	168.9018	171.9222	7.17569	7.48055	2.914*
Body weight	58.2068	60.6332	8.19515	9.93247	1.884
BMI	20.7022	21.2460	2.97773	4.12797	1.067
Arm length	76.3260	78.4476	3.71488	4.17265	3.798*
Leg length	84.8281	87.6134	6.74788	7.55024	2.751*

Table 1 shows that the mean and standard deviation of indigenous and non-indigenous players on Height (cm) has been found  $168.90 \pm 7.17$  and  $171.92 \pm 7.48$ , in Body Weight (Kg) has

been found  $58.20 \pm 8.15$  and  $60.63 \pm 9.93$ , in BMI has been found  $20.70 \pm 2.97$  and  $21.24 \pm 4.12$ , in Leg Length (cm) has been found  $84.82 \pm 6.74$  and  $87.61 \pm 7.55$ , in Arm Length (cm) has been found  $76.32 \pm 3.71$  and  $78.44 \pm 4.17$ . The 't' value of Height, Leg Length, Arm Length are 2.914, 3.798, 2.751 are significant at 0.05 level of significance but Body Weight and BMI is 1.884 and 1.067 are not significant at 0.05 level.

Fig 1: Comparison of mean of height between indigenous and non-indigenous players.

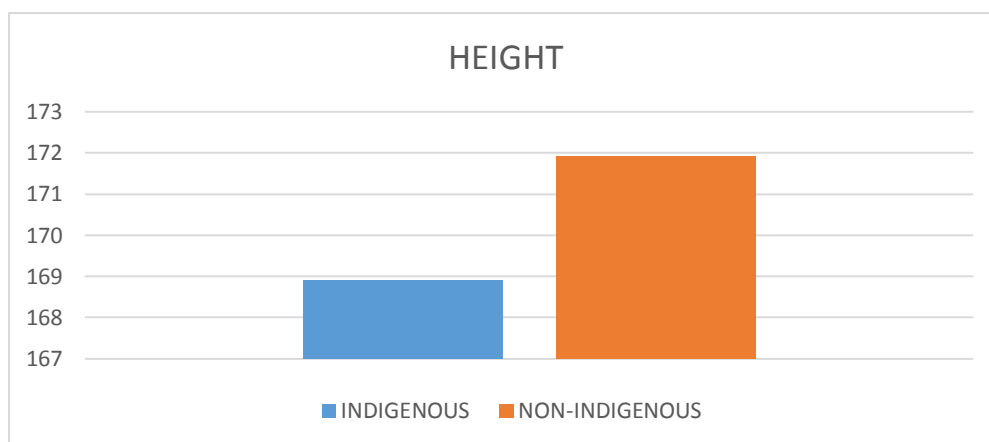


Fig 2: Comparison of mean of Body Weight between indigenous and non-indigenous players

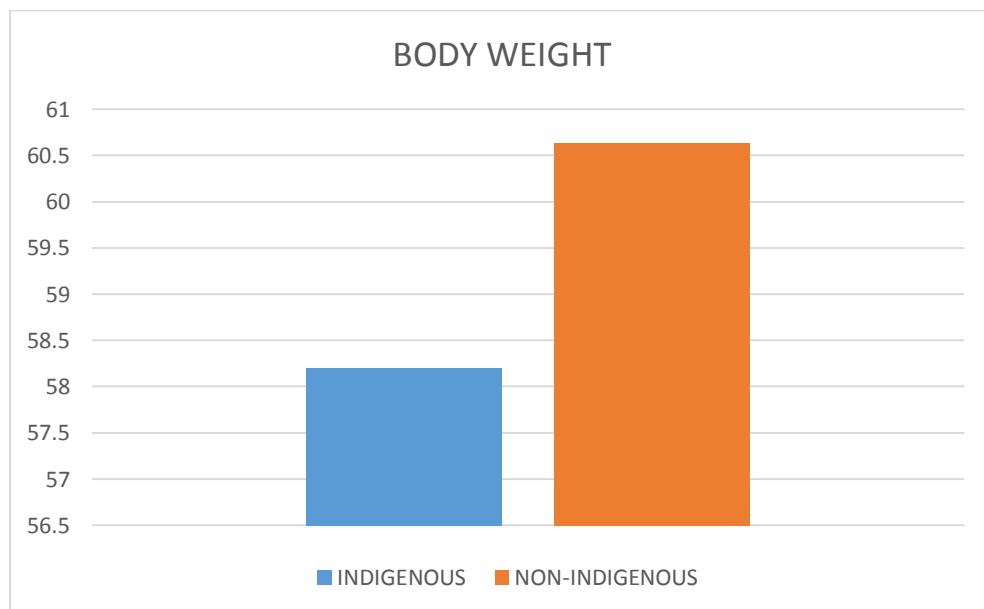


Fig 3: Comparison of mean of BMI between indigenous and non-indigenous players

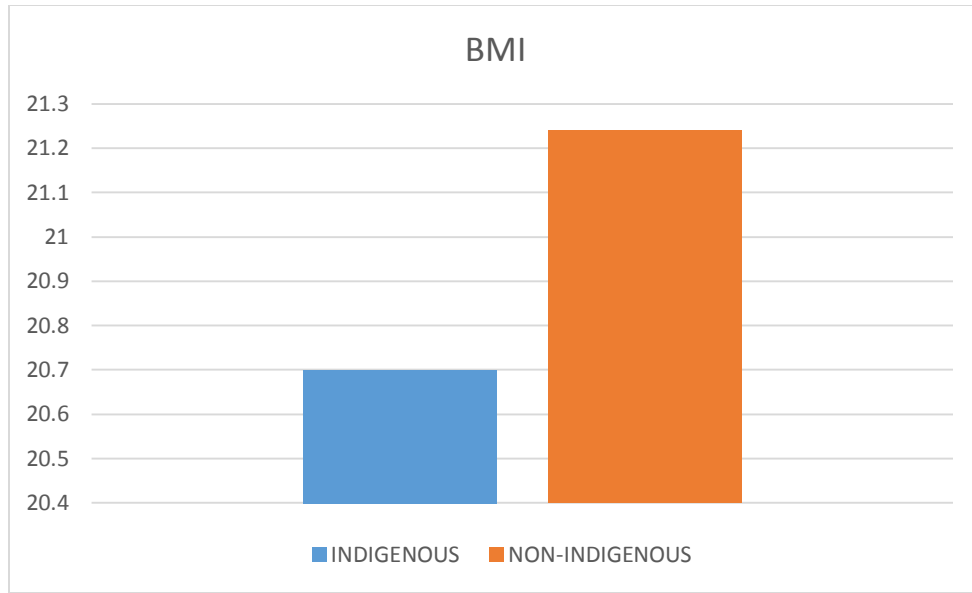


Fig 4: Comparison of mean of Arm Length between indigenous and non-indigenous players

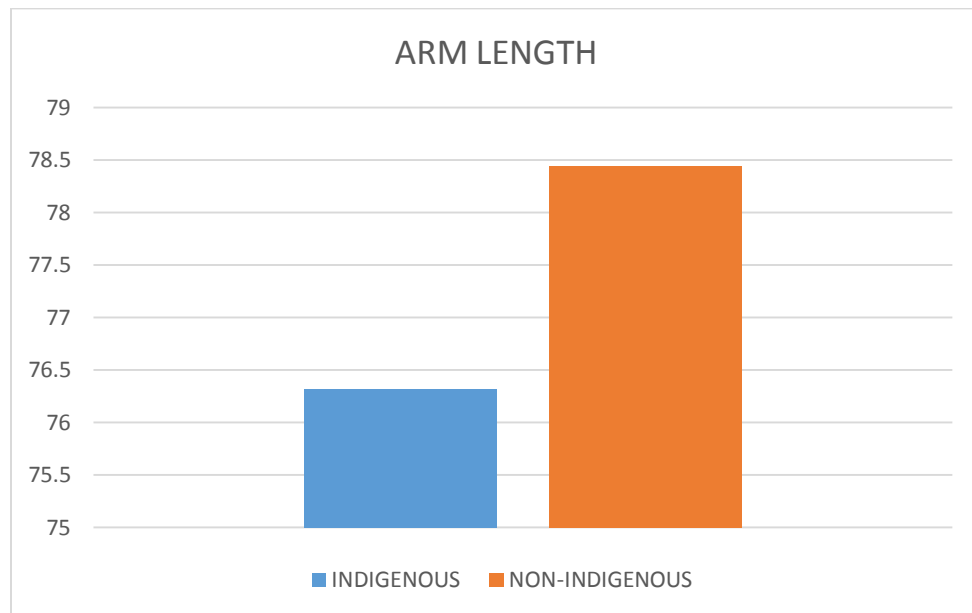
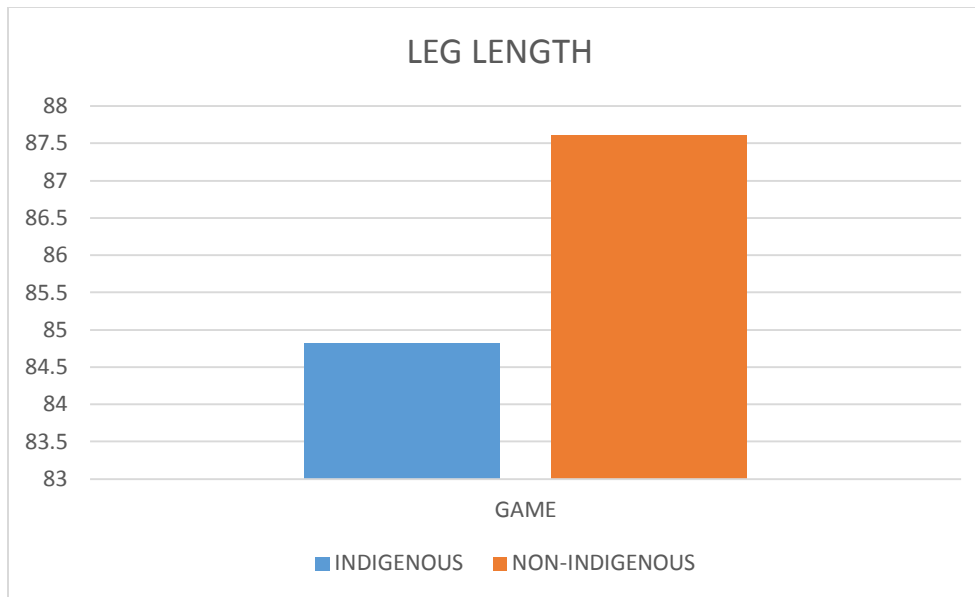


Fig 5: Comparison of mean of Leg Length between indigenous and non-indigenous players



## Discussion

The result of the study revealed significant difference between the mean scores of indigenous and non-indigenous game players in relation to Height, Arm Length, Leg Length but no significance difference in Body weight and BMI. It seems that players of non-indigenous (handball and basketball) have higher Height, Arm Length and Leg Length compare to indigenous (Kabaddi and Kho-Kho) Players. So, the selection criteria, the different types of games and the rules of the game between these sports can explain the observed difference. Non-indigenous players are comparatively tall, It may be because their players handling a ball above their heads and because their height helps them to reach toward the basket or toward the top of the net (Popovic et al., 2013). And their arm length and leg length are comparatively high than indigenous game players it may be because who have long arm might do well to use the better grip because it provides better control over the skill (Deba Pasad Sahu, 2014). Non indigenous game players are having less height, arm length and leg length. Less height may be because to maintain more balance and agility during the game (Gunnar Mathisen & Pettersen, 2015). Arm length and leg length are less compare to Non-indigenous game it may be because these variables are positively correlated with height (Mohanty et al., 2001).

There is a study conducted by (Popovic et al., 2013) supports current study result, in this study it shows that there is significance difference in anthropometric variables and body composition among basketball and control group, and basketball players have taller than control group. One more study conducted by (Masanovic et al., n.d.) contrast to current study result. In this study it shows that volleyball players are taller than handball players.

Result of the study conducted by (Kerketta & Singh, 2016) supports current study result. In this study it shows that kabaddi players have less height, arm length and leg length compared to basketball players. One more study conducted by (Pilli, 2010) supports current study result, it shows that Kho-Kho players have less height than handball players.

## Conclusion

Body segments vary from one sport to other as each sport demands different type of body segment to reach peak performance. This reveals Body segment has a direct bearing on activity status. The present study compared some basic Body segments and BMI of selected indigenous and non-indigenous game players. The results demonstrate that significant differences in favour of non-indigenous game players in body segments (height, arm length and leg length).

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