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A COMPARATIVE STUDY ON BODY PROPORTIONALITY OF ALL INDIA AND WEST ZONE INTER UNIVERSITY LEVEL MALE HANDBALL PLAYERS

Dr. Sk. Md. A.M.K. Jagirdar
Head, Dept. of Phy. Education,
Milliya Arts & Science College,
Beed, Dist. Beed (MS) India

Sayyad S. Noor
Research Scholar,
Dr.BAM University,
Aurangabad, Dist. Aurangabad (MS) India

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ABSTRACT

Several authors have already discussed the importance of Anthropometric variables in youth and adult team Handball players. The relationship of length to breadth, height to thickness, length-to-length etc. of various parts of body represents proportions. The body proportion can be studied in various ways, but indices method is best for determining body proportions. For the purpose of the study 100 male handball players were selected from All India Inter zonal Handball tournament held at BHU Varanasi from dated 23-27 February 2016. And 100 male handball players were selected from West zone intervarsity Handball Trail held at RTM University Nagpur. Z - test was applied on collected data for finding the difference of body proportionality between all India and Zone level handball players tested at 0.05 level of Significance. Results of the study reveled that significance difference was exists between sitting height- stature index, Thigh Length - Lower Leg Length Index, Upper Arm - Lower Arm Length Index, Hip Breadth - Stature Index and Shoulder Breadth - Stature Index. Whereas insignificant difference found in Ponderal index of All India and west zone intervarsity level male handball players.

Introduction

Top level sports performance not only requires certain physical qualities like speed, endurance, power, strength and agility but also a good physical structure. Now-a-days, body build gets physical attention at the time of selection of players for games and sports where high level competition is involved. In modern sports, anthropometric measurements and their relationship with various motor traits are important guides for coaches as well as players for making training schedules. Most of the games demand higher than normal level of speed, strength, endurance, flexibility, co-ordination and the optimum fitness of the organism. Research findings show that a high level of performance of techniques alone has very little to do with competitive sports. Scientists and physiologists have been of the view that anthropometric measurements and the physical components of an athlete have a lot to do with his performance. Along with techniques or the tactics of a player or a team, physical and physiological characteristics better performance.

Handball (also known as team handball, Olympic handball, European team handball, European handball, or Borden ball) is a team sport in which two teams of seven players each (six outfield players and a goalkeeper) pass a ball to throw it into the goal of the other team. A standard match consists of two periods of 30 minutes, and the team that scores more goals wins.

Handball has become one of the popular sports in the world and is known for its speed. This game is also a part of Olympic Sport. The simple rules of game, minimal ground and equipment facilities and the speed of game itself along with the scope for players to exhibit their exclusive skills makes it a popular game among even the schools and educational institutions. An effective handball players needs to possess several physical and mental abilities such as high-speed action, neuro muscular coordination, explosive jumping and hand power with proper aiming at goal. Additional abilities like explosive power of arms and legs, sprint velocity and kinesthetic feeling in ball control add to the playing efficacy. These physical activities, most crucial for playing Handball, are considered anaerobic mainly because of the speed at which the game is played (Ronglan 2006).

Several authors have already discussed the importance of Anthropometric variables in youth and adult team Handball players. In adult team Handball, back players are taller

and have a greater body mass compared to wings, which helps when shooting from distance. Since, players positioned on the wing rarely engage in physical contact with the opposing defenders, a tall stature and high body weight are of less importance to successful performance in this position. Pivots play within the opponent's defensive formation with the back or flank facing the goal and the defenders themselves. To perform well on the pivot position, stated that a strong upper body and large total body mass may be needed to engage in physical contact for certain positions.

The relationship of length to breadth, height to thickness, length-to-length etc. of various parts of body represents proportions. This importance of proportion becomes evident, when we want to compare particular body parts of two persons who are otherwise different in over all size. The proportions or ratio keeps one measurement constant in all subjects compared and evaluate the differences in the other measurements. The body proportion can be studied in various ways, but indices method is best for determining body proportions.

Singh, K. (2015) indicates in his study that the ball passing and throwing skill efficiency of Handball players can be predicted on the basis of arm strength, leg strength, sitting height, total arm length, leg length, elbow diameter, chest girth and lean body mass. The value of $R2 = .701$ which shows that combination of these eight variables collectively account for 71% of variance of Handball players ball passing and throwing skill efficiency score. ($R2 = $ can be broken up as) $R2 = 70.10 = 11.46 + 9.09 + 13.75 + 12.35 + 11.11 + 10.71 + 5.85 + (-4.53)$. It shows that arm strength, leg strength, sitting height, total arm length, elbow diameter, chest girth and lean body mass contributes 11.46, 9.09, 13.75, 12.35, 11.11, 10.71, 5.85 and -4.53 percent individually towards the variance of Handball players ball passing and throwing skill efficiency scores respectively. Standard error of estimate 1.388212 indicates that 71 percent of the obtained performance scores of ball passing and throwing skill efficiency of Handball players will lies within ± 1.388212 points of the predicted ball passing and throwing skill efficiency scores. The coefficient of multiple correlation is of sufficient size, so the equation developed can be put in to the prediction for the evaluation of the ball passing and throwing skill efficiency. It is true that the mere skill alone never assures victory. Higher level of Handball performance depends

upon the body composition, strength measure, technique, tactics, and psychological factors. The present study was undertaken with the theme of the above factors and the number of studies conducted in these aspects and found its importance.

Objectives of the Study

The purpose of this study is to find out the differences of body proportionality between the all India level and west zone intervarsity level male handball players.

Significance of Study

A sports man has to pass through various stages to come up to the highest level of competition. This study will provide guidelines to understand the different motor fitness, skill fitness and physical traits of Indian male handball players of all India level and zone level competitions. This will help the coaches' physical educationists to counsel the potential or talented sports man at an appropriate age to select the right playing position of handball game as par his inherited physical and physiological qualities. This may help in fulfilling our dream of producing world-class handball players.

Selection of Samples

For the purpose of the study 100 male handball players were selected from All India Inter zonal Handball tournament held at BHU Varanasi from dated 23-27 February 2016. And 100 male handball players were selected from West zone intervarsity Handball Trail held at RTM University Nagpur. Subjects were well experienced and selected from various intervarsity coaching camps and competitions. Their age ranged 18 to 25 years. The purpose of the study was explained before all included subjects and they were agreed to become a part of study.

Research Design

For the purpose of this study, both the samples were considered the true representative of the entire male handball population of Indian at the time their assessment of the anthropometrical variables. The present study is a status study, which did not require the investigator basically to manipulate any of the variables included in it. It was not intended to study the interaction among various variables. In all there were three samples and three variables to be investigated.

Body Proportionality

The following indices were used to determining various body segmental proportionalities.

- Sitting height-Stature index $= \dfrac{Sitting\ Height}{Stature} \times 100$

- Ponderal index $= \dfrac{Stature}{3\sqrt{Weight}}$

- Thigh length-Lower leg length index $= \dfrac{Thigh\ Length}{Lower\ leg\ length} \times 100$

- Upper arm length-Lower arm length index $= \dfrac{Upper\ arm\ length}{Lower\ arm\ length} \times 100$

- Hip width-Stature index $= \dfrac{Hip\ width}{Stature} \times 100$

- Shoulder width-Stature index $= \dfrac{Shoulder\ width}{Stature} \times 100$

Statistical procedure

Reiterating the objective of the study, we have to point out that we intend to investigate the body proportionality between all India and west zone intervarsity level male handball players. Z - test will be used for finding the difference of body proportionality between all India and Zone level handball players. The differences in various variables of all India and west zone intervarsity level male handball players were tested at 0.05 level of Significance.

Analysis of Data

Table - 01 Sitting Height - Stature Index

Variable	Mean Sitting Height - Stature Index	Standard Deviation	Z- Value
All India Handball players	53.57728	1.431715	3.021598
West Zone Handball players	52.97485	1.387511	
The mean Sitting Height - Stature Index of All India Handball players is > than mean Sitting Height - Stature Index of west zone handball players by 1.137 %.			

* Significant at 0.05 level

** Z value for one tail test to be significant at 0.05 level 1.64

Table 1 Shows significant obtained Z value for one tail test, which leads us to conclude that the mean Sitting Height - Stature Index of All India level Handball players, is significantly greater (1.137%) than the mean Sitting Height - Stature Index of West zone level handball players.
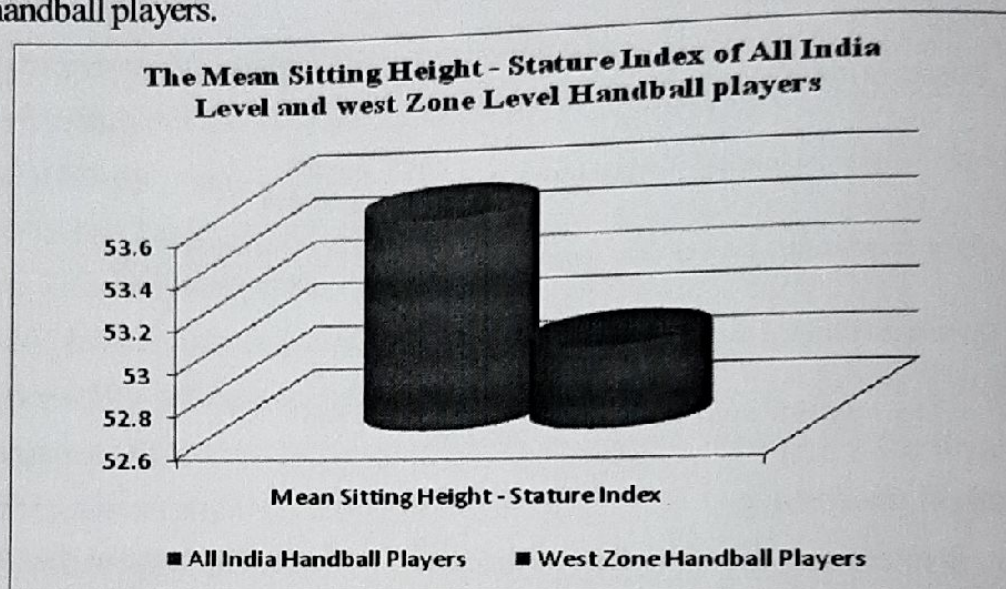
Figure - 1

The Mean Sitting Height - Stature Index of All India Level and west Zone Level Handball players

Mean Sitting Height - Stature Index

■ All India Handball Players   ■ West Zone Handball Players

Fig.1. The Mean Sitting Height - Stature Index of All India Level and west Zone Level Handball players

Table - 2 Ponderal Index

Variable	Mean Ponderal Index	Standard Deviation	Z – Value
All India Handball players	41.02377	0.678515	0.904092
West Zone Handball players	41.13059	0.967313	
The mean Ponderal Index of All India Handball players is > than mean Ponderal Index of west zone handball players by 0.259718 %.			

*   Significant at 0.05 level

** Z value for one tail test to be significant at 0.05 level 1.64

Table 2 Shows significant obtained Z value for one tail test, which leads us to conclude that the mean Ponderal Index of All India level Handball players, is significantly greater (0.259718%) than the mean Ponderal Index of West zone level handball players.
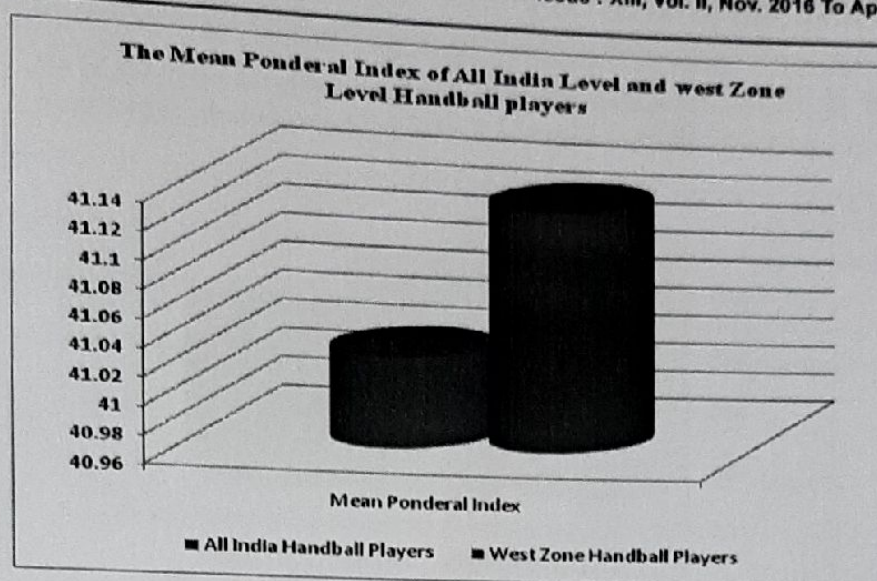
Figure - 2

Fig.2. The Mean Ponderal Index of All India Level and west Zone Level Handball players

Table – 3 Thigh Length – Lower Leg Length Index

Variable	Mean Thigh Length – Lower Leg Length Index	Standard Deviation	Z- Value
All India Handball players	162.2302	10.28932	21.72252
West Zone Handball players	124.4502	14.02194	
The mean Thigh Length – Lower Leg Length Index of All India Handball players is > than mean Thigh Length – Lower Leg Length Index of west zone handball players by 30.36%.			

*   Significant at 0.05 level

** Z value for one tail test to be significant at 0.05 level 1.64

Table 3 Shows significant obtained Z value for one tail test, which leads us to conclude that the mean Thigh Length - Lower Leg Length Index of All India level Handball players, is significantly greater (30.36%) than the mean Thigh Length - Lower Leg Length Index of West zone level handball players.
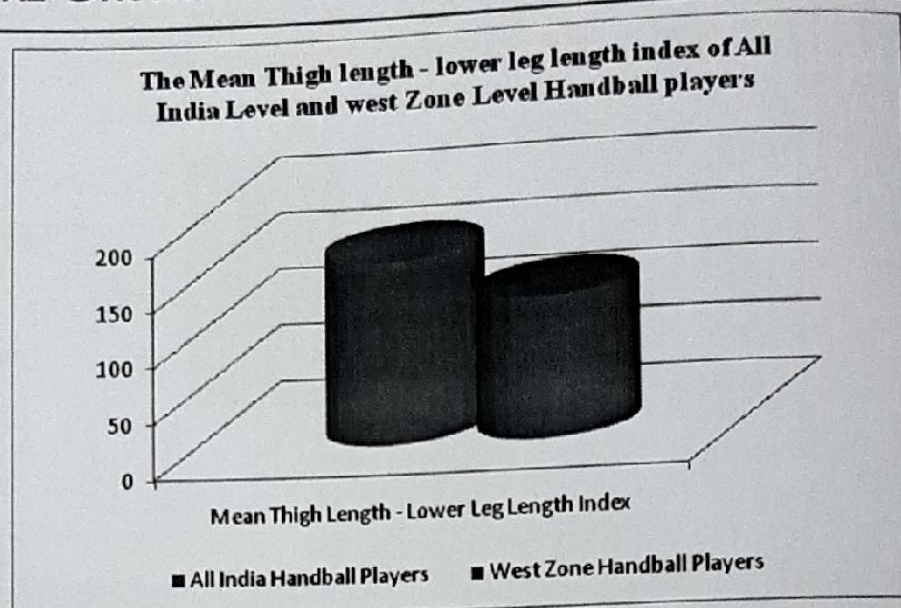
Figure - 3

Fig.3. The Mean Thigh Length - Lower Leg Length Index of All India Level and west Zone Level Handball players

Table - 4 Upper Arm - Lower Arm Length Index

Variable	Mean Upper Arm - Lower Arm Length Index	Standard Deviation	Z- Value
All India Handball players	109.31467	0.703859	8.7802
West Zone Handball players	117.55025	9.353274	
The mean Upper Arm - Lower Arm Length Index of All India Handball players is > than mean Upper Arm - Lower Arm Length Index of west zone handball players by 7.01%.			

* Significant at 0.05 level

** Z value for one tail test to be significant at 0.05 level 1.64

Table 4 Shows significant obtained Z value for one tail test, which leads us to conclude that the Upper Arm - Lower Arm Length Index of All India level Handball players, is significantly greater (7.00601%) than the mean Upper Arm - Lower Arm Length Index of West zone level handball players.
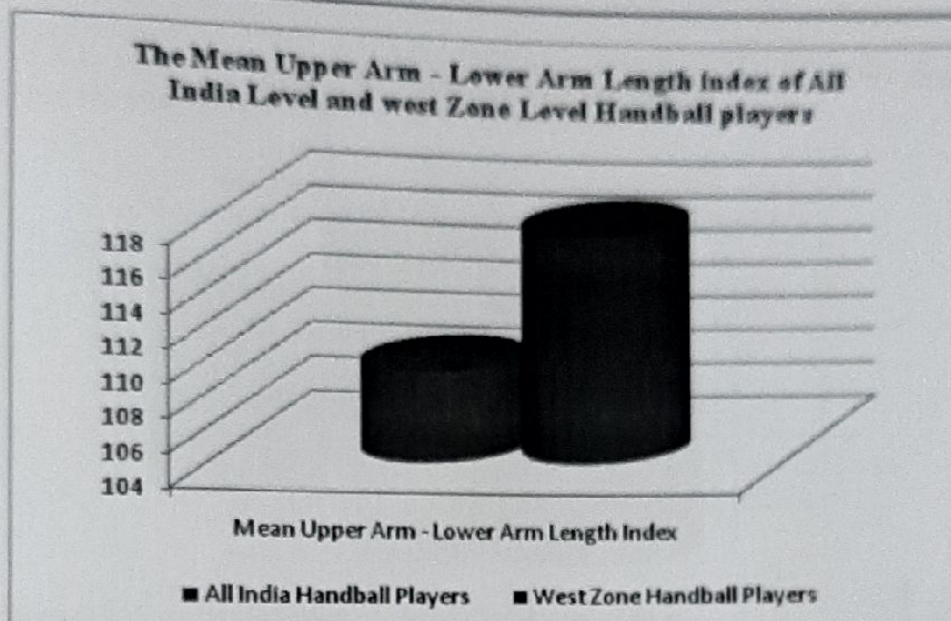
Figure - 4

Fig.4. The Mean Upper Arm - Lower Arm Length Index of All India Level and west Zone Level Handball players

Table - 5 Hip Breadth - Stature Index

Variable	Mean Hip Breadth - Stature Index	Standard Deviation	Z- Value
All India Handball players	15.73677	0.625561	11.68131
West Zone Handball players	14.75598	0.560035	
The mean Hip Breadth - Stature Index of All India Handball players is > than mean Hip Breadth - Stature Index of west zone handball players by 6.65%.			

* Significant at 0.05 level

** Z value for one tail test to be significant at 0.05 level 1.64

Table 5 Shows significant obtained Z value for one tail test, which leads us to conclude that the Hip Breadth - Stature Index of All India level Handball players, is significantly greater (6.65%) than the mean Hip Breadth - Stature Index of West zone level handball players.
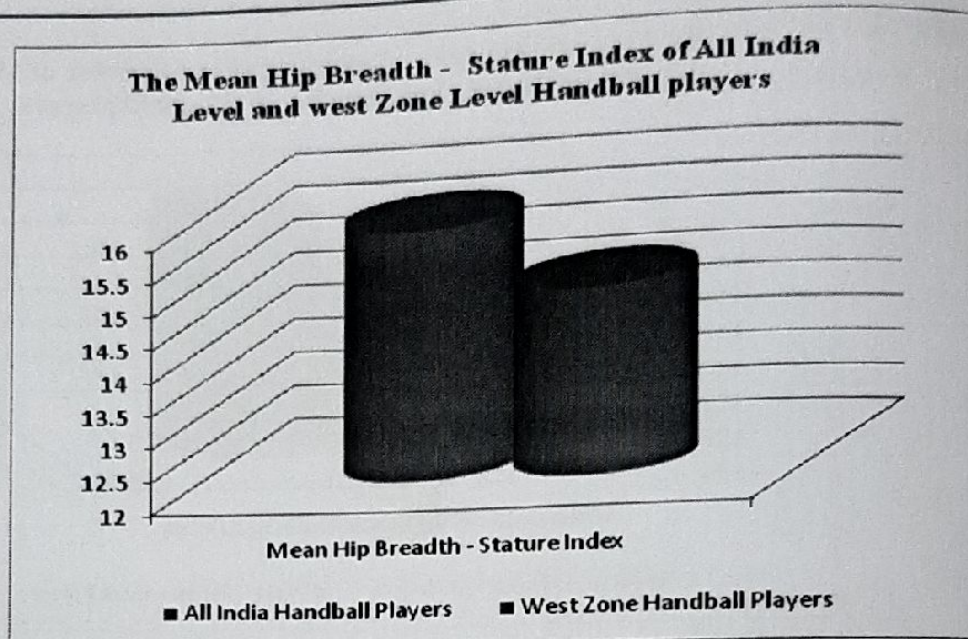
Figure - 5

The Mean Hip Breadth - Stature Index of All India Level and west Zone Level Handball players

Mean Hip Breadth - Stature Index

■ All India Handball Players   ■ West Zone Handball Players

Fig.5. The Mean Hip Breadth - Stature Index of All India Level and west Zone Level **Handball Players**

Table - 6 Shoulder Breadth - Stature Index

Variable	Mean Shoulder Breadth- Stature Index	Standard Deviation	Z- Value
All India Handball players	23.44721	0.767469	8.066401
West Zone Handball players	22.35215	1.119803	
The mean Shoulder Breadth- Stature Index of All India Handball players is > than mean Shoulder Breadth- Stature Index of west zone handball players by 4.90%.			

* Significant at 0.05 level

** Z value for one tail test to be significant at 0.05 level 1.64

Table 6 Shows significant obtained Z value for one tail test, which leads us to conclude that the Shoulder Breadth- Stature Index of All India level Handball players, is

significantly greater (4.90%) than the mean Shoulder Breadth- Stature Index of West zone level handball players.
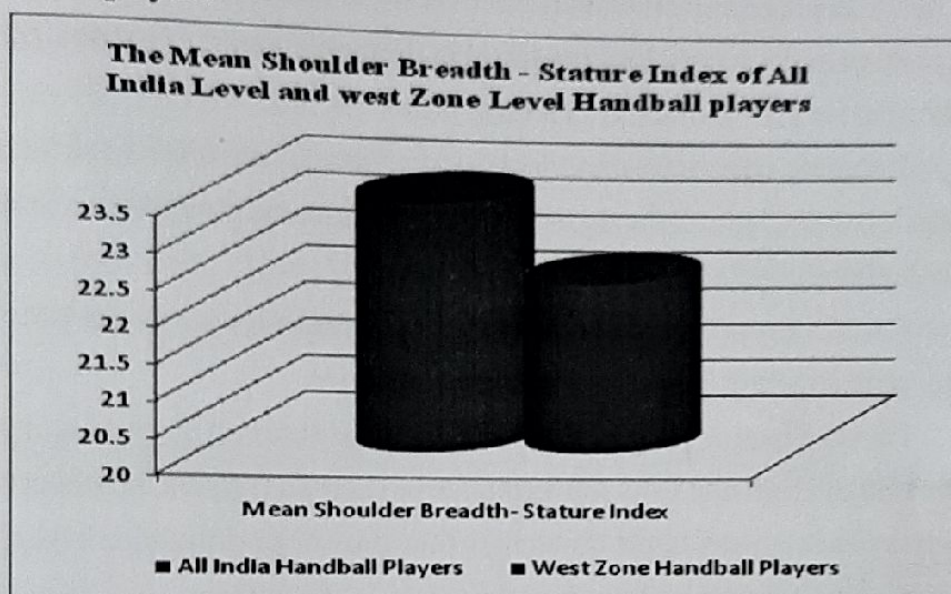
Figure - 6

Fig. 6. The Mean Shoulder Breadth- Stature Index of All India Level and west Zone **Level Handball Players**

Discussion of Findings

Sitting Height- Stature index

It is observed that mean sitting height - stature index of all India level male handball players is significantly greater (1.137%) than west zone male handball players. This means that all India level male handball players had shorter trunk and greater leg length than their west zone counterparts.

A greater lower extremity provides greater mobility in relation to dodge and reach on the court, which helps them in shooting, blocking, defense etc.

Mokha and Sidhu (1988), also observed that Indian female volleyball players had greater upper and lower extremities than the controls.

Ponderal Index

It is observed that mean Ponderal Index of all India intervarsity level male handball players is not significantly greater than the mean Ponderal Index of west zone intervarsity level male handball players.

We see no significant difference in the mean ponderal index of all India intervarsity level handball players and west zone intervarsity level handball players which confirms that ponderal index is not a limiting factor in the performance of handball players.

Upper arm length - Lower arm length index

It observed that mean upper length - lower arm length index of all India intervarsity level male handball players is significantly greater than west zone intervarsity level male handball players by 7.01%.

Greater proportion of upper arm - lower arm length index provides greater advantage in shooting, passing, blocking and defense.

Parvez Shamim (2002), conducted a similar study on physical and physiological parameters of High and Low performance basketball players, he observed that high performers have greater lower arm length than the low performance basketball players.

Thigh length - lower Leg length index

It is observed that mean thigh length - lower leg length index of all India intervarsity level male handball players is significantly greater than west zone intervarsity level male handball players by 30.36%.

Greater thigh and lower leg length signifies greater reach on the court due to higher center of gravity.

Sodhi et. al. (1990), conducted a study on north Indian junior volleyball players. The result of the study revealed that the volleyball players in each age groups possessed greater leg length than the controls.

Hip Breadth - Stature Index

It is observed that mean hip breadth of all India intervarsity level male handball players is significantly greater than west zone intervarsity level male handball players by 6.65%. This signifies that proportionate hip breath of all India intervarsity level male handball players is significantly greater than west zone handball players.

Ansari and Singh (2007) observed in their study that the mean Hip width - Stature index of 800 m runners is significantly greater than 1500 - 5000 m and 5000 - 10000 m runners whereas there is no significant difference between the mean hip width - stature index of 1500 -5000 m and 5000 - 10000 m runners.

Singh and Singh (2010) concluded in their study insignificant difference in the mean hip width - stature and shoulder breadth - stature indices of long jumpers, high jumpers, triple jumpers and pole vaulters.

Shoulder Breadth - Stature Index

It is observed that mean shoulder breadth -stature index of all India intervarsity level male handball players is significantly greater than west zone intervarsity level male handball players by 4.90%. This signifies that proportionate shoulder breath to stature of all India intervarsity level male handball players is significantly greater than west zone handball players.

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