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## A comparative study of selected anthropometric variables of arms between national and state level baseball female players

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### Abstract

The purpose of this study was to compare of anthropometric parameters with performance among softball players and to find the anthropometric predictors of performance in softball. These Anthropometric Variables (Upper arm length, Lower Arm Length, Total Arm Length, Upper arm Girth and Lower Arm Girth) of National and State level Baseball College Girls. To achieve the objective of the study thirty (N=30) national level Girls and thirty (N=30) state level Girls were selected randomly as subjects of the study. The age of the subjects ranged between 16-27 years. To determine the significant difference between the mean scores of national and state level Girls on selected anthropometric variables' test was employed with the help of IBM Statistical Software Version 20. The level of significance was set at 0.05. Results of the study revealed that there were significant differences obtained on Anthropometric variables (upper arm girth and lower arm girth) between national and state level Baseball female players. There were no significant differences on the account of upper arm length, lower arm length and total arm length between national and state level Baseball players.

**Keywords:** Anthropometric girth, width & baseball, softball, performance

### Introduction

The two Greek words 'anthropos' and 'metrein' have given birth to a new term 'anthropometry' 'anthropos' means man and 'metrein' means to measure. Therefore, when we speak literally anthropometry is the measurement of the human body to discover its exact dimensions and the proportions of its parts. Anthropometry, measurement of body structure is the oldest type of body measurement known, dating back to the beginning of recorded history. Baseball is a bat and ball sport played between two teams with nine players from one team on the field at a time. The game of Baseball entails throwing, fielding, pitching, catching, base-running and hitting (Craig *et al.*, 1985; American Academy of Pediatrics. 2012) [1]. To develop in these areas, many factors play a significant role like skill, practice, level of physical activity, techniques, psychological traits, nutrition and other environmental factors. Sport has acquired an immense popularity and in view of its scientific organization, it has become a worldwide phenomenon. Besides numerous factors responsible for the dismal performance of sports persons, the physique or body composition, including the size, shape and form plays a significant role. The scientists have been of the view that anthropometric measurements of sportsman have for more significant role to play in their performance, than the practices and techniques used by a person or a team. The research findings indicate that a high level of technique perfection has less to do with the success of an individual or a team in modern competitive sports, if it is restricted by physical and anthropometric limits. For centuries, measurements of body size and proportions have been studied because the relationship between these measurements and body functions and beauty. To develop in these areas, many factors play a significant role like skill, practice, level of physical activity, techniques, psychological traits, nutrition and other environmental factors. However, a particular body size and shape and certain genetically conditioned abilities and features are required in order to achieve top level performance in Baseball.

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## Methods & Materials

Subjects have been randomly selected for the study. The age ranged from 17-28 years for the subjects. Total number of subjects was 60 Baseball players from Punjab region. The investigators selected 30 national level and 30 state level Baseball college female players. In the consultation with experts and considering tester's competency and even feasibility criteria in mind, especially of equipments reliability and time factor, the following anthropometric variables were selected for the study namely: Upper arm length, Lower Arm Length, Total Arm Length, Upper arm Girth and Lower Arm Girth.

## Statistical Analysis

In order to examine the hypothesis of the present study Mean, SD and independent sample t- test were employed to compare the mean scores of national and state level Baseball players. Level of significance was set at 0.05. The IBM SPSS Statistics software was used to analyzed the collected data.

## Results

The comparison between national and state level college boys on selected anthropometrical variables were statistically analysed using 't' test. The data pertaining to the same in presented table 1.

**Table 1:** Shows group variables mean SD and 't' ratio

Group	Variables	Mean	SD	't' ratio
National State	Upper arm length	80.58 81.80	3.90 3.48	0.784
National State	Lower Arm Length	34.40 34.73	1.86 1.74	0.715
National State	Total Arm Length	45.63 46.03	2.02 1.62	0.843
National State	Upper arm Girth	25.63 24.90	0.96 1.09	2.754*
National State	Lower Arm Girth	25.03 24.56	0.80 0.97	2.022*

Value of 't' required for its significant at 5% level is 2.000

Table 1 shows that there is significant differences between national and state level Baseball female players in relation to upper arm girth ( $t=2.754$ ) and lower arm girth ( $t=2.022$ ). The mean of upper arm girth of national and state level players was 25.63 and 24.90, respectively which was statistically significant at the t-value. In case of lower arm girth for national and state level Baseball players were recorded mean as 25.03 & 24.56, respectively. The results of upper arm length, lower arm length and total arm length were found in significant at 0.05 level of confidence of student t-test

## Discussion

It is evident from the above results that significant differences were found between national and state level Baseball players on the parameters upper arm girth & lower arm girth. While comparing the mean values of these two groups, it was found that national level Baseball players have better musculature in respect to upper and lower arm girth as compared to state level players. The outcome of results might be due to the fact that national level players use their arm's muscles in the practice and competition more times than state level players, also do different types of exercises to improve the power of the arms resulting which the national level players had more girth value of upper and lower arm. The findings of upper arm length was in line with the study of Gopal Chandra Saha (2012), he found insignificant differences between individual

and team game and had contrast with Singh *et al.* (2010) [8]. They conducted a study on fifty three field hockey players to determine the anthropometric measurements and body composition of teams from India, Pakistan and Sri Lanka and Pakistan team had found significantly higher upper arm length. The upper arm & lower arm girth results were in line with the results of Naghibi Morteza (2011) [5], he recorded significant differences between female soccer players in secondary and high schools.

## Conclusions

Significant differences were found between national and state level female Baseball player on the account of Upper arm girth and lower arm girth. Findings of this study suggest that the national level Players were significantly higher upper and lower arm girth than state level players. Anthropometric characteristics such as weight, total arm length, lower arm length, and upper arm, forearm and chest circumferences, biacromion and bicondylar humerus diameters and lean body mass were the main factor correlating with batting skill in male softball players. These characteristics should therefore be taken into account by the coaches/trainers during softball talent selection, as they tend to be a requirement for future high level performance in the game.

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