

# A Study Of Upper Arm Muscle Circumference Of Anthropometric Measurement Among Aged Group Tribal And Non-Tribal Sportsmen

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**Abstract:** Anthropometric characteristics are important indicators of physical fitness and sports performance. Among these variables, upper arm muscle circumference reflects muscular development and strength of the upper limbs, which are essential for many sports activities. The purpose of the present study was to compare upper arm muscle circumference between tribal and non-tribal sportsmen of Goa with reference to age groups. A total of 100 male sportsmen were selected as subjects for the study, including 50 tribal and 50 non-tribal players from different sports disciplines in Goa. The subjects were further categorized into two age groups, namely 21–25 years and 26–30 years. Upper arm muscle circumference was measured using a standard measuring tape following accepted anthropometric procedures. The collected data were analyzed using mean, standard deviation, and independent t-test. The results indicated that non-tribal sportsmen showed slightly higher mean values of upper arm muscle circumference compared to tribal sportsmen in both age groups; however, the differences were not statistically significant at the 0.05 level of significance. The findings suggest that regular participation in sports activities contributes to similar muscular development among tribal and non-tribal athletes regardless of age group.

**Keywords:** Anthropometry, Upper arm circumference, Tribal athletes, Non-tribal athletes, Age groups, Sports science

## I. INTRODUCTION

Anthropometric measurements play a significant role in evaluating physical structure, body composition, and muscular development of athletes. These measurements are widely used in sports science to identify physical characteristics that contribute to sports performance and physical fitness.

Upper arm muscle circumference is an important anthropometric variable that reflects the muscular development and strength of the upper limbs. It is particularly important in sports activities that require throwing, striking, lifting, and pushing movements. Well-developed arm muscles contribute significantly to athletic performance and physical efficiency.

According to **Malina, Bouchard, and Bar-Or (2004)**, anthropometric characteristics such as limb circumference, body proportions, and muscular development are important determinants of athletic performance and are influenced by growth, maturation, and physical activity.

Similarly, **Baechle and Earle (2008)** reported that systematic training and resistance exercises lead to muscular hypertrophy, which increases limb circumference and strength. Athletes who regularly participate in sports activities tend to develop better muscular structures compared to non-athletes.

Research conducted by **Singh and Yadav (2010)** emphasized that anthropometric characteristics such as arm length, arm circumference, and body proportions play an important role in sports performance. Their findings indicated that athletes with better muscular development of the upper limbs often perform better in sports requiring strength and power.

Tribal populations in India generally engage in physically demanding daily activities and may develop natural muscular strength. However, scientific studies comparing anthropometric characteristics between tribal and non-tribal athletes are limited. Therefore, the present study was undertaken to compare upper arm muscle circumference between tribal and non-tribal sportsmen of Goa with reference to age groups.

## II. METHODOLOGY

### Selection of Subjects

For the purpose of the present study, **100 male sportsmen from Goa** were selected as subjects.

The subjects were divided into two groups:

1. Tribal Sportsmen – 50
2. Non-Tribal Sportsmen – 50

The subjects were further categorized into two age groups:

1. 21–25 years
2. 26–30 years

#### Variable Selected

Anthropometric Variable:

1. Upper Arm Muscle Circumference

#### Criterion Measure

Upper arm muscle circumference was measured using a **flexible steel measuring tape**. The measurement was taken at the midpoint between the acromion process and the olecranon process of the arm while the arm was relaxed. The measurement was recorded to the nearest **0.1 cm**.

#### Statistical Technique

The following statistical techniques were used:

1. Mean
2. Standard Deviation
3. Independent t-test

The level of significance was set at **0.05**.

### III. RESULTS AND DISCUSSION

Table 1

Comparison of Upper Arm Muscle Circumference between Tribal and Non-Tribal Sportsmen (Age Group 21–25 Years)

| Anthropometric Measurement     | Sportsman  | No. | Mean  | SD   | T-Value | Significant Level |
|--------------------------------|------------|-----|-------|------|---------|-------------------|
| Upper arm muscle circumference | Tribal     | 25  | 28.80 | 2.84 | 0.87    | Not Significant   |
|                                | Non-Tribal | 25  | 29.10 | 2.65 |         |                   |

The table indicates that the mean upper arm muscle circumference of tribal sportsmen aged 21–25 years was **28.80 cm**, whereas the mean value for non-tribal sportsmen was **29.10 cm**. The calculated t-value was **0.87**, which was not significant at the 0.05 level of significance.

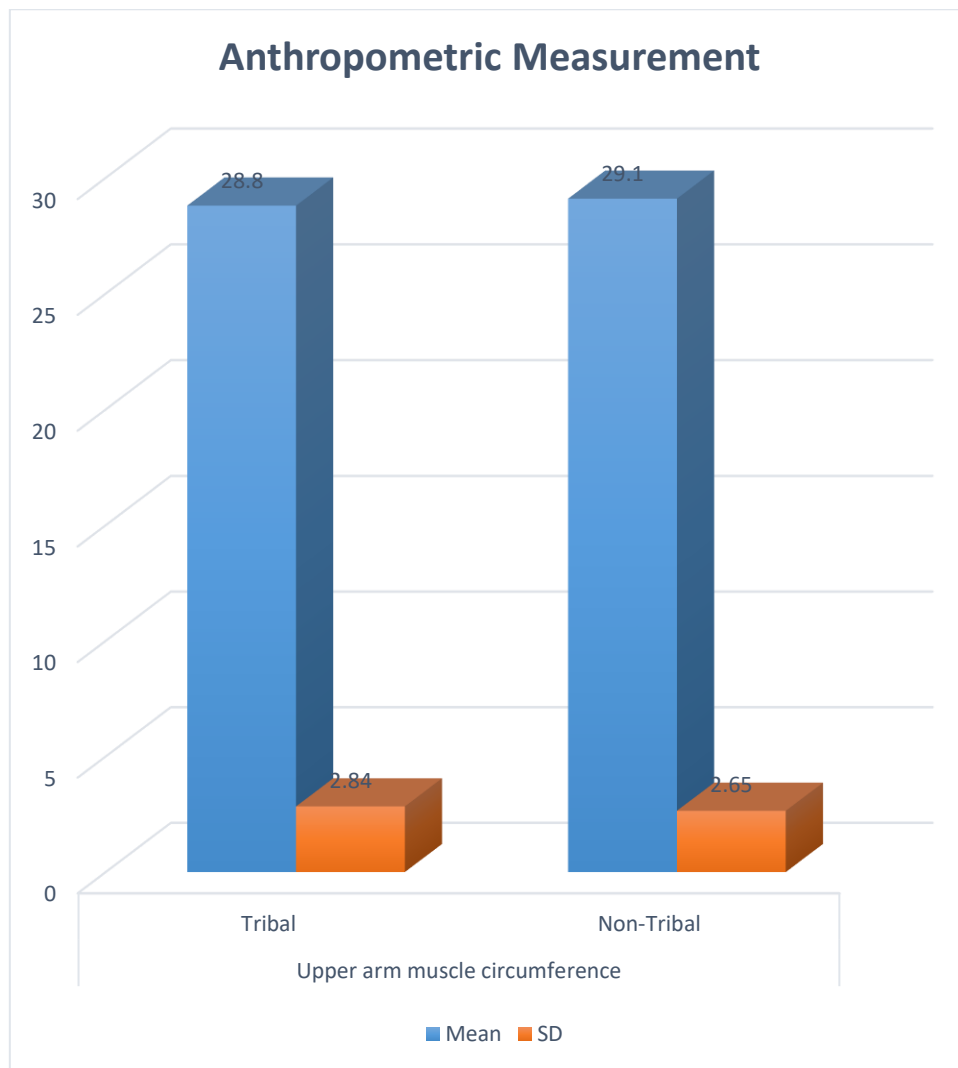


Figure -1 Comparison of Upper Arm Muscle Circumference between Tribal and Non-Tribal Sportsmen (Age Group 21–25 Years)

Table 2

Comparison of Upper Arm Muscle Circumference between Tribal and Non-Tribal Sportsmen (Age Group 26–30 Years)

| Anthropometric Measurement     | Sportsman  | No. | Mean  | SD   | T-Value | Significant Level |
|--------------------------------|------------|-----|-------|------|---------|-------------------|
| upper arm muscle circumference | Tribal     | 25  | 27.96 | 2.72 | 0.93    | Not Significant   |
|                                | Non-Tribal | 25  | 28.70 | 2.81 |         |                   |

The table shows that the mean upper arm muscle circumference of tribal sportsmen aged 26–30 years was **27.96 cm**, while the mean value of non-tribal sportsmen was **28.70 cm**. The calculated t-value was **0.93**, which was also not significant at the 0.05 level.

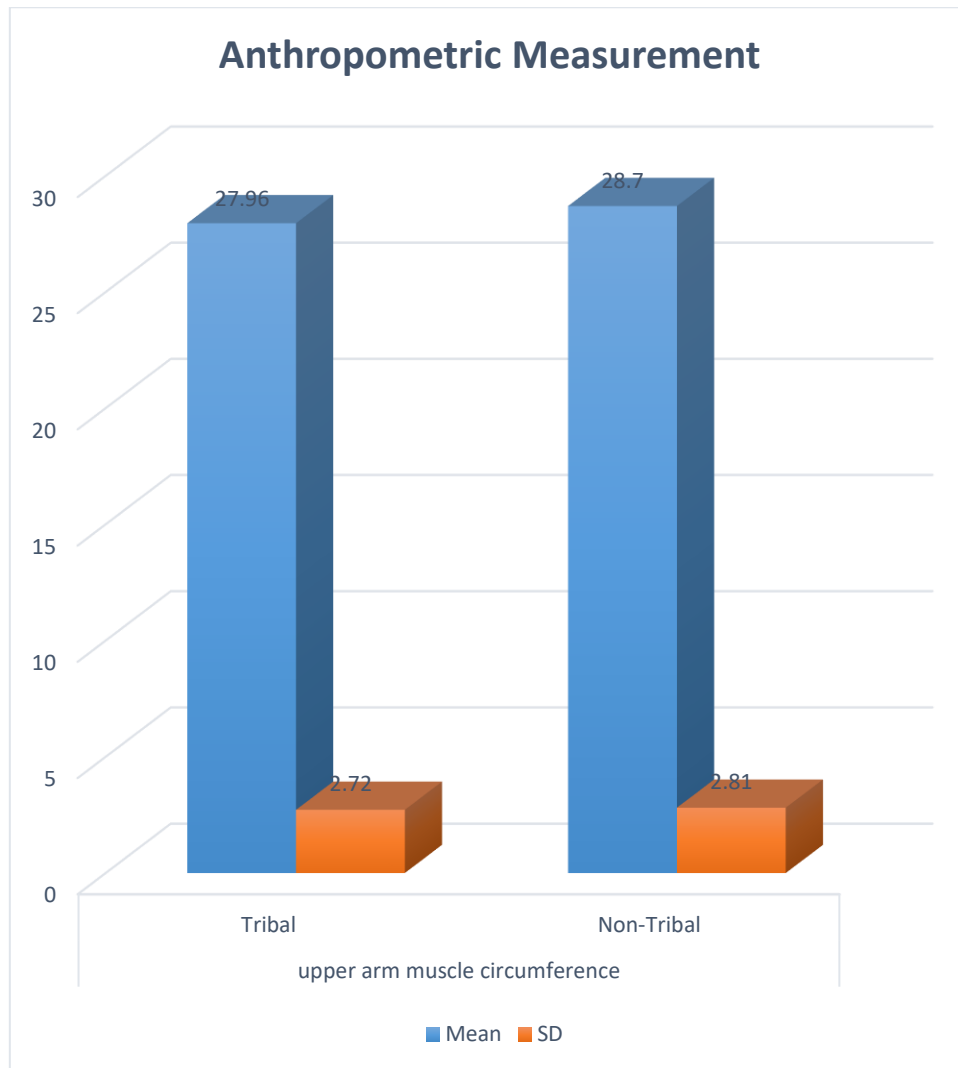


Figure -2 Comparison of Upper Arm Muscle Circumference between Tribal and Non-Tribal Sportsmen (Age Group 26–30 Years)

#### IV. DISCUSSION

The results of the present study revealed that non-tribal sportsmen demonstrated slightly higher mean values of upper arm muscle circumference compared to tribal sportsmen in both age groups; however, the differences were not statistically significant.

These findings are consistent with the observations of **Malina, Bouchard, and Bar-Or (2004)**, who stated that anthropometric characteristics such as limb circumference are strongly influenced by physical activity and training rather than ethnic background alone. Since the participants of the present study were actively engaged in sports activities, both groups exhibited similar muscular development.

The results also support the findings of **Baechle and Earle (2008)**, who emphasized that systematic training and physical exercise lead to muscular hypertrophy and increased limb circumference. Athletes who undergo regular training tend to develop similar muscular characteristics regardless of their social or ethnic background.

The findings are also in agreement with **Singh and Yadav (2010)**, who reported that anthropometric variables such as arm circumference are closely related to sports participation and physical training. According to their study, athletes involved in structured sports programs show improved muscular development of the upper limbs.

Furthermore, **Patil et al. (2012)** highlighted that lifestyle patterns and physical activity levels play a crucial role in determining physical fitness and body composition. In the present study, both tribal and non-tribal sportsmen were regularly engaged in sports training, which may have contributed to the similarity in their upper arm muscle circumference.

Therefore, the findings suggest that regular sports participation plays an important role in muscular development and may reduce anthropometric differences between tribal and non-tribal athletes.

## V. CONCLUSION

Based on the findings of the study, the following conclusions were drawn:

1. Non-tribal sportsmen showed slightly higher mean values of upper arm muscle circumference compared to tribal sportsmen.
2. The differences between the two groups were not statistically significant in either age group.
3. Regular sports participation contributes significantly to upper limb muscular development among athletes irrespective of tribal or non-tribal background.

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