IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 3, March 2026

DOI: 10.17148/IJARCCE.2026.153110

Comparison Of Anthropometric Variable With Respect To Forearm Muscle Circumference Among Tribal And Non-Tribal Sportsmen With Reference To Age Groups

Gaude Pralay Rohidas

Research Scholar – Swami Ramanand Teerth Maathwada University-Nanded

Abstract: Anthropometric characteristics play an important role in determining physical fitness and sports performance. Among these characteristics, forearm muscle circumference is considered an important indicator of upper limb strength and muscular endurance. The purpose of the present study was to compare forearm muscle circumference between tribal and non-tribal sportsmen of Goa with reference to two age groups (21–25 years and 26–30 years). A total of 100 male sportsmen were selected as subjects for the study, including 50 tribal and 50 non-tribal players from various sports disciplines. The subjects were further categorized into two age groups. Forearm 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 to determine the significance of difference between groups. The results revealed that non-tribal sportsmen demonstrated slightly higher mean values of forearm 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 sports participation contributes to similar muscular development of the forearm among tribal and non-tribal athletes regardless of age category.

Keywords; Anthropometry, Forearm circumference, Tribal athletes, Non-tribal athletes, Age groups, Sports science

I. INTRODUCTION

Anthropometric Variable are widely used in sports science to evaluate body structure, muscular development, and physical fitness of athletes. These measurements help researchers and coaches understand the physical characteristics that contribute to sports performance.

Forearm muscle circumference is an important anthropometric variable that reflects muscular strength and endurance of the lower arm. In many sports such as cricket, tennis, wrestling, badminton, and athletics, the strength and endurance of forearm muscles play a crucial role in performance. A well-developed forearm contributes to grip strength, throwing ability, and control in many sports skills.

According to **Malina, Bouchard, and Bar-Or (2004)**, anthropometric variables such as limb circumference are influenced by growth, maturation, physical activity, and environmental factors. These measurements are frequently used to evaluate muscular development among athletes.

Similarly, **Baechle and Earle (2008)** reported that regular participation in physical training leads to muscular hypertrophy and improvement in limb circumference due to repeated muscular contractions and strength development. Research conducted by **Singh and Yadav (2010)** emphasized that anthropometric variables including arm and forearm circumference have a significant relationship with athletic performance, particularly in sports that require upper limb strength.

Tribal populations in India often engage in physically demanding daily activities that may naturally contribute to muscular development. However, scientific comparisons between tribal and non-tribal athletes in terms of anthropometric characteristics remain limited. Therefore, the present study was undertaken to compare forearm muscle circumference between tribal and non-tribal sportsmen of Goa with reference to age groups.

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II. METHODS

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. Forearm Muscle Circumference

Criterion Measure

Forearm muscle circumference was measured using a **flexible steel measuring tape**. The measurement was taken at the **maximum girth of the forearm** while the arm was relaxed and hanging naturally at the side of the body. The measurement was recorded to the nearest **0.1 cm**.

Statistical Technique

The collected data were analyzed using the following statistical techniques:

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 Forearm Muscle Circumference between Tribal and Non-Tribal Sportsmen (Age Group 21–25 Years)

Anthropometric Variable	Sportsman	No.	**Mean**	**SD**	T-Value	Significant Level
Forearm Muscle Circumference	Tribal	25	24.36	2.14	0.96	Not Significant
	Non-Tribal	25	24.98	2.06		

The table indicates that the mean forearm muscle circumference of tribal sportsmen aged 21–25 years was **24.36 cm**, while the mean value of non-tribal sportsmen was **24.98 cm**. The calculated t-value was **0.96**, which was not significant at the 0.05 level.

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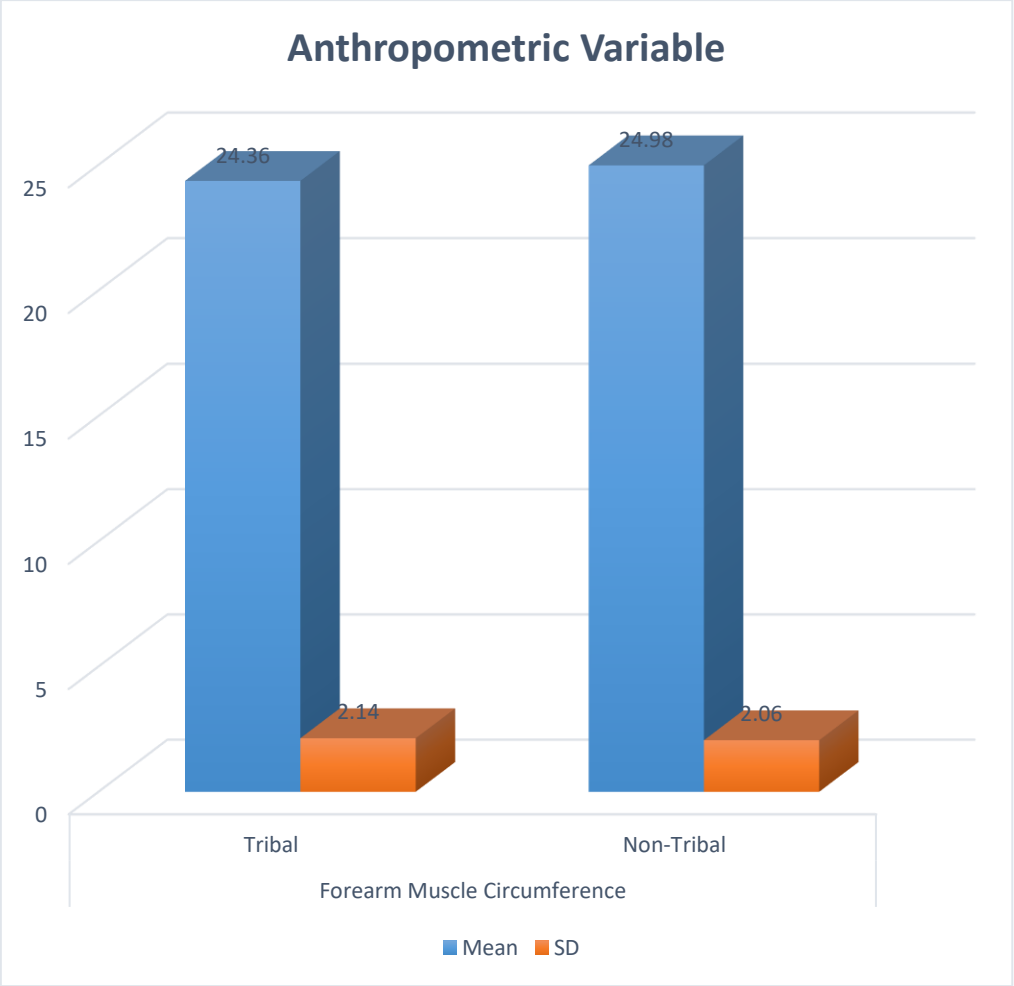

Figure-1 showing Comparison of Forearm Muscle Circumference between Tribal and Non-Tribal Sportsmen (Age Group 21–25 Years)

Table 2
Comparison of Forearm Muscle Circumference between Tribal and Non-Tribal Sportsmen (Age Group 26–30 Years)

Anthropometric Variable	Sportsman	No.	**Mean**	**SD**	T-Value	Significant Level
Forearm Muscle Circumference	Tribal	25	23.90	2.08	0.94	Not Significant
	Non-Tribal	25	24.52	2.11		

The table shows that the mean forearm muscle circumference of tribal sportsmen aged 26–30 years was **23.90 cm**, whereas the mean value of non-tribal sportsmen was **24.52 cm**. The calculated t-value was **0.94**, which was also not significant at the 0.05 level of significance.

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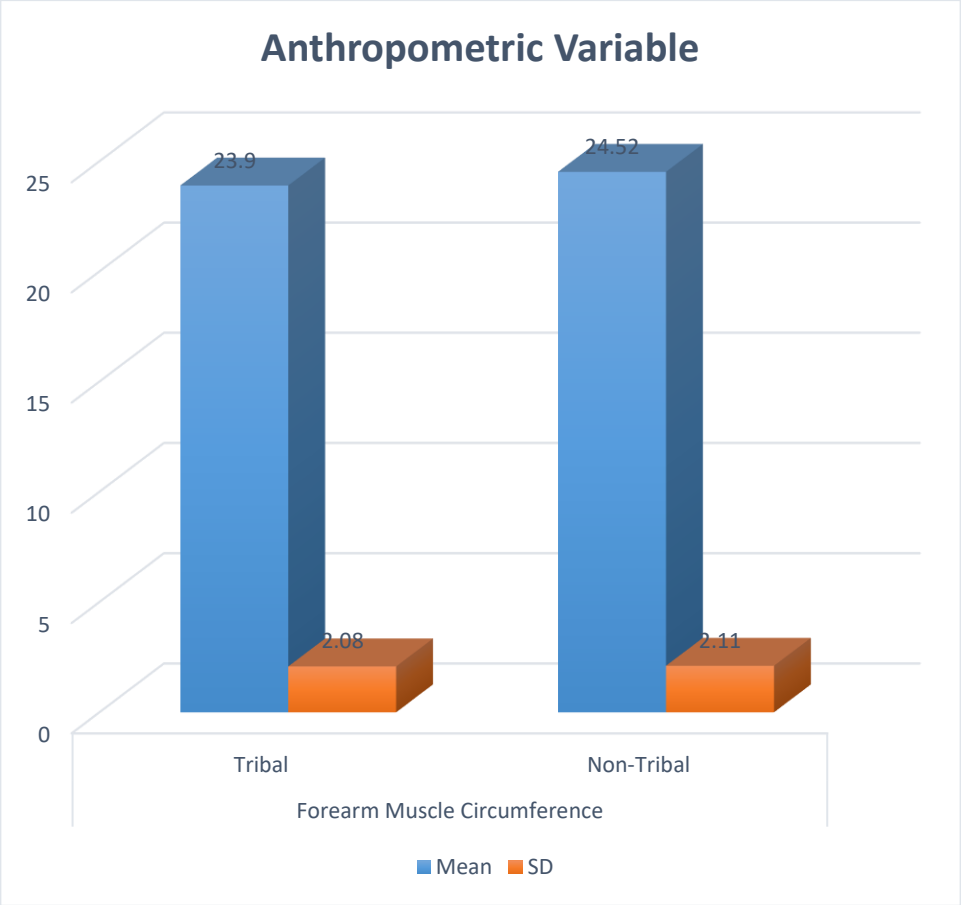

Figure-2 showing Comparison of Forearm Muscle Circumference between Tribal and Non-Tribal Sportsmen (Age Group 26–30 Years)

IV. DISCUSSION

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

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

The findings also support the observations of **Baechle and Earle (2008)**, who reported that continuous sports training leads to muscular hypertrophy and improvement in limb circumference. Athletes who undergo regular physical training develop better muscular strength and endurance regardless of their background.

Similarly, **Singh and Yadav (2010)** found that anthropometric characteristics such as arm and forearm circumference are related to sports performance and physical training. According to their research, athletes involved in systematic sports training show improved muscular development of the upper limbs.

Furthermore, **Patil et al. (2012)** reported that lifestyle patterns and level of physical activity significantly influence physical fitness and body composition. In the present study, both tribal and non-tribal sportsmen were involved in regular sports activities, which may have contributed to the similarity in their forearm muscle circumference.

Thus, the findings indicate that sports participation and training play an important role in the muscular development of athletes and may reduce anthropometric differences between tribal and non-tribal populations.

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V. CONCLUSION

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

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

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