



## Research Article

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## Comparison of Selected Anthropometric and Physical Parameter Between Cross Country Athletes of National Sports University and Regular Coaching Camp Khuman Lampak

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**Abstract:** The present study was to compare the selected anthropometric and physical parameter between cross country athletes of NSU and RCC. For the purpose of the study 20 athletes; 10 each from NSU and RCC were considered and their age ranging from 18 to 25 years. The following variables were selected for anthropometric measurements i.e. height, weight, BMI, body composition and for physical parameters variables speed, explosive strength, agility, muscular endurance and cardiovascular endurance were considered. The finding of the study in anthropometric attributes and performance metrics. NSU generally performs better in the 50m sprint, agility and 12-minute run, indicating slightly superior athletic performance while RCC exhibits higher skeletal muscle mass and better standing broad jump performance. Both groups have similar values for height, weight, BMI and body fat mass with slight differences in means and variability. Standard deviations indicate small overall variations, though agility in NSU shows more inconsistency. Overall, differences between the groups are modest, with each group showing specific strengths. An independent samples t-test was conducted to compare physical attributes and performance metrics between two groups. The 95% confidence intervals for all mean differences included zero, indicating no statistically significant differences between the groups for any measured variable.

**Keywords:** Anthropometric, speed, agility, cardiovascular endurance, explosive strength.

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## INTRODUCTION

**Cross-country running** is a long-distance sport that involves racing over varied terrains, including fields, forests, hills, and sometimes even rugged, uneven ground. Unlike track races, which take place on flat, measured tracks, cross-country courses challenge athletes with natural obstacles, elevation changes, and unpredictable weather conditions. These factors make it both a test of physical endurance and mental resilience.

In recent years, there has been a growing interest in cross-country running in India, especially in rural and semi-urban areas where access to athletic tracks and gyms may be limited. The natural terrains available in these areas make cross-country running an accessible and appealing sport for individuals and communities. Schools, colleges, and universities across India host annual cross-country events, with some universities even including cross-country races as part of their inter-college sports festivals.

Cross-country running is one of the most physically demanding sports, requiring endurance, speed, and agility. Athletes must be able to sustain long periods of exertion while navigating unpredictable terrains such as steep inclines, soft ground, and varied surfaces. To succeed in this sport, a combination of aerobic fitness, muscular endurance, and efficient biomechanics is crucial. Among the factors that influence these components, anthropometric characteristics such as body composition, height, weight and skeletal muscle mass, can play a key role in shaping performance outcomes.

Anthropometric refers to the measurement and analysis of the physical dimensions and proportions of the human body. Anthropometry involves quantifying various aspects such as height, weight, body circumferences, and skeletal dimensions. These measurements are used to assess and describe human size, shape, and composition, providing valuable information for purposes like health assessments,

ergonomic design, nutrition studies, and sports performance analysis.

Anthropometric analysis plays a vital role in understanding how physical attributes affect running efficiency, endurance, and injury susceptibility in cross-country athletes. By comparing and evaluating key parameters such as BMI, body fat percentage, skeletal muscle mass, it is possible to gain insights into the physiological profiles that contribute to superior performance in the sport. This research aims to compare selected anthropometric and physical parameters between elite cross-country athletes, shedding light on the factors that distinguish high performers in this demanding discipline.

Physical fitness is defined as the general capacity to adapt and respond favourably to physical efforts. It is our ability to carry our daily tasks and routine physical activities without undue fatigue. It is a function of the blood vessels, lungs, and muscles at optimum efficiency.

Physical fitness analysis plays a crucial role in evaluating and enhancing the performance of cross-country athletes. This process involves assessing key physiological attributes such as speed, muscular endurance, strength, agility and cardio-vascular endurance. Given the demanding nature of cross-country running; where athletes must navigate varied terrains, changing elevations, and unpredictable weather conditions; understanding their physical fitness levels is essential for optimizing training and performance.

The present study is on “A Comparative Study of Selected Anthropometric Measurements and Physical

parameter between Cross Country Athletes of NSU and RCC Khuman, Manipur” The performance will be based on the level of participation i.e. National Level Competitions.

The field of sports science recognizes the importance of anthropometric measurements and physical fitness in endurance sports like cross-country running. This study compares athletes from NSU and RCC Khuman, Manipur, analysing height, weight, BMI, body composition, agility, and endurance. The findings provide insights into performance differences and offer practical guidance for coaches to improve training programs.

The research is being done to gain a deeper understanding of how specific anthropometric and physical fitness parameters affect the performance of cross-country athletes. This knowledge can be used to optimize training programs, reduce injury risk, identify talented athletes, and ultimately enhance overall performance in the sport of cross-country running. By comparing these parameters, the study aims to provide evidence-based insights that can lead to more efficient and effective athletic development strategies.

## METHOD AND PROCEDURE

### Selection of subject

To carry out this study 20 males athletes; 10 each from RCC and NSU were selected and their aged ranges from 18 to 25 years. The sample was collected from Manipur. Simple random sampling method is adopted for the selection of the subjects.

### Test selection

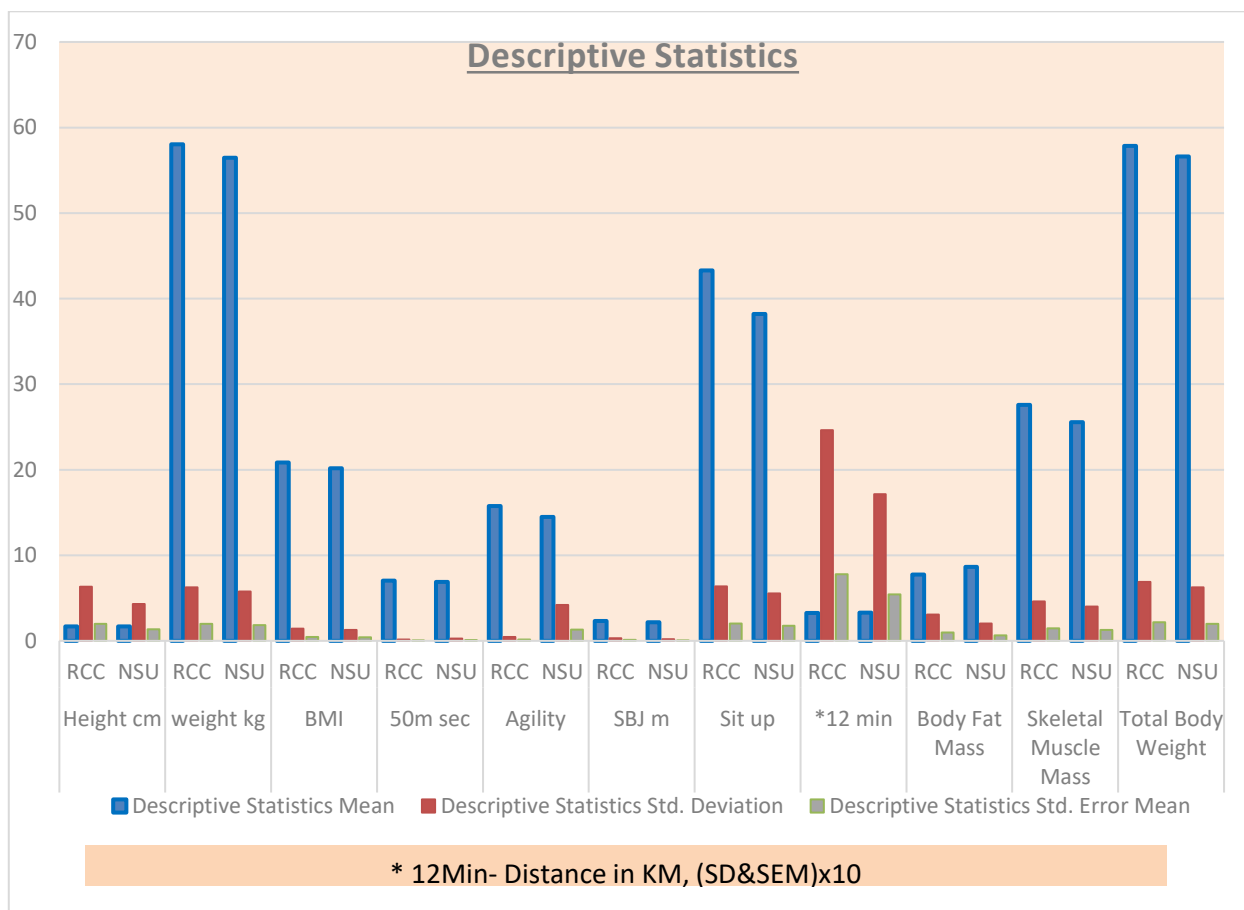
Sl.no	Variables	Test/tools	Unit of measurements
1	Speed	50 mts run	Seconds
2	Agility	6 x 10m	Seconds
3	Explosive Strength	Standing Broad Jump	Meter
4	Muscular Endurance	Sit Up	Number
5	Cardiovascular endurance	Cooper’s 12 min Run/Walk test	Metres
6	Height	Stadiometer	Centimetres
7	Weight	Weighing machine	Kilograms
8	Body mass index (BMI)	Weighing machine, Stadiometer	Kg/m <sup>2</sup>
9	Body Composition	Bioelectrical Impedance Analysis	Percentage

## RESULT

**Table: Illustration of statistical differences between the NSU and RCC cross country athletes.**

Descriptive Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Height cm	1	10	166.810	6.3081	1.9948
	2	10	167.320	4.3181	1.3655
weight kg	1	10	58.020	6.2585	1.9791

	2	10	56.450	5.7635	1.8226
BMI	1	10	20.8340	1.43613	.45414
	2	10	20.1840	1.29306	.40890
50m sec	1	10	7.0320	.15817	.05002
	2	10	6.8690	.26979	.08532
Agility	1	10	15.7540	.43447	.13739
	2	10	14.4800	4.20359	1.32929
SBJ m	1	10	2.3330	.30833	.09750
	2	10	2.1870	.18258	.05774
Sit up	1	10	43.30	6.378	2.017
	2	10	38.20	5.554	1.756
12 mint	1	10	3242.00	246.297	77.886
	2	10	3297.00	171.468	54.223
Body Fat Mass	1	10	7.760	3.0848	.9755
	2	10	8.650	2.0107	.6358
Skeletal Muscle Mass	1	10	27.590	4.6030	1.4556
	2	10	25.550	4.0009	1.2652
Total Body Weight	1	10	57.860	6.9009	2.1823
	2	10	56.620	6.2416	1.9738



**Figure 1: Graphical representation of statistical differences between NSU and RCC cross country athletes.**

The descriptive statistics for the two groups are presented in Table 1. For height, RCC (M = 166.81 cm, SD = 6.31) and NSU (M = 167.32 cm, SD = 4.32) showed similar averages. Regarding weight, RCC (M = 58.02 kg, SD = 6.26) was slightly higher than NSU (M = 56.45 kg, SD = 5.76). BMI values were comparable between RCC (M = 20.83, SD = 1.44) and NSU (M =

20.18, SD = 1.29). In the 50-meter sprint, NSU (M = 6.87 sec, SD = 0.27) outperformed RCC (M = 7.03 sec, SD = 0.16). For agility, NSU (M = 14.48, SD = 4.20) was faster than RCC (M = 15.75, SD = 0.43). In the standing broad jump, RCC (M = 2.33 m, SD = 0.31) had a slightly greater average than NSU (M = 2.19 m, SD = 0.18). RCC performed more sit-ups (M = 43.30, SD = 6.38)

compared to NSU ( $M = 38.20$ ,  $SD = 5.55$ ). For the 12-minute run, NSU ( $M = 3297.00$  m,  $SD = 171.47$ ) covered a slightly greater distance than RCC ( $M = 3242.00$  m,  $SD = 246.30$ ). In body composition, RCC had lower body fat mass ( $M = 7.76$ ,  $SD = 3.08$ ) but higher skeletal muscle mass ( $M = 27.59$ ,  $SD = 4.60$ ) compared to NSU ( $M = 8.65$ ,  $SD = 2.01$ ;  $M = 25.55$ ,  $SD = 4.00$ , respectively). Total body weight was slightly higher in RCC ( $M = 57.86$  kg,  $SD = 6.90$ ) compared to NSU ( $M = 56.62$  kg,  $SD = 6.24$ ). The table compares two groups ( $N = 10$  each) across various physical attributes and performance metrics. NSU generally performs better in the 50m sprint, agility, and 12-minute run, indicating slightly superior athletic performance, while RCC exhibits higher skeletal muscle mass and better standing broad jump performance. Both groups have similar values for height, weight, BMI, and body fat mass, with slight differences in means and variability. Standard deviations indicate small overall variations, though agility in NSU shows more inconsistency. Overall, differences between the groups are modest, with each group showing specific strengths.

An independent samples t-test was conducted to compare physical attributes and performance metrics between two groups. Levene's test indicated that the assumption of equal variances was met for most variables ( $p > .05$ ), except for 50m time ( $F = 4.241$ ,  $p = .054$ ), agility ( $F = 3.767$ ,  $p = .068$ ), and standing broad jump ( $F = 4.219$ ,  $p = .055$ ), where variances were borderline unequal. Results showed no significant differences between groups for height ( $t(18) = -0.211$ ,  $p = .835$ ), weight ( $t(18) = 0.584$ ,  $p = .567$ ), BMI ( $t(18) = 1.064$ ,  $p = .302$ ), 50m time ( $t(18) = 1.648$ ,  $p = .117$ ), agility ( $t(18) = 0.953$ ,  $p = .353$ ), standing broad jump ( $t(18) = 1.288$ ,  $p = .214$ ), sit-ups ( $t(18) = 1.907$ ,  $p = .073$ ), 12-minute run ( $t(18) = -0.580$ ,  $p = .569$ ), body fat mass ( $t(18) = -0.764$ ,  $p = .455$ ), skeletal muscle mass ( $t(18) = 1.058$ ,  $p = .304$ ), or total body weight ( $t(18) = 0.421$ ,  $p = .678$ ). The 95% confidence intervals for all mean differences included zero, indicating no statistically significant differences between the groups for any measured variable.

## CONCLUSION.

The present study aimed to compare selected anthropometric and physical parameters between cross-country athletes from NSU and RCC Khuman, Manipur. The research findings highlight both similarities and slight differences between the two groups, with each exhibiting distinct strengths in certain performance metrics.

In terms of anthropometric measurements, both groups demonstrated comparable averages for height, weight, BMI, and body fat mass. However, RCC athletes showed slightly higher skeletal muscle mass, while NSU athletes performed better in speed, agility, and cardiovascular endurance. These results suggest that

while both groups possess similar physical attributes, their performance strengths may be influenced by other factors such as training programs, terrain familiarity, and mental resilience.

The study found no statistically significant differences between the two groups for any of the measured parameters, as indicated by the independent samples t-test. This suggests that, despite the slight performance differences, the overall anthropometric and physical fitness profiles of the athletes are quite similar. The minor variations in performance and physical attributes may be attributed to individual factors such as training intensity, diet, and psychological factors, rather than intrinsic differences in body composition or physical fitness.

In conclusion, while both groups exhibit specific strengths, the findings underscore the complexity of performance in cross-country running, where a combination of physical attributes, training, and mental factors contribute to overall success. These results provide valuable insights for coaches, athletes, and sports scientists looking to optimize training programs and enhance performance in cross-country events. Further research with larger sample sizes and more detailed analyses could offer additional perspectives on the interplay between anthropometric characteristics and performance in endurance sports.

## BIBLIOGRAPHY

1. Anish Tony, Krishnaswami P.C (April 2012). "The Relationship among swimming performance and selected physiological parameters in competitive Male Age Group (10-14 years) Swimmers", Sports Research, Vol.1, No. 1, p.51
2. Anil Chandra Mutum (2004), "Relationship of Selected Motor Fitness Components with Plying Ability in Hockey". (Unpublished Master's Dissertation of Amravati University,
3. Carter, J. E. L., & Heath, B. H. (1990). *Somatotyping - Development and Applications*. Cambridge University Press.
4. Camp Billie Ann (1963), "The Relationship and Validity of a Single Hit Repeated Volley Test in Volleyball and Relationship of Height to Performance on the Test", Completed Research in Health, Physical Education and Recreation, Volume No.6 p.49
5. Harinder Singh Kang (2011), "The Relationship among Body weight, Leg Strength Back Strength Left Hand Grip of female weight lifter", Journal of Sports Science, Vol.34, No. 1, Jan (2011), p.20
6. Jadhav. K.G.(2012) *Principles of Sports Training*, Khel Sahitya Kendra K.S.K Publishers & Distributors
7. Julia E. Eason (1962), "The Relationship of Height and Weight to the Performance of College Women in Selected Basketball Skill Test", Completed

- Research in Physical Education and Recreation, Vol.5, p.100
8. Malina, R. M., Bouchard, C., & Bar-Or, O. (2004). *Growth, Maturation, and Physical Activity*. Human Kinetics.
  9. Martin, D. E., & Coe, P. N. (1997). *Training Distance Runners*. Human Kinetics.
  10. Mackenzie Brain(2005)101performance evaluation tests
  11. Norton, K., & Olds, T. (2001). *Morphological Evolution of Athletes Over the 20th Century: Causes and Consequences*. *Sports Medicine*, 31(11), 763-783.
  12. Wilmore, J. H., & Costill, D. L. (2005). *Physiology of Sport and Exercise*. Human Kinetics. Sravan kr. Singh Yadav: A comparative study on selected anthropometric and physical Fitness variables between football and hockey male players