



## Research Article

## A Study of Selected Physiological Variables on Volleyball Referees of Gujarat


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Abstract	Manuscript Information
<p>The purpose of the study was to assess the selected physiological variables on state level volleyball referees of Gujarat state. The Gujarat State Volleyball Association conducted a volleyball referee examination in October 2023. 60 Candidates were selected to conduct the study from this examination, with ages ranging from 25 to 35 years. Selected physiological variables for the study were body mass index, basal Metabolic rate, fat percentage and lean body Mass. To calculate, BMI and BMR calculator software were used, and also height, weight, age, gender and skin-fold measurements were taken with the help of instruments such as a stadiometer, a weighing machine and a large skin fold caliper. Descriptive statistical analysis has been done by T-test and the significance of the result was seen on 0.05 levels. The t-test showed that a significant difference was found for fat percentage among male and female volleyball referees of Gujarat state, whereas no significant difference was found for BMR, BMI and Lean body mass among male and female volleyball referees of Gujarat. The study revealed that female volleyball referees have a higher percentage of fat than male volleyball referees in Gujarat.</p>	<ul style="list-style-type: none"> <li>▪ <b>ISSN No:</b> 2583-7397</li> <li>▪ <b>Received:</b> 16-03-2025</li> <li>▪ <b>Accepted:</b> 25-04-2025</li> <li>▪ <b>Published:</b> 30-04-2025</li> <li>▪ <b>IJCRM:</b>4(2); 2025: 490-492</li> <li>▪ <b>©2025, All Rights Reserved</b></li> <li>▪ <b>Plagiarism Checked:</b> Yes</li> <li>▪ <b>Peer Review Process:</b> Yes</li> </ul>
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**KEYWORDS:** Physiological variables, volleyball Referees, BMI, BMR, Gujarat State Volleyball Association (GSVA)

**1. INTRODUCTION**

Physical Education plays an important role in promoting physical fitness, Character Building and Discipline among youth, children, players, and officials. Physical fitness is equally important for Volleyball Referees as Volleyball players. The Body Mass Index is a heuristic proxy for human body fat based on an individual’s weight and height. Actually, BMI does not measure the percentage of Body fat, but it is defined as the individual’s body weight divided by the square of his or her height. Basal Metabolic Rate (BMR) and the closely related resting Metabolic Rate (RMR) are the amount of daily energy expended by animals at rest. Body composition can be measured in several ways. The most common method is using a set of measurement callipers to measure the thickness of subcutaneous fat in multiple places of the abdominal area, the subscapular region, arms, buttocks and thighs of the body. These measurements are then used to estimate total body fat with a Margin of error of approximately four percentage points.

A person’s body fat percentage is the total weight of the person’s fat divided by the person’s weight, and consists of essential body fat that is highly required for maintaining human life and reproductive functions. The percentage for women is greater than that of men, due to the demands of childbearing and other hormonal functions. Essential fat is 3% - 5% for men and 8% - 12% for women. Storage body fat consists of fat accumulation in adipose tissue, part of which protects internal organs in the chest and abdomen. The minimum recommended total body fat percentage

exceeds the essential fat percentage value reported above. The purpose of selecting the problem was to know and improve the physical fitness and physiological conditions of state-level volleyball referees of Gujarat.

**2. METHODOLOGY**

The purpose of the study was to assess the selected physiological variables on state level volleyball referees of Gujarat. For the said purpose, 60 candidates were selected to conduct the study from the referee’s examination held in October 2023, with ages ranging from 25 to 35 years. Selected physiological variables for the study were BMI, BMR, fat percentage and lean Body Mass. Descriptive statistics such as Mean, standard deviation, and range were used to assess the selected physiological variables of state-level volleyball referees, as well as to compare the selected physiological variables among male and female volleyball referees of Gujarat. Descriptive statistical analysis was done by t-test, and the significance of the result was seen at the 0.05 level. All the instruments used in this research were found to be quite précised and reliable. To calculate the collected data, SPSS version 16 and MS-Excel 2007 were used. The blood pressure of the subject was measured using a sphygmomanometer.

**3. ANALYSIS AND DISCUSSION**

The Mean, standard deviation and t-values were calculated, which were presented here from tables 1 to 5.

**Table 1:** Physiological Variables of State Volleyball Referees of Gujarat

PHYSIOLOGICAL VARIABLES	MEAN	S.D.	MAX.S.	MIN.S.	RANGE
BMI	21.29	2.16	27.85	16.82	11.03
BMR (K.Cal)	1590	124.90	1929	1296	633
FAT %	19.68	1.68	24.28	16.41	7.87
LEAN BODY MASS (Kg)	48.47	6.40	65.87	34.80	31.07

It is evident from table-1 for BMI Mean, S.D. and range were 21.29, 2.16 and 11.03. So, we can say that all the subjects were normal and had an ideal body weight on the basis of BMI. Normal BMI is between 18.5 and 24.9. [2]

Fat% Mean, S.D. and range were 19.68, 1.68 and 7.87, which were acceptable for a sedentary person and not for

sportsmen. Normal fat Ratio is between 3-5% for males and 8-12% for females. [3]

For lean Body mass, Mean, S.D. and range were 48.47, 6.40 and 31.07, which means subjects have 48.47 kg of mass in their bones, muscles and other organs on average.

**Table-2;** Comparison of Basal Metabolic Rate of State Volleyball Referees of Gujarat

BMR	MEAN	S.D.	SIGNIFICANT “t”	t-RATIO
Male Referees	1603	137.2	2.00	0.838
Female Referees	1576	112.1	2.00	

\*Significant at 0.05 level.

Table-2 revealed that the calculated value of t (0.838) was lower than the significant value of t (2.00) at a 0.05 level of significance. So, there was no significant difference

between male and female volleyball referees with respect to Basal Metabolic Rate.

**Table 3:** Comparison of Body Mass Index of States Volleyball Referees of Gujarat

BMR	MEAN	S.D.	SIGNIFICANT “t”	t-RATIO
Male Referees	21.63	2.21	2.00	1.21
Female Referees	20.95	2.09	2.00	

\*Significant at 0.05 level.

Table-3 revealed that the calculated value of t (1.21) was lower than the significant value of 2.00 at 0.05 level. So,

there was no significant difference found among male and female referees of Gujarat in respect of Body Mass Index.

**Table 4:** Comparison of the Fat Percentage of the Volleyball Referees of Gujarat

BMR	MEAN	S.D.	SIGNIFICANT “t”	t-RATIO
Male Referees	19.20	1.84	2.00	2.261*
Female Referees	20.15	1.38	2.00	

\* Significant at 0.05 level.

Table-4 revealed that the calculated value of t (2.261\*) was higher than the significant value of t (2.00) at 0.05 level of significance. Here in table-4 significance difference was

found among male and female referees of Gujarat with respect to fat percentage.

**Table 5:** Comparison of Lean Body Mass of State Volleyball Referees of Gujarat

BMR	MEAN	S.D.	SIGNIFICANT “t”	t-RATIO
Male Referees	49.45	6.98	2.00	1.189
Female Referees	47.49	5.72	2.00	

\* Significant at 0.05 level.

Table-5 revealed that the calculated value of t (1.189) was lower than the significant value of t (2.00) at a 0.05 level of significance. So, there was no significant difference found among male and female referees of Gujarat in respect of Lean Body Mass.

found in the mean difference of fat percentages among state-level volleyball referees of Gujarat.

#### 4. DISCUSSION OF FINDINGS

As a result, there was no significant difference between male and female state volleyball referees of Gujarat in respect of BMI, BMR and Lean Body Mass. Whereas the study revealed that there was a significant difference found among male and female state volleyball referees of Gujarat in respect of fat Percentage. The findings of the present study may also be attributed to other factors such as dietary habits, geographical location, climatically condition and also due to other racial and ethnic factors and issues which require further study to substantiate the findings, taking into consideration the above factors which were not considered in the present study.

#### 5. CONCLUSION

It can be concluded that the state-level volleyball referees of Gujarat have an ideal body weight on the basis of Body Mass Index. Also, they passed a normal amount of Basal Metabolic rate. Referees have 48.47 kg of mass in their bones, muscles and other organs on average. Female state volleyball referees have a higher percentage of fat than male state volleyball referees in Gujarat. Finally, the result of the study revealed that there was no significant difference found in the mean differences of BMI, BMR and Lean Body Mass, whereas a significant difference was

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