Influence Of Body Mass Index on Speed Performance Among Girls Kabaddi Players

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***Abstract*—The purpose of this study was to examine the influence of Body Mass Index (BMI) on speed performance among girls Kabaddi players. A total of thirty girls Kabaddi players, aged 15–17 years, were selected through purposive sampling from Baba Gola Government Girls Senior Secondary School, Banga (S.B.S. Nagar). The participants were categorized into different BMI groups based on the Quetelet Index. Speed performance was measured using the 50-meter dash test, while BMI was calculated using the standard Quetelet formula. To analyze the data, descriptive statistics and One-Way Analysis of Variance (ANOVA) were applied using SPSS Version 23.0, with the level of significance set at 0.05. The findings revealed significant differences in speed performance among the BMI groups. Further pairwise comparisons showed significant differences between underweight and obese groups, normal weight and overweight groups, normal weight and obese groups, overweight and obese groups. The study concluded that Body Mass Index has a significant impact on the speed performance of girls Kabaddi players. Players with healthier BMI levels demonstrated better speed performance compared to those in higher BMI categories.**

***Index Terms*—Body Mass Index, Speed, 50-Meter Dash, Kabaddi**

I. INTRODUCTION

Kabaddi is one of the most popular indigenous sports in India and requires a combination of physical fitness components such as speed, agility, strength, endurance, and flexibility for successful performance. Among these components, speed plays a crucial role as players must rapidly accelerate, evade opponents, and execute offensive and defensive skills within a limited time. Therefore, factors influencing speed performance are of considerable interest to coaches, trainers, and sports scientists.

Body Mass Index (BMI) is a commonly used anthropometric measure that evaluates body weight relative to height and is widely used to classify individuals as underweight, normal weight, overweight, or obese. BMI serves as an important indicator of body composition and physical health (Quetelet, 1830). In sports, body composition has been recognized as a key factor affecting athletic performance because excess body mass may hinder movement efficiency and reduce the ability to perform speed-related activities.

Previous studies have reported a significant relationship between BMI and physical fitness performance. Lopes et al. (2019) found that body mass index was associated with various components of physical fitness among adolescents, with higher BMI often linked to lower physical fitness levels. Similarly, Vandoni et al. (2022) reported that body characteristics, including body mass, influence speed performance in adolescents. Research has also suggested that excess body weight may negatively affect running speed because additional mass increases the energy required for movement and acceleration (Dharmajayanti et al., 2023).

Since Kabaddi demands quick and explosive movements, maintaining an appropriate body weight may be important for optimal speed performance. However, limited research has been conducted to examine differences in speed among girls Kabaddi players belonging to different BMI categories. Therefore, the present study was undertaken to investigate the effect of Body Mass Index on speed performance among girls Kabaddi players.

1.1 Aim of Study

The aim of this study was to examine the effect of Body Mass Index (BMI) on speed performance among girls Kabaddi players. It was hypothesized that there would be no significant difference in speed performance among different Body Mass Index (BMI) groups of girls Kabaddi players.

II. MATERIAL AND METHODS

Thirty girls Kabaddi players aged 15–17 years were selected from Baba Gola Government Girls Senior Secondary School, Banga (S.B.S. Nagar), Punjab, through purposive sampling. The players were divided into four BMI groups: underweight (n = 8), normal weight (n = 8), overweight (n = 7), and obese (n = 7). The classification was based on the Quetelet Index (BMI = Weight in kg / Height in m²), where participants with a BMI below 18.5 kg/m² were considered underweight, those with a BMI between 18.5 and 24.9 kg/m² were classified as normal weight, those with a BMI between 25.0 and 29.9 kg/m² were categorized as overweight, and those with a BMI of 30.0 kg/m² or above were classified as obese.

The study focused on two variables: Body Mass Index (BMI) and speed. BMI was calculated using the Quetelet Index (Adolphe Quetelet, 1830), while speed was measured through the 50-meter dash test.

2.1 Procedure

All the participants were informed in detail about the purpose and procedures of the study before the collection of data. The researcher explained the testing protocol and ensured that the participants understood the requirements of the tests. No special motivational techniques were used prior to data collection. All participants performed the tests under similar conditions and followed the same testing procedures. The researcher provided necessary instructions and supervision throughout the testing process to ensure uniformity and accuracy in data collection.

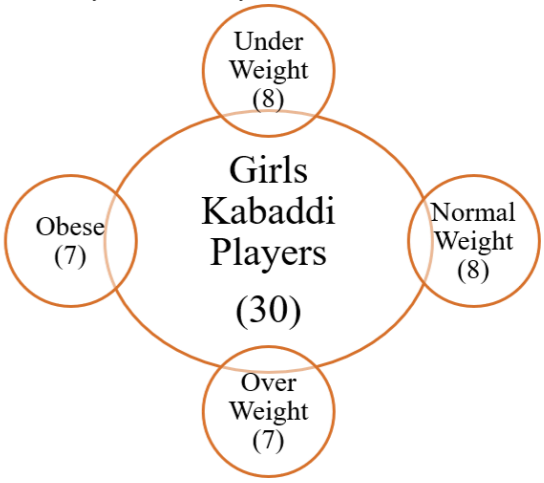

Figure: I Description of subjects

2.2 Statistical Technique

The collected data were analyzed using SPSS software (Version 23.0). Descriptive statistics, including mean and standard deviation, were calculated to describe the characteristics of the data. To determine whether significant differences existed in speed performance among the different BMI groups of girls Kabaddi players, One-Way Analysis of Variance (ANOVA) was employed. The level of significance for all statistical tests was set at 0.05.

III. RESULTS

Table:1 Descriptive statistics of speed variable among different BMI groups of girl's kabaddi players

Dependent Variable	BMI Group	Mean	SD	Std. Error
SPEED	Under weight	8.70	0.31	0.11
	Normal weight	8.56	0.30	0.10
	Over weight	9.11	0.35	0.13
	Obese	9.64	0.25	0.09
	Total	8.98	0.51	0.09

SD = Standard Deviation

Table:1 reveals that the mean, standard deviation, and standard error values of the speed variable among underweight, normal weight, overweight, and obese groups of girl's kabaddi players were 8.70 ± 0.31 and 0.11, 8.70 ± 0.30 and 0.10, 9.11 ± 0.35 and 0.13, and 9.64 ± 0.25 and 0.09 respectively. The findings indicate that the obese group showed

the highest mean time in 50-meter dash, whereas the underweight and normal weight groups recorded the lowest and equal mean time.

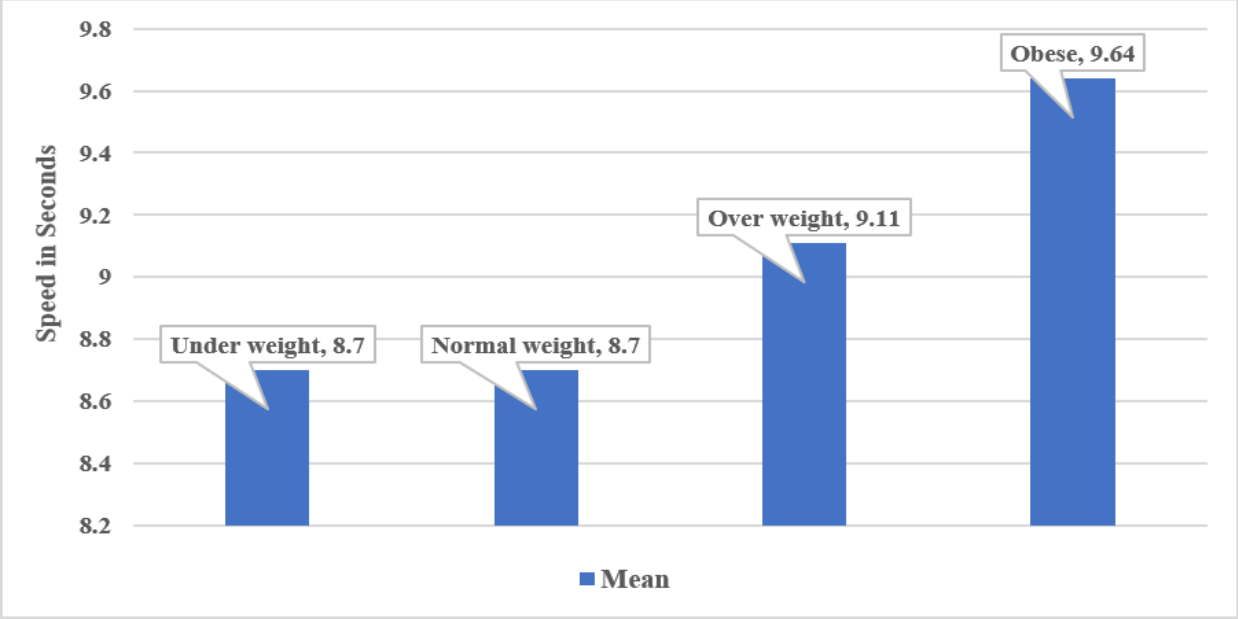

Figure: II Graphical representation of mean scores of speed variable among different bmi groups of girls kabaddi players

Table: 2 Analyses of variance (Anova) of speed variable among different BMI groups of girl's kabaddi players

Dependent Variable	Sources of Variance	Sum of Squares	df	Mean Square	f-value	p-value
SPEED	Between Groups	5.14	3	1.71	18.12	0.01*
	Within Groups	2.46	26	0.09		
	Total	7.60	29			

* Indicated significant at the 0.05 level.

Table: 2 presents the analysis of variance (ANOVA) of the speed variable among different body mass index groups of girl's kabaddi players. The obtained p-value (p = 0.00) was found to be less than the level of significance of 0.05, indicating the existence of a significant difference among the underweight, normal weight, overweight and obese groups in relation to speed performance. Further, the pairwise comparison of the speed variable among various body mass index groups of girl's kabaddi players have been presented in Table: 3.

Table: 3 pairwise comparison of speed variable among various body mass index groups of girl's kabaddi players

Dependent Variable	Group		Mean Difference(I-J)	Std. Error	p-value
	Group Name(I)	Group Name (J)			
SPEED	Under Weight	Normal Weight	0.14	0.15	0.84
		Over Weight	-0.40	0.16	0.11
		Obese	-0.93	0.16	0.01*
	Normal Weight	Over Weight	-0.55	0.16	0.02*
		Obese	-1.07	0.16	0.00*
	Over Weight	Obese	0.53	0.16	0.03*

* Indicated significant at the 0.05 level.

Table: 3 reveals that significant differences in speed performance were observed between underweight and obese groups, normal weight and overweight groups, normal weight and obese groups, overweight and obese groups of girl's kabaddi players. However, no significant difference was found between underweight and normal weight groups as well as underweight and overweight groups.

IV. DISCUSSION

The purpose of this study was to examine the effect of Body Mass Index (BMI) on speed performance among girls Kabaddi players. The findings of the study revealed a significant difference in speed among the different BMI groups. The results further indicated that players with normal BMI demonstrated better speed performance compared to overweight and obese players. This may be because excess body weight acts as an additional load during running, reducing movement efficiency and acceleration. Since Kabaddi requires quick movements and rapid changes in direction, maintaining an optimal BMI appears to be beneficial for speed performance.

The findings are consistent with previous studies. Nikolaidis (2013) reported that higher BMI was associated with lower performance in speed-related activities among young athletes. Similarly, Malina et al. (2004) found that excess body weight negatively affects motor performance and running ability in adolescents. These findings support the results of the present study, indicating that BMI plays an important role in determining speed performance among girls Kabaddi players.

V. CONCLUSION

The present study concluded that there was a significant difference in speed performance among different Body Mass Index (BMI) groups of girls Kabaddi players. It was further concluded that Body Mass Index significantly influences speed performance, with players having a normal BMI demonstrating better speed compared to overweight and obese players.

Conflict of Interest: The authors declare that there is no conflict of interest regarding the research, authorship, and publication of this article.

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