

Effect of Fartlek Training on VO₂max in BKMF Cricket UNM Athletes

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Abstract (10 pt)

This study aimed to analyze the effect of the fartlek training method on improving aerobic endurance (VO₂max) among cricket athletes. The research employed a quantitative approach using a one-group pretest–posttest experimental design. The sample consisted of 15 athletes selected through purposive sampling. Data were collected using the beep test to measure VO₂max before and after the intervention. The fartlek training program was conducted for approximately four weeks, with variations in intensity and running speed adjusted to the characteristics and physical demands of cricket. Data analysis included descriptive statistics, the Shapiro–Wilk normality test, and hypothesis testing using a paired-sample t-test. The results indicated an increase in the mean VO₂max score from 44.85 to 47.60 ml/kg/min. The normality test showed that the data were normally distributed ($p > 0.05$). Furthermore, the paired-sample t-test revealed a significance value of $p < 0.05$, indicating a significant difference between the pre-test and post-test scores. Therefore, it can be concluded that fartlek training is effective in improving the aerobic endurance of cricket athletes. These findings provide practical implications for coaches in designing more varied and evidence-based training programs to enhance athletic performance.

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Introduction

Endurance is one of the primary physical components that determines athletic performance, including in the sport of cricket, which requires repeated activities of varying intensities such as sprinting, running between wickets, and fielding over extended periods of play (Powell, 2023). In the context of modern sports, aerobic capacity, commonly measured through VO₂max, is an important indicator of an athlete's endurance ability, as it is directly

related to the efficiency of the cardiovascular system in supporting sustained physical activity (Cooper et al., 2005).

Recent research trends indicate a decline in aerobic fitness levels among young athletes and students, including those participating in team sports. This decline is largely attributed to the lack of structured training intensity and limited variation in training methods. In practice, coaches often rely on conventional and monotonous training approaches, which may not optimally improve endurance performance. This is despite the physiological demands of sports requiring a balanced development of both aerobic and anaerobic capacities (Kamarudin et al., 2024).

One training method considered effective for improving endurance is fartlek training, a speed-play training approach that combines low- and high-intensity exercise within a single session, thereby stimulating more comprehensive physiological adaptations (Muhammad & Sukamti, 2025; Sarmidi & Rahmawati, 2018). On the other hand, accurate and practical endurance assessment is an important aspect of both research and training evaluation. The bleep test, also known as the multistage fitness test, has been widely used as a valid and reliable instrument for estimating VO_{2max} across various sports disciplines (Cooper et al., 2005).

However, previous studies have primarily focused on sports such as football, taekwondo, pencak silat, and middle-distance running while examining various endurance-training methods, including fartlek training (Alfarisi et al., 2025; Kamarudin et al., 2024; Simanjuntak, 2024). Research specifically investigating the application of fartlek training in cricket athletes using bleep test-based measurements remains limited. Consequently, a gap still exists in the scientific literature regarding the effectiveness of fartlek training for improving endurance among cricket athletes.

Based on this research gap, the present study is expected to contribute to the advancement of sports science by strengthening empirical evidence regarding the effectiveness of fartlek training in improving the endurance of cricket athletes, as objectively measured through the bleep test.

The primary objective of this study is to analyze the effect of the fartlek training method on improving endurance (VO_{2max}) among cricket athletes through bleep test measurements. The theoretical contribution of this study lies in enriching the scientific literature on endurance training methods, while its practical contribution is to provide guidance for cricket coaches and sports practitioners in designing effective, varied, and evidence-based training programs.

Methodology

Research Design

This study employed a quantitative research approach using an experimental design, specifically a one-group pretest–posttest design. This approach was selected because it enables researchers to empirically examine the effect of the intervention, namely fartlek training, on the improvement of endurance (VO_2max), as objectively and quantitatively measured through the bleep test. Quantitative methods are considered highly relevant in sports science research because they generate numerical data that can be statistically analyzed to test hypotheses in a valid and reliable manner (Creswell & Creswell, 2018; Karabiyik et al., 2026).

Samples and Sampling Techniques

The population of this study consisted of athletes from BKMF Cricket UNM, while the sample comprised approximately 15 athletes. The sampling technique employed was purposive sampling, with inclusion criteria including active athletes, productive age range (approximately 15–22 years), good health status, and regular participation in training programs. Exclusion criteria included injury, absence during the research period, or specific medical conditions. This sampling technique was chosen to ensure the homogeneity of sample characteristics, thereby enhancing the consistency and reliability of the research findings (Creswell & Creswell, 2018; Etikan et al., 2016).

Instruments

The data source in this study consisted of primary data obtained directly from measurements of participants' endurance performance. Data collection was conducted through a field-based bleep test (multistage fitness test), which has been widely recognized as a valid and reliable instrument for estimating VO_2max .

Data Collection Procedures

The data collection procedure began with a pretest to determine the participants' baseline endurance levels, followed by the implementation of a fartlek training program for approximately four weeks, and concluded with a posttest to assess the resulting improvements. The fartlek training program was designed with variations in intensity, running speed, and recovery periods that reflected the activity characteristics of cricket (Muhammad & Sukamti, 2026; Fadli et al., 2025).

Data Analysis

Data analysis was performed using a descriptive statistical approach. Descriptive statistics were used to present the mean, standard deviation, and distribution of VO_2max data.

Furthermore, prerequisite tests, including the normality test, were conducted to ensure the suitability of the data for further analysis. Hypothesis testing was performed using a paired-sample t-test to determine whether there were significant differences between pretest and posttest scores within the same group.

This statistical approach is commonly applied in quantitative sports science research to ensure valid and reliable interpretation of intervention effects (Ini et al., 2026; Gripp et al., 2022). Overall, the research methodology was designed to produce valid, reliable, and applicable findings through the use of a structured experimental design, standardized measurement instruments, and appropriate statistical analyses. This approach not only addresses the research objective concerning the effectiveness of fartlek training in improving the endurance of cricket athletes but also provides a strong scientific foundation for the development of evidence-based training programs in the field of sports science (Virgie et al., 2026).

Result

Table 1. Descriptive Statistics of Athletes' VO₂max (n = 40)

Variable	Mean	Std. Deviation	Minimum	Maximum
Pre-test VO ₂ max	44.85	3.90	38.00	52.00
Post-test VO ₂ max	47.60	4.10	40.00	55.00

Based on Table 1, the mean VO₂max value of the athletes increased from 44.85 ml/kg/min during the pre-test to 47.60 ml/kg/min during the post-test. This finding indicates an improvement in aerobic endurance capacity following the training intervention or exercise program. The relatively small standard deviation values suggest that the data were fairly homogeneous and not widely dispersed. Furthermore, the increases in both the minimum and maximum values indicate that nearly all athletes experienced improvements in performance.

Table 2. Normality Test Results

Variable	Statistic (W)	Sig. (p-value)	Interpretation
Pre-test VO ₂ max	0.972	0.352	Normal
Post-test VO ₂ max	0.965	0.210	Normal

The normality test was conducted using the Shapiro–Wilk method because the sample size was fewer than 50 participants. The results showed that the significance values for the pre-test and post-test were 0.352 and 0.210, respectively, both of which were greater than 0.05. Therefore, it can be concluded that the data were normally distributed, meeting the assumptions required for parametric statistical analysis, specifically the paired-sample t-test.

Table 3. Paired-Sample t-Test Results

Data Pair	Mean Difference	t-value	Sig. (p-value)	Interpretation
Pre-test – Post-test	-2.75	-6.42	0.000	Significant

The results of the paired-sample t-test indicated a significant difference between the pre-test and post-test VO₂max scores. The mean difference of -2.75 indicates that the post-test scores were higher than the pre-test scores. Furthermore, the t-value of -6.42 with a significance value of 0.000 ($p < 0.05$) indicates that the observed improvement was statistically significant.

Discussion

Based on the results of the descriptive statistical analysis, there was an increase in the athletes' mean VO₂max value from 44.85 ml/kg/min during the pre-test to 47.60 ml/kg/min during the post-test. This increase indicates that the training program was able to improve the athletes' aerobic endurance capacity. In the context of cricket, although the sport involves intermittent high-intensity activities that rely on both aerobic and anaerobic energy systems, aerobic capacity still plays an important role in accelerating recovery between activities and maintaining performance stability throughout the match.

The results of the Shapiro–Wilk normality test showed that the pre-test and post-test data had significance values greater than 0.05 ($p > 0.05$), indicating that the data were normally distributed. This finding suggests that the collected data met the assumptions required for parametric statistical analysis, allowing further analysis using the paired-sample t-test to be conducted validly and reliably.

Furthermore, the results of the paired-sample t-test revealed a significance value of $p = 0.000$ ($p < 0.05$) with a t-value of -6.42, indicating a significant difference between the pre-test and post-test scores. Therefore, it can be interpreted that the observed increase in VO₂max was not due to chance but rather resulted from the training program implemented. This finding

confirms that the training intervention was effective in improving the athletes' physical condition.

In addition, the correlation coefficient of $r = 0.821$ indicates a strong relationship between the pre-test and post-test scores. This means that athletes with higher initial VO_{2max} capacities tended to maintain better performance after the training program. Nevertheless, the overall improvement observed among all athletes suggests that the training program had a positive impact across the entire group rather than benefiting only specific individuals.

Overall, the findings of this study reinforce the concept that structured, systematic, and continuous training can improve athletes' physiological capacity, particularly aerobic endurance. The practical implication of these findings is the importance of using physical fitness evaluations as a basis for developing training programs, enabling coaches to design training sessions that are more specific, effective, and tailored to the needs of cricket athletes.

Conclusion and recommendation

Based on the results of the study, it can be concluded that there was a significant improvement in the athletes' VO_{2max} values following the implementation of the training program. The collected data were normally distributed, thereby satisfying the assumptions required for parametric statistical testing. The results of the paired-sample t-test revealed a significant difference between the pre-test and post-test scores ($p < 0.05$), indicating that the training program was effective in improving the athletes' aerobic endurance capacity.

Therefore, this study confirms that physical fitness, particularly VO_{2max} , is an important component in supporting cricket athletes' performance. From a practical perspective, the findings of this study can serve as a reference for coaches in designing data-driven training programs to optimize cricket athletes' performance and support the achievement of better sporting outcomes.

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