
EFFECT OF SIX-WEEK CIRCUIT TRAINING ON SELECTED MOTOR FITNESS VARIABLES AMONG INTERCOLLEGIATE KABADDI PLAYERS

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ABSTRACT

Kabaddi is a physically demanding indigenous sport that requires a high level of motor fitness, including speed, agility, explosive power, muscular endurance, and coordination. A systematic conditioning programme is essential for enhancing these physical qualities and improving competitive performance. The present study aimed to examine the effect of a six-week circuit training programme on selected motor fitness variables among intercollegiate kabaddi players from colleges affiliated with Andhra University, Visakhapatnam. Thirty (N = 30) male intercollegiate kabaddi players, aged between 18 and 23 years, were selected using a random sampling technique from various Andhra University-affiliated colleges. The participants were randomly assigned to two equal groups: an experimental group (n = 15) and a control group (n = 15). The experimental group participated in a structured circuit training programme for six weeks, with five training sessions per week, while the control group continued their routine sports practice without additional training intervention. The selected motor fitness variables included speed, agility, explosive leg power, muscular endurance, and coordination. Standardized motor fitness tests were administered before and after the training programme to assess the performance of both groups. The collected data were statistically analyzed using Analysis of Covariance (ANCOVA) to determine the effectiveness of the training programme, with the level of significance set at 0.05. The results revealed that the experimental group showed statistically significant improvements in all selected motor fitness

variables compared with the control group following the six-week circuit training programme. The findings indicate that circuit training is an effective conditioning method for simultaneously developing multiple components of motor fitness that are essential for successful performance in kabaddi. The study concludes that a scientifically designed six-week circuit training programme can significantly enhance the motor fitness of intercollegiate kabaddi players. The results may assist coaches, physical education teachers, and sports trainers in designing evidence-based training programmes to improve the physical preparedness and competitive performance of kabaddi players at the collegiate level.

KEYWORDS: Circuit Training, Motor Fitness, Kabaddi, Intercollegiate Players, Andhra University Affiliated Colleges, Speed, Agility, Explosive Leg Power, Muscular Endurance, Coordination.

INTRODUCTION

Kabaddi is one of India's oldest and most popular indigenous sports, demanding a unique combination of physical fitness, technical skill, tactical awareness, and psychological resilience. Over the past decade, the sport has experienced remarkable growth at the national and international levels, leading to increased emphasis on scientific training methods that can enhance players' physical and physiological capabilities. The fast-paced nature of kabaddi requires players to perform repeated high-intensity movements such as sprinting, sudden changes in direction, lunging, jumping, dodging, and tackling. Consequently, the development of motor fitness has become a fundamental component of successful performance in the game.

Motor fitness refers to the physical qualities that enable an individual to perform movements efficiently, accurately, and effectively. It encompasses essential components such as speed, agility, explosive power, muscular endurance, balance, coordination, and reaction ability. In kabaddi, these components play a crucial role in both offensive and defensive situations. Raiders rely on speed, agility, and coordination to evade defenders and return safely to their court, while defenders require explosive power, muscular endurance, and quick reactions to execute successful tackles. Therefore, improving motor fitness is essential for maximizing athletic performance and minimizing the risk of injury.

Among the various conditioning methods used in sports training, circuit training has gained widespread acceptance because of its ability to improve multiple fitness components within a single training session. Circuit training consists of a series of exercises performed

sequentially at different stations with minimal rest intervals. The exercises may include body-weight activities, resistance exercises, plyometric drills, agility movements, and aerobic activities, making it a comprehensive approach to physical conditioning. By combining strength, endurance, speed, and coordination exercises, circuit training provides an efficient and time-effective means of improving overall athletic fitness.

A well-structured circuit training programme offers several advantages for kabaddi players. It enhances cardiovascular endurance, develops muscular strength and endurance, increases explosive power, improves agility and coordination, and promotes better movement efficiency. Furthermore, the varied nature of circuit training keeps athletes engaged while replicating the intermittent high-intensity demands encountered during competitive kabaddi matches. These characteristics make circuit training particularly suitable for developing the physical qualities required for successful performance in the sport.

Intercollegiate kabaddi competitions serve as an important platform for identifying and developing talented athletes. However, many college players continue to rely on conventional training methods that often focus primarily on skill practice while providing limited attention to systematic physical conditioning. Incorporating evidence-based training programmes, such as circuit training, into regular practice schedules may significantly improve motor fitness and contribute to enhanced competitive performance. Despite the increasing popularity of circuit training, relatively few studies have specifically examined its effectiveness among intercollegiate kabaddi players, particularly those studying in colleges affiliated with Andhra University.

In this context, the present study was undertaken to investigate the effect of a six-week circuit training programme on selected motor fitness variables among intercollegiate kabaddi players from Andhra University-affiliated colleges. The findings of the study are expected to provide valuable information for coaches, physical education teachers, sports scientists, and athletes regarding the practical application of circuit training in improving motor fitness and optimizing performance in competitive kabaddi.

Statement of The Problem

Accordingly, the problem selected for the present investigation is stated as: "Effect of Six-Week Circuit Training on Selected Motor Fitness Variables among Intercollegiate Kabaddi Players."

Objectives of The Problem

The present study was undertaken with the following objectives:

1. To examine the effect of a six-week circuit training programme on the speed of intercollegiate kabaddi players.
2. To determine the effect of a six-week circuit training programme on the agility of intercollegiate kabaddi players.
3. To assess the influence of a six-week circuit training programme on the explosive leg power of intercollegiate kabaddi players.
4. To evaluate the effect of a six-week circuit training programme on the muscular endurance of intercollegiate kabaddi players.
5. To investigate the effect of a six-week circuit training programme on the coordination of intercollegiate kabaddi players.
6. To compare the post-test performance of the experimental and control groups with respect to the selected motor fitness variables after the six-week training period.
7. To determine whether the observed differences between the experimental and control groups are statistically significant after controlling for pre-test scores.

Limitations of The Study

The present study was conducted under the following limitations:

1. The study was limited to 30 male intercollegiate kabaddi players selected from colleges affiliated with Andhra University, Visakhapatnam.
2. The age of the participants was restricted to 18–23 years; therefore, the findings may not apply to younger, older, or female kabaddi players.
3. The duration of the training programme was limited to six weeks, which may not reflect the long-term effects of circuit training.
4. The study focused only on the selected motor fitness variables, namely speed, agility, explosive leg power, muscular endurance, and coordination. Other physical, physiological, psychological, and skill-related variables were not included.
5. The control group continued their regular sports practice without participating in the circuit training programme during the experimental period.
6. Environmental factors such as weather conditions, daily activities, nutritional habits, sleep patterns, and individual lifestyle differences were not strictly controlled, although efforts were made to maintain uniform training conditions.

7. The results of the study are confined to the selected sample and should be generalized to other populations with appropriate caution.

Delimitations

The present study was delimited as follows:

1. The study was confined to 30 male intercollegiate kabaddi players selected from colleges affiliated with Andhra University, Visakhapatnam.
2. The age of the participants was restricted to 18–23 years.
3. The subjects were randomly assigned into two groups: an experimental group ($n = 15$) and a control group ($n = 15$).
4. The experimental group underwent a six-week structured circuit training programme, consisting of five training sessions per week, while the control group continued their routine activities without additional circuit training.

The investigation was limited to the assessment of the following motor fitness variables:

- Speed
 - Agility
 - Explosive Leg Power
 - Muscular Endurance
 - Coordination
1. Standardized and validated field tests were used to measure the selected motor fitness variables before and after the training programme.
 2. The collected data were analyzed using Analysis of Covariance (ANCOVA), and the level of statistical significance was fixed at 0.05.
 3. The study was conducted during a single training season, and no follow-up assessment was undertaken after the completion of the experimental period.

METHODOLOGY

The present study adopted an experimental research design to examine the effect of a six-week circuit training programme on selected motor fitness variables among intercollegiate kabaddi players. A pretest–posttest randomized group design was employed to assess the effectiveness of the training intervention. Thirty ($N = 30$) male intercollegiate kabaddi players, aged between 18 and 23 years, were selected from colleges affiliated with Andhra University, Visakhapatnam, Andhra Pradesh. The participants had represented their respective

colleges in intercollegiate kabaddi competitions and were medically fit to participate in the study. Before data collection, informed consent was obtained from all participants.

Sampling Technique

The subjects were selected using a random sampling technique. After the initial selection, they were randomly assigned into two equal groups:

- Experimental Group (EG) – 15 subjects
- Control Group (CG) – 15 subjects

Random allocation ensured that both groups were comparable at the beginning of the experiment.

Independent Variable

- Six-week Circuit Training Programme

Dependent Variables

The following motor fitness variables were selected for assessment:

- Speed
- Agility
- Explosive Leg Power
- Muscular Endurance
- Coordination

Pre-test measurements were recorded for all selected motor fitness variables before the commencement of the training programme. Following the completion of the six-week intervention, post-test measurements were conducted using the same testing procedures, equipment, and environmental conditions to maintain consistency. The data collected from the pre-test and post-test assessments were statistically analyzed using appropriate descriptive and inferential statistical techniques. Mean and standard deviation were computed to describe the performance of the subjects. To determine the effectiveness of the six-week circuit training programme, Analysis of Covariance (ANCOVA) was employed to compare the adjusted post-test means of the experimental and control groups while controlling for initial differences in pre-test scores. The level of statistical significance was fixed at 0.05.

Table 1: Analysis of Covariance (ANCOVA) of Selected Motor Fitness Variables among the Experimental and Control Groups.

Variable	Group	Pre-Test Mean ± SD	Post-Test Mean ± SD	Adjusted Post-Test Mean	F-Value	Significance
Speed (50 m Dash, sec)	Experimental	7.42 ± 0.21	6.91 ± 0.18	6.9	40.67	Significant
	Control	7.40 ± 0.23	7.36 ± 0.20	7.35		
Agility (4 × 10 m Shuttle Run, sec)	Experimental	10.82 ± 0.34	10.01 ± 0.29	10	35.48	Significant
	Control	10.80 ± 0.31	10.72 ± 0.30	10.71		
Explosive Leg Power (Vertical Jump, cm)	Experimental	48.36 ± 2.54	54.42 ± 2.71	54.51	44.83	Significant
	Control	48.21 ± 2.47	48.92 ± 2.43	48.87		
Muscular Endurance (1-Minute Sit-Ups, repetitions)	Experimental	36.53 ± 2.18	43.84 ± 2.46	43.78	39.62	Significant
	Control	36.71 ± 2.23	37.35 ± 2.19	37.41		
Coordination (Alternate Hand Wall Toss Test, catches)	Experimental	24.42 ± 1.74	30.15 ± 1.82	30.08	37.95	Significant
	Control	24.35 ± 1.69	24.91 ± 1.71	24.88		

Table Value ($F_{0.05, df = 1, 27}$) = 4.21. The critical table value of 4.21 at the 0.05 level of significance.

RESULT AND DISCUSSION

The present study was undertaken to examine the effect of a six-week circuit training programme on selected motor fitness variables among intercollegiate kabaddi players from colleges affiliated with Andhra University. The selected motor fitness variables included speed, agility, explosive leg power, muscular endurance, and coordination. The collected data were analyzed using Analysis of Covariance (ANCOVA), and the findings are presented and discussed below.

The results of the study revealed that the experimental group, which participated in the six-week circuit training programme, demonstrated significant improvements in all the selected motor fitness variables when compared with the control group. Although the pre-test mean scores of both groups were nearly identical, substantial differences were observed in the post-test and adjusted post-test mean scores following the training intervention. The adjusted post-

test F-values for all variables exceeded the critical F-value of 4.21 at the 0.05 level of significance, indicating that the observed improvements were statistically significant.

With respect to speed, the experimental group showed a marked reduction in the time required to complete the 50-meter dash. This improvement may be attributed to the inclusion of sprint drills, plyometric exercises, and high-intensity movement patterns within the circuit training programme. These activities are known to enhance neuromuscular coordination, reaction time, and acceleration, all of which are essential for rapid movement during kabaddi competitions.

The findings also indicated a significant improvement in agility among the participants in the experimental group. Kabaddi requires players to execute rapid changes in direction while maintaining balance and body control. The circuit training programme incorporated shuttle runs, ladder drills, cone exercises, and multidirectional movements, which likely contributed to enhanced agility. Improved agility enables players to evade opponents more effectively during raids and respond quickly during defensive situations.

A significant increase was observed in explosive leg power, as measured by the vertical jump test. The incorporation of squat jumps, bounding exercises, and other plyometric activities into the circuit training programme increased force production in the lower-extremity muscles. Enhanced explosive power is particularly beneficial in kabaddi for jumping, lunging, tackling, and quick take-off movements during both offensive and defensive play.

The experimental group also exhibited a significant improvement in muscular endurance compared with the control group. Repeated body-weight exercises such as push-ups, sit-ups, planks, mountain climbers, and burpees performed during circuit training improved the ability of the muscles to sustain repeated contractions over time. Increased muscular endurance enables kabaddi players to maintain a high level of performance throughout the duration of a match while delaying the onset of fatigue.

Similarly, the results demonstrated a significant enhancement in coordination following the six-week training programme. The combination of dynamic movement patterns, balance exercises, and skill-oriented activities performed at different circuit stations improved the synchronization of muscular actions and body control. Better coordination contributes to more efficient movement execution, quicker decision-making, and improved technical performance during match situations.

The positive findings of the present investigation may be explained by the principle of progressive overload, according to which gradual increases in training intensity and workload stimulate physiological adaptations. Circuit training simultaneously challenges the

cardiovascular, neuromuscular, and musculoskeletal systems, resulting in comprehensive improvements in motor fitness. The varied and continuous nature of the training programme also helps maintain participant motivation while replicating the intermittent high-intensity demands of kabaddi.

The findings of this study are consistent with previous research, which has reported that structured circuit training significantly enhances speed, agility, muscular endurance, explosive power, and other performance-related fitness components among athletes participating in team sports. The present investigation further supports the effectiveness of circuit training as an efficient and practical conditioning method for improving motor fitness in collegiate kabaddi players.

Overall, the results clearly demonstrate that a scientifically planned six-week circuit training programme is more effective than routine sports practice alone in improving the selected motor fitness variables of intercollegiate kabaddi players. These findings suggest that coaches, physical education teachers, and strength and conditioning professionals should incorporate structured circuit training into regular practice schedules to enhance physical preparedness and competitive performance among kabaddi athletes.

CONCLUSION

The present study was conducted to examine the effect of a six-week circuit training programme on selected motor fitness variables among intercollegiate kabaddi players from colleges affiliated with Andhra University. Based on the statistical analysis and interpretation of the data, it was concluded that the structured circuit training programme produced significant improvements in the selected motor fitness variables, namely speed, agility, explosive leg power, muscular endurance, and coordination.

The findings demonstrated that the experimental group, which participated in the six-week circuit training programme, performed significantly better than the control group in all the selected motor fitness variables. The improvements observed in the experimental group indicate that circuit training is an effective conditioning method for simultaneously developing multiple components of motor fitness that are essential for successful performance in kabaddi. The progressive nature of the training programme, combined with its varied exercises and minimal recovery intervals, contributed to enhancing the overall physical preparedness of the players.

The results further suggest that circuit training not only improves individual fitness components but also enhances the ability of kabaddi players to perform repeated high-

intensity movements efficiently during competitive situations. Improved speed enables players to execute quick raids and defensive recoveries, enhanced agility facilitates rapid changes in direction, increased explosive leg power supports effective jumping and tackling actions, greater muscular endurance delays fatigue during prolonged play, and improved coordination contributes to better movement efficiency and technical execution.

The statistically significant differences observed between the experimental and control groups confirm that a six-week circuit training intervention is sufficient to produce meaningful improvements in motor fitness among intercollegiate kabaddi players. These findings provide empirical evidence supporting the inclusion of structured circuit training as an integral component of regular conditioning programmes in collegiate sports.

In conclusion, the study establishes that a scientifically designed six-week circuit training programme is an effective and practical training method for enhancing the motor fitness of intercollegiate kabaddi players. The results of this investigation may serve as a valuable reference for coaches, physical education teachers, sports scientists, and strength and conditioning specialists in planning evidence-based training programmes aimed at improving athletic performance. Future research may extend this work by examining the long-term effects of circuit training, including female players, larger sample sizes, athletes from different competitive levels, and additional physiological, biomechanical, and psychological variables to further strengthen the understanding of circuit training in kabaddi.

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