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IMPACT OF INDIGENOUS TRAINING ON SELECTED PHYSIOLOGICAL AND SKILL PERFORMANCE VARIABLES OF INTER COLLEGIATE LEVEL CRICKET PLAYERS

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ABSTRACT

The purpose of the present study was to investigate the impact of concurrent indigenous training on selected physiological and skill performance variables among intercollegiate level cricket players. A total of 30 male cricket players aged between 18 and 25 years were selected using purposive sampling technique and randomly divided into two equal groups, namely experimental and control groups. The experimental group underwent a structured indigenous training program based on Kalarippayattu along with regular cricket practice, while the control group continued only with routine cricket training. The selected physiological variables included resting heart rate and VO_2 max, while the skill performance variables were batting reaction time, bowling accuracy, and throwing accuracy. Pre-test and post-test measurements were taken for both groups. The collected data were analysed using descriptive statistics (mean and standard deviation) and inferential statistics using the paired 't' test. The level of significance was fixed at 0.05. The results of the study revealed that the experimental group showed significant improvement in all selected variables compared to the control group. There was a marked reduction in resting heart rate, indicating improved cardiovascular efficiency, and a significant increase in VO_2 max, reflecting enhanced aerobic capacity. Additionally, significant improvements were observed in batting reaction time, bowling accuracy, and throwing accuracy, demonstrating enhanced neuromuscular coordination and skill performance. It was concluded that concurrent indigenous training is an effective method for improving both physiological fitness and skill performance among intercollegiate cricket players.

KEYWORDS: *Indigenous Training, Kalaripayattu, VO_2 Max, Resting Heart Rate, Batting Reaction Time, Bowling Accuracy, Throwing Accuracy, Cricket Performance*

INTRODUCTION

Modern competitive sports demand not only superior physical fitness but also high levels of psychological stability, neuromuscular coordination, and cognitive efficiency. Cricket, being one of the most technically complex and psychologically demanding team sports, requires athletes to demonstrate a unique combination of physiological endurance, biomechanical precision, perceptual awareness, emotional control, and sustained mental concentration. Unlike many continuous sports, cricket involves intermittent high-intensity actions combined with prolonged periods of anticipation, strategic thinking, and decision-making under pressure. At the intercollegiate level, cricketers encounter multiple performance stressors such as academic pressure, competition anxiety, performance expectations, team selection stress, and fluctuating confidence levels. These factors significantly influence both physical performance and mental health variables including concentration, anxiety regulation, emotional stability, self-confidence, and psychological resilience. Therefore, modern sports science increasingly emphasizes holistic training approaches that integrate physical conditioning with mental development. In recent decades, sports training methodologies have expanded beyond conventional strength and conditioning practices to include alternative movement systems such as yoga, Pilates, mindfulness training, and martial arts-based conditioning. These integrative approaches aim to improve body awareness, neuromuscular efficiency, balance, flexibility, reaction ability, and psychological well-being simultaneously. Among such traditional systems, Indian indigenous martial arts have gained renewed scientific attention due to their multidimensional training structure. One of the oldest and most sophisticated martial arts traditions of India is Kalarippayattu, which originated in the southern state of Kerala. Historically practiced as a comprehensive system of physical culture, self-defense, and mental discipline, Kalaripayattu integrates dynamic body movements, controlled breathing, rhythmic footwork, animal postures (Vadivu), flexibility exercises, combat sequences, and meditative practices. The training emphasizes harmony between mind and body, enhancing agility, coordination, reflex action, balance, flexibility, and mental focus. Kalarippayattu training begins with Meypayattu, a structured body-conditioning sequence designed to develop muscular strength, joint mobility, neuromuscular coordination, and postural alignment. The system further incorporates Chuvadu (footwork patterns), leg swings, jumps, rotational movements, and animal-based postures that demand concentration, spatial awareness, and controlled energy flow. These components closely resemble functional movement patterns required in cricket activities such as batting footwork, bowling mechanics, rapid fielding movements, and wicket-keeping reflexes. From a physiological perspective, Kalaripayattu enhances cardiovascular endurance, muscular endurance, flexibility, and motor coordination through continuous dynamic movements. From a psychological perspective, its disciplined training structure promotes attentional control, emotional regulation, stress management, and mental alertness. The integration of breathing control and rhythmic movement patterns contributes to improved autonomic nervous system regulation, which is associated with reduced anxiety and enhanced cognitive performance. Despite the rich cultural and physical heritage of Indian martial arts, their application within

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contemporary sports training remains scientifically underexplored. Most cricket conditioning programs rely heavily on resistance training, aerobic conditioning, and skill drills, often neglecting traditional movement systems that may provide complementary benefits. Particularly at the intercollegiate level, where athletes are still developing physically and psychologically, incorporating indigenous training methods may offer a culturally relevant and holistic approach to athlete development. Mental health variables have become increasingly important in sports research due to growing recognition of psychological factors influencing athletic performance. Anxiety management, concentration ability, emotional stability, and self-confidence directly affect decision-making speed, reaction accuracy, and performance consistency in cricket. Training modalities that simultaneously stimulate physical and psychological systems may therefore produce superior performance adaptations compared to conventional training alone. Kalaripayattu, through its integrated physical–mental training philosophy, provides a potential intervention capable of improving selected mental health variables among athletes. The structured sequences require sustained attention, controlled breathing, body awareness, and disciplined execution, all of which contribute to enhanced cognitive engagement and psychological balance. Regular participation in such training may reduce competitive anxiety, improve emotional regulation, and strengthen confidence levels among players. However, empirical research examining the impact of Kalaripayattu training on psychological outcomes in competitive sports populations remains limited. Scientific validation is necessary to establish its effectiveness and applicability within modern sports conditioning frameworks. Hence, the present study attempts to experimentally investigate the impact of Kalaripayattu training on selected mental health variables among intercollegiate level cricket players. This research aims to bridge the gap between traditional Indian physical culture and contemporary sports science by evaluating whether indigenous training practices can contribute meaningfully to psychological well-being and athletic performance enhancement.

Selection of Subjects

For the purpose of the present study, 30 intercollegiate male cricket players were selected from affiliated colleges. The age of the subjects ranged between 18 and 25 years.

The subjects were selected using purposive sampling technique and were medically fit to participate in the training programme.

The selected subjects were randomly divided into two equal groups:

- Experimental Group – received Kalari Payattu (martial arts) training along with regular cricket practice.
- Control Group – continued regular cricket training without Kalari Payattu training.

Each group consisted of an equal number of participants.

SELECTION OF VARIABLES

The research scholars reviewed the available literature from books, journals, magazines, periodicals, and research articles. Based on feasibility an independent variable was selected.

SELECTION OF VARIABLES

S. NO	VARIABLES	TEST ITEMS	UNIT OF MEASUREMENT
PHYSIOLOGICAL VARIABLES			
1	Resting Heart Rate	Harvard Step	Heart rate per minute
2	Vo2 Max	12 Minutes cooper	Distance in meters
SKILL PERFORMANCE VARIABLES			
3	Batting Reaction Time	Ball drop batting reaction test	Points
4	Bowling Accuracy	Line and length test	Points
5	Throwing Accuracy	Overarm Throwing accuracy	Points

RESEARCH DESIGN

The present study employed a random group pre-test and post-test experimental design to examine the effectiveness of Kalari Payattu training on selected variables among intercollegiate cricket players. The selected subjects were randomly assigned into two groups, namely the experimental group and the control group, to ensure equality and minimize selection bias. Both groups were assessed through pre-tests prior to the commencement of the training programme in order to determine the initial status of the selected variables. Following the pre-test assessment, the experimental group participated in a structured Kalari Payattu training programme in addition to their regular cricket practice, whereas the control group continued with their routine cricket training without any additional intervention. After completion of the specified training period, post-tests were conducted for both groups under identical conditions. The comparison between pre-test and post-test scores enabled the researcher to determine the effectiveness of the training programme and to evaluate the differences between the experimental and control groups.

Statistical Techniques

The data collected from the pre-test and post-test measurements of the selected physiological and skill performance variables were systematically analyzed using appropriate statistical techniques to determine the effectiveness of the training programme.

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Descriptive statistics, namely mean and standard deviation, were calculated to summarize and describe the central tendency and variability of the scores obtained by the subjects in both experimental and control groups. To examine the significance of improvement within each group, the paired 't' test was employed to compare pre-test and post-test mean scores, thereby identifying changes resulting from the training intervention. For comparing the differences between the experimental and control groups after the training period, parred 't' test was applied, with pre-test scores serving as covariates where necessary to control initial group differences and enhance the accuracy of treatment effects. All statistical analyses were conducted following standard research procedures, and the level of significance was fixed at 0.05, which is considered an acceptable probability level in physical education and sports science research to determine whether the observed differences were statistically significant and not due to chance.

TABLE – I
COMPUTATION WITH 't' TEST OF RESTING HEART RATE ON EXPERIMENTAL AND CONTROL GROUP ON COLLEGE CRICKET PLAYERS

Variables	Group	Test	Mean	S. D	D. M	σ DM	't'
Resting heart rate	**Experimental**	**Pre test**	87	2.89	6.26	3.12	7.76
		Post test	81.07	2.28			
	Control group	**Pre test**	84.00	2.97	0.46	0.51	3.50
		Post test	83.53	2.87			

*Significant Level of significant was fixed at 0.05 with df 19 Table value 2.04

Table - I Indicates that experimental and control group of resting heart rate on mean and standard deviation of college cricket players. The experimental group pre and post test mean values are 87.33 and 81.07 and standard deviation values are 2.89 and 2.28 and obtained 't' value is 7.76 which is greater than table value 2.04 with df 14. And control group mean values are 84.00 and 83.53 and standard deviation 2.97 and 2.87 and obtained 't' value 3.50 which is small greater than table value 2.04. The finding of the study indicates that experimental group significant improvement on resting heart rate due to concurrent indigenous training on college cricket player

FIGURE – 1
THE BAR DIAGRAM SHOWS THAT THE PRE AND POST TEST MEANS OF EXPERIMENTAL AND CONTROL GROUPS ON RESTING HEART RATE OF COLLEGE CRICKET PLAYERS.

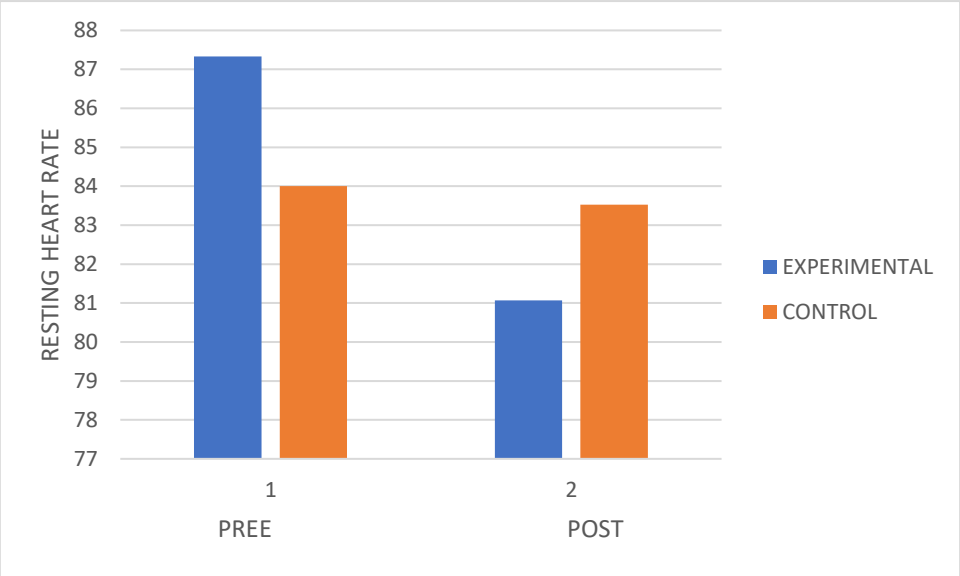


Figure: 1 clearly indicate that experimental group compared with control group with significant improvement on Resting heart rate on college level cricket players.

TABLE – II
COMPUTATION WITH 't' TEST OF VO2 MAX ON EXPERIMENTAL AND CONTROL GROUP ON COLLEGE CRICKET PLAYERS

Variables	Group	Test	Mean	S. D	D. M	σ DM	't'
VO2 MAX	Experimental	Pre test	2012.00	42.96	182.00	45.7	15.42
		Post test	2194.00	65.87			
	Control group	Pre test	1988.00	37.07	4.66	13.77	1.33
		Post test	1992.67	35.95			

*Significant Level of significant was fixed at 0.05 with df 19 Table value 2.14

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Table -II Indicates that experimental and control group of vo2 max on mean and standard deviation of college cricket players. The experimental group pre and post test mean values are 2012.00 and 2194.00 and standard deviation values are 42.96 and 65.87 and obtained 't' value is 15.42 which is greater than table value 2.14 with df 14. And control group mean values are 1988.00 and 1992.67 and standard deviation 37.07 and 35.95 and obtained 't' value 1.33 which is lesser than table value 2.14. The finding of the study indicates that experimental group significant improvement on vo2 max due to concurrent indigenous training on college cricket players.

FIGURE – 2
THE BAR DIAGRAM SHOWS THAT THE PRE AND POST TEST MEANS OF EXPERIMENTAL AND CONTROL GROUPS ON VO2 MAX OF COLLEGE CRICKET PLAYERS.

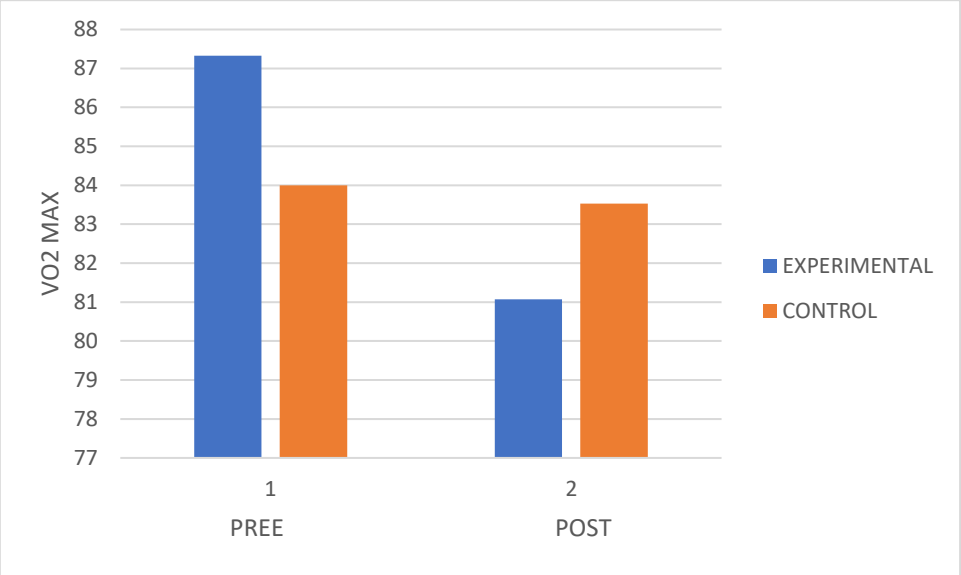


Figure: 2 clearly indicate that experimental group compared with control group with significant improvement on vo2 max on college level cricket players.

TABLE - III
COMPUTATION WITH 't' TEST OF BATTING REACTION TIME ON EXPERIMENTAL AND CONTROL GROUP ON COLLEGE CRICKET PLAYERS

Variables	Group	Test	Mean	S. D	D. M	σ DM	't'
Batting reaction time	Experimental	Pre test	6.80	0.86	2.13	1.35	6.09
		Post test	8.93	1.43			
	Control group	Pre test	6.13	0.74	0.33	0.48	2.64
		Post test	6.47	0.51			

*Significant Level of significant was fixed at 0.05 with df 14 Table value 2.14

Table - III Indicates that experimental and control group of batting reaction time on mean and standard deviation of college cricket players. The experimental group pre and pos test mean values are 6.80 and 8.93 and standard deviation values are 0.86 and 1.43 and obtained 't' value is 6.09 which is greater than table value 2.14 with df 14. And control group mean values are 6.13 and 6.47 and standard deviation 0.74 and 0.51 and obtained 't' value 2.64 which is small greater than table value 2.14 The finding of the study indicates that experimental group significant improvement on batting reaction time due to concurrent indigenous training on college cricket players.

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FIGURE - 3
THE BAR DIAGRAM SHOWS THAT THE PRE AND POST TEST MEANS OF EXPERIMENTAL AND CONTROL GROUPS ON BATTING REACTION TIME OF COLLEGE CRICKET PLAYERS.

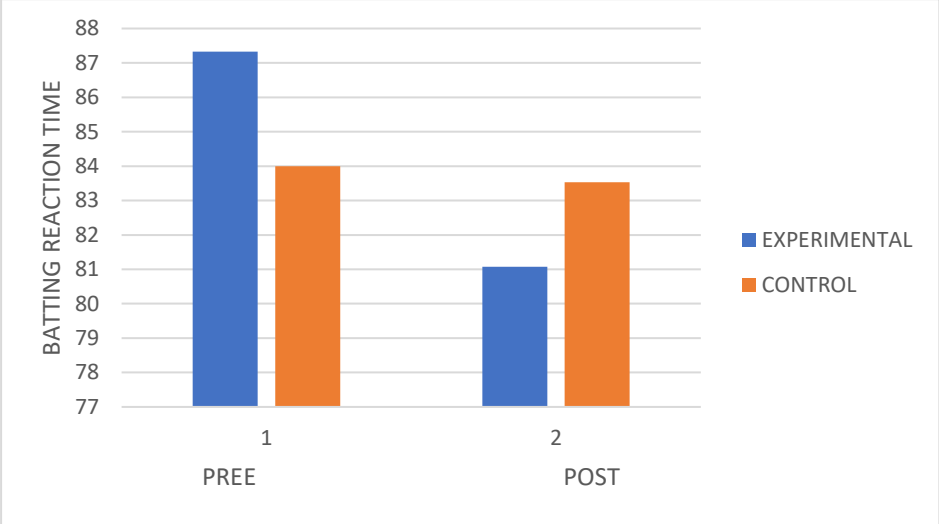


Figure: 3 clearly indicate that experimental group compared with control group with significant improvement on batting reaction time on college level cricket players.

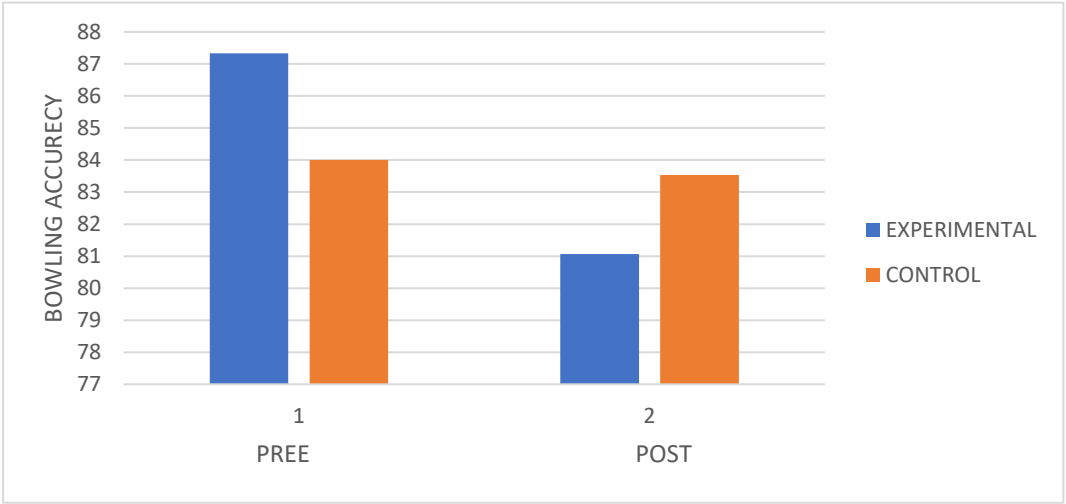
TABLE - IV
COMPUTATION WITH 't' TEST OF BOWLING ACCURACY ON EXPERIMENTAL AND CONTROL GROUP ON COLLEGE CRICKET PLAYERS

Variables	Group	Test	Mean	S. D	D. M	σ DM	't'
Bowling accuracy	Experimental	Pre test	9.20	1.78	3.13	1.18	10.22
		Post test	12.33	1.67			
	Control group	Pre test	8.67	1.23	0.33	0.48	2.64
		Post test	9.00	1.13			

*Significant Level of significant was fixed at 0.05 with df 19 Table value 2.14

Table - IV Indicates that experimental and control group of bowling accurecy on mean and standard deviation of college cricket players. The experimental group pre and post test mean values are 9.20 and 12.33 and standard deviation values are 1.78 and 1.67 and obtained 't' value is 10.22 which is greater than table value 2.14 with df 14. And control group mean values are 8.67 and 9.00 and standard deviation 1.23 and 1.13 and obtained 't' value 2.64 which is small greater than table value 2.14. The finding of the study indicates that experimental group significant improvement on bowling accuracy due to concurrent indigenous training on college cricket players.

FIGURE – 4
THE BAR DIAGRAM SHOWS THAT THE PRE AND POST TEST MEANS OF EXPERIMENTAL AND CONTROL GROUPS ON BOWLING ACCURECY OF COLLEGE CRICKET PLAYERS.



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Figure: 4 clearly indicate that experimental group compared with control group with significant improvement on Bowling accuracy on college level cricket players.

TABLE – V
COMPUTATION WITH 't' TEST OF THROWING ACCURACY ON EXPERIMENTAL AND CONTROL GROUP ON COLLEGE CRICKET PLAYERS

Variables	Group	Test	Mean	S. D	D. M	σ DM	't'
Throwing accuracy	Experimental	Pre test	11.20	1.93	6.0	2.03	11.41
		Post test	17.20	3.05			
	Control group	Pre test	9.93	1.83	0.33	0.48	2.64
		Post test	10.27	1.66			

*Significant Level of significant was fixed at 0.05 with df 19 Table value 2.14

Table - V Indicates that experimental and control group of throwing accuracy on mean and standard deviation of college cricket players. The experimental group pre and post test mean values are 11.20 and 17.20 and standard deviation values are 1.93 and 3.05 and obtained 't' value is 11.41 which is greater than table value 2.14 with df 14. And control group mean values are 9.93 and 10.27 and standard deviation 1.83 and 1.66 and obtained 't' value 2.64 which is small greater than table value 2.14. The finding of the study indicates that experimental group significant improvement on throwing accurecy due to concurrent indigenous training on college cricket players.

FIGURE – 5
THE BAR DIAGRAM SHOWS THAT THE PRE AND POST TEST MEANS OF EXPERIMENTAL AND CONTROL GROUPS ON THROWING ACCURECY OF COLLEGE CRICKET PLAYERS.

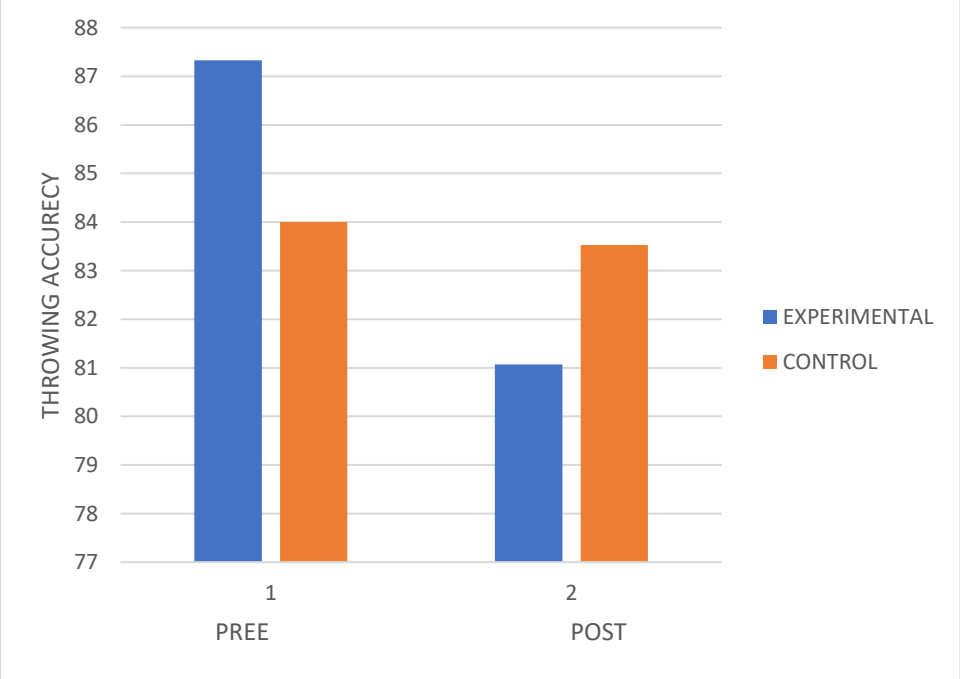


Figure: 5 clearly indicate that experimental group compared with control group with significant improvement on batting throwing accuracy on college level cricket players.

DISCUSSION OF FINDING

The findings of the present study clearly indicate that concurrent indigenous training had a significant positive effect on both physiological and performance variables among college cricket players. The experimental group showed a marked reduction in resting heart rate, indicating improved cardiovascular efficiency, and a highly significant increase in VO_2 max, reflecting enhanced aerobic capacity. In addition, there was considerable improvement in batting reaction time, bowling accuracy, and throwing accuracy, which suggests better neuromuscular coordination, skill execution, and overall performance efficiency. These improvements can be attributed to the combined effect of structured and sport-specific training stimuli included in the concurrent indigenous training program, which enhanced both physical fitness and technical skills. In contrast, the control group, which did not undergo any specialized training, showed only minimal or negligible improvements in all variables. Therefore, it can be concluded that concurrent indigenous training is an effective method for improving both physiological fitness and performance abilities in college cricket players. Fox and Mathews (1981), Bompa (1999).

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CONCLUSION

Based on the analysis and interpretation of data, the following conclusions were drawn:

- Concurrent indigenous training has a significant positive impact on both physiological and performance variables among college cricket players.
- The reduction in resting heart rate indicates improved cardiovascular efficiency.
- The increase in VO_2 max shows enhanced aerobic capacity and endurance.
- Improvements in batting reaction time, bowling accuracy, and throwing accuracy indicate better neuromuscular coordination and skill performance.
- The experimental group outperformed the control group in all variables, confirming the effectiveness of the training program.

Therefore, it is concluded that concurrent indigenous training is an effective training method for improving both fitness and performance in college-level cricket players.

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APPENDIX
INDIGENOUS TRAINING PLAN
WEEKLY MICRO CYCLE

Day	Training Focus	Major Activities	Duration
Monday	Flexibility & Conditioning	Warm-up drills, basic stretches, mobility exercises	60 min
Tuesday	Footwork Basics	Simple step patterns, posture alignment, coordination drills	60 min
Wednesday	Balance Training	Static balance, core activation, slow movements	60 min
Thursday	Agility Introduction	Light jumps, direction changes, reaction drills	60 min
Friday	Integrated Practice	Basic sequence practice, breathing, relaxation	60 min

*Duration Of The Training Per Day: 60 Minutes
*Intensity May Change According To The Weekly