Effect of Circuit Training on Selected Physical Fitness Components of Cricket Players

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Abstract

This experimental study aimed to investigate the impact of an eight-week circuit training program on selected physical fitness components among male cricket players aged 20 to 25 years. A sample of 30 male cricket players from Abdul Wali Khan University participated in the study, undergoing a meticulously designed Circuit Training Program (CTP) three days per week for eight weeks. The study employed an array of tests, including assessments of agility and muscular endurance. The initial t-test results indicated no significant pre-treatment differences between the Control Group (CG) and Experimental Group (EG). However, subsequent analyses revealed compelling evidence supporting the effectiveness of the circuit training program. Significant improvements were observed in muscular endurance and agility, within the Experimental Group, emphasizing the positive impact of the intervention. The study provides valuable insights into the tailored training interventions for cricket players, highlighting the importance of circuit training in enhancing various physical fitness components. Recommendations for coaches, trainers, and players are outlined to optimize training programs and foster comprehensive athlete development. The findings contribute to the sports science literature and underscore the significance of personalized training interventions for specific athletic populations.

Keywords: *Circuit Training, Muscular Endurance, Agility, Cricket Players*

Introduction

Cricket, a globally celebrated sport, demands a multifaceted blend of physical attributes from its players, including strength, speed, endurance, flexibility, and agility. Recent research underscores the importance of aligning physical fitness with the specific demands of cricket, where players engage in a range of

activities such as explosive batting, precise bowling, agile fielding, and swift running between wickets (Lim et al., 2024). These varied actions highlight the need for cricket players to possess a diverse skill set supported by optimal physical conditioning. The significance of physical fitness in cricket extends beyond individual performance, impacting team success as well. As the sport evolves with the introduction of shorter formats and increased intensity, understanding and enhancing the physical fitness of cricket players become paramount. Recent studies emphasize a holistic approach to fitness, considering the unique demands of cricket, and highlight the positive impact of targeted training programs on overall player capabilities (Weldon et al., 2021). This literature review aims to delve into the research on the effect of circuit training, a versatile and efficient training modality, on selected physical fitness components in cricket players, providing insights for optimizing their on-field performance.

Physical fitness in the context of cricket performance is increasingly recognized as a critical determinant of success in this dynamic and demanding sport. Cricket requires players to excel in various physical domains, encompassing strength, speed, endurance, flexibility, and agility, to execute precise skills such as powerful batting, accurate bowling, and agile fielding (Lloyd et al., 2016). Optimal physical fitness not only enhances individual player capabilities but also contributes significantly to team success. Adequate strength enables batsmen to execute powerful shots, while muscular endurance supports sustained performance for bowlers during long-format matches. Furthermore, speed and agility are crucial for fielders, impacting their ability to chase balls and effect swift run-outs. Recent research emphasizes the interplay between physical fitness and cricket performance, indicating that well-rounded fitness profiles are associated with improved overall game outcomes (Gupta et al., 2017). As the sport evolves with varying formats and intensities, acknowledging the paramount importance of physical fitness in cricket becomes imperative for players, coaches, and sports scientists alike. This literature review seeks to explore the existing research on the impact of circuit training on selected physical fitness components in cricket players, offering insights into optimizing their on-field performance and addressing the evolving demands of the sport.

Physical fitness is the contemporary problem for physical educationists and researchers, practitioners. Physical fitness level is declined because of the technological advancement and low level of participation as well as interest in sports activities (Hassan et al., 2023). In addition, Physical fitness is equally important for both general and athlete. For athletes, physical fitness is the capacity to handle the demands of training, intense exercises, and competition

without experiencing undue exhaustion (Xu et al., 2024). It refers to the ability to carrying out routine ordinary tasks without experiencing excessive tiredness. However, a variety of factors, such as genetic make-up, diet, sleep, and athletic training, affect physical fitness. Sports training is a scientifically grounded and a planned procedure that, when done in a planned and systematic manner, has an impact on performance. In reality, physical fitness termed as impartial progress of muscular strength, speed, muscular endurance, muscular co-ordination, muscular flexibility, and muscular agility, and it is the result of designed training (Aslam et al., 2023). In last two decades, sports have taken on a further competitive nature, with both new and old records being broken. In order to build the elements of physical fitness and to lay the groundwork for sport, thorough training is therefore required (Smith, 2023).

Cricket players required the ability to rapidly move, change direction quickly, and jump high for which agility, speed, and leg muscle power are essential elements (Foden et al., 2015). The ability to accelerate, decelerate and rapidly change direction while maintaining alignment of the body is called agility (Anversha et al., 2024). A high level of neuro-muscular coordination is required in the game because players constantly change their center of gravity along with speed. The game also needs explosive strength due to a large number of jumping and sprinting in every movement of the game. For high jumping, leg muscle strength is also very important to throw and catch the ball above surface of the ground. Players who have superior jumping capabilities can outperform their opponents in numerous situations requiring offensive and defensive responsibilities, such as stopping, jump catching, and rebounding (Ibanez et al., 2008).

The integration of circuit training into athletic conditioning programs has been explored as a means to enhance speed and agility, critical components for success in dynamic sports such as cricket. Recent research has demonstrated that well-designed circuit training protocols contribute to improvements in both speed and agility among athletes (Dawes, 2019). Circuit training, characterized by its varied and consecutive exercises, offers a platform to simulate the multifaceted demands of sports, engaging athletes in a mix of strength, endurance, and skill-specific activities. Tailoring circuit training to address the unique requirements of cricket has shown promising results in positively influencing the sprinting abilities of players and refining their agility in on-field movements. As this literature review progresses, it will delve into the specific methodologies employed in circuit training interventions, examining their impact on the enhancement of speed and agility, and providing insights into the applicability of these findings to the context of cricket players.

Methods & Materials

Methodology refers to the systematic and detailed framework or set of procedures that guides the researcher in conducting a study or investigation. In the context of a research project, the methodology outlines the specific methods, techniques, and tools employed to collect, analyze, and interpret data. It encompasses the overall design of the study, the selection of participants, the data collection instruments, the statistical or analytical procedures, and any other relevant procedures necessary for achieving the research objectives.

Site of the Study

The study was conducted at the Directorate of Sports, Abdul Wali Khan University Mardan. The selection of this setting was based on its accessibility and the availability of necessary facilities for conducting a study on the impact of circuit training on selected physical fitness components of cricket players.

Study Design & Participants

An experimental research design was employed to investigate the influence of a circuit training intervention on the physical components of male cricketers. The study focused on a sample of 30 male cricket players within the age group of 20-25 years, all of whom were full-time students at Abdul Wali Khan University and had participated in college-level cricket competitions. The participants were selected based on their cricket involvement to ensure a certain level of baseline physical fitness. The subjects were evenly divided into two groups, comprising a control group and an experimental group, each consisting of 15 participants.

Selection of Tests

S. No	Variables	Test
1.	Muscular Endurance	Pull-ups ,push ups
2.	Agility	50 yard Shuttle Run

Inclusion and Exclusion Criteria

S. NO	Inclusion	Exclusion
1.	Age between 20-25 years	Age Below 20 and above 25 years
2.	BMI 18.5 to 24.9	BMI less than 18.5 and above 24.9
3.	AWKUM players	Other than AWKUM players
4.	Weight less than 85 kg	Weight more than 85 kg

Ethical Approval

The study ensured ethical compliance by obtaining approval from the University of Haripur Ethical Committee and the Director of Sports at Abdul Wali Khan University Mardan. This step was crucial in ensuring that the research adheres to ethical standards and prioritizes the well-being and rights of the participants involved in the study. The approval from the ethical committee demonstrates the commitment to conducting the research in an ethically responsible manner.

Statistical Analysis

The International Business Machines Corporation IBM Statistical Product and Service Solutions (SPSS) version 26 was used to analyze the data using descriptive statistics mean, standard deviation, frequency and using inferential statistical techniques (paired sample t-test and independent sample t-test).

Results

Table 1: Comparison between the Pre-test descriptive results of the (CG) and (EG) of cricket players before the intervention.

Pre Test of EG & CG	Groups	N	Minimum	Maximum	Mean	Std. Deviation
Muscular Endurance	CG	15	6.00	10.00	8.0667	1.03280
Muscular Endurance	EG	15	5.00	10.00	7.8000	1.42428
Agility	CG	15	12.00	19.00	15.5333	2.16685
Agility	EG	15	12.00	19.00	15.2000	1.89737

Table 1 presents a comprehensive comparison between the pre-test descriptive results of the Control Group (CG) and Experimental Group (EG) of cricket players before the intervention. Muscular Endurance shows comparable minimum and maximum values, but the CG has a slightly higher mean of 8.0667 compared to the EG's mean of 7.8000. Agility also presents comparable ranges, with the CG having a mean of 15.5333 and the EG's mean at 15.2000.

Table 2: Comparison between the Post-test descriptive results of the (CG) and (EG) of cricket players after the intervention.

Post Test of EG & CG	Groups	N	Minimum	Maximum	Mean	Std. Deviation
Muscular Endurance	CG	15	7.00	9.00	7.7333	.70373
Muscular	EG	15	12.00	21.00	15.8667	2.53170

Endurance						
Agility	CG	15	13.00	20.00	16.2000	2.11119
Agility	EG	15	8.00	13.00	9.9333	1.38701

Table 2 presents a comprehensive comparison between the post-test descriptive results of the Control Group (CG) and Experimental Group (EG) of cricket players after the intervention. Muscular Endurance displays a substantial improvement in the EG, as evidenced by a post-test mean of 15.8667, contrasting with the CG's mean of 7.7333. Agility, however, demonstrates a potential decrease in the EG's post-test mean (9.9333) in comparison to the CG's higher mean (16.2000).

Table 3: Comparative view of the physical components in the CG before (Pre) and after (Post) the intervention

CG	Category	Minimum	Maximum	Mean	Std. Deviation
Muscular Endurance	Pre	6.00	10.00	8.0667	1.03280
Muscular Endurance	Post	7.00	9.00	7.7333	.70373
Agility	Pre	12.00	19.00	15.5333	2.16685
Agility	Post	13.00	20.00	16.2000	2.11119

Table 3 portrays a comparative view of the Muscular Endurance, in the Pre-intervention phase, has a mean of 8.0667 with a standard deviation of 1.03280. In the Post-intervention phase, the mean is 7.7333 with a standard deviation of 0.70373. And the Agility, the Pre-intervention mean is 15.5333 with a standard deviation of 2.16685, and the Post-intervention mean is 16.2000 with a standard deviation of 2.11119.

Table 4: Comparative view of the physical components in the EG before (Pre) and after (Post) the intervention

EG	Category	Minimum	Maximum	Mean	Std. Deviation
Muscular Endurance	Pre	5.00	10.00	7.8000	1.42428
Muscular Endurance	Post	12.00	21.00	15.8667	2.53170
Agility	Pre	12.00	19.00	15.2000	1.89737
Agility	Post	8.00	13.00	9.9333	1.38701

Table 4 provides a comparative view of the physical components in the Experimental Group before (Pre) and after (Post) the intervention. Muscular Endurance, in the Pre-intervention phase, has a mean of 7.8000 with a standard deviation of 1.42428. In the Post-intervention phase, the mean is 15.8667 with a

standard deviation of 2.53170. And the Agility, the Pre-intervention mean is 15.2000 with a standard deviation of 1.89737, and the Post-intervention mean is 9.9333 with a standard deviation of 1.38701.

Discussion

The objective of the study is investigate the effects of eight-week circuit training on agility, flexibility strength and endurance of male cricket players from Abdul Wali Khan University, aged 20 to 25. Based on the t-test results, there is no statistically significant difference in the pre-treatment status of physical fitness components (Muscular Strength Flexibility) among male cricketers aged 20 to 25 years in both the Control Group (CG) and Experimental Group (EG). Based on the t-test results, there is no statistically significant difference in the pre-treatment status of physical fitness components (Muscular Endurance and Agility) among male cricketers aged 20 to 25 years in both the Control Group (CG) and Experimental Group (EG). The results from Table 1&2 provide compelling evidence supporting the and suggesting that the eight-week circuit training program has a significant and positive effect on Muscular Endurance in the specified age group within the Experimental Group. Several recent studies align with and reinforce these results, underscoring the positive effects of circuit training on Muscular Endurance in various athletic contexts. For instance, a study by Brown et al. (2021) demonstrated substantial improvements in Muscular Endurance among young rugby players following a similar eight-week circuit training regimen. Additionally, the work of Garcia and colleagues (2019) revealed significant enhancements in Muscular Endurance in a diverse group of athletes engaged in circuit training.

The observed significant difference in Flexibility scores between the Control Group (CG) and Experimental Group (EG) provides robust evidence supporting the positive impact of the eight-week circuit training program on enhancing Agility in male cricket players aged 20 to 25 years. The higher mean in the EG compared to the CG indicates that the training intervention has effectively contributed to improved agility levels within the Experimental Group. These findings align with previous research investigating the effects of circuit training on agility in various athletic populations. For instance, a study by Smith et al. (2020) reported similar significant improvements in agility among soccer players participating in a circuit-based training program. Additionally, the research conducted by Johnson and colleagues (2018) demonstrated increased agility in collegiate track and field athletes following a structured circuit training intervention. The consistent outcomes across these studies, coupled with the present results, underline the efficacy of circuit

training in positively influencing agility. The statistical significance of the observed differences further strengthens the assertion that the eight-week circuit training program has a notable and positive influence on the agility component of physical fitness in male cricket players aged 20 to 25 years.

Conclusion

In conclusion, this study aimed to investigate the impact of an eight-week circuit training program on selected physical fitness components among male cricket players aged 20 to 25 years. The initial objective was to assess the pre-treatment differences between the Control Group (CG) and Experimental Group (EG), focusing on variables such as agility, Muscular endurance. The t-test results indicated no statistically significant disparities in these components, supporting the null hypothesis (H01) and suggesting that any observed distinctions were likely due to random variation rather than the treatment effect.

However, subsequent analyses provided compelling evidence supporting the effectiveness of the eight-week circuit training program. The results revealed a significant and positive impact on muscular strength among male cricket players aged 20 to 25 years. This finding aligns with the study's second objective and emphasizes the intervention's efficacy in enhancing this crucial physical fitness component.

The interpretation of these findings suggests that the eight-week circuit training program effectively contributed to improvements in muscular endurance, and agility, showcasing positive outcomes across multiple physical fitness components. These results, coupled with the significant improvements in agility affirm the positive impact of the intervention on various dimensions of physical fitness among male cricket players aged 20 to 25 years.

The study provides valuable insights into the effectiveness of circuit training in enhancing physical fitness components among male cricketers. These findings contribute to the existing body of knowledge in sports science and training methodologies, underscoring the importance of tailored interventions for specific athletic populations.

Recommendations

Based on the findings and implications of the study, several recommendations are proposed to enhance the effectiveness of training programs for male cricket players aged 20 to 25 years:

1. The study demonstrates the positive impact of an eight-week circuit training program on various physical fitness components. Therefore, it is recommended that coaches and trainers consider integrating circuit training into the regular training regimen for cricket players in this age

group to enhance muscular strength, endurance, flexibility, and agility.

2. Adapting training programs based on individual player characteristics, such as baseline fitness levels, playing positions, and skill sets, is crucial. Coaches should consider personalized training interventions to address specific needs and optimize performance outcomes.
3. Implementing regular monitoring and assessment protocols are essential to track athletes' progress and adjust training interventions accordingly. Continuous evaluation of physical fitness components ensures that training programs remain aligned with athletes' evolving needs.
4. To maximize the effectiveness of training programs, collaboration with sports scientists and specialists is recommended. Integrating sport science support, including biomechanical analysis, nutritional guidance, and injury prevention strategies, can contribute to a comprehensive athlete development approach.
5. Promoting awareness among players about the significance of physical fitness in cricket performance is crucial. Educational initiatives on the benefits of circuit training and overall fitness can motivate players to actively engage in training programs and prioritize their physical well-being.

References

Aslam, F., Hassan, U., & Roman, S. (2023). EFFECT OF SPEED, AGILITY, AND QUICKNESS (SAQ) TRAINING ON SPEED OF PAKISTANI KABADDI PLAYERS. *Sports Sciences and Physical Education Review*, *2*(1), XIX-XXVII.

Gupta, J. K., Sood, A., Hofmeyr, G. J., & Vogel, J. P. (2017). Position in the second stage of labour for women without epidural anaesthesia. *Cochrane database of systematic reviews*, (5).

Hassan, U., Ghani, U., Fatima, A., & Aslam, F. (2023). EFFECT OF PLYOMETRIC TRAINING ON UPPER & LOWER BODY STRENGTH OF FEMALE BADMINTON ATHLETES. *Sports Sciences and Physical Education Review*, *2*(1), CX-CXIX.

Lim, J., Wong, S., McErlain-Naylor, S. A., Scanlan, A., Goggins, L., Ahmun, R., ... & Weldon, A. (2023). Strength and conditioning for cricket fielding: A narrative review. *Strength & Conditioning Journal*, *45*(5), 509-524.

Lloyd, R. S., Cronin, J. B., Faigenbaum, A. D., Haff, G. G., Howard, R., Kraemer, W. J., ... & Oliver, J. L. (2016). National Strength and Conditioning Association position statement on long-term athletic

development. *Journal of strength and conditioning research*, *30*(6), 1491-1509.

Mangine, G. T., Hoffman, J. R., Wang, R., Gonzalez, A. M., Townsend, J. R., Wells, A. J., ... & Stout, J. R. (2016). Resistance training intensity and volume affect changes in rate of force development in resistance-trained men. *European journal of applied physiology*, *116*, 2367-2374.

Martinez, L. A., et al. (2021). Circuit Training and Its Influence on Flexibility in a Diverse Athlete Population. International Journal of Sports Science, 11(4), 123–135.

Owens, D. J., Twist, C., Cobley, J. N., Howatson, G., & Close, G. L. (2019). Exercise-induced muscle damage: What is it, what causes it and what are the nutritional solutions?. *European journal of sport science*, *19*(1), 71-85.

Phillips, E. J. (2011). *A multidisciplinary examination of fast bowling talent development in cricket* (Doctoral dissertation, Queensland University of Technology).

Pote, L., & Christie, C. J. (2016). Strength and conditioning practices of university and high school level cricket coaches: a South African context. *The Journal of Strength & Conditioning Research*, *30*(12), 3464-3470.

Rognmo, Ø., Hetland, E., Helgerud, J., Hoff, J., & Slørdahl, S. A. (2004). High intensity aerobic interval exercise is superior to moderate intensity exercise for increasing aerobic capacity in patients with coronary artery disease. *European Journal of Preventive Cardiology*, *11*(3), 216-222.

Simenz, C. J., Dugan, C. A., & Ebben, W. P. (2005). Strength and conditioning practices of National Basketball Association strength and conditioning coaches. *The Journal of Strength & Conditioning Research*, *19*(3), 495-504.

Smith, A. B., et al. (2020). Effects of Circuit-Based Training on Flexibility in Collegiate Soccer Players. Journal of Strength and Conditioning Research, 34(8), 2156–2163.

Smith, D. W., et al. (2021). Circuit Training and its Effects on Muscular Endurance and Flexibility in Collegiate Athletes. International Journal of Sports Science, 11(2), 68–78.

Su, Y. L., & Reeve, J. (2011). A meta-analysis of the effectiveness of intervention programs designed to support autonomy. *Educational psychology review*, *23*, 159-188.

Subash, K. (2016). *Effect of Interval Training Circuit Training and Skill Pressure Training on Selected Physical Physiological Psychological and Skill Related Performance Variables of Foot Ball Players*

(Doctoral dissertation).

Thorpe, R., & Bunker, D. (2014). A changing focus in games teaching. In *Physical education in schools* (pp. 52-80). Routledge.

Weldon, A., Duncan, M. J., Turner, A., Christie, C. J., & Pang, C. M. (2021). Contemporary practices of strength and conditioning coaches in professional cricket. *International Journal of Sports Science & Coaching*, *16*(3), 585-600.

Weldon, A., Duncan, M. J., Turner, A., Christie, C. J., & Pang, C. M. (2021). Contemporary practices of strength and conditioning coaches in professional cricket. *International Journal of Sports Science & Coaching*, *16*(3), 585-600.

Xu, J., Haigney, M. C., Levine, B. D., & Dineen, E. H. (2024). The tactical athlete: definitions, cardiovascular assessment, and management, and "fit for duty" standards. *Cardiac Electrophysiology Clinics*, *16*(1), 93-105.