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Article Review

Review of Local Wisdom-Based Circuit Training to Improve the Physical Abilities of Football Players

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Abstract

Modern football requires complex physical abilities, including strength, endurance, speed, agility, and coordination. Circuit training is an effective method for improving these physical components. The application of training that utilises local wisdom is considered to be able to increase motivation and the relevance of training programmes for young athletes. This article aims to describe the application of circuit training based on local wisdom for football athletes and its impact on improving physical abilities. The research uses a descriptive analytical method through literature studies and athlete interviews as stated in the football handbook. The results of the analysis show that circuit training combined with the utilisation of the local environment and culture can improve speed, muscle strength, endurance, and coordination. In addition to physical aspects, this approach also contributes to the character building of athletes through local values such as discipline, hard work, and togetherness.

Keywords: circuit training, local wisdom, football, physical condition, speed.

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1. INTRODUCTION

Football is one of the most developed and most popular sports among Indonesians, a phenomenon that cannot be separated from the long history of this sport's development since the colonial era until the establishment of PSSI in 1930, which later became the foundation for national football development from an early age to the professional level. As times have changed, football is no longer viewed merely as a recreational activity but has evolved into a sport that demands physical fitness, technical skills, tactical understanding, and high mental resilience (Erdoğan et al., 2025; Kudryavtsev et al., 2024; Pettersen et al., 2023). The development of modern football shows a shift towards a much faster, more explosive and dynamic game, requiring players to be in peak physical condition in terms of strength, speed, endurance, agility, flexibility

and movement accuracy (Bahtra et al., 2025; Loturco et al., 2022; Siby et al., 2024). A proper and systematic training programme is essential to meet the demands of the game, especially for young athletes who are in a very important phase of physical and psychological development. One training method that has been proven effective in improving various components of physical condition is circuit training, which is a series of exercises arranged in several stations and performed in sequence to simultaneously train muscle strength, endurance, agility, speed, and flexibility (Belli et al., 2022; Mačak et al., 2022; Mang et al., 2024). Latihan ini telah digunakan sejak tahun 1953 oleh Morgan & Anderson dan hingga kini tetap menjadi pilihan utama dalam pembinaan atlet karena kemampuannya meningkatkan total fitness secara efisien.

Circuit training is highly relevant because each station can be designed to resemble the demands of the game, such as short sprints, quick changes of direction, explosive jumps, and core stability exercises (Agus et al., 2024; Hassan et al., 2024; Wartałowicz et al., 2022). However, one of the challenges in developing training programmes is the emergence of boredom due to monotonous training, especially among athletes aged 17–20 years who are psychologically in a phase of seeking new experiences, self-exploration, and a need for variety in interesting activities. Therefore, coaches are required to be creative in designing training programmes that are not only physiologically effective but also motivating and culturally appropriate for the athletes. One innovative approach is to integrate local wisdom into training programmes, namely the utilisation of the environment, traditions, social values, and local skills to enrich the variety of training activities (Ramli et al., 2025; Sakti et al., 2024; Widodo & Priyanto, 2022). Local wisdom encompasses various aspects, such as the use of the natural environment, the utilisation of simple tools such as speed chutes made from local fabrics, and the internalisation of cultural values such as discipline, mutual cooperation, sportsmanship, and perseverance.

Previous research has shown that traditional circuit training has been proven effective in improving various aspects of physical condition in football players, including aerobic endurance, strength, and agility, as reported in a study that tested an eight-week circuit training programme with core exercises on adult football players, which showed a significant improvement in competitive physical performance after circuit intervention compared to the initial condition (Yogi, 2024). A circuit training programme lasting several weeks significantly improved physical fitness scores (including endurance, sprinting, agility, and strength) when compared to baseline measurements (Khalifatullah et al., 2024). The importance of aerobic capacity (VO_2max) as a key parameter in the physiological profile of football players at various levels of competition, which underlies the need for intensive physical training such as circuit training in modern football training programmes (Slimani et al., 2019). The movement components in traditional games have been empirically proven to increase physical engagement and motor stimulus diversity in the context of fitness (Muhaimin et al., 2024).

Although numerous studies have confirmed the effectiveness of circuit training in enhancing the physical fitness components of soccer players, the majority of prior research has predominantly employed conventional and standardized training approaches that are largely disconnected from the athletes' socio-cultural context. These studies tend to focus primarily on physiological outcomes, such as improvements in VO_2max, muscular strength, and agility, while giving limited attention to psychological, motivational, and cultural factors that may substantially influence training adherence and effectiveness, particularly among adolescent and young adult athletes.

Moreover, empirical investigations that integrate circuit training with elements of local wisdom remain scarce, especially within the context of soccer training in Indonesia. Existing studies on traditional games and culturally grounded physical activities are mainly situated within physical education or general fitness settings and have not been explicitly developed or evaluated as structured training models aimed at enhancing the physical conditioning of competitive soccer athletes. Consequently, there is a notable absence of a circuit training model that systematically combines modern circuit training principles with local wisdom and empirically examines its effects on key physical fitness components in soccer players.

Another critical gap in the literature lies in the limited exploration of local wisdom–based training as a strategy to mitigate training monotony, enhance athlete engagement, and reinforce social values such as teamwork, sportsmanship, and discipline within the training process. Therefore, further research is warranted to not only assess the physiological efficacy of training interventions but also to situate athletes within culturally and socially relevant training contexts that reflect their lived environments.

Thus, the development of a circuit training model based on local wisdom is relevant for application in football athlete training because it combines physiological, psychological, and socio-cultural aspects into a single integrated training approach. This approach not only comprehensively improves athletes' physical abilities but also overcomes training boredom, strengthens cultural identity, and responds to the need for national football coaching that is more humanistic, contextual, and adaptive to the dynamics of Indonesian society. Based on this description, this article aims to describe the application of local wisdom-based circuit training and analyse its impact on improving the physical abilities of football athletes.

2. METHOD

This study utilised a descriptive analytical method, which involved describing and analysing the concept of circuit training and its application in the context of local wisdom based on literature reviews and supporting documents.

2.1 Data Sources

The main sources are football pocket books containing training theories, circuit training concepts, basic football techniques, physical conditioning development, and descriptions of local wisdom and its application.

2.2 Data Collection Techniques

Data was obtained through literature studies on physical training theory, circuit training, and local wisdom; content analysis of documents describing circuit training forms, training principles, characteristics of athletes aged 17–20 years, and the use of training equipment; and narrative studies of interviews with athletes regarding the impact of wind resistance-based training.

2.3 Research Instruments

Given that this study employed a descriptive and analytical approach, the research instruments were designed to capture conceptual, empirical–narrative, and contextual data. The instruments used in this study are described as follows:

1. Document Analysis Form

This instrument was utilized to examine the content of soccer pocketbooks, scholarly articles, and other written sources relevant to circuit training and local wisdom.

The document analysis focused on the following indicators:

a. Fundamental concepts and principles of circuit training in soccer
b. Types and characteristics of circuit training stations
c. Physical fitness components trained, including strength, speed, endurance, agility, and coordination
d. Forms of integrating local wisdom into physical training programs
e. Embedded cultural values, such as discipline, hard work, togetherness, and sportsmanship
f. The suitability of training programs for athletes aged 17–20 years

Each indicator was analyzed descriptively to identify patterns, meanings, and relevance to the research objectives.

2. Semi-Structured Interview Guide

The semi-structured interview guide was employed to obtain empirical–narrative data from athletes regarding their experiences participating in local wisdom–based circuit training, particularly involving the use of parachute speed chutes.

The interview questions explored the following aspects:

a. Athletes' experiences in participating in circuit training sessions
b. Athletes' perceptions of training difficulty levels and exercise variety
c. Perceived effects of the training on speed, strength, and endurance
d. The influence of utilizing equipment adapted to the local environment (e.g., wind and beach conditions)
e. The impact of training on motivation, enthusiasm, and competitive mentality
f. Positive values perceived during the training process

The interviews were conducted flexibly to allow for in-depth exploration of participants' responses based on their individual experiences.

3. Data Categorization Sheet (Coding Sheet)

This instrument was used to support the systematic categorization of data derived from:

a. literature reviews,
b. document analysis, and
c. interviews.
d. The main analytical categories included:
e. physical fitness components,
f. forms of circuit training,
g. elements of local wisdom,

h. physical impacts,

i. psychological impacts

j. socio-cultural impacts.

The data categorization sheet was designed to ensure consistency, rigor, and traceability throughout the data analysis process.

2.4 Data Analysis

The data was analysed using a thematic approach, identifying important themes such as the effectiveness of circuit training, the impact of using local wisdom, improving athletes' physical abilities, and the relevance of cultural values to character building.

3 RESULTS

3.1 The Effectiveness of Circuit Training on the Physical Condition of Football Players

Circuit training is recognised as an effective method for improving various physical components of athletes. The document explains that one training cycle usually consists of 8–15 stations, each of which trains a different physical aspect. An example of a circuit with 8 stations includes strength training (push-ups, chair dips), agility (zig-zag run), flexibility (sit-ups), and speed (shuttle run). Exercises such as squat thrusts and plyometric jumps improve power and explosiveness, while back-ups strengthen the back muscles and core stability. This form of training is in line with the demands of modern football, which requires players to perform short sprints, changes of direction, and repeated physical contact.

3.2 Integrating Local Wisdom into Physical Training

Local wisdom encompasses norms, values, customs, the natural environment, and traditions that exist within a community. In the context of football training, local wisdom can be realised through the use of the surrounding environment as a training medium, such as beaches, rice fields, or open fields, as well as the use of traditional or simple tools. Training on the beach, for example, provides a soft sand surface and increases resistance, thereby providing more intensive muscle strength training. This is supported by interviews with athletes who stated that sprint training on the beach using a speed chute parachute makes the thigh and ankle muscles work harder, thereby increasing running speed and endurance. In addition, cultural values such as hard work, discipline, mutual cooperation, and independence also strengthen the character of athletes. Local wisdom is not only interpreted as a physical element, but also as a mentality and identity embedded in society.

3.3 Impact of Wind Resistance Training (Speed Chute Parachute)

The use of a speed chute parachute in circuit training provides resistance variation from the wind. The document notes that this tool provides increased load as running speed increases, thereby increasing stride length, stride frequency, and explosive power of athletes.Young athletes interviewed revealed that the intensity of using the parachute repeatedly over distances of 50–150 metres creates a heavy sensation in the thigh and ankle muscles, which in turn increases acceleration and maximum speed. This type of training is particularly suitable for footballers who often perform short sprints and quick changes of direction during matches. This exercise is also flexible as it does not require expensive gym equipment and can be performed on various terrains,

including beaches with stronger wind conditions, which adds to the training load.

3.4 Characteristics of Athletes Aged 17–20 Years and the Effects of Training

Athletes aged 17–20 years are in the late adolescent phase, which is a stage of physical and psychological development leading up to adulthood. At this stage, physical development has reached its maximum level, including strength and body structure. Strategic thinking, emotional control, and self-identity are also maturing. Local wisdom-based circuit training is ideal for this age group because physically, they are capable of high-intensity training. Psychologically, they need variety in their training to avoid boredom. Socially, they are beginning to develop a competitive character and work ethic. Incorporating local values into training can foster positive traits such as perseverance, internal motivation, and appreciation for their own culture.

3.5 Holistic Benefits of Local Wisdom-Based Circuit Training

The analysis shows that this approach provides the following benefits:

a. Physical benefits, namely increased speed and acceleration, strengthened leg and ankle muscles, increased power through plyometric training, improved aerobic and anaerobic endurance, and increased agility through zig-zag and shuttle run movements.

b. Psychological Benefits: reducing boredom through exercise variety, increasing motivation through enjoyable and challenging training experiences, developing discipline and perseverance.

c. Socio-Cultural Benefits: strengthening identity and pride in local culture, viewing exercise not only as a physical activity but also as part of character building, preserving local wisdom through its integration into sports activities.

4. DISCUSSIONS

Circuit training as a training method has been shown to be effective in improving aerobic and anaerobic capacity, muscular endurance, and repeated -sprinting ability, which is crucial for football players. For example, several studies in the context of football players found improvements in VO_2max and match-related endurance after circuit or structured interval interventions, so circuits are often recommended as an efficient method for training work capacity and recovery between intense actions (Nurhayati & Hasnawati, 2023). strong relationship between aerobic capacity and the ability to perform repeated sprints. This finding is important because properly programmed circuits can target the same physiological components, thereby improving repeated sprint performance, which often determines the outcome of a match (Archiza et al., 2020). Short-duration, high-intensity training can improve VO_2max and sprint performance when the frequency and dose of training are adjusted, providing a strong physiological basis for incorporating sprint stations/high-intensity actions into football circuits (Suliarno et al., 2024).

A significant improvement in fitness components (cardiorespiratory endurance, agility, gross motor coordination) after integrating traditional games into exercise or physical education programmes, meaning that traditional games serve as a multi-component stimulus that is highly suitable for use as stations in exercise circuits (Budiman, 2024). Improvements in agility, motivation to learn/train, and motor skills in children and adolescents. These results suggest a functional transfer to the change-of-direction abilities and agility required by football players when dribbling, tackling, or performing tactical manoeuvres (Saputra et al., 2025). The use of

traditional games increases participant participation, enjoyment, and motivation retention—these factors are important because optimal physiological adaptation occurs when athletes consistently undergo sufficiently intense and regular training loads (Aliriad et al., 2024).

Circuit training is recognized as a multidimensional training approach that integrates several key physical components—such as strength, agility, speed, and endurance—within a single structured program. A substantial body of research has demonstrated the effectiveness of circuit training in enhancing the physical condition of soccer players, particularly general fitness indicators including VO_2max, sprint performance, muscular strength, and agility. Recent experimental studies involving adolescent and adult soccer players have reported significant improvements in these variables following structured circuit training interventions lasting approximately 6–8 weeks.

The findings of this study are consistent with existing systematic literature, which indicates that circuit training not only improves individual physical attributes but also facilitates positive transfer effects on game-related skills and overall performance. These outcomes are especially relevant to soccer, given its intermittent, multidirectional, and multidimensional performance demands.

Within modern training paradigms, performance enhancement must be closely aligned with the specific physiological and biomechanical demands of competition. Circuit training meets this requirement by providing exercise stimuli that closely resemble soccer match activities, including repeated jumps, short-distance sprints, rapid changes of direction, and brief recovery periods. These movement patterns reflect the dynamic and high-intensity nature of actual gameplay.

From a theoretical perspective, this approach supports the principle of dynamic correspondence, whereby training exercises are designed to simulate competition-specific movement structures rather than merely improving isolated physical capacities. As such, circuit training represents a practical application of sport-specific conditioning theory in soccer performance development.

The incorporation of local wisdom into training programs extends beyond cultural representation and serves as an adaptive strategy that accounts for environmental and socio-psychological contexts. Training conducted in natural local environments—such as sandy beaches or rice fields—introduces distinct physical and perceptual challenges that can enhance athletic development.

Sandy surfaces, for instance, provide greater mechanical resistance compared to firm ground, requiring increased muscular effort during explosive movements and stabilization phases. This condition is comparable to findings in the literature emphasizing the importance of strengthening eccentric–concentric muscle actions through plyometric and sprint training on compliant surfaces. Moreover, utilizing diverse local environments can reduce training monotony and enhance athletes' motivation and engagement, a factor widely acknowledged in contemporary sports science as environmental variation–induced motivational enhancement.

This study broadens the traditional concept of circuit training by embedding ecological and cultural dimensions within its structure. By aligning training design with ecological dynamics theory, the proposed model emphasizes the interaction between athletes, tasks, and environments, thereby offering a more holistic and context-sensitive approach to soccer conditioning.

5. CONCLUSIONS

Circuit training based on local wisdom is an effective and relevant training approach for developing football players in Indonesia. Analysis shows that circuit training can improve various components of physical condition such as strength, speed, endurance, agility, and coordination. When combined with the utilisation of the local environment and culture, this method not only enriches the variety of training but also has a positive impact on the mental and character aspects of athletes. This approach is in line with the needs of youth football development, which emphasises creativity, efficiency, and the internalisation of cultural values. Therefore, coaches are encouraged to develop more innovative training models while still considering local conditions and athlete characteristics.

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