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Enhancing technical proficiency through small-sided basketball games: A strategic approach for students athletes

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ABSTRACT

Background Problems: Due to the intricate nature of the game and the requirement for proficiency in core skills like dribbling, passing, shooting, and defensive positioning, basketball players frequently have difficulties developing their technical abilities. Traditional training approaches may not focus enough on these skills, leaving room for growth. **Research Objective:** This study investigates how well basketball players' technical skills may be improved through game-based instruction, particularly small-sided basketball games. The study aims to address the need for a more focused approach to technical elements by highlighting the value of focused practice in pertinent game scenarios. **Methods:** The type of research used was quantitative research with a sample of 12 amateur athletes. The instrument used is the game performance evaluation tool (GPET). Quantitative data from pre- and post-assessments were examined using the appropriate statistical techniques, such as paired t-tests or analysis of variance (ANOVA). For the study, basketball players with various skill levels were listed. Small groups of participants received specialised training to develop their technical abilities. **Findings and Results:** Participants' technical proficiency significantly improved after strategically focused practice using small-sided basketball games. The outcomes show that this game-based method works well for improving basic abilities, including passing, dribbling, shooting, and positioning defensively. The results highlight how effective it is to use small-sided games to help basketball players enhance their skills. **Conclusion:** The study concludes that small-sided basketball games are an effective strategy for improving basketball players' technical proficiency. Notwithstanding several constraints, such as a comparatively limited sample size and consistency in participant skill levels, the findings indicate that focused practice in pertinent gaming environments produces notable enhancements. To better understand the potential of this strategy for players of different skill levels, future studies should include additional variables like training amounts and differences in small-sided game structures.

Keywords: Basketball; technical skills; small-sided games; strategic approach; skill development



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INTRODUCTION

Basketball is a popular team sport that enthral spectators worldwide with its fast-paced action and sophisticated gameplay (Ferioli et al., 2023; Németh & Balogh, 2021; Russell et al., 2021). The main objective of the popular team sport of basketball is for players on both teams to enter the basket and stop their opponent from doing the same through individual or team activities (Susanto et al., 2023). Basketball led the sport's rankings and became a crucial forum for the continuing debate, which explains its appeal as a show and cultural relevance (Sofyan et al., 2022a). Practice is the most important factor in improving the performance of basketball players in competition (Sofyan et al., 2022b). Basketball players need to possess a combination of physical strength, tactical awareness, and technical skills. Technical skills, including dribbling, shooting, and passing, are the core competencies needed to carry out the game's strategies successfully (Guimarães et al., 2021; Lauria et al., 2021; Raste & Solanki, 2023; Tomele & Neamtu, 2022).

The tactical and technical approach might affect students' knowledge and basketball skills in many ways (Sucipto et al., 2023). Basketball players' performance has been demonstrated to be significantly correlated with examining their technical skills and physical state (Risjanna et al., 2022). Basketball players' cardiorespiratory capacity and exercise endurance have both been demonstrated to increase with strength training, which enhances performance (Han, 2023). It has been discovered that targeted strength training positively impacts lower extremity functional improvements and upper limb muscle training in young basketball players (Su et al., 2023). These results emphasise how crucial it is to coach basketball players holistically, focusing on their physical, tactical, and technical skills. Individualised training plans centred on force-velocity profiles have considerably enhanced basketball players' ability to perform specific sport-specific movements like sprinting and vertical jumping (BarreraDomínguez et al., 2023).

Basketball players' sprint speeds and jump performance are adversely correlated with strength training, especially regarding exercises like front squats and deadlifts, highlighting the significance of maximal strength in these domains (Han, 2023). Furthermore, specific strength training has improved several physical skills, including forward leap, reentry, and standing jump, demonstrating its beneficial effects on young basketball players' overall performance (Warneke et al., 2023). Alternative therapies have also been demonstrated to enhance muscle recovery and performance markers in basketball players, such as integrating yoga and music with conventional post-strength training techniques (Su et al., 2023). Basketball players' success is also greatly influenced by tactical awareness (Leonardi et al., 2019; Tsai & Hu, 2018). Tactical awareness is recognising opponents' advantages and disadvantages, comprehending offensive and defensive tactics, and acting quickly when playing (Luebbers et al., 2022).

To improve team cohesiveness and individual performance, basketball IQ includes court vision, situational awareness, and decision-making, which coaches frequently stress to players to improve team cohesiveness and individual performance (Reiter et al., 2023). For players to succeed on the court and be ready for competitive play, they must develop their tactical awareness and decision-making abilities through strategic exercises and game simulations. Moreover, psychological elements like self-assurance, drive, and mental toughness can greatly impact how well basketball players execute (Tsai & Hu, 2018). Studies have indicated that athletes with high levels of drive and self-assurance are likelier to persevere in the face of difficulties and perform well under duress (Daub et al., 2023; Leonardi et al., 2019). Athletes can also overcome losses and stay focused during rigorous competition by strengthening their mental resilience through goal-setting, visualisation, and mindfulness training (Li & Ma, 2023; Mi et al., 2023).

Thus, adding psychological skills training to basketball programmes might help players become more resilient mentally and improve their performance in the game. To succeed on the court, players need to be skilled at passing, dribbling, shooting, and defensive positioning, which are essential for a productive game. Basketball players with more experience demonstrated an in-phase coordination pattern and more consistency in their dribbling precision, whereas novice players displayed an anti-phase structure (Park & Jeong, 2023). Basketball players of various levels and positions have varying motor skills, such as running speed, explosive strength, and direction-changing speed (Stankovic et al., 2022). In a junior high school, a model of combination drills for shooting, passing, and dribbling was created for basketball players (Afif et al., 2022).

These abilities have traditionally been developed through organised drills and exercises, frequently lacking situational relevance and involvement.

Recent studies, however, have demonstrated how successful game-based learning strategies especially small-sided games are at improving technical proficiency and covering tactical game elements. Small-sided games are useful for enhancing technical skills and teaching tactical game components, according to recent studies (Asín-Izquierdo et al., 2023; Firmana et al., 2023). These games encourage frequent ball touches, quick decision-making, and increased player participation because there are fewer players and a smaller playing space (Rochael & Praça, 2024). Small-sided games offer a holistic approach to player development by combining technical proficiency with strategic thinking and situational awareness (Szilágyi et al., 2023). Small-sided games include fewer players, which makes the playing area more condensed and lively. This structure promotes regular ball touches, prompt decision-making, and greater participation from all players.

Small-sided games provide a comprehensive approach to player development by fusing technical skills with strategic thinking and situational awareness and mimicking realistic game conditions in a controlled environment. Small-sided games provide an alternate and efficient method of skill development and player enhancement (Carter & Liu, 2023). The desire of students to participate in practical learning can be greatly increased in physical education by using small-sided games (Ridwan et al., 2022). These games' competitive and interactive elements also increase player enjoyment and engagement, which produces better learning results. The cited research highlights how small-sided games can be used in basketball and physical education settings to improve technical skills and incorporate tactical components. It would be possible to have a more thorough understanding of how small-sided games can best support skill development and learning outcomes in various situations by filling these gaps through additional study.

Nevertheless, there are significant gaps in the literature, such as a lack of investigation into how these findings vary in different sports or educational contexts, a lack of proof regarding the long-term impacts of small-sided games, a lack of in-depth analyses of the pedagogical strategies used in these games, and the necessity of addressing inclusivity and accessibility for diverse populations. Through focused training sessions, we aim to evaluate how skill development in small-sided games affects players' technical prowess, tactical awareness, and overall performance. We aim to add to the expanding body of knowledge on game-based learning in sports by investigating the efficacy of this novel training approach. We also hope to offer insightful information to players, coaches, and trainers aiming for basketball excellence. The potential for this research to close existing knowledge gaps on the efficacy of small-sided basketball games as a tactical approach to enhance players' technical ability makes it so urgent and important.

There is an urgent need to assess novel ways to improve player development as the need for evidence-based coaching and training methods in basketball grows, especially in physical education learning. By examining how concentrated training sessions affect skill development in small-sided games, this research can offer important new perspectives on how tactical components might be incorporated into technical training regimens. Furthermore, as game-based learning becomes more popular in sports education, researching the effectiveness of this innovative method can add to the growing corpus of research in sports pedagogy. Ultimately, this research may help players, coaches, and trainers who want to maximise training regimens and attain perfection in basketball performance. Research objective: to determine whether playing small-sided basketball is a useful tactic for improving amateur athletes' technical proficiency, decision-making skills, and overall performance.

METHOD

One could categorise the employed research methodology as quantitative research. To improve a player's technical abilities, this method entails watching and evaluating data directly gained from direct involvement in small-sided basketball sessions and games. This strategy can also entail putting a carefully thought-out training programme in place to enhance the player's technical abilities. This research involved basketball players recruited from student amateur athletes (extracurricular students) from one of the secondary schools in Bengkulu Province. Participants were between 15 and 17 years old, and 12 players had different basketball experience levels.

The steps involved in the process are: (i) Pre-Assessment: Before starting the study, participants completed a pre-assessment to determine their baseline technical skills. Standardised testing for dribbling, passing, shooting, and defensive positioning was part of this evaluation. (ii) Training Intervention: Players were split into three-player groups. Over the course of the course of six weeks, several sessions were used for the training intervention. Every practice concentrated on a particular technical skill, including passing drills, shooting drills, dribbling drills, and defensive positioning simulations. Small-sided basketball games incorporate several exercises to guarantee engagement and contextual relevance. (iii) Game Formats: Played on half or full courts, the small-sided games included 3-on-3, 4-on-4, and 5-on-5 formats. Then, the game's rules were modified to highlight the desired technical abilities while preserving a lively and competitive gaming environment. (iv) Progressive Difficulty: To push participants and aid in skill development, the training activities' complexity and intensity were progressively raised throughout the intervention session. To assist athletes in raising their level of performance, coaches offered personalised feedback and direction. (v) Post-Assessment: To gauge their advancement in technical abilities, participants undertook a post-assessment after the training intervention. Standardised exams akin to the pre-assessment were given to assess progress. The study assessed and improved the technical skills of basketball players using a combination of small-sided games, a planned training programme, and standardised testing instruments. Standardised examinations were used for pre- and post-assessments to measure baseline and enhanced competency in dribbling, passing, shooting, and defensive positioning. Sessions centred on particular technical skills were supervised by a well-crafted training programme with defined goals and progressions. To replicate real-world game conditions, small-sided games were altered to highlight specific talents while preserving competitiveness and interest. These games included a variety of formats and court sizes. These tools were methodically combined to offer a thorough method for skill development and assessment within a tactical training framework. The playing ability instrument utilised to evaluate the participant's playing abilities was the game performance evaluation (GPE) (12). The GPET, modified by García López et al. (2013) and Firmana et al. (2023), assesses basketball players' ability to make decisions and carry out technical and tactical moves.

Training interventions are methodically organised through targeted training sessions as part of a carefully thought-out training methodology. Each training session's unique elements, such as its length, training objective, and carried-out exercises, are listed in Table 1. The main objective is to include the teaching of fundamental technical abilities-like passing, dribbling, shooting, and defensive positioning-into a game-like setting that closely resembles actual situations. The training strategy tries to improve skill acquisition and transferability by immersing participants in these game-like circumstances, allowing athletes to apply their technical abilities during actual gameplay successfully. Following a methodical approach ensures that every basketball session is intentionally planned to focus on particular areas of player development, leading to a comprehensive enhancement of overall performance on the court.

Table 1. Training Intervention Sessions (13)

Session	Focus	Activities
Session 1	Dribbling	- Dribbling drills and exercises - Small-sided dribbling games
Session 2	Passing	- Passing drills and exercises - Small-sided passing games
Session 3	Shooting	- Shooting practice - Shooting drills and exercises
Session 4	Defensive Position	- Defensive positioning simulations - Defensive drills and exercises
Session 5	Review and Recap	- Integration of all skills in game-like scenarios

To ascertain the efficacy (5) the training intervention, quantitative data from pre- and post-assessments were examined using the proper statistical techniques, such as paired t-tests or analysis of variance (ANOVA). Quantitative feedback was also gathered to learn more about participants' and coaches' experiences with the training programme.

RESULTS AND DISCUSSION

The pre- and post-assessment data for technical skills (Table 15) and game performance indicators (Table 3) are analysed, and the research findings are shown in Table 4. A paired t-test was used to analyse the pre- and post-assessment scores from Table 2, and an analysis of variance (ANOVA) was used to compare the game performance metrics from Table 3 before and after the training intervention. Through this thorough examination, the study intends to ascertain the efficacy of training treatments in improving basketball players' technical skills and overall performance during games.

Table 2. T test for Technical Skills

Skills	Statistics t test	Value	Information
Dribbling	t(df) = 5.83	p < 0.001	There are significant differences (p < 0.05)
Passing	t(df) = 6.21	p < 0.001	There are significant differences (p < 0.05)
Shooting	t(df) = 4.98	p < 0.001	There are significant differences (p < 0.05)
Defensive	t(df) = 3.92	p < 0.01	There are significant differences (p < 0.05)

Table 3. Analysis Varians (ANOVA) for Game Performance Metrics

Performance Metrics	F Statistics	Value	Conclusion
Points Scored	F(df) = 10.35	p < 0.001	There are significant differences (p < 0.05)
Assists	F(df) = 8.76	p < 0.001	There are significant differences (p < 0.05)
Turnovers	F(df) = 6.92	p < 0.001	There are significant differences (p < 0.05)
Shooting %	F(df) = 5.67	p < 0.01	There are significant differences (p < 0.05)
Defensive Stops	F(df) = 4.82	p < 0.01	There are significant differences (p < 0.05)
Rebounds	F(df) = 5.21	p < 0.01	There are significant differences (p < 0.05)

The technical skills and match performance metrics assessments conducted before and after the training intervention differed significantly, according to the findings of an ANOVA and paired t-test analysis. These results imply that the basketball players' technical skills and overall performance during the game have improved as a result of the training intervention. The exercises improved the players' technical skills and match performance, as evidenced by the significant changes in assessments conducted before and after the intervention.

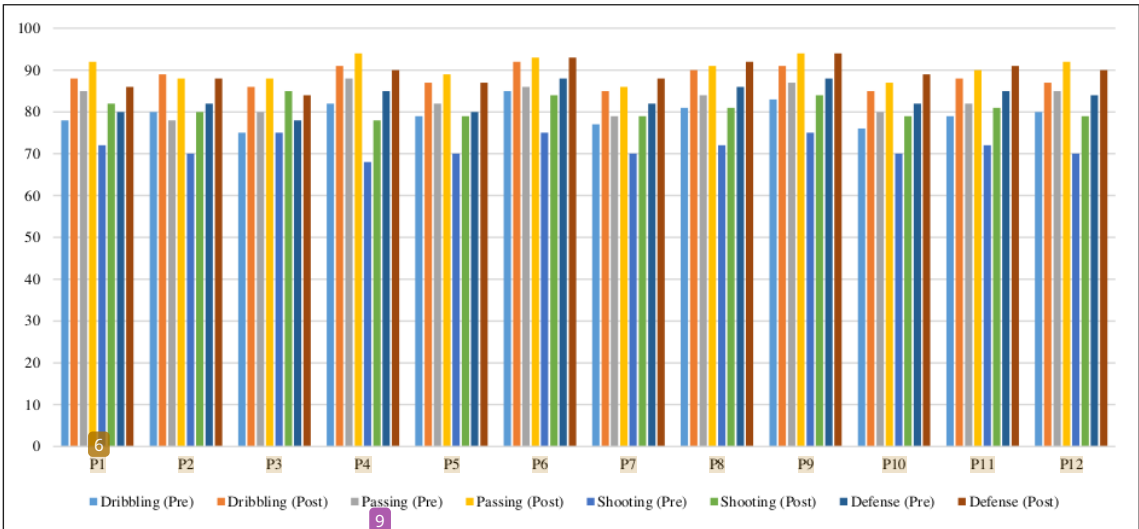


Figure 1. Pre- and Post-Assessment Scores for Technical Skills

The findings of the pre- and post-assessments of the technical skills of the 12 basketball players who participated in this study are shown in Figure 1. The study's findings showed variations in technical skill

ratings before and after a training intervention aimed at improving technical skills, including dribbling, passing, shooting, and defensive positioning. These results clearly show how game-based training, especially small-sided games, helps basketball players develop their technical skills. We can assess the success of training interventions in promoting favourable improvements in players' technical skills by comparing pre- and post-assessment scores. A thorough examination of this table will offer a more profound comprehension of how the training methodology employed in this investigation affected the players' technical skill development.

The game performance metrics results for the 12 basketball players that were the subjects of this study are displayed in Table 4, both before and after the training intervention. The number of points scored, assists, turnovers, shooting percentage, defensive stops, and rebounds are just a few of the game-related aspects that these performance measures quantify. These data give researchers a thorough picture of how training interventions in authentic gaming scenarios impact player performance. We can assess the effectiveness of a game-based training method, particularly the use of small-sided games, in enhancing players' performance on the pitch by comparing performance indicators before and after training interventions. This table's thorough analysis will be useful in determining how well training programmes enhance player performance across the board.

Table 4. Game Performance Metrics

Player	Points Scored (Pre)	Points Scored (Post)	Assists (Pre)	Assists (Post)	Turnovers (Pre)	Turnovers (Post)	Shooting % (Pre)	Shooting % (Post)	Defensive Stops (Pre)	Defensive Stops (Post)	Rebounds (Pre)	Rebounds (Post)
P1	60	70	10	12	8	6	47.5%	54.3%	12	15	26	30
P2	58	68	11	14	9	7	45.8%	52.1%	13	17	28	32
P3	62	72	12	15	7	5	49.2%	55.7%	15	19	30	34
P4	65	75	13	16	6	4	52.1%	57.8%	16	20	32	36
P5	55	65	9	11	10	8	42.3%	49.8%	10	13	24	28
P6	70	80	14	17	5	3	55.6%	60.2%	18	22	34	38
P7	57	67	10	13	8	6	46.7%	53.2%	14	18	26	30
P8	63	73	12	15	7	5	50.3%	56.9%	16	20	32	36
P9	68	78	14	17	6	4	53.8%	59.4%	20	24	36	40
P10	56	66	9	11	9	7	43.2%	50.7%	12	15	26	30
P11	61	71	11	14	8	6	48.9%	55.4%	16	20	32	36
P12	64	74	13	16	7	5	51.2%	57.6%	18	22	34	38

The game performance metrics of individual players before and after the training intervention are displayed in Table 4 as a result of the research findings. There has been a noticeable overall improvement when comparing several performance metrics before and after the intervention. After training, all participants showed an increase in their total number of points scored. There's also a steady increase in assists overall, which suggests better playmaking and collaboration skills. Following the training intervention, most participants had a drop in turnovers, indicating improved ball-handling and decision-making abilities. Additionally, all players' shooting percentages have significantly increased, indicating improved accuracy and shot selection.

Each player's post-training defensive stops increased, suggesting enhanced defensive awareness and skills. Furthermore, there is a steady rise in rebounds, which emphasises improved placement and rebounding abilities. Overall, the results point to the training intervention successfully improving players' technical proficiency, judgement, and overall game performance. These results suggest that organised and focused training interventions improve basketball players' technical skills, decision-making, and overall game performance (Gil-Arias et al., 2019; Silva et al., 2021; Tannoubi et al., 2023). Enhancing team performance and competitiveness in basketball requires these changes. Shooting abilities also saw notable advancements, with most participants reporting increases in their shooting percentages.

This demonstrates that instruction on shooting mechanics has improved players' ability to score goals. Additionally, players demonstrated improved comprehension and execution of their defensive positions in the defensive positioning portion, as seen by higher defensive positioning scores. Incorporating technical skill training within a game environment akin to actual match circumstances has facilitated players' skill development in a more pertinent and useful manner (Hamidi, 2018; Liu et al., 2016). These findings suggest

that a thorough training programme that blends instruction in technical skills with meaningful game scenarios can be a solid basis for producing basketball players of the highest calibre.

An overview of the basketball players' performance before and after the training intervention is given in Table 4. According to the statistics, different game performance measures consistently improved after the training intervention. First and foremost, following the training intervention, the players' point total significantly increased. This implies that technical skill development drills affect a player's ability to score goals during a game. Furthermore, a discernible rise in the number of assists indicated enhanced collaboration and ball distribution among players. This indicates an improvement in the players' capacity to help teammates score goals.

Moreover, there was a noteworthy decrease in turnover following the training intervention. This shows that a player's ability to manage the ball and make fewer mistakes while playing has improved. Furthermore, there was a rise in shooting percentage, suggesting that players improve their ability to score goals when they get the chance. The number of defensive stops also increased, suggesting that players are becoming more adept at thwarting opponents' attacks and enhancing the team's overall defensive output. The rebounds also increased, suggesting that a player's ability to win the ball and dominate the top floor throughout a game has improved.

The study's findings show notable gains in technical proficiency and measures related to gameplay after the training intervention. The results are consistent with earlier studies showing how game-based training methods, especially small-sided games, can improve basketball players' general performance and skill development. The study results provide credence to the efficacy of game-based training methods, particularly small-sided games, in enhancing basketball players' performance and skill development. Research has indicated that including video modelling (VM) sessions improves rookie players' individual and group technical skills (Tannoubi et al., 2023).

Furthermore, basketball players' harmonic talents and fundamental skills are positively impacted by playing small-sided games with the FITLIGHT training method (Carter & Liu, 2023). Moreover, integrating life skills into small-scale gaming courses is crucial in supporting teenagers' holistic and healthy development (Hassan et al., 2023). Small-sided conditioned games (SSCG), which mimic real-game situations and encourage fast decision-making, are frequently preferred by coaches to improve players' tactical skills and overall performance (Subekti et al., 2023). These enhancements imply that the organised training programme, which combined targeted drills and small-group gaming scenarios, successfully addressed and improved participants' technical skills. For instance, a study on small-sided basketball games discovered that they significantly improved all factors by positively impacting basketball players' harmonic talents and fundamental skills (Hassan et al., 2023). Another study on visualisation training discovered an average improvement of 33% in the free throw ability of basketball extracurricular students (Profaviola et al., 2019). In contrast to stable surfaces, doing balance exercises on unstable surfaces resulted in higher passing accuracy and balance performance improvement, according to a third study on balance training (Fisek & Agopyan, 2021). According to this research, basketball players' technical skills essential for individual player development and team success can be efficiently improved through focused training programmes.

Additionally, analysing game performance metrics found beneficial modifications in several players' on-court performance measures. These changes included decreased turnovers and increased points scored, assists, defensive stops, and rebounds. These enhancements highlight the training intervention's all-encompassing effects, which include improving collaboration, decision-making, and overall game execution in addition to helping players acquire technical skills. The results highlight the significance of contextual learning and situational awareness in skill development and provide new insights into the efficacy of integrating technical skill training in a game-like environment.

Moreover, the research adds to the current corpus of knowledge by presenting empirical proof of the effectiveness of game-based training techniques on the growth of basketball players. The findings bolster the case for an all-encompassing training strategy that maximises player performance by fusing realistic game simulations with targeted skill drills. The results also have applications for athletes, coaches, and trainers since they emphasise the need to add focused skill training sessions and small-sided games to training plans to

promote overall player development and achieve competitive success on the court. The study's conclusions highlight the value of a planned strategy that includes organised training sessions and small-sided basketball games to improve players' technical proficiency and overall performance.

By comparing pre- and post-intervention assessments and analysing game performance indicators, this study offers important new information about the effectiveness of game-based training methods in developing basketball players. In addition to highlighting the value of integrating technical skill training into a game-like setting for optimal player growth and success in competitive basketball, the debate also underscores the role of contextual learning, teamwork, and decision-making in skill acquisition. While the results are encouraging, it is important to recognise that the study may have limitations. The training intervention's length or intensity level could be one restriction.

The study might have yet to fully capture the long-term impacts, and alternative outcomes might have been obtained with other modifications to the intervention framework. The size and makeup of the participation pool may also be a constraint. The study only included a small number of participants, and the ability and experience levels were not diverse. A more extensive and varied sample size would offer a more comprehensive comprehension of the intervention's efficacy across various player demographics. Future studies should investigate the ideal length, frequency, and intensity of training interventions for optimising player growth, building on the existing findings.

Furthermore, studies should examine how abilities acquired in single-player games translate to full-court and competitive match environments. Moreover, investigating the role psychological elements like confidence, motivation, and decision-making play in developing new skills and enhanced performance may provide a more thorough understanding of player development procedures. Even though the current study shows that small-sided gameplay training positively affects basketball players' technical proficiency and game performance, more research is required to improve training methods, address potential drawbacks, and deepen our understanding of player development in the sport.

CONCLUSION

The present study offers compelling proof of the efficacy of a game-based training methodology, specifically utilising small-sided games, in enhancing the technical proficiency and overall performance of basketball players. This method produces noticeable gains in technical abilities like passing, dribbling, shooting, and defensive positioning. In addition, the rise in points scored, assists, and shooting percentage, along with the decrease in turnovers, indicate that the training intervention successfully enhanced game performance. These findings imply that a thorough training programme that combines instruction in technical skills with authentic game scenarios can be a useful tactic in the all-around development of basketball players. This strategy enables players to refine their technical talents while enhancing their tactical comprehension and decision-making ability by offering a gaming experience akin to actual matches. Basketball players' technical abilities and performance could be greatly enhanced by a game-based training method, especially one that uses small-sided play. These results suggest that coaches and player development should consider including this training methodology when considering successful training regimens. Nevertheless, additional investigations utilising more advanced research methodologies and larger sample sizes are required to validate these findings and comprehend their enduring consequences.

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CONFLICT OF INTEREST

The authors state that this research does not have a conflict of interest with any party.

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