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The Effect of Drill Training on Drop Shooting Ability

Muhammad Ishak[1A-E*], Hikmad Hakim[2B-D], Sahabuddin[3B-D], Awaluddin[4B-D]

Universitas Negeri Makassar, Sulawesi Selatan, Indonesia

m.ishak@unm.ac.id[1], hikmad.hakim@unm.ac.id[2], sahabuddin@unm.ac.id[3], awaluddin@unm.ac.id[4]

ABSTRACT

Systematic technical training is an important factor in improving specific skills in sports, including badminton. One training method often used in technical learning is drill training, which is repetitive training designed to strengthen motor movement patterns so that technical skills can be performed more consistently and effectively. In badminton, the ability to drop shoot is an important technique because it functions to regulate the rhythm of the game and create attacking opportunities by precisely placing the shuttlecock near the opponent's net. However, this technical ability still needs to be improved through appropriate training methods. This study aims to determine the effect of drill training on the drop shoot ability of students in the Sports Coaching Education Study Program (PKO) of the Faculty of Sport and Health Sciences, Makassar State University. This study used a quantitative approach with an experimental method through a one-group pretest-posttest design. The sample of the study was 30 students who participated in the drill training program for six weeks with a training frequency of three times per week. The research instrument used a drop shoot accuracy test based on a target area on the badminton court. Data analysis was carried out using descriptive statistics, the Shapiro-Wilk normality test, the Levene homogeneity test, and hypothesis testing using a paired sample t-test. The results showed that the average pretest score of 58.40 increased to 74.60 in the posttest with a difference of 16.20 points. The t-test showed a value of t = 12.84 with p = 0.000 (p < 0.05) which indicates a significant effect of drill training on drop shoot ability. The effect size value (Cohen's d = 2.28) indicates a very large influence category. Thus, it can be concluded that drill training is effective in improving drop shoot ability in PKO FIKK UNM students.

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INTRODUCTION

Training is a fundamental component of sports science and physical education because it is through planned and repeated training that individuals can optimally develop physical, technical, and tactical abilities. From a modern sports science perspective, training is not only defined as repetitive physical activity, but also as a systematic process

designed to improve motor skills, neuromuscular coordination, and biomechanical efficiency of movement (Bompa & Buzzichelli, 2019; Suchomel et al., 2018). The principle of training, which involves consistent repetition of movements, is believed to strengthen motor movement patterns so that the skills being practiced can be performed automatically and stably in competition situations (Magill & Anderson, 2021; Schmidt & Lee, 2019).

In the context of sports technique learning, training methods are a crucial factor in determining the success of skill mastery. Various training approaches have been developed in sports coaching science, such as game-based training, tactical training, and technical repetition-based training. One of the most widely used methods in technical learning is drill training, a training method that emphasizes structured repetition of movements so that athletes or trainees can master specific techniques consistently and effectively (Rizkyanto et al., 2023; Ford et al., 2020). Drill training is generally designed to break down a complex skill into simpler movement components so that each part of the movement can be systematically learned. This approach has proven effective in improving movement accuracy, coordination, and technical stability in various sports such as basketball, soccer, tennis, and badminton (Davids et al., 2020; Memmert, 2018). Through structured repetition, drill training helps individuals develop efficient movement patterns so that learned skills can be automatically applied in game situations.

Furthermore, drill training also plays a crucial role in the development of specific motor skills. Motor skills in sports involve complex coordination between the nervous system, muscles, and visual perception, enabling athletes to execute movements precisely and efficiently (Pardiman, Sugiharto, & Rifai, 2018). Research in the field of motor learning shows that repetition of directed movements can improve neuromuscular efficiency and accelerate the process of automating technical skills (Wulf & Lewthwaite, 2016; Magill & Anderson, 2021). Therefore, using appropriate training methods is key to improving technical skills in sports. Systematically designed training programs based on motor learning principles are believed to improve the quality of technical performance in athletes and students studying sports skills in higher education settings.

In badminton, mastery of basic and advanced techniques is a crucial factor in determining a player's successful performance in a match. Badminton is a sport that demands a combination of speed, precision, coordination, and the ability to make tactical decisions in a very short time (Phomsoupha & Laffaye, 2015; Lees, Kershaw, & Moura, 2020). Therefore, every technique used in the game must be optimally mastered through structured training. One important technique in badminton is the drop shot, a shot directed smoothly and precisely into the front of the opponent's court near the net. This technique aims to deceive the opponent and force them to move forward quickly, creating opportunities for subsequent attacks (Pardiman et al., 2018). In modern play, the drop shot is used not only as a variation of attack but also as a strategy to control the rhythm of the game and create more effective attacking space.

Executing the drop shot requires complex motor coordination. Players must be able to control the power of the shot, adjust the angle of the racket, and determine the correct timing when making contact with the shuttlecock. Furthermore, this technique requires

body balance, wrist control, and coordination between footwork and racket swing (Phomsoupha & Laffaye, 2015; Lees et al., 2020). Therefore, mastering the drop shot technique requires systematic and repeated practice so that players can perform it consistently. Several studies have shown that drill training methods are effective in improving technical skills in various sports. For example, research by Rizkyanto et al. (2023) showed that drill training can significantly improve shooting accuracy in basketball after a structured training program. Other studies have also shown that drill training can improve passing accuracy in soccer and improve the consistency of hitting technique in badminton (Fahri et al., 2024; Pardiman et al., 2018).

Furthermore, the drill approach is also considered effective in the context of sports learning because it allows coaches or instructors to provide direct feedback on the technique performed by participants. Repeated feedback can help trainees correct movement errors so that technical skills can develop more optimally (Wulf & Lewthwaite, 2016; Davids et al., 2020). Although various studies have demonstrated the effectiveness of drill training methods in improving technical skills in sports, several objective issues remain that require further in-depth study. One key issue is the limited research specifically examining the effect of drill training on drop shot ability in the context of sports education at the college level.

Most previous research has focused on technical skills in other sports such as basketball, soccer, or tennis. For example, studies on drill training in basketball generally emphasize improving shooting accuracy, while in soccer, the focus is more on improving passing or shooting accuracy (Rizkyanto et al., 2023; Fahri et al., 2024). Meanwhile, research on the drop shot technique in badminton is still relatively limited, particularly those examining the effect of drill training methods on improving this technical ability.

Furthermore, most existing research has been conducted on club athletes or high school athletes, while research involving students in sports study programs is very limited. However, students in the Sports Coaching Education (PKO) program have different characteristics than club athletes, both in terms of training experience, physical activity intensity, and the academic load they must simultaneously undertake.

This difference in context raises questions about the extent to which previous research findings can be applied to the PKO student population. Furthermore, the variety of training methods used in the field also varies widely, making it unclear which training method is most effective in significantly improving drop shooting ability at the student level.

Another issue that requires attention is the lack of research using experimental designs with pretest and posttest measurements to evaluate changes in technical ability after a drill program has been implemented over a period of time. This kind of longitudinal research is crucial to determine the extent to which drill training can have a tangible impact on improving technical skills in sports.

Based on the various issues outlined above, several research gaps can be identified that formed the basis for this study. First, very little research has specifically examined the effect of drill training on drop shot ability in badminton at the tertiary level. Most previous research has focused on other technical skills or on populations of club athletes

and school students. Second, there has been no empirical study that comprehensively evaluates the effectiveness of a structured drill training program on improving drop shot ability in PKO students. This indicates a need to develop research that can quantitatively link drill training methods with technical performance improvements. Third, previous research has not examined specific components of drill training, such as the intensity of repetitions, the duration of the training program, and the form of instructional feedback provided during the training process. These components play a crucial role in determining the effectiveness of a training program.

This research offers several novel contributions to the fields of sport science and physical education. First, this research is an empirical study that directly evaluates the effect of drill training on drop shot ability in students in the Sports Coaching Education program at the Faculty of Sport and Health Sciences, Makassar State University. Second, this research integrates the principles of motor learning, sport pedagogy, and a technical training program into a single experimental research design that objectively measures changes in technical ability through pretest and posttest measurements. Third, this research provides a practical contribution in the form of recommendations for drill training programs that can be implemented by coaches, lecturers, and students in the process of learning sports techniques.

Based on the background, research gaps, and the novelty offered, this study aims to analyze the effect of drill training on drop shot ability in students in the Sports Coaching Education program at the Faculty of Sport and Health Sciences, Makassar State University. This study uses an experimental design with pretest and posttest measurements to evaluate changes in technical ability after participants have participated in a structured drill training program. The results of this study are expected to provide empirical evidence regarding the effectiveness of drill training methods in improving sports technical skills, particularly the drop shot technique in badminton. In addition, the findings of this study are also expected to contribute to the development of sports learning curricula in universities and become the basis for further research that examines the relationship between technical training methods and various other aspects of sports performance such as neuromuscular coordination, reaction speed, and game strategy.

METHODS

This study used a quantitative approach with an experimental method to test the causal relationship between drill training as the independent variable and drop shooting ability as the dependent variable in students in the Sports Coaching Education (PKO) Study Program, Faculty of Sport and Health Sciences, Makassar State University. The quantitative approach was chosen because it allows for the collection of numerical data that can be objectively analyzed using statistical techniques, allowing the research results to provide measurable empirical conclusions regarding the effectiveness of a training program (Creswell & Creswell, 2018; Thomas, Nelson, & Silverman, 2019). In sports research, experimental methods are often used to evaluate the impact of training

interventions on improving athletes' technical skills and performance because this design allows for systematic control of research variables (Bompa & Buzzichelli, 2019; Hopkins, 2017).

Specifically, this study employed a quasi-experimental design with a one-group pretest–posttest design. This design involves one group of subjects having their drop shooting ability measured before treatment (pretest), then being given a drill training program for a specified period, and then having their technical ability measured again after treatment (posttest). This approach is commonly used in physical education and sports coaching research because it allows researchers to evaluate changes in technical performance resulting from training interventions, even without the full randomization of a pure experiment (Fraenkel, Wallen, & Hyun, 2019; Mackenzie & Cushion, 2018). By comparing pretest and posttest scores, this study can identify whether there is a significant improvement in drop shot accuracy after participants participate in a structured drill training program.

The variables in this study consist of the independent variable, namely drill training, and the dependent variable, namely drop shot ability or accuracy in badminton. Drill training is defined as a training method that emphasizes the repetition of technical movements in a systematic and structured manner to strengthen motor movement patterns and improve skill consistency (Ford et al., 2020; Magill & Anderson, 2021). Meanwhile, drop shot ability is operationalized as a player's ability to execute a smooth shot that precisely places the shuttlecock near the opponent's net, as measured by the level of accuracy and consistency of the shot against a predetermined target on the court (Phomsoupha & Laffaye, 2015; Lees et al., 2020). Furthermore, several control variables, such as age, playing experience, and training duration, were kept constant to minimize the influence of external factors on the research results.

The population in this study was all PKO FIKK UNM students participating in badminton practice activities during the current semester. The research sample was drawn from this population using a purposive sampling technique, with the criteria being students who actively participate in badminton training, are in good physical condition, and are willing to participate in the study. This sampling technique aims to ensure that the research subjects possess characteristics relevant to the research objectives, so that the data obtained can represent the actual situation (Etikan & Bala, 2017; Thomas et al., 2019).

The research instrument used was a drop shot skill test based on a target area on a badminton court. In this test, respondents were asked to execute a number of drop shots into a predetermined target area using markers near the net. Each shuttlecock that landed in the target area was scored based on established assessment criteria, generating quantitative data on shot accuracy. The instrument was equipped with standard equipment such as rackets, shuttlecocks, a badminton court, observation sheets, and a stopwatch to ensure uniformity of measurement conditions (Hopkins, 2017; Lees et al., 2020). Before being used in the main study, the instrument was pre-tested through a pilot test to ensure the validity and reliability of the measurements.

Muhammad Ishak[1A-E*], Hikmad Hakim[2B-D], Sahabuddin[3B-D], Awaluddin[4B-D]
m.ishak@unm.ac.id

Data collection techniques included structured observations, field skills tests, and documentation of training activities. Observations were used to record respondents' technical performance during the drop shot test based on predetermined indicators, while the field test generated quantitative data in the form of shot accuracy scores. Documentation in the form of photographs and video recordings served as supporting data to ensure the accuracy of the test results (Mackenzie & Cushion, 2018).

The research data were analyzed using descriptive and inferential statistics. Descriptive statistics were used to describe the data distribution through mean values and standard deviations, while hypothesis testing was conducted using a paired sample t-test to compare pretest and posttest scores for drop shooting ability. Normality and homogeneity tests were performed first as prerequisites for parametric analysis. The entire data analysis process was conducted using statistical software such as SPSS to ensure the accuracy of calculations and interpretation of research results (Field, 2018).

RESULTS AND DISCUSSION

Result

Research Data Description

Table 1.
Descriptive Statistics of Drop Shoot Scores

Variabel	N	Mean	SD	Minimum	Maximum
Pretest	30	58.40	6.85	45	70
Posttest	30	74.60	7.10	60	88

Table 2.
Hasil Uji Normalitas

Variable	SW Statistics	Sig. (p)	Description
Pretest	0.962	0.322	Normal
Posttest	0.971	0.451	Normal

Table 3.
Homogeneity Test Results

Variabel	F	Sig. (p)	Description
Pretest–Posttest	0.784	0.382	Homogeneous

Table 4.
Paired Sample t-test Results

Variabel	Mean Difference	t hitung	Sig. (2-tailed)	Keterangan
Pretest–Posttest	16.20	12.84	0.000	Signifikan

$$d = \frac{Mean\ Difference}{SD}$$

$$d = \frac{16.20}{7.10} = 2.28$$

Based on descriptive and inferential analyses, it can be concluded that drill training significantly improves drop shooting ability in PKO FIKK UNM students, both statistically and practically in terms of improving technical performance.

Discussion

This study proves that drill training has a significant effect on the drop shot ability of PKO FIKK UNM students. Statistical test results indicate a significant and consistent increase in drop shot accuracy after the drill training treatment, which aligns with previous research findings in the context of systematic sports technique learning (drill training)(Artha & Subrata, 2022).

Drill training is a form of repetitive practice that emphasizes the repetition of specific movements in a structured manner. In the context of badminton, drills are designed to simulate specific technique patterns, including footwork, timing, and touch in the drop shot (Edel et al., 2023). The results showed that after the drill implementation, there was a significant increase in students' drop shot accuracy, as reflected in the statistically significant difference in pretest and posttest scores ($t = 12.84$; $p < 0.001$). This is consistent with the findings of Artha and Subrata (2022), who reported an increase in average drop shot technique after the application of the drill method in athletes. Physiologically, drills stimulate the motor learning process, helping participants develop strong motor programs through repetition, feedback, and reinforcement of movement patterns (motor procedural memory). Research on motor learning in the context of sports technique shows that repetitive practice increases movement automation, resulting in more stable and efficient technique (motor learning).

The process of technical skill development in this study can be explained through a three-stage model of movement learning: cognitive, associative, and autonomous. At the beginning of the drill, participants are in the cognitive stage, where they attempt to understand the drop shot pattern. Subsequently, both repetition and feedback transform the movement into a more stable (associative) and ultimately automatic (autonomous) stage, resulting in faster and more precise responses to the shuttlecock during a real match (Magill & Anderson, 2021). However, as the drill progresses, participants gradually reduce their cognitive load, allowing automatic movements to develop more quickly.

Structured drill training also improved the neuromuscular adaptation of the study participants. These adaptations include improved coordination between the central nervous system and muscles, as well as increased motor unit synchronization required for drop shots. In high-performance badminton research, the effects of improving technical skills through drills have been linked to changes in movement kinematics and more efficient neuromuscular responses. This improvement is evident from statistical observations, where drop shot accuracy scores increased from a pretest average of 58.40 to a posttest average of 74.60 after drill training. These changes indicate that participants' neuromuscular systems can respond to intensive training through repetition of specific techniques, consistent with other research in the context of badminton training.

Drills provide the necessary stimulus to improve the consistency of technical movements. Various studies in racket sports have shown that drills are effective in improving specific technical skills when designed to reflect real-life game patterns. For example, drills that vary the location of the shuttlecock and the approach to movement patterns can expand participants' skills to adapt to diverse match contexts. Additionally, other studies have shown that drills focused on techniques such as the forehand drop shot significantly improve technical skills in young children, demonstrating that the principles of drills are applicable to athletes of all ages. A key factor in drill effectiveness is the use of high-quality feedback from coaches during drill sessions. This feedback accelerates the correction of incorrect movement patterns and reinforces correct ones, a process supported by motor learning theory, which emphasizes the importance of feedback in motor skill acquisition. Drills not only improve technical accuracy but also the consistency of drop shot performance in advanced training and game situations. The repetitive nature of drills helps reduce movement variability and enhances motor response to rapid court stimuli, allowing the drop shot to be executed consistently at a higher performance level. This study reinforces previous findings that also demonstrated the positive effect of drills on improving specific badminton techniques. Artha and Subrata (2022) found significant differences in drop shot technique performance after drills. Furthermore, research on the forehand drop shot also showed significant improvements after systematically designed drills were implemented. Furthermore, research using drills to improve other badminton skills (e.g., smash or long serve) also showed similar results, with drills resulting in significant technical improvements compared to pre-treatment conditions. This provides empirical evidence that the principles of drill training are effective for various techniques in badminton.

The results of this study support the recommendation that structured, repetitive, and specific drills on the drop shot technique should be a core methodology in badminton player development programs at the college level. By integrating motor learning principles and quality feedback, coaches can design effective drills to train specific techniques such as the drop shot, which is a crucial shot in the game's offensive strategy. While the results of this study are strong, there are several limitations worth noting. First, the study sample was limited to PKO FIKK UNM students, so generalization to other populations, such as youth athletes or professional athletes, requires further study. Second, the training duration was relatively short (e.g., 6 weeks), so longer-term research could better illustrate the dynamics of change in drop shot technical skills. Finally, variations in drill type and interval intensity could be directions for future research to understand how these factors moderate the effectiveness of drills in improving technical accuracy.

CONCLUSION

Based on the results of the research data analysis on the effect of drill training on drop shooting ability in students in the Sports Coaching Education (PKO) Study Program,

Faculty of Sport and Health Sciences, Makassar State University, it can be concluded that the implementation of the drill training method significantly improved students' drop shooting skills. Descriptively, the results showed that the average drop shooting ability score before treatment (pretest) was 58.40 with a standard deviation of 6.85, while after the six-week drill training program (posttest), it increased to 74.60 with a standard deviation of 7.10. This represents an average score increase of 16.20 points, indicating that drill training significantly improved technical ability.

The results of the prerequisite analysis test indicate that the research data met the assumptions of parametric statistics. The normality test using the Shapiro–Wilk method showed a significance value of 0.322 in the pretest and 0.451 in the posttest, indicating that both data were normally distributed because the significance value was greater than 0.05. Furthermore, the homogeneity test using Levene's Test showed a significance value of 0.382, indicating that the data variance was homogeneous.

Furthermore, the results of the hypothesis test using a paired sample t-test showed a calculated t-value of 12.84 with a significance value of $p = 0.000$ ($p < 0.05$). These results indicate a significant difference between the pretest and posttest scores for drop shooting ability. Therefore, the research hypothesis stating that drill training has an effect on improving drop shooting ability in PKO FIKK UNM students is accepted.

Furthermore, the effect size calculation using Cohen's d yielded a value of 2.28, which falls into the very large effect size category. This indicates that drill training not only has a statistically significant effect but also has a very strong practical impact on improving drop shooting technique skills.

Conceptually, the findings of this study support motor learning theory, which states that repeated and structured practice can strengthen technical movement patterns and increase the consistency of sports skill performance. Therefore, the drill training method can be recommended as an effective technical training approach in badminton learning, especially in improving drop shoot skills in sports coaching education students.

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Finally, the author hopes that the results of this study will contribute scientifically to the development of badminton technique training methods, particularly in the context of developing students and prospective sports coaches in higher education settings.

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