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Modified training drills in improving the dribbling agility of futsal athletes

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Introduction: Futsal has become increasingly popular over the years; hence, studies focusing on the integration of drills to improve the performance of athletes are relevant. This study investigates the impact of modified training drills in improving the dribbling agility of futsal athletes.

Methods: A total of 13 athletes participated in the research. Their dribbling agility was classified based on the Test of Agility in Dribbling before and after the training duration. The training program, which follows the FITT principle, consisted of three sessions per week (following a TThS schedule) for 2 weeks, adapting their normal training days. Descriptive statistics (frequency counts, percentages, mean, and standard deviation) summarized the demographic characteristics and agility levels. A Wilcoxon signed-rank test was utilized to determine the significant difference between the pre-test and post-test results, as the participants were not randomly sampled. A Spearman's rank correlation test was used to test the association of demographic profiles with the levels of dribbling agility.

Results: Demographic analysis revealed that most participants were 14 years old, with a majority having a height between 140–149 cm and a weight of 40–49 kg. Descriptive statistics showed a significant improvement in agility performance, as the average agility time decreased from 24.51 s in the pre-test to 20.50 s in the post-test. After training, the participants' dribbling agility levels shifted from predominantly 'poor' classifications to 'average', 'good', and 'excellent'. Statistical analysis confirmed that this difference was statistically significant ($p < 0.05$). Further analysis revealed that weight has a significant association with agility performance, while age and height did not.

Discussion: The results support the hypothesis that modified training drills positively impact agility. The findings suggest that weight can be considered an important factor in evaluating the impact of agility training.

Conclusion: The modified agility training program effectively enhanced dribbling agility among futsal athletes. The study suggests that future researchers may extend the training duration and control external factors. It is also recommended that weight be considered in planning and evaluating agility training programs.

KEYWORDS

futsal, agility training, dribbling agility, test of agility in dribbling, modified training drills

1 Introduction

Futsal is an interesting FIFA recognized form of indoor football that is played between two teams on the pitch in a game with increased popularity among men and women for over the last 15 years. (Lago-Fuentes et al., 2020). Teams can field up to five players at a time, including one goalkeeper, from their 14 squads with rolling and unlimited substitutions. In futsal, the main goal is to score goals or push as many balls into the opponent's goal as possible without giving up one's own goal. The game of futsal consists of different skills that are essential to achieving top performance, which highlights the necessity for players to understand the importance of honing these skills (Imansyah and Hananingsih, 2016; Yusuf and Zainuddin, 2020; Irawan and Prayoto, 2021). One essential skill that futsal players need to have is the ability to dribble, it has an important role in achieving various goals specifically, namely, being able to master the game, maintaining ball possession, breaching the defense of the opponent, and preparing to attack or score a goal against the opponent. In order to achieve this, good agility and support from good physical condition to enable the body to move faster in dribbling is essential (Nugroho, 2018).

In recent years, futsal has become increasingly popular among young people and university students, capturing the attention of audiences worldwide and emerging as one of the sports with the biggest growth. This rapid growth has made futsal a relevant topic for both academics and practitioners who aim to understand the sport better (Yiannaki and Skubala, 2023). Despite its growing popularity, multiple studies (Pranyoto and Suhajana, 2019; Kustiawan et al., 2020; Suryanata et al., 2021; Kasuma et al., 2023) indicate a lack of research on improving the performance of futsal athletes. Pranyoto and Suhajana (2019) observed that players often struggle with dribbling, passing, and creating space. They also noted deficiencies in off-ball movement, defensive anticipation, and physical attributes like agility. Interviews with coaches and players revealed that most training focuses on technical skills and gameplay, with insufficient emphasis on physical conditioning, particularly agility.

Dribbling agility is crucial for futsal players as it allows them to quickly change the direction, evade or bypass opponents, and maintain ball control (Naser et al., 2017; Farhani et al., 2019). Modified training drills are specialized exercises designed to enhance these skills by focusing on precise movements, rapid direction changes, and ball control under various conditions (Israel et al., 2024). These drills are important for developing both the physical and cognitive aspects of agility, essential for high-level futsal performance. Current sports training trends highlight the importance of sport-specific drills that replicate game scenarios to improve relevant skills more effectively. Tailored training drills for futsal are gaining popularity due to their targeted approach in enhancing dribbling agility. For instance, a study by Fatchurrahman et al. (2019) found that specific drills, such as the ladder drill in out and the icky shuffle, significantly improved agility and speed when dribbling among athletes.

One major challenge is ensuring that these drills are appropriately customized to fit the skill levels and developmental needs of individual athletes. Without proper customization, training can be ineffective and even increase the risk of injury (Dedal et al.,

2025). Additionally, access to quality training resources and facilities can be a significant obstacle, particularly in underfunded sports programs. Limited availability of quality equipment and knowledgeable coaches can reduce the effectiveness of modified training drills. According to Kustiawan et al. (2020) noted that many futsal programs in Indonesia lack the necessary support to implement these drills effectively, as they often require expensive equipment that may not be available even in some countries.

Despite these challenges, the potential of modified training drills to enhance dribbling agility in futsal athletes presents a compelling case for further research and development. There is a clear need to establish best practices that ensure safe, enhancement, and accessible training for all athletes (Sulistiyono et al., 2023). Future research should focus on creating comprehensive training protocols that address the unique demands of futsal, including the elements of sport science, biomechanics, and injury prevention.

Dribbling is a crucial skill in futsal that relies heavily on agility. Modified training drills offer a promising approach to enhance this skill, although challenges such as proper modification and resource availability must be addressed. This study aims to identify and promote best practices in training futsal athletes, ultimately contributing to improved performance specifically on agility in dribbling skill. Currently, there is a limited availability of knowledge and tested training drills for futsal athletes, hence this study is proposed to fill this gap.

Futsal, known as 'futebol de salao' or hall football in Portuguese was long introduced in 1930 and therefore has a long-standing history. Its popularity can be attributed to its exciting gameplay, very high precision skills, and numerous benefits as wide array of careers opportunities have arisen over the past years. It maintains its growth as a worldwide sport and is played at the at the professional and amateur levels in different countries (Naser et al., 2017). Furthermore, futsal is recognized as one of the team sports that has highly increased the number of practitioners and global rise in recent years (Méndez-Domínguez et al., 2022). The vast growth of the said sport increased the demand for futsal-related studies to better comprehend and understand the sport to have an in-depth knowledge for coaches, athletes, and administrators that consequently can lead to improvement and growth of the sport in their native countries (Moore et al., 2014).

The evident growth of the sport highlights the demand for studies concerning skills to possibly enhance the mechanism behind a competitive game play. One of these is the physical skill that is an important aspect to consider during preparation, training sessions and during the game. Currently, it discerns that there is a notable disparity in the number of studies using the English language, with significantly fewer studies on futsal compared to the extensive body of literature on the established football, wherein rules of the game are similar in some ways (Moore et al., 2014). This lack poses a significant threat as language barrier can interfere with the dissemination of proper and established skill training and recommendations with regards to improving futsal performance. Moreover, in the study of Naser et al. (2017), it is recommended that researchers help practitioners develop more specific studies and tests relating to physical skills that improve futsal performance. It underscores that there is a need for a more focused studies to have a wide understanding and optimize training techniques for

both players and coaches using a widespread language to facilitate international communication and understanding towards the sport.

A deeper comprehension of the physical and skill requirements could certainly contribute to the growth of the sport. In addition, practitioners would be able to provide useful knowledge to players through their comprehension of essential skills that is crucial for the players to bring victory in a game. Futsal is a high-intensity activity that involves sudden direction changes, jumping, kicking, and stopping while using strong forces (Hart et al., 2016). Thus, it is important to focus on every skill that needs to be executed during gameplay to facilitate appropriate action, avoid injuries, and improve the overall performance of the players.

Research suggests that height and body weight influence agility in athletes as taller individuals generates better agility and increased body weights can harm agility performance. Contradicting, a study of Fischetti et al. (2019) demonstrated a parallel positive correlation between the length of the agility test and body weight. Similarly, Dhapola and Verma (2017) concluded that there is a significant relationship between body weight and agility level, meaning that as weight increases, agility also tends to increase. The research suggest that one reason agility might improve as weight increases because the weight is easily shifted during movement relating to muscle mass and muscle strength of an individual. Covering diverse components, such as cardiovascular endurance, muscular strength, agility, and balance, contributes to a holistic understanding of the respondents' physical fitness (Gula, 2024). It is also stated in the study of Uzun et al. (2020) that the child develops motor skills faster during adolescence period. During this period, agility improved well with good exercises, so it is necessary to start trainings and increase the level of physical activities to hone the skill.

Agility, as defined by Sekulic et al. (2019), is a rapid whole-body movement with change of speed or direction in response to a stimulus. This is critical for success in many tactical positions generally in team sports. Futsal, a soccer-like game, integrates a variety of abilities and improves performance through exercises that can strengthen motor skills including agility. Futsal players change directions more than soccer players because they dribble a smaller ball on a smaller court. Futsal requires agility, with dribbling being a fundamental tactic for outmaneuvering opponents and breaking past defenses. According to Selin et al. (2024) which has found out in different courses of action regarding the aspect of agility and dribbling skills among Futsal players where it can be concluded that both have a concrete correlation. The results show there is a parallel relationship between the agility levels and dribbling skill of Futsal players where higher agility scores are equivalent to improved dribbling agility capacities.

Similarly, studies like those by Arwandi and Firdaus (2021) emphasize the crucial role of dribbling agility in enhancing dribbling techniques specifically in maneuvering past close opponents that can be improved through various training methods. Moreover, the study suggest that specific agility training programs can significantly impact the ability of the players to perform fundamental dribbling maneuvers effectively. The findings underscore the importance of tailored agility training regimens in improving dribbling proficiency in sports like futsal.

According to several research, there are performance components that needs to be highly developed such as speed and agility. Speed and agility have been widely recognized as one of the

characteristics that influences the performance (Çakir, 2019). In several studies, it is advised to include acceleration exercises and agility training especially sports that needs quick movements like Futsal (Aktaş, 2023). Therefore, specialized training drills plays a major role in enhancing these attributes as it allows the coaches and athletes to focus on a specific target to enhance and help to create a good performance during game play. Since Futsal has a smaller field, it is an intensified sport that requires players to engage activities like sprinting which requires agility improvement in dribbling ability of the players through specified training is required (Ayarra et al., 2018).

Recent research studies how to train athletes in order to improve the ability to dribble by increasing agility and proved its effectiveness. Based on the result of the study of Wiranata et al. (2023), training for 6 weeks at 3 times a week can improve the dribbling agility of student athletes. Specific drills are one of the main components of an effective training for a better performance as such drills enable the players to become ready mentally, physically, and emotionally. In the study of Hidayat (2019), the findings concluded that Agility Ladder Training influences the agility of the futsal extracurricular students in Bina Darma University. With an improved dribbling agility, excellent performance can be observed during game play. Specified drills also help players to adjust positions during play and become more skilled (Hammood, 2020). These studies collectively support that specified training drills specifically on dribbling agility are effective and can significantly enhances the performance when playing.

The purpose of this study is to evaluate the modified training drills on enhancing the dribbling skill of the players across the field, specifically on agility. The participants were introduced to the modified training drills-varied agility training that includes Boomerang Run, Shuttle Run, Dodging Run, Hexagon Speed and Agility, Zigzag Run, and Three Cone Drill. These drills are designed to improve agility focus, speed, quickness, multi-directional movement, coordination and balance, and footwork technique that are commonly used in athletic training programs to improve overall performance, specifically on agility. This study focused on the integration of drills to improve the player's agility when dribbling the ball, ensuring a safe and motivating environment.

This study aims to understand how the modified training drills in futsal impacts the dribbling agility of the athletes. Specifically, it seeks to answers to the following questions:

1. What is the demographic profile of the participants in terms of:
 - 1.1 Age
 - 1.2 Height
 - 1.3 Weight
2. What is the level of the dribbling agility performance of the participants before and after conducting the modified training drills?
3. Is there a significant difference on the dribbling agility performance before and after the modified training drills?
4. Is there a significant association between athletes' demographic profiles and their level of dribbling agility?

Statement of Hypothesis

H₀: There is a negative impact of the modified drills, varied agility training to the futsal athletes' dribbling agility.

H₁: There is a positive impact of the modified drills, varied agility training to the futsal athletes' dribbling agility.

The Figure 1 illustrates the conceptual framework of the study about the impact of the modified training drills on the futsal athletes' dribbling agility is the primary focus of this study. The modified training drills served as the independent variable while the improved dribbling agility of the athletes is the dependent variable. In this study, agility training drills are used as the independent variable, reflecting the factor that cannot be altered. The researchers used modified agility training drills to see how it affected the participants' dribbling ability. The dependent variable is improved dribbling agility, which is being tested and influenced by agility training routines. The study aimed to establish a cause-and-effect relationship between the independent variable (modified agility training drills) and the dependent variable (improved dribbling agility), investigating whether the agility training drills lead to an improvement in dribbling agility.

2 Methods

This study utilizes a quasi-experimental design to evaluate the efficacy of the modified training drills–varied agility training. Quasi-experimental designs resemble experimental approaches but lack random assignment, making them suitable for studies where assigning participants randomly is impractical or unethical.

The study was conducted at Baybay National High School, specifically at the school's gymnasium. Since the respondents physically attend their conventional training, the study was conducted through face-to-face evaluation.

The research participants of the study were the athletes of Baybay National Highschool–Futsal team, Lady Jaguars with a total of 13 futsal athletes aged 12–15 years old that participates actively in their regular training. Purposive sampling was used to select the participants in this study. It is a form of non-probability sampling that focused on the characteristics of the selected number of groups that are of interest of the research study (Rai and Thapa, 2015).

The research instrument in this study involved pre-test and post-test using the Test of Agility in Dribbling. This research instrument was adopted from the study of Pambudi et al. (2021) from the Journal of Physical Education and Sports. This test was used to determine the level of dribbling agility in the athletes' performance. The outcome of the test was documented and evaluated to determine if there is a significant difference of the dribbling performance before and after the modified training drills–varied agility training.

Table 1 provides the classification system and norms used to evaluate the athletes' dribbling agility performance. It defines five distinct levels of performance from “Excellent” to “Bad”, based on the time (in seconds) taken to complete the agility test.

Each classification level includes a descriptive qualifier that interprets what the time score means in terms of the athlete's technical skill, control, and overall agility. For example, an “Excellent” rating (under 18.9 s) indicates elite-level ball control and speed, while a “Poor” rating (24.00–26.9 s) indicates significant struggles with coordination and precision.

This table was the essential benchmark against which each athlete's pre-test and post-test results were measured to determine their agility level and quantify their improvement after the training intervention.

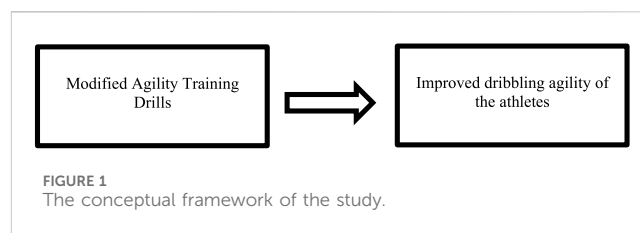


TABLE 1 Test of agility in dribbling.

No.	Norm	Time/Seconds
1	Excellent	Less – 18.9
2	Good	19.00–21.9
3	Average	22.00–23.9
4	Poor	24.00–26.9
5	Bad	27.00–more

- Excellent (<18.9 s).
 - Demonstrates exceptional ball control, speed, and reaction time.
 - Athlete exhibits near-flawless footwork, rapid directional changes, and seamless integration of dribbling techniques under pressure.
 - Performance level suggests elite competitive readiness.
- Good (19.00 – 21.9 s).
 - Shows strong technical proficiency with consistent, efficient movements.
 - Minor delays in transitions or slight hesitations may occur but do not significantly hinder performance.
 - Indicates a high-potential athlete capable of further refinement.
- Average (22.00 – 23.9 s).
 - Reflects moderate agility and ball-handling skills with observable room for improvement.
 - Athlete maintains basic control but lacks fluidity in complex maneuvers or quick pivots.
 - Typical of developing players requiring targeted drill repetition.
- Poor (24.00 – 26.9 s).
 - Struggles with speed-regulation, coordination, or precision.
 - Frequent pauses, missteps, or ball-loss during drills.
 - Signals a need for foundational training and technique correction.
- Bad (≥27.00 s).
 - Significantly below par in agility and dribbling mastery.
 - Poor reaction time, weak spatial awareness, or inadequate conditioning evident.
 - Urgent intervention required, including remedial drills and fitness conditioning.

The evaluation tool was used as a gathering data. The participants were introduced to the created modified training drills. For their participation, coaches and participants received an invitation letter and a proper consent before indicating their participation in the study.

In selecting the participants for the study, the researchers conducted a screening using the Illinois agility test, those participants who belongs to the classification of ‘fair’ and ‘poor’ were qualified to participate in the modified training drills and the participants who fails to meet the required agility test were excluded from the training program. The researchers will record the time obtained from starting point to finish.

After that, the researchers conducted a pre-test using the Test of Agility in Dribbling to determine the dribbling agility level of the participants. After completing the 6 sessions, the researchers conducted a post-test using the Test of Agility in Dribbling to determine how the modified training drills affects the dribbling agility among futsal athletes.

The participants were introduced to the modified training drills–varied agility training. The varied agility training includes

Boomerang Run, Shuttle Run, Dodging Run, Hexagon Speed and Agility, Zigzag Run, and Three Cone Drill. Modification of the varied agility training includes increasing the number of repetitions, following the principle of overload. The training program follows the FITT principle consists of 60 min per sessions for three sessions per week in 2 weeks and follows TThS schedule adapting their normal training days.

Descriptive statistics, such as frequency counts, percentages, mean, and standard deviation was performed to summarize the demographic characteristics of the participants and their levels of agility before and after the intervention. The data violated the normality test. A Wilcoxon signed rank test was utilized in determining the significant difference between the pre-test and post-test results since the participants were not randomly sampled, which violates the assumptions of utilizing the parametric Paired Sample T-test. A Spearman's rank correlation test was used to test the association of demographic profiles and the levels of dribbling agility since the relationship between variables are not linear. The levels of correlation and their corresponding interpretations are adapted from Sanli (2019) and presented in Table 2. A significance level of $\alpha = 0.05$ was used for all statistical tests. Statistical analysis in this study was done using RStudio.

2.1 Limitations of the study

This study focused on how the modified training drills improves dribbling agility performance of the athletes in Baybay National High School. The respondents of the study included 13 futsal-athletes who actively attend in their regular training. By providing evidence-based recommendations, the study aimed to contribute to the optimization of futsal training programs. This research also addressed the broader discourse on athletic training by highlighting the importance of tailored, sport-specific drills in achieving peak performance.

2.2 Ethical consideration

The researchers followed the Data Privacy Act of 2012 closely, making sure all athletes' data was kept safe and private. The data collected was stored on Google Drive, which only the researchers could access. After the study, information about the respondents/athletes were deleted. Before starting, a consent letter was given to the athletes. This letter explained the importance of the study, permission to collect data, voluntary participation, and confidentiality.

The study rigorously assessed and mitigate any potential physical risks associated with the modified training drills. Safety measures were implemented to prevent injuries, maintaining safe environments, and adhering to local health and safety regulations. Ensure participants' physical wellbeing by screening them thoroughly for any health conditions that could pose risks during the study and provide appropriate medical supervision or interventions as needed and maintain open communication channels for reporting and addressing any incidents or concerns promptly to minimize physical risks throughout the study duration.

TABLE 2 Level of correlation between athletes' demographic profiles and their level of dribbling agility.

Correlation coefficient	Interpretation
0.00 to 0.29 (0.00 to -0.29)	Very Weak/Negligible correlation
0.30 to 0.49 (-0.30 to -0.49)	Weak positive (negative) correlation
0.50 to 0.69 (-0.50 to -0.69)	Moderate positive (negative) correlation
0.70 to 0.89 (-0.70 to -0.89)	Strong positive (negative) correlation
0.90 to 1 (-0.90 to -1)	Very strong positive (negative) correlation

Every participant received detailed information about why the study is being done, how it was conducted, what potential risks and benefits might be involved. Written consent was obtained to make sure that participants and their parents completely understand what their role was and that they are choosing to take part freely. This helps protect everyone involved and ensures that participants can make informed decisions about joining the study. The participants are allowed to choose not to be longer involved in the study any time and there were no consequences imposed. This ensures that there is no coercion or undue influence on athletes to partake in the research.

In accessing the research, respondents were assured that the researchers would assist them. Respondents would get information regarding on the final output/result of the given study. The researchers discussed ideas concerning the disclosure of different approaches for the increase in quality to receive significant and valuable results through teamwork. It also ensured that the descriptions of the responses were elaborate and written in proper English. To maintain the credibility of the researchers the respondents were assured that the data was safe with the researchers and their answers were kept very discreet. The authors proved their concern to the area under study by having a vigorous discussion and recording the respondents' answers, as well as, analyzing and interpreting the same.

Researchers securely store all participant data in encrypted and password-protected formats to prevent unauthorized access. Access to data were restricted to researchers only. Researchers clearly communicate to the participants how their data was collected, used, and protected throughout the study. The researchers ensured that the confidentiality and privacy measures remain effective and compliant with ethical guidelines throughout the research process.

The researchers were patient during conducting the study; thus, they were humble most of the time. After the data was collected, a debriefing session was conducted to give the respondents a chance to ask anything bothering them. After the study, the researchers prepared a letter of appreciation for the respondents, and it was dispatched to the participants through their messenger accounts. Finally, the recommendation was offered where the study outcomes seemed to warrant it or when questions had to be asked to avoid creating confusion and enhance understanding of the research study. This must have meant that there may be cases of conflict of interest between the members and this must be dealt with professionally. The researchers ensures that the critique given to all participants is constructive and should encourage an open discussion by trying to get the consent of the majority in all situations to produce the best end results.

TABLE 3 Demographic profile of the athletes.

Profile	Levels	n	%
Age	12 years old	2	15.38
	13 years old	2	15.38
	14 years old	6	46.15
	15 years old	3	23.08
Total		13	100
Height	140–149 cm	8	61.54
	150–159 cm	4	30.77
	160 cm and above	1	7.69
Total		13	100
Weight	30–39 kg	4	30.77
	40–49 kg	6	46.15
	50 kg and above	3	23.08
Total		13	100

Since the participation of the Futsal athletes of the chosen group is voluntary, there were no monetary gains for their participation, and they only implement the training program for enhancing dribbling agility of the Baybay Jaguars Team's athletes. However, showing gratitude as a form of appreciation of their willingness to participate in the study.

3 Results

In selecting the participants of this study, they were chosen based on the category of 'fair' and 'poor' classification in the screening using the Illinois Agility Test. Out of 14 futsal athletes, only 13 were selected to participate in the study. **Table 3** presented the demographic profile of the participants in terms of age, height, and weight. As seen in the table above, majority of the participants aged 14 years old with the percentage of 46.15%, 23.08% were aged 15 years old, and a total of 15.38% were aged 12 and 13 years old.

Moreover, a total of 8 (61.54%) participants were 140–149 cm tall, four participants were 150–159 cm tall with the percentage of 30.77%, and one (7.69%) participant was 160 cm tall and above. In weight, there are four (30.77%) participants weighed 30–39 kg, six (46.15%) of the participants weighed 40–49 kg, and a total of three (23.08%) participants weighed 50 kg and above.

Table 4 shows that in pre-test, the average agility is 24.51 s, with a standard deviation of 1.31 s. For post-test, the average agility is 20.50 s, with a standard deviation of 2.34 s. It is evident that the post-test has a lower recorded time which indicates a better agility performance than the pre-test.

Before the implementation of the modified agility training drills, a significant number of eight participants were classified as 'poor' with the percentage of 61.54% with the dribbling agility level between 24.0 and 26.9 s while five of the participants belongs to the classification of 'average' with the percentage of 38.46% with dribbling agility level between 22.0 and 23.9 s. However, after conducting the modified agility training program, it is observed that there is a significant improvement in the athletes' dribbling agility with having a significant number of seven participants (53.85%) classified as 'good' with dribbling agility level between 19.0 and 21.9 s, a total of two (15.38%) participants were classified as 'excellent' with the dribbling agility level of less – 18.9 s, and four of the participants (30.77%) were classified as 'average' from 'poor' classification. The result clearly shows that the modified agility training program improved the dribbling agility of futsal athletes. The result coincides in the study of [Barbieri et al. \(2016\)](#) wherein specialized futsal training programs have been found to enhance agility and other physical aspects.

Figure 2 shows a clear and consistent downward trend in the average time it took athletes to complete the agility drill over the course of the six-day training program. The average time started at 25 s on Day 0 (the pre-test) and steadily decreased each day, finishing at 20.50 s on Day 6 (the post-test). This steady decline demonstrates that the athletes' agility improved throughout the training, as they were able to complete the dribbling course faster and more efficiently with each session. The graph provides a visual representation of the positive impact of the modified training drills.

Figure 3 compares the individual agility times for all 13 athletes during the pre-test and post-test. Each pair of bars represents a single athlete. The key takeaway is that every single athlete improved their performance, as shown by the fact that every "Post-Test" bar is shorter than its corresponding "Pre-Test" bar. This indicates a consistent and across-the-board reduction in the time taken to complete the dribbling agility test after the training intervention. The graph visually confirms the study's finding that the modified training drills were effective for all participants, leading to a statistically significant improvement in overall dribbling agility.

Table 5 shows the result of the Wilcoxon signed rank test on the difference in dribbling agility performance of athletes before and after the modified training drills. The difference in post-test and pre-test is 4.01 s, which indicates that, on average, athletes decrease their time by approximately 4.01 s after the modified training drills, which implies that the athletes improved their dribbling agility as a lower time completion indicates a better performance. Since the p-value, 0.000000198, is way less than the standard significance level of 0.05, we can reject the null hypothesis. The result shows that there is a positive impact of the modified drills and varied agility training on the futsal athletes' dribbling performance. The result is supported by the tables presented in **Tables 4, 5**, wherein the dribbling agility of the athletes improved after the training drills, and the average time completion in the post-test is lower than the pre-test, which indicates a better dribbling agility performance. According to the

TABLE 4 Level of dribbling agility of athletes before and after the modified training drills.

Test	Mean (seconds)	Standard deviation (seconds)	Quali D
Pre-Test	24.51	1.31	Poor
Post-Test	20.50	2.34	Good

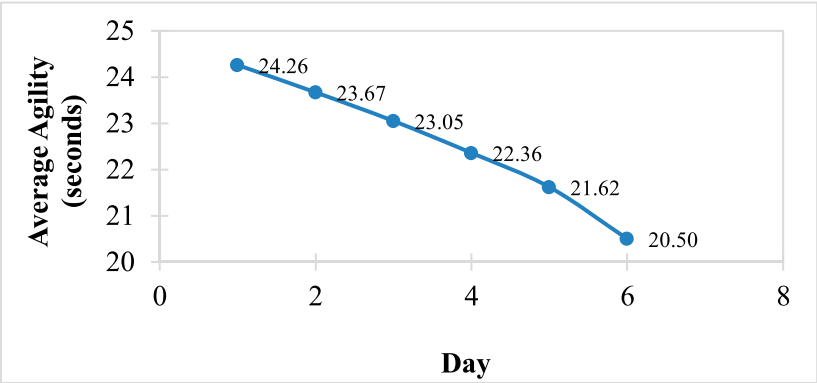


FIGURE 2
Average agility (seconds) of athletes during the 6-day training drills.

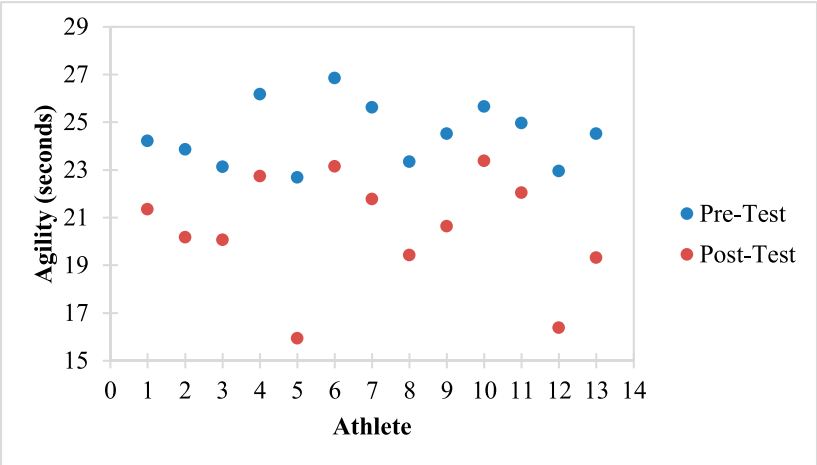


FIGURE 3
Dribbling agility (seconds) of athletes during the pre-test and post-test.

TABLE 5 Wilcoxon signed rank test.

Test	Mean (seconds)	Difference (seconds)	Test statistic	p-value
Pre-Test	24.51	4.01	10.562	0.000000198
Post-Test	20.50			

study of [Hidayat \(2019\)](#), results concluded that Agility Ladder Training influenced the dribbling agility of the futsal students in a university.

[Table 6](#) shows that age and height have no significant relationship while, the weight had significant relationship with the levels of dribbling agility. After conducting their training drills and documented their demographic profiles, the results indicate that levels of dribbling agility are not associated or affected whether an athlete is old or young, and tall or short. However, the result in weight infers that the levels of dribbling agility of the athletes was affected by whether they were light or heavy. Based on the levels of correlation and their corresponding

interpretations ([Table 2](#)) that is adapted from [Sanli \(2019\)](#), there is a strong positive correlation between level of dribbling agility and weight wherein as the weight increases, the level of dribbling agility also increases. This result can be supported by the study of [Dhapola and Verma \(2017\)](#), in which the study demonstrated that there is a significant relationship with a strong positive correlation between body weight and agility. With this result, future researchers should consider factors like weight in evaluating modified training drills using dribbling agility.

[Table 7](#) presents the standard scoring norms for the Illinois Agility Test, a widely recognized assessment used to measure

TABLE 6 Test for association between athletes' demographic profiles and their level of dribbling agility, measured through seconds.

Profile	Correlation coefficient	p-value	Interpretation
Age	0.153 ^{ns}	0.617	No significant association
Height	0.457 ^{ns}	0.116	No significant association
Weight	0.762 ^s	0.002	Significant association

ns, not significant; s, significant.

TABLE 7 Standard test norm of Illinois agility test.

No.	Norm	Time/Seconds
1	Excellent	Less 17.0
2	Good	17.9–17.0
3	Fair	21.7–18.0
4	Poor	23.0–21.8

(Source: Widiastuti, 2015:141).

TABLE 8 Standard test norm of illinois agility test before and after the modified training drills.

Norm	Time/Seconds	Before		After	
		n	%	n	%
Excellent	Less 17.0	0	0	5	61.54
Good	17.1–17.9	0	0	8	38.46
Fair	18.0–21.7	9	69.23	0	0
Poor	21.8–23.0	4	30.77	0	0
Total		13	100	13	100

Source of Norm: Widiastuti, 2015:141.

general agility. It classifies performance into four levels Excellent, Good, Fair, and Poor, based on the time taken to complete the test. The norms show that an “Excellent” rating requires a very fast time of less than 17.0 s, while a time of 23.0 s or slower is classified as “Poor.” This table provides a crucial benchmark for interpreting an athlete’s general agility score by comparing their time against established, standardized performance levels.

Table 8 clearly demonstrates the dramatic improvement in the athletes’ general agility following the modified training program, as measured by the standard Illinois Agility Test. Before the training, the majority of athletes (69.23%) were classified in the “Fair” category, with an additional 30.77% in the “Poor” category. No athletes scored in the “Good” or “Excellent” ranges. After the training, this distribution shifted entirely. All 13 athletes improved their scores enough to move out of the “Fair” and “Poor” categories. The results show that 61.54% achieved an “Excellent” rating and 38.46% achieved a “Good” rating. This table provides strong evidence that the modified training drills were highly effective in enhancing not just dribbling-specific agility, but also the players’ overall agility.

4 Conclusion

The study involved 13 athletes of which 15% were 14 years and above with the rest of the age group having the following distribution. Majority of the participants have a height of 140–149 cm; 61.54% and weight of 40–49 kg; 46.15%.

The results of the before and after implementing the modified training drills shows that it has an apparent improvement of performance. In pre-test, the average agility is 24.51 s, with a standard deviation of 1.31 s while for the post-test, the average agility is 20.50 s, with a standard deviation of 2.34 s. The post-test has a lower recorded time which shows a better agility performance than the pre-test.

The data shows that there is an improved dribbling agility of the futsal athletes in results of participating in the modified agility training program. Before the implementation of the modified agility training drills, eight participants were classified as ‘poor’ with the percentage of 61.54% with the dribbling agility level between 24.0 and 26.9 s while five of the participants belongs to the classification of ‘average’ with the percentage of 38.46% with dribbling agility level between 22.0 and 23.9 s. After conducting the modified agility training program, it showed a great improvement in the athletes’ dribbling agility with having seven participants (53.85%) classified as ‘good’ with dribbling agility level between 19.0 and 21.9 s, a total of two (15.38%) participants were classified as ‘excellent’ with the dribbling agility level of less – 18.9 s, and four of the participants (30.77%) were classified as ‘average’. The WSR test proved that there was a statistical significance difference in the agility performance of the players with the $p < 0$. Hence, according to the obtained t value 0.000000198, which is below the significance level of 0.05. This therefore implies of a positive influence of the training drills.

The Spearman’s correlation test that was used to test the association of demographic profiles and levels of dribbling agility resulted to the following finding: age and height have no significant relation while, weight had a significant relationship with the levels of dribbling agility.

Based on the results of the study, employing modified agility training program has a notable positive impact to the futsal athletes. By applying the statistics, it is evident that those changes are not the results of chance as the obtained p-value is very low. The increase in agility performance by athletes’ moving to the next higher category also points to the appropriateness and efficiency of a training program. By incorporating these drills into their practice, this study succeeds in proving that modified agility training program improves dribbling agility and highlights its value for futsal training.

The null hypothesis H_0 states that there is a negative impact of the modified drills, varied agility training to the futsal athletes' dribbling agility has been rejected. While, the alternative hypothesis H_1 that states that there is a positive impact of the modified drills, varied agility training to the futsal athletes' dribbling agility has been accepted. The findings of this study demonstrate that a structured, modified agility training program significantly enhances dribbling agility in futsal athletes, supported by statistically robust evidence ($p < 0.05$).

However, while the outcomes are promising, several methodological limitations are considered when interpreting these findings. First, the small sample size ($N = 13$) restricts the generalizability of the results, as larger participant groups are typically required to ensure statistical robustness. Second, the absence of a control group makes it difficult to attribute the improvements solely to the training intervention, as external factors (natural development, concurrent training, or placebo effects) could have influenced the results. Third, weight was identified as a significant factor affecting agility, yet potential fluctuations in participants' weight during the study were not monitored, possibly confounding the relationship between training and performance. Lastly, measurement biases, such as tester subjectivity or environmental inconsistencies, could have influenced pre- and post-test results, though these were not explicitly controlled for.

Despite these limitations, the study provides valuable preliminary evidence supporting the efficacy of modified agility drills in enhancing dribbling performance. Future research should address these shortcomings by employing larger, more diverse samples, incorporating control groups, monitoring physiological variables and standardizing measurement protocols. By doing so, subsequent studies can offer more definitive conclusions regarding the impact of agility training on futsal athletes' performance.

Overall, while the findings suggest that modified agility training improves dribbling agility, the methodological constraints necessitate cautious interpretation. Acknowledging these limitations does not diminish the observed improvements but rather underscores the need for more rigorous experimental designs in future investigations.

4.1 Recommendations

1. For a more comprehensive assessment, future researchers better assess the effectiveness of modified training drills, extending the duration of training for at least 4 weeks to see better improvements in dribbling agility.
2. Future researchers should consider factors like weight in evaluating modified training drills using dribbling agility as it affects the agility level among futsal athletes.
3. This study recommends that all sports should include agility training drills to their conventional training to help contribute to the optimization of their athletic performance.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by Kevin R. Sumayang Visayas State University. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

MM: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review and editing. ML: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review and editing. JS: Methodology, Validation, Writing – review and editing. JD: Investigation, Methodology, Project administration, Writing – review and editing. MU: Conceptualization, Investigation, Methodology, Writing – review and editing. LG: Data curation, Supervision, Validation, Writing – review and editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The author(s) declare that Generative AI was used in the creation of this manuscript. There are some sections in the manuscript that was improved and made the explanations concise using AI.

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