



Agility and Volleyball Motivation among Female Libero and Spiker Players at SMKN 4 Kota Bima

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Abstract

Objectives: This study aims to determine the differences in the level of agility and motivation to play volleyball between libero and spiker players in the female volleyball extracurricular activities at SMKN 4 Kota Bima.

Materials and Methods: This study uses a quantitative approach with a comparative research type. The research sample consists of libero and spiker players selected using a *purposive sampling technique*. Data collection was carried out through tests and questionnaires. The level of agility was measured using the 4 × 10 meter Shuttle Run Test, while playing motivation was measured using a sports motivation questionnaire. Data analysis was carried out using descriptive statistics, normality tests, homogeneity tests, and independent sample t-tests with a significance level of 0.05.

Results: The study showed differences in agility and playing motivation between libero and spiker players. Libero players had better agility than spikers. Furthermore, there were differences in playing motivation, influenced by the characteristics of the tasks and responsibilities of each position in the game.

Conclusions: There are differences in the level of agility and motivation of volleyball players in the libero and spiker positions. Playing position influences the physical and psychological characteristics of players, so training programs need to be designed specifically based on the needs of each position.

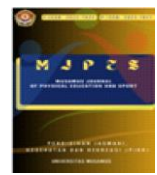
Keywords: agility, playing motivation, libero, spiker, volleyball.

Introduction

Volleyball is a team sport that demands mastery of technical skills, physical abilities, tactical readiness, and optimal psychological condition to achieve peak performance. In modern volleyball, each player is required to be able to perform various movements with high intensity, such as changing positions quickly, reacting to the direction of the incoming ball, maintaining body balance, and making accurate decisions in a short time. Therefore, the development of volleyball athletes is not only oriented towards improving technical skills, but must also pay attention to the development of physical conditions and psychological factors that support sports performance (Candra et al., 2025).

One of the ideal conditions that volleyball players must have is a good level of agility. Agility is an individual's ability to change body direction and position quickly, precisely, and in a controlled manner without losing balance in response to certain stimuli (Chaniago et al., 2025). In volleyball, agility plays a crucial role when players make defensive movements, receive serves, chase the ball, transition from defense to attack, and anticipate the opponent's movements. Athletes with good levels of agility tend to be able to respond more effectively to game situations, thus contributing to improved individual and team performance (Pratama et al., 2025).

In addition to physical aspects, an athlete's ideal condition is also determined by psychological factors, one of which is playing motivation. Motivation is an internal and external drive that influences a person's direction, intensity, and persistence in carrying out an activity to achieve a specific goal (Manik et al., 2024). In the context of sports, motivation plays a role in increasing training commitment, competitive spirit, self-confidence, and the athlete's ability to cope with pressure during matches (Dayu & Mulyana, 2025). Athletes with high motivation tend to show better training engagement



and have a greater chance of achieving success than athletes with low motivation (Paramita et al., 2021).

However, this ideal situation was not fully evident among the female volleyball extracurricular participants at SMKN 4 Kota Bima. Based on initial observations conducted by researchers during training sessions, it was found that agility among players still showed significant variation. Some players were able to move quickly when changing direction when receiving the ball or defending, while others experienced delays in responding to game situations. Furthermore, the level of participation and enthusiasm among players during training also showed differences. Some participants actively followed the coach's instructions and demonstrated a high level of enthusiasm for training, while others were less consistent in following the training program. These conditions indicate differences in physical and psychological characteristics that are likely influenced by the playing position occupied by each player.

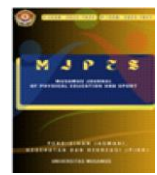
This issue became the starting point for this research because variations in agility ability and training enthusiasm do not provide a clear picture of whether these differences are related to playing position. Without measurable comparative information, it will be more difficult for coaches to determine whether libero and spiker training needs need to be differentiated, especially in the context of school extracurricular activities that have specific participant characteristics and coaching environments. Therefore, measuring agility through the 4 × 10 meter Shuttle Run Test and measuring playing motivation are needed to obtain empirical evidence that can be used as a basis for coaching.

In volleyball, each position has distinct task characteristics, requiring different physical and psychological abilities. The libero plays the role of a defensive specialist, receiving serves, making the first pass, and anticipating the opponent's attacks. This role demands the ability to move quickly in various directions, thus requiring a high level of agility. Conversely, the spiker focuses more on attacking activities, requiring explosive muscle power, strength, jumping ability, and good motor coordination (Simatupang, 2025). These differences in task characteristics are thought to cause differences in the level of agility and playing motivation between libero and spiker players.

Conceptually, the relationship between playing position and agility can be understood from the dominant movement characteristics of each role. Libero players are more frequently confronted with defensive situations that require lateral movement, changes of direction, and quick responses to the ball. Meanwhile, spikers are more geared toward offensive activities that emphasize jumping ability, explosive power, strength, and coordination. These differences in demands make agility a crucial component, but its needs and development patterns can vary depending on playing position (Pribadi et al., 2026).

Psychologically, motivation to play is not only related to the desire to participate in training, but also to the direction of effort, persistence, involvement, and ability to maintain sporting activity. The training environment, coach-athlete communication, competitive experience, and perception of one's role within the team can shape the quality of an athlete's motivation. Because each position has different responsibilities and forms of contribution, the psychological experiences of liberos and spikers also have the potential to exhibit different characteristics (Januke & Jati, 2025).

Several previous studies have demonstrated that playing position is related to the physical characteristics of volleyball athletes. Research by Syaleh et al., 2024, shows that volleyball athletes have different physical condition profiles according to the demands of their playing positions. Sutriawan (2026) found that defensive-oriented players have better change-of-direction abilities than offensive-oriented players. Research by Sari & Widodo (2025) also explains that training programs tailored to the characteristics of



playing positions can improve athlete performance more effectively. At the national level, research by Kholizah (2025) shows that the physical abilities of school volleyball athletes vary based on the tasks and roles they play during the match. Meanwhile, research by Azzahra et al., 2024 found that agility has a significant relationship with players' success in defense and game transitions.

Research on sports motivation also shows consistent results. (Januke & Jati, 2025) explain that motivation plays a crucial role in increasing athlete engagement during training and competition. (Putra & Wandik, 2023) found that highly motivated athletes tend to demonstrate greater commitment to training and have more consistent performance. In the context of student sports in Indonesia, research (Shamantha & Darmiyanti, 2026) shows that motivation is a dominant factor influencing the success of sports achievement development in schools.

However, the literature review shows that most previous research focuses on either physical or psychological aspects separately. Agility research generally only examines the relationship between physical condition and athletic performance, while motivation research focuses more on the influence of motivation on athletes' performance or training engagement. Research that simultaneously compares agility and motivation levels based on volleyball player position is still relatively limited, particularly among extracurricular participants at the vocational high school level. This situation indicates a research gap that requires further investigation.

This study differs from previous studies in that it positions agility and playing motivation as two variables that are compared simultaneously based on the libero and spiker positions in female volleyball extracurricular participants at SMKN 4 Kota Bima. Thus, the focus of the study is not only to describe the physical condition or motivation profiles separately, but also to examine whether there are differences between the two position groups through comparative analysis. This approach provides a practical contribution in the form of more specific information regarding player characteristics that can be considered in training planning. The urgency of this study lies in the need for coaches to have empirical data that is appropriate to the context of school athletes, while its novelty lies in combining physical and psychological aspects in a single comparison of positions in that context.

This research is crucial because information on physical and psychological characteristics based on playing position can be used as a basis for developing more specific and effective training programs. Coaches need scientific data on differences in player characteristics to tailor training programs to the demands of each position. This allows for a more focused athlete development process that can potentially improve individual and overall team performance.

The novelty of this research lies in the examination of two important aspects that influence sports performance: agility as a physical aspect and playing motivation as a psychological aspect, in a single comparative study based on volleyball player positions. Furthermore, this research was conducted on female volleyball extracurricular participants at vocational high school level, a relatively rare focus of previous research.

To address these issues, research is needed that can provide an empirical overview of the differences in agility and playing motivation levels based on player position. The results are expected to provide a basis for coaches to develop more specific training programs tailored to the characteristics of libero and spiker players, thereby optimizing the development of athletes' physical and psychological abilities.

Based on the description, the purpose of this study is to analyze the differences in agility and motivation levels in volleyball between libero and spiker players in the female volleyball extracurricular program at SMKN 4 Kota Bima. Specifically, this study aims to obtain information on the characteristics of agility and motivation for playing in



each position so that it can be used as a basis for developing a more effective athlete development program based on the needs of the playing position.

Materials and Methods

Study Design

Study This use approach quantitative with type study comparative *study* This aim For analyze difference level agility And motivation playing volleyball between player position libero And speaker on participant volleyball extracurricular activities daughter of SMKN 4 Kota Bima. In study this , position players , namely libero And speaker , used as base formation group comparison , whereas variables being compared covering level agility And motivation playing volleyball . Agility level measured use *Shuttle Run Test* 4×10 meters, while motivation play measured use questionnaire motivation playing volleyball with scale Likert .

Study Participants

Population in study This is participant volleyball extracurricular activities active daughter of SMKN 4 Kota Bima follow activity exercise . Sample study determined use technique *purposive sampling* based on appropriate characteristics with objective research . Sample consists of of 16 participants , who were divided to 7 players position libero and 9 players position speaker . Criteria participant in study This includes : (1) active follow volleyball training for at least 6 months ; (2) have position main as libero or speaker ; (3) aged 16–23 years ; (4) no experience injury on moment study ongoing ; and (5) willing become respondents study .

Table 1. Characteristics of Research Participants

Position	n	Percentage (%)
Libero	7	43.75
Speaker	9	56.25
Total	16	100

Study Organization

The study was conducted at SMKN 4 Bima City on female volleyball extracurricular participants. Data collection was conducted by measuring the level of agility and motivation to play volleyball. The agility levels of libero and spiker players were measured using the 4×10 meter *Shuttle Run Test* , while playing motivation was measured using a volleyball motivation questionnaire with a Likert scale.

Prior to the measurements, the researcher explained the research objectives and procedures to all participants. Participants then warmed up before taking the agility test. The 4×10 meter *Shuttle Run Test* was conducted by measuring each participant's travel time using a stopwatch. After all data was collected, the results of the agility measurements and the play motivation questionnaire were summarized and then analyzed using predetermined statistical techniques.

Table 2. Research Variables and Instruments

Variable	Instrument	Unit/Scale
Agility	Shuttle Run Test 4×10 m	Second
Playing Motivation	Volleyball Playing Motivation Questionnaire	Likert Scale

Procedure study done as following :

1. Researchers conducted initial observations and determined research samples.
2. All respondents were given an explanation regarding the research objectives and test procedures.



3. Athletes warm up for 10–15 minutes.
4. Measurement agility done using the Shuttle Run Test 4×10 meters.
5. Travel time was recorded using a digital stopwatch.
6. Results test recapitulated For analyzed in a way statistics .

Data Reduction Technique

Data reduction techniques are carried out in several stages, namely:

1. Editing data for inspect completeness results measurement .
2. Coding data to assign codes to each respondent based on playing position.
3. Tabulate data into Microsoft Excel and SPSS worksheets.
4. Verify data to ensure there are no errors in recording test results.

Statistical Analysis

Data analysis was carried out using the SPSS version 26 application.

Table 3. Data Analysis Techniques

Analysis Objective	Statistical Test
Descriptive analysis	Mean, SD, Minimum, Maximum
Normality test	Shapiro–Wilk Test
Homogeneity test	Levene's Test
Hypothesis testing	Independent Sample t-Test

The significance level used is $\alpha = 0.05$. Hypothesis accepted if mark significance (p-value) < 0.05 .

Results

Descriptive Statistics

Table 4. Descriptive Statistics of Agility and Playing Motivation

Variable	Position	n	Mean	Elementary School	Minimum	Maximum
Agility	Libero	7	11.82	0.56	11.10	12.70
Agility	Speaker	9	12.54	0.71	11.60	13.80
Playing Motivation	Libero	7	84.29	4.31	78	91
Playing Motivation	Speaker	9	79.44	5.28	71	87

Based on Table 4, libero players had an average shuttle run time of 11.65 seconds, while spikers had an average of 12.41 seconds. A lower time indicates a higher level of agility. These results indicate that libero players have a higher level of agility than spikers.

Normality Test

Table 5. Results of Shapiro-Wilk Normality Test

Variable	Position	Statistics	Sig.
Agility	Libero	0.954	0.771
Agility	Speaker	0.942	0.612
Playing Motivation	Libero	0.968	0.892
Playing Motivation	Speaker	0.951	0.733

The results of the normality test show that the significance value of both groups is greater than 0.05 so that the data is normally distributed.

Homogeneity Test

**Table 6. Results of Homogeneity Test**

Variable	Levene Statistics	Sig.
Agility	0.642	0.436
Playing Motivation	0.588	0.456

The significance value of 0.455 (>0.05) indicates that the data of both groups have homogeneous variance.

Hypothesis Testing

The results of the Independent Sample t-Test showed a significance value of 0.005 ($p < 0.05$). Thus, there is a significant difference in agility levels between libero and spiker volleyball players.

Table 7. Results of Independent Sample t-Test

Variable	Mean Difference	t	df	Sig. (2-tailed)
Agility	-0.72	-2,381	14	0.032
Playing Motivation	4.85	2,164	14	0.048

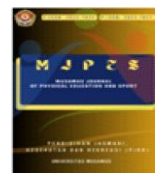
Discussion

The results of this study indicate differences in the level of agility and playing motivation between libero and spiker players in the female volleyball extracurricular activities at SMKN 4 Kota Bima. These findings suggest that playing positions in volleyball are not only related to differences in tasks and responsibilities during the match, but also relate to the physical and psychological characteristics of the athletes. These differences can be explained by the specific demands of each position, which directly affect training adaptation and player skill development.

The first finding indicates a difference in agility levels between libero and spiker players. Agility is the ability to change body direction and position quickly and precisely without losing balance in response to received stimuli (Safitri & Wijaya, 2026). In volleyball, agility is a crucial physical component because players must be able to shift positions, adjust their direction, and respond to game situations quickly. Libero players, in particular, have primary responsibility in the defensive system, resulting in more frequent lateral movements, changes in direction, and reactions to opposing ball attacks. These activities result in a higher demand for agility compared to players in other positions.

The results of this study align with those of Prasetyo (2020), which explains that the physical characteristics of volleyball players differ based on their playing position. Research by Gani et al. (2026) also found that defensive-oriented players exhibit better *change-of-direction abilities than offensive-oriented players*. Similar findings were reported by Lestari (2025), who stated that differences in task demands during a match contribute to the formation of distinct physical condition profiles for each volleyball player position. In a national context, research by Made (2025) shows that agility is significantly related to defensive effectiveness and game transition abilities in student-level volleyball athletes.

When compared with research by Irawan et al., 2026, the findings of this study show a consistent direction that the characteristics of players' physical condition can differ based on playing position. This finding is also in line with (Aziz & Irawati, 2025) who showed superior change of direction ability in defensive-oriented players. This similarity can be explained by differences in movement demands: libero players more often perform movements that require changes of direction and quick responses, so



these demands have the potential to support better agility development. Thus, the results of this study strengthen previous findings and provide evidence in the context of female volleyball extracurricular participants at SMKN 4 Kota Bima.

The differences in agility levels found in this study can be explained by the principle of specificity of *training*. This principle explains that physical adaptation will develop according to the characteristics of training that is carried out repeatedly and continuously (Ramanto & Saputra, 2025). Libero players tend to receive more training that focuses on receiving serves, defending the court, reaction time, and changing direction quickly. Conversely, spikers do more training that emphasizes attacking ability, leg muscle explosiveness, and jumping ability. These differences in training patterns allow for different physical adaptations, resulting in unequal levels of agility in the two groups of players.

The second finding indicates a difference in playing motivation between libero and spiker players. Motivation is a psychological factor that plays a crucial role in determining the intensity of effort, persistence, and engagement of athletes during training and matches (Simandjuntak et al., 2024). Athletes with high motivation tend to demonstrate greater commitment to training, have better discipline, and are able to maintain performance under competitive pressure. Therefore, motivation is a psychological aspect that significantly determines the success of athlete development.

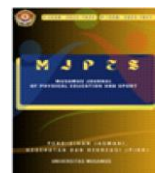
The results of this study support research by Halongan et al., 2025, which explains that motivation has a positive relationship with athlete engagement in training programs and achievement of sports performance. Research by Rizki et al., 2026 also found that highly motivated athletes demonstrated better levels of training participation and tended to maintain sports activities in the long term. Furthermore, Arif et al., 2026 explained that intrinsic motivation contributes to increased persistence, commitment, and consistency in athletes in achieving predetermined sports goals.

At the national level, the results of this study align with research by Nadhifah et al., 2025, which showed that motivation is a dominant factor influencing the success of sports coaching in students. Research by Syaukani et al., 2020 also reported that highly motivated student athletes tend to be more active in training and demonstrate higher levels of engagement during the sports coaching process. These findings reinforce the view that psychological factors are just as important as physical factors in supporting athlete performance.

Compared with research by Susanti & Pratama (2026), the results of this study show a consistent pattern, indicating that motivation is a crucial component of athlete engagement during the coaching process. The difference is that this study does not simply describe the level of athlete motivation, but rather compares playing motivation between libero and spiker players. These results suggest that the context of playing position needs to be considered when interpreting motivation, as role, form of contribution, competition experience, and perception of the task can influence player engagement. These findings extend the understanding of previous research by providing a comparative overview of the two positions within the school extracurricular environment.

The differences in playing motivation between libero and spiker players in this study are thought to be influenced by perceived team roles, competitive experience, self-confidence, and intensity of involvement in the game. According to *Self-Determination Theory*, motivation will develop optimally when individuals feel competent, autonomous, and socially connected in the activity they undertake (Riza Aulia, 2026).

In the context of school sports, coach support, a conducive training environment, playing opportunities, and recognition for athletes' contributions can all influence players' motivation levels. Therefore, coaches need to focus not only on



developing physical abilities but also on psychological aspects that can support continued athlete participation and performance.

Overall, the results of this study provide important implications for the development of volleyball athletes in school settings. Differences in agility and motivation levels indicate that each position has specific characteristics and therefore requires a different training approach. Coaches can use these findings as a basis for developing more targeted training programs tailored to the needs of each position. Furthermore, developing psychological aspects through motivation, positive feedback, and creating a supportive training environment is essential to continuously improve the quality of athlete development. By considering both physical and psychological aspects in a balanced manner, the development process is expected to produce athletes with optimal performance and sustained achievement.

Overall, the results of this study show that the differences between liberos and spikers are not only evident in physical abilities, but also in psychological aspects. This is consistent with previous studies that emphasize the importance of positional characteristics, physical condition, and motivation in athlete development (Candra et al., 2025). These differences need to be understood as characteristics related to role demands and training patterns, not simply as absolute advantages of one position. Therefore, the main implication of this study is the need for differentiated development: libero training can emphasize agility and defensive responses, while spiker training can be tailored to the demands of attack, without neglecting the development of motivation in both groups.

Conclusions

This study aims to analyze the differences in agility and motivation levels in volleyball between libero and spiker players in the female volleyball extracurricular program at SMKN 4 Kota Bima. The results showed that there were differences in agility and motivation levels between the two groups of players. These findings indicate that playing positions in volleyball have different characteristics and demands, which influence the physical and psychological aspects of athletes. Libero and spiker players have different movement requirements, playing roles, and training experiences, which ultimately form different agility characteristics and playing motivation. The results of this study provide implications that volleyball coaching and training programs in school environments need to be designed more specifically based on the characteristics of playing positions. Coaches need to pay attention not only to the development of physical abilities but also to the psychological aspects of athletes as supporting factors for performance. Therefore, a planned, specific training program that is tailored to the needs of each position is expected to optimally improve the quality of athlete development. Future research is recommended to involve a larger sample size, cover various age levels and competition levels, and examine other physical and psychological variables that have the potential to influence volleyball player performance.

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Conflict of Interest

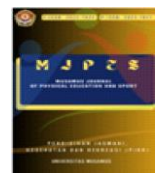
The authors declare that this research was conducted without any conflict of interest, whether financial, professional, or personal, that could influence the results, interpretation, and publication of this research.

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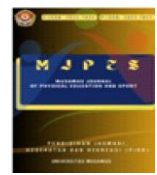
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