Effects of Training Methods and Motor Ability on Overhead Passing Skills in Volleyball Games

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ABSTRACT

This is the experimental study to find out the comparison of two training methods to improve the skills of passing techniques for playing volleyball. The training method consists of the powerful opponent training method and the passive opponent training method. This study also aims to determine the interaction between the training methods and motor skills on the passing techniques in the volleyball game. Motor skills consist of high motor skills and low motor abilities. This research was conducted at the volleyball court, Faculty of Sports Science, Universitas Negeri Makassar academic year 2018/2019. The experimental method involved 80 students divided into four groups. The data analysis technique is a two-way analysis of variance (ANOVA) and then followed by the Tukey test ($\alpha = 0.05$). There are four conclusions in this study. Firstly, the skill of passing techniques in the volleyball game using the powerful opponent training method is better than using the passive opponent training method ($FA = 80.003 > Ftable = 4.113$). Secondly, there is an interaction between the training methods and motor skills with the passing techniques in the volleyball game ($FAB = 20,763 > Ftable = 4,113$). Thirdly, the students who were trained using the powerful opponent training method were better than those who used the passive opponent training method. And the fourth conclusion regarding the low motor ability group. The result of a passive opponent training method was better than the active group.

Keywords: Training method, motor ability, overhead pass volleyball

1. INTRODUCTION

In South Sulawesi, volleyball is a sport that is in high demand by students and the community. Almost all education facilities provide a volleyball field, but the terms of coaching are still less systematic. On the other hand, the quality of coaches is still classified as an amateur. Most of them do not have a local trainer certificate, so that it is very difficult for them to be active in the national level. The less qualification of trainers causes less achievement of athletes. They diligently train, but without methods and strategies that lead to the goals to be achieved. Facilities and infrastructure standards that are less supportive and unscheduled routine championship calendars make opportunity to gain experience in playing is very lacking.

Consequently, it has an impact on the development of achievement, which is very slow. Another case is seen in various provinces on Java, with an excellent coaching system, professional coaches and a routine championship calendar. Java Island is best known in Indonesia as a producer of national volleyball player because of many volleyball events exist such as fellow student championships, inter-club championships, inter-student championships, and inter-company championships. This also supported by the existence of sponsors for this sport.

The game of volleyball as a sport has specific basic techniques, such as; (1) Serve. In volleyball, the accurate serve is needed. A serve is the opening act of an attack. Otherwise, it can make it difficult for your opponent to receive the service. (2) Pass. Pass over in volleyball is a crucial thing to master. In an attacking state, more passing techniques are used to give feedback to friends who are ready to attack (smash), while the lower passing is used more in a state of defense. Other basic techniques are (3) Smash. In the volleyball smash game, it is imperative to get points. Stable and accurate smashes are needed so that they are not easy to block opponents. The last basic technique is (4) Block. This blocking technique is used to prevent the opponent's attack. In volleyball games, to get points must go through a deadly attack (smash), but without the support of a mature bait, the fatal shooting will not be realized. Thus the passing technical skills are essential to master in volleyball games [1].

The quality of an athlete's abilities is determined by the development of training strategies and methods. The training result will become more effective and efficient in increasing volleyball game performance. The internal factors also have an essential role in the achievement of sports because each individual is different in their level of motor ability. Zetou et al. [2] explain that a person who is fast in a matter, such as moving a hand or finger, does not mean that he is also fast in another motor appearance. Thus to direct someone in motor skills must be adjusted to the ownership of motor skills. The volleyball game relies on reaction, movement speed, strength, and power so that it requires motor skills.

The central theme of this study can be formulated as follows: Unclear training methods in improving the skills of overhead passing techniques, which are needed in the game of volleyball. This might be due to various things, including practicing without proper training methods and strategies. This problem raises the desire of the authors to conduct a study on the application of two compelling and efficient training methods in improving the skills of overhead passing techniques in the volleyball game by involving motor skills. The two training methods in question are the active opponent training method and the passive opponent training method.

The method is a systematic way to smooth the implementation of the learning process or practice in achieving an expected goal. Training is a systematic process of practicing or working. The training or exercise has the limiting time, progressively, and individually enhanced, which leads to the characteristics of human physiological and psychological functions to achieve predetermined goals. The application of training for ordinary people has also been made even though they are not aware of it. For the world of modern sports, the application of practice is carried out through a systematic and continuous process by referring to the training principles and approaches of science and technology. [3]–[5].

The method of active opponent training is a form of overhead passing training in pairs (training with peers and limited by the net) by using the volleyball court as a training ground, to gain skills in passing techniques. This form of active opponent training requires the opponent to play as a control or as an active aid in conducting overhead passing procedures for volleyball because the ball that comes depends on the opponent. This means that the coming ball needs to be anticipated first before choosing the right response.

A passive opponent method is a form of overhead passing overtraining using the walls as a training tool for players. In passive opponents exercises, the ball must be passed to the wall. The player must pass the ball to the wall target. Furthermore, the upper passing process is repeated according to the rhythm of the movement and ability of each player.

2. RESEARCH METHODS

The method to be used in this study is an experimental method with a 2x2 factorial design (Table 1).

Table 1. Factorial Design 2x2

Drill method (A) — Motoric Skills (B)	Active opponent (A1)	Passive opponent (A2)
High (b1)	A1B1	A2B1
Low (b2)	A1B2	A2B2
Total	A1	A2

Note:

A1 B1: Sample groups with high motor skills are trained with active opponent training methods (AOTM)

A2 B1: Sample groups with low motor skills are trained by active opponent training methods (AOTM)

A1 B2: Sample groups with high motor skills are trained with passive opponents training methods (POTM).

A2 B2: Sample groups with low motor skills are trained by passive opponents training methods (POTM).

The sampling technique in this study is the essence of quantitative research. For survey research, as in correlational studies, researchers only need to draw a sample once. Whereas in experiments, for example, with a 2x2 factorial design, researchers can bring a sample twice from the same population because the aim is to compare it as an influence. The procedure for obtaining high and low component groups in both methods is: First, take 27% of the total score (for group methods A and method B). Second, take the sequence starting from the highest score to the number of samples needed and make the series starting from the lowest score to the number of samples required. Middle scores between the highest and lowest ratings are discarded. In this research, the target population is all students of the Faculty of Sport Science UNM.

The sample in this study was obtained from students who took the volleyball courses as many as 85 students. The determination of the research sample was carried out by a randomized group design technique, namely using 95 randomized people, and 80 samples were taken. Then, from 80 samples were randomized again to determine the 40 samples included in the active opponent training method group and 40 other samples included in the passive opponent training method group. The two groups of exercise methods were tested for their motor skills, and the results were sorted from the highest score to the lowest score.

Scores between high and low motor skills are removed. Thus formed 4 (four) cells from the two groups of training methods, namely: (1) The group of active opponent training methods with a high motor ability

(A1B1). (2) Group of passive opponent training methods with high motor skills (A2B1). (3) Group of active opponent training methods with a low motor ability (A1B2). And (4) Group of passive opponent training methods with a low motor ability (A2B2). Then the first and third groups are trained with the active opponent training method. At the same time, the second and fourth groups are prepared with the passive opponent training method. The treatment was carried out outside of class

hours and the frequency of exercise for each group is 3 (three) times a week for 18 (eighteen) meetings.

3. RESEARCH RESULT

This research revealed four hypotheses, in which all four had to be tested for accuracy by using statistical analysis using a 2 x 2 variance analysis (2 x 2 factorial). In a row, the hypothesis in this study can be expressed as follows:

Table 2. Summary calculation of ANAVA 2x2

Sources of Variation	Dk	JK	KT	F_{count}	F_{Tabel}	P_{Value}
Average Treatment	1	60372.90				
X (Training Method)	1	280.900	280.90	80.003	4.113	0.000
K (Motor Ability)	1	0.900	0.90	0.256	4.113	0.616
X*K (Interaction)	1	72.900	72.90	20.763	4.113	0.001
Eksperimen Error	36	126.400	3.511			
Total	40	60854.00				

Information:
A1 B1: Sample groups with high motor skills are trained with active opponent training methods (AOTM).
A2 B1: Sample groups with low motor skills are trained by active opponent training methods (AOTM)
A1 B2: Sample groups with high motor skills are trained with passive opponents training methods (POTM).
A2 B2: Sample groups with low motor skills are trained by passive opponents training methods (POTM).

The first hypothesis is testing for different skills as a whole in groups that are trained using AOTM and the POTM. Based on the summary results of the analysis of variance analysis, as shown in Table 2 above, it can be seen that the Fcount between columns (FA) = 80.003, looks greater than = 4.113. It appears that the value is higher or P-value = 0,000 <0.05 so that H0 is rejected and H1 is accepted. Thus it can be concluded that the effect between active and passive opponent training methods on the overhead passing skills of students is significantly different. In other words, the upper passing training using AOTM (average = 41.5000 and standard intersection = 2.06474) are better than the results of POTM (average = 36.2000 and save standard = 2.50473). Thus the overall results of overhead passing training on volleyball using AOTM are better than the POTM tested or accepted.

Secondly, the hypothesis testing for interaction between the training methods and motor skills on the passing skills students. Based on the summary results of the analysis of variance analysis, as shown in Table 2 above, obtained interaction (FAB) = 20.763 and = 4.113. It appears that higher or P-value = 0,000 <0.05, so H0 is rejected and H1 is accepted. The achievement of

overhead passing skills is influenced by the interaction between the training methods and motor skills.

The average score of overhead passing skills on volleyball in the group of high motor ability trained with AOTM is 42.7000 and POTM group is 40.3000. For the average rating of passing skills on volleyball, the low motor ability group trained by the active opponent training method is 34.7000 and the passive opponent training method group is 37.7000. Thus the research hypothesis which states that training method and motor ability have an interaction with the overhead passing skills of Faculty of Sport Science students is tested or accepted.

The comparison is continued by comparing between groups one by one to find out more which groups are significantly different and which groups are not significantly different. This test is known as further testing. Further tests were carried out with the Tukey test, because all groups had the same number of samples, so it was necessary to compare the average difference with the various criticisms. Based on the results of data analysis, the Tukey test results are obtained as follows:

Table 3. Summary of the values of the average difference and the critique of overhead passing skills between the sample groups

Sample Grup	Difference Average	Difference Critical	P-value	Information remarks
A1B1 and A2B1	8.40000	0.85375	0.00	Significant
A1B2 and A2B2	6.00000	0.85375	0.00	Significant

Information:
A1B1: Sample groups with high motor skills are trained with AOTM.
A2B1: AOTM trains sample groups with low motor skills.
A1B2: Sample groups with high motor skills are trained with POTM.
A2B2: POTM trains sample groups with low motor skills.

Table 4. Summary the average value of the test for overhead passing skills on volleyball between the sample groups

Sample Group	Average	N
A1B1	42.7000	10
A2B1	40.3000	10
A1B2	34.3000	10
A2B2	37.9000	10
Total	38.8000	40

A1 B1: Sample groups with high motor skills are trained with AOTM.
A2 B1: AOTM trains sample groups with low motor skills.
A1 B2: Sample groups with high motor skills are trained with POTM.
A2 B2: POTM trains sample groups with low motor skills.

4. DISCUSSION

The application of the AOTM is better than the POTM for overhead passing skills on volleyball. It is based on the results of the analysis of variance analysis of 2 x 2 about the difference in coefficient between the two training methods as a whole, namely between columns (FA) = 80.003 is greater than = 4.113. It appears that higher, or P-value = 0,000 <0.05. By looking at other results, the passing skill training overusing the active opponent training method with a value (average = 41.5000 and standard deviation = 2.06474) compared to the result of passing skills training on volleyball using the passive opponent training method with a value (average = 36,20000 and standard deviation = 2,50473). So it was concluded that the method of AOTM was better than POTM. The active opponent training method and the passive opponent training method are well known and are widely used. Both training methods have the same goal.

In contrast, the AOTM is to improve the overhead passing of the volleyball athlete with the coach's decision. The coach regulates the rhythm of the exercise based on the athlete's abilities. On the other side, POTM improves the overhead passing skills following the athlete's level. The different achievement of students drives the demand for effective and efficient training methods. The better performance of students is the reason for the importance of AOTM. In this method, both opponents have to be active during training. The intense train increases their skills. In contrast, the POTM only trained by bouncing the ball against the wall. Thus, it can be recommended that the method of active opponent training is more

suitable to be applied in improving the overhead passing skills of volleyball[6].

Furthermore, from the results of the analysis of variance 2 x 2 about the interaction between the method of AOTM and POTM with motor skills on overhead passing skills over volleyball shows that = 20,763> = 4,113 or P-value = 0,000 <0.05. This interaction illustrates that training is more suitable to be applied to both groups of motor skills. This is due to the results of the Tukey test comparing the active opponent training method with high motor skills and the passive opponent training method (A1B1: A2B1), the P-value = 0,000 <0.05. In other words, the effectiveness of AOTM for high motor skills (mean = 42.7000 and standard deviation = 2.00278) are significantly better than those of POTM. (average = 40.3000 and standard deviation = 1.33749).

The AOTM with the low motor ability and the method of passive opponent training with a low motor ability (A1B2: A2B2), the result of P-value = 0,000 <0.05. In other words, the effectiveness of the POTM with a low motor ability (mean = 37.9000 and standard deviation = 0.1.449443) is significantly better than the AOPM (average = 34.7000 and standard deviation = 2.45176). It means that the training methods and motor skills together affect improving overhead passing skills on volleyball. In high motor abilities, which are trained using the AOTM, they get higher passing results on volleyball compared to the group of athletes with the same motor abilities. They are trained using the passive opponent training method. In the athlete group with low motor ability who were trained by POTM obtained higher skills compared to the group of athletes with low motor ability abilities and were trained by AOTM. This shows that the effect of the training method is related to the motor skills of athletes who follow the overhead passing skills training on volleyball.

The following explains the interaction (relationship) of the active opponent training method and the passive opponent training method and the motor ability for overhead passing skills on volleyball. That the two methods of training above can improve overhead passing skills on volleyball because both of these training methods directly train with the point. Even though they have high and low motor skills, they have positive interactions in improving overhead passing skills on volleyball. Following the results of the analysis above, the two training methods have interactions where both ways of training can influence overhead passing skills on volleyball after being given training following the principles of practice.

Thus it can be concluded that for those who have high motor skills, it is more suitable to be trained using active opponent training methods. In contrast, the athlete with low motor skills is better suited to be prepared with POTM. This method can improve their overhead passing skills on volleyball.

The application of the AOTM is better than the POTM for overhead passing skills on volleyball for the group of high motor skills. The Tukey test proved this. The AOTM has a high motor ability (A1B1) compared to the POTM group that has high motor ability (A2B1). The result is P-value = 0,000 <0.005. The AOTM (average = 42.7000) is significantly better than the POTM (average=40.3000) for group with high motor ability. Both the active opponent training method and the passive opponent training method have the same goal which is to improve the overhead passing skills of volleyball. For this, both exercises are suitable for improving the overhead passing skills of volleyball because one of the main supporting factors is in increasing the overhead passing skills of volleyball. However, the two methods of training also each have differences in terms of implementation. The method of exercising active opponents in its implementation, researchers provide practice on how to pass the ball in pairs following the instructions of the researcher. While the passive opponent's training method in its implementation, the researcher gave an example or practice of how to pass the volleyball directed towards the wall. Then the sample follows what was instructed by the researcher. It can be seen that after being given both these exercises, the average value of achievement in AOTM is higher than the sample group trained using POTM even though both groups have similar high motor skills. It can be recommended that for athletes who have high motor skills, the AOTM is suitable to be applied in improving the overhead passing skills of volleyball.

The application of the POTM is better than the AOTM of overhead passing volleyball skills on low motor skills. The results of the Tukey test evidence this, the group method of AOTM that has low motor ability (A1B2) compared to the group of POTM that have the low motor ability (A2B2), the result of P-value = 0,000 <0.05. In other words, the sample group that has the low motor ability and the effectiveness of the POTM (mean = 37.9000) is significantly better than the active opponent training method (average = 34.7000).

Both the active opponent training method and the passive opponent training method have the same goal which is to improve the overhead passing skills of volleyball. For this, both exercises are suitable for enhancing the overhead passing skills of volleyball because they are one of the main supporting factors in increasing the overhead passing skills of volleyball. The method of exercising active opponents in its application gives researchers the practice of passing over in pairs.

After doing the practice, the researcher finishes giving the athlete practice following the passing over that has been demonstrated. The athlete must pass over repeatedly according to the instructions of the researcher. While the passive opponent's training method in its implementation the researcher gave an example or practice of how to pass over by bouncing the ball against the wall correctly. Then the students follows what was instructed by the researcher. It was seen that the group with low motor skills obtained better achievement by using POTM. The overhead passing skills obtained the average value of the sample group trained using the POTM was higher than the sample group trained using the AOTM. Although both of these groups have low motor skills[7].

Overall, the result of the study is a reference for the coach to improve the overhead passing skills of volleyball. It is advisable to use active opponent training methods and passive opponent training methods regularly. Furthermore, the coaches of volleyball play in training basic techniques, especially overhead passing should involve elements of motor ability in the assisted athletes. Especially for the volleyball club, they need to facilitate learning facilities and infrastructure so that problems do not occur that can hamper the training process.

5. CONCLUSION

The AOTM gives a better influence than the POTM on overhead passing skills on volleyball. Furthermore, there is an interaction between the training methods and motor skills with the overhead passing skills on volleyball for students. The high motor ability group that is trained using AOTM gives a better influence than POTM. While the low motor ability group that is trained by using the POTM gives a better effect than the AOTM.

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