

## Influence of Small-Sided Games and Motor Ability in Performance Games Development

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### Abstract

The purpose of this study is to be able to determine whether there is an influence of small sided games and motor ability on athlete performance in volleyball games. The method in this study is an experimental method where the design of this study uses factorial design. The results of this study show that small-sided games training methods, block system programs and random system programs have a significant effect on games performance, small-sided games training has interactions with motor ability that have different effects on games. While the small-sided games training method block system and random system programs have a significant effect on games performance in the high motor ability group, small-sided games training methods, block system programs and random system programs, do not have a significant effect on games performance in the low motor ability group. So that in providing volleyball training programs, especially the random system program, it should be given to athletes who have high motor ability. But for low motor ability can be used both programs, both block system programs and random system programs.

**Keywords:** Performance Games, Small-Sided Games, Motor Ability, Volleyball Information System

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## 1. INTRODUCTION

Exercise modifications in volleyball games have been very much given by coaches to be able to improve the motor skills of athletes (Nia et al., 2022). Volleyball is a team sport in which

players have to pass the ball over the net to meet their goals (Palao, Santos, & Urena, 2004). In addition to the advanced physiological skills required for team sports, volleyball players also need advanced technical and precision skills. In addition, athletes often have to prove their quality under intense stress and fatigue (Sheppaerd, Gabbett, & Riggs, 2015). Early in its development, volleyball coaches often used skill tests to assess their athletes' ability in basic game techniques such as receiving (first ball), passing (passing), or jumping (attacking). In addition, coaches get information through early tests that help predict the future success of the players (Idor, Rnon, Ershko, Aayan, & Alk, 2007).

In recent years, an approach called "small sided games" has been developed to incorporate skill and conditioning into games. Young players often find it difficult to maintain classic drills because these types of exercises lack fun and lack experience (education, 2014). Gabbett, Georgieff, Anderson, & Cotton (2006) concluded that skill-based volleyball training improves serve, attitude, serve, accuracy, tipping, and service technique. They also concluded that a small game program should be supplemented with the right amount of energy system training to improve the physiological and anthropometric characteristics of talented junior volleyball players (Services, 2006). Recently, Kristicevic, T., Madic, D. & Krakan. I. (2016) Found the same influence between small games and teaching exercises in improving the skill accuracy of junior volleyball players. Decision-making skills and abilities are essential for successful players. However, the remaining challenge for long-term athlete development is time spent developing different skills. Therefore, more research is needed to confirm this theory, especially for younger volleyball players. The purpose of this study was to determine the effect of small games and motor skills on the game performance of PBV Pasundan U-17 volleyball athletes.

The game of volleyball is characterized by a large number of changing situations in which players perform various actions that seek to score points, to the point of avoiding making mistakes and losing points, which clearly leads to a conflict of goals (Alfonso, Mesquita, Marcelino, & Antonio, 2010). The outcome of the match depends on the various elements of the game, and the score depends on the quality of the opponent's attack, blocks, serve and the number of errors (Zetou & Tsigilis, 2006). Volleyball players usually make attacks with high jumps over the net. The players' maximum range ability to perform jumps on attacks and vertical block jumps is decisive for their effective actions (Grgantov & Jurko, 2006). This ability is an important indicator in the process of selecting early volleyball players. Saavedra (2013), in their study of volleyball players aged 14-17 years revealed significant differences between the winners and the losers, based on the level of serve, dig and cleanliness of the players' spikes. Adef, Abd, Cef, & Ad, (2017) observed that the chances of scoring points in elite volleyball junior teams are significantly affected by fast and powerful attacks.

Relevant studies have largely focused on determining the relationship between the specific motor skills of volleyball players and their ability to attack, block and receive that can determine outcomes (Adef et al., 2017). Many of these authors have emphasized, first of all, the correlation between the abilities of individual players and certain elements of the game of volleyball. A stronger correlation can be interpreted as a motor determinant of the player's efficient actions. However, the available literature has no report on the relationship between the entire set of volleyball motor skills and performance efficiency (Mroczek, 2017). It seems that the relationship between a certain motor ability and efficiency, can hypothesize that the efficiency of attack, block and service is determined by certain motor abilities. Motor skills are an integral part of sports performance and achievement. The term motor ability has been used synonymously

with 'physical fitness'. But it is different, because the modern definition of physical fitness takes into account not only the components of motor fitness but also the components related to health. Basic movement efficiency, involving elements such as agility, speed, flexibility and strength. The motor capability for generally known performance is strength. Motor abilities for generally known performance are strength, speed, power, agility, flexibility, reaction time, speed of performance, balance, and coordination. In most sports, other factors such as physical skills, training, rest, and nutrition of athletes are the same. It is important to note that performance in motor abilities depends largely on the health status of each individual (Grgantov & Jurko, 2006).

For the successful implementation of volleyball games, an information system is needed that can support the course of the game and act as a tool that can provide information desired by the community. Controlling the quality of the competition, in addition to recording the results of matches and creating tables with team rankings, includes recording information about all parties participating in the competition: Clubs, teams, players, coaches and referees are essential. This is useful for ensuring that data storage is done in an organized, searchable, and not redundant manner. The Volleyball Information System (VIS) subsystem for competition management allows league competitions to use algorithms (Humski & Skocir, 2011). The public information subsystem includes the ability to publish news on any site belonging to the system, the ability to publish documents in various parts of the document repository, the ability to publish the results of any competition and the current team. Rankings, the ability to see last season's results and the ability to view information about clubs, teams, players, coaches and dismissals. Each organization takes part of the overall task of ensuring quality control. In relation to the division of organizational tasks, it is necessary to build an information system that will support the work of each functional unit. This is achieved through the implementation (or implementation process) of a separate web portal. Each functional unit consists of an administrative section in which authorized users can enter information in accordance with the rights granted to the system to perform assigned tasks. The system is developed using modern technologies such as PHP, MySQL, JavaScript, Ajax and others (Humski & Skocir, 2011).

Referring to the discussion above, the author who is one of the best volleyball match statistics team personnel owned by the national volleyball organization or what we usually call PBVSI (Indonesian Football Association), has concerns about the success of volleyball games in several amateur and professional level teams/clubs. Especially on the basic technique of each individual athlete himself. The results of the match statistics show weaknesses in the basic technique, because this basic technique is the main capital in the game of volleyball. In modern volleyball games, basic techniques are one of the strategies to determine attacks and can also be weaknesses that will be utilized by the opposing team in achieving victory.

## **2. METHOD**

### **2.1 Participants**

The participants used were U-17 PBV Pasundan Bandung volleyball athletes aged a maximum of 17 years old totaling 48 people who were placed into four groups, each group of 12 people with the criteria of still being active in training.

### **2.2 Research Design**

This study aims to examine the interaction of the influence of small sided games and motor ability on games performance based on motor ability and researchers provide treatment

(treatment) with the application of an exercise program in the form of small sided games based on parameter test results to determine groups, therefore the research design used in this study is experimental factorial design 2x2 (Fraenkel et al., 2012).

### 2.3 Instruments

The research instrument is a match device in the form of official statistical software used by FIVB (Federation Internatinal Volleyball) to collect match statistics data.

### 2.4 Procedures

This study was conducted as many as 12 meetings in accordance with previous studies where in one training session it was carried out for 60 minutes, with 10 minutes estimated for warming up so that the total time used to carry out the program was 10 hours (Johann et al., 2016).

### 2.5 Data Analysis

In VIS Guidelines Riteria, (2005) explained, FIVB has been developing the Volleyball Information System (VIS) for the past six years. All data were analyzed using Two Way ANOVA analysis.

## 3. RESULTS

The basis for decision making is based on the summary results of the calculation of the Two Way ANOVA analysis in table 4.8, if the significance value with  $\alpha = 0.05$  based on F Table (Sig)  $< 4.06$  then there is no significant difference between the Small-Sided Games training method of the Block System program and the Random System program against Games Performance, and if the significance value with  $\alpha = 0.05$  based on F Table (Sig)  $> 4.06$  then there is a significant difference between the exercise methods Small-Sided Games program Block System and program Random System against Games Performance, it has been known that the significance value of 12,394  $> 4.06$ . Therefore, it can be concluded that there is a significant difference between the training method of the Small-Sided Games block system program and the Random System program against Games Performance.

Hypothesis 1 : There is a significant difference between the exercise method of the Small-Sided Games program Block System and the Random System program against Games Performance

**Table 1.**

*Table Summary Results of ANOVA Two Way Analysis Calculations*

Sumber Variasi (antar)	JK	dk	RJK	$Fh = \frac{RK}{RKD}$	Ft	
					$\alpha = 0,05$	Information
JKA (b)	0,333	1	0,333	0,172	4,06	Insignificant
<b>JKA (k)</b>	24,083	1	24,083	<b>12,394</b>	4,06	<b>Significant</b>
JKA (bk)	36,750	1	36,750	18,912	4,06	Significant
JKD	85,5	44	1,943	-	-	-

Total (R)	146,667	47	-	-	-	-
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Hypothesis 2: There is an interaction between the Small-Sided Games training method and Motor Ability which has a different influence on Games Performance.

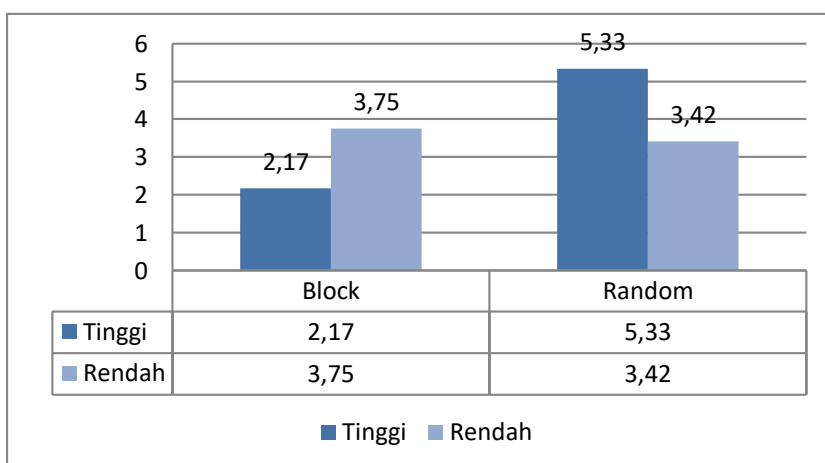
**Table 2.**

*Table Summary Results of ANOVA Two Way Analysis Calculations*

Source						Ft	
Variations (inter)	JK	dk	RJK	$Fh = \frac{RK}{RKD}$	$\alpha = 0,05$	Information	
JKA (b)	0,333	1	0,333	0,172	4,06	Insignificant	
JKA (k)	24,083	1	24,083	12,394	4,06	Significant	
<b>JKA (bk)</b>	36,750	1	36,750	<b>18,912</b>	4,06	<b>Significant</b>	
JKD	85,5	44	1,943	-	-	-	
Total (R)	146,667	47	-	-	-	-	

**Figure 1.**

*Graph Analysis of Interactions Between Small-Sided Games Exercise Methods and Motor Ability*



#### 4. DISCUSSIONS

The exercises used in this study are small-sided games, one type of exercise that aims to improve volleyball mastery and volleyball player skills (Putra et al., 2016). Small sided games are practice games played with less than 6 players on a smaller court (Mubarok, 2019). The training pattern for small-sided games is achieved through the use of the exercise method itself (Wardana et al., 2018). Small sided games are very common in volleyball training because of their versatility (Puriana & Kurniawan, 2019) including the ability to add intensity to the game compared to full court games (Festiawan et al., 2019) in addition to small sided games developing strategic content to play equally better (Mubarok & Mudzakir, 2020). The practice of small sided games provides a strong motivation to improve physical condition and improve game technique and is highly recommended for the training of young soccer players (Roni et al., 2018).

Based on the important theories that form the basis of this research decision, it shows that the relationship between athletes' Performance Games results and Motor Ability is quite strong, so there is an interaction between the Small-Sided Games training method and Motor Ability which has a different influence on Games Performance on volleyball games, and it is known that Games Performance is influenced by Motor Ability. Motor skills are an important component of the expertise demonstrated by athletes and are demanded of individuals performing motion tasks. Motor can be defined as a permanent relative change in behavior, or a person's ability to perform skills that are used as a benchmark for permanent relative performance improvement or the ability of each individual to perform skills that are used as a benchmark for relatively permanent performance improvement as a result of practice or experience.

Based on the results of research, Small-Sided Games has a significant influence on Games Performance, especially volleyball. Small-Sided Games provides a variety of exercise programs about the results of performing skills or about achieving the desired goal, is important information when wanting to master the skills of playing volleyball. In theory, Small-Sided Games provides clarity on the difference between goals and movement results that can then be used by the trainer as a reference to make the exercise program more varied than before. There are some experts who believe that the Small-Sided Games method of amateur volleyball training is the most effective step, arguing that the training program provided corresponds to different motor levels in each individual. By providing the Small-Sided Games method in every exercise carried out does have a good impact to be used as a training guide, because the method provides facts of results during training that has been carried out by individual athletes. There are several problems that occur on the field that are felt directly by the athlete who trains, if the method given does not match the motor level that each individual athlete has, there will be no desired change in skills. Before giving an exercise program to athletes, coaches should do a Motor Ability test using the Thershold Parameters Test as done by the researcher, so that the training material provided is in accordance with the motor portion of each individual.

Motor ability can be trained according to the desired needs and goals with the training method, motor ability provides influence when used for advanced needs such as during matches that require endurance to maintain body condition in order to maintain the level of skill ability that has previously been trained intentionally, in contrast to this study which has the aim of researching the level of mastery of volleyball skills of U-17 athletes with the level of varied skills.

Basically, there are still many things that need to be improved in this stage, so that motor ability will be very influential in volleyball training activities, especially for amateur athletes who are in the learning stage and who are already proficient so that motor performance is maximized.

Based on the study of the implications described in the previous discussion, the evolution of team sports training has been reflected in the increasing uniformity of characteristics of high-level athletes (Laudio & Tanganelli, 2009). The overall kineja of a team sport depends on many factors, which are thought to determine whether to win or lose in each of its tracks (Drikos, Kountouris, Laios, & Laios, 2017). Therefore, there is still some ambiguity in the planning of the training process to improve performance at the time of the competition (Silvia, Marcelino, Lecerda, & JOAO, 2016). Analyzing team performance is important to optimize the training process, and to help develop concepts and strategies that stimulate increased team effectiveness (Afonso & Mesquita, 2011). In general, this helps to improve the quality of exercise which is at least as important as the quantity of exercise (Ericsson & Roring, 2007). If a coach can quantitatively understand how the performance of various skills is related to the number of points scored, the coach can then adjust the team's training schedule to focus on improving the performance of key skills more closely related to point scoring (Miskin et al., 2010). In certain sports such as volleyball, match analysis is an important factor used to evaluate individual and team performance (Zetou & Tsigilis, 2006).

In recent years, researchers have focused on the development of computer systems and technology tracking to analyze, evaluate, and detect game systems because detecting game patterns is difficult (Jimenez-olmedo, Pueo, & Penichet-tomas, 2016). Volleyball coaches are mainly related to how to combine individual skills and individual tactics to allow the entire team to achieve a level of performance that is actually greater than that of individual players, and how to develop the right volleyball strategy for players when facing certain opponents (Lin, 2016). One of the main functions of performance analysis in sports is to provide coaches with standardization and a predetermined monitoring performance system that can be used for the objectification of events (Submitted et al., 2013). For a better understanding of the details of the game, coaches have used statistical reports (Donoghue, n.d.). Through this way they analyze the game based on many factors, one of which is the rotation of the team. This information can help in the training process to increase the lack of efficient rotation (Silva et al., 2017).

## 5. CONCLUSIONS

This study is related to the influence of small-sided games and motor ability exercises in developing game performance is very effective. So that in providing volleyball training programs, especially training programs with a better system, it is given to athletes who have high motor skills. But for low motor abilities, both programs can be used, both block system programs and random system programs.

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