International Journal of Human Movement and Sports Sciences 12(1): 99-105, 2024 http://www.hrpub.org
DOI: 10.13189/saj.2024.120112

The Influence of Mental Training and Playing Circuit-Based Training Program on Student Volleyball Learning Outcomes

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Received September 27, 2023; Revised November 30, 2023; Accepted December 27, 2023

Cite This Paper in the Following Citation Styles

(a): *[1] Yuni Astuti, Syahrial Bakhtiar, Bekir Erhan Orhan, Erianti, Dina Amsari,* Govindasamy Balasekaran, *Zsolt Németh , "The Influence of Mental Training and Playing Circuit-Based Training Program on Student Volleyball Learning Outcomes," International Journal of Human Movement and Sports Sciences, Vol. 12, No. 1, pp. 99 - 105, 2024. DOI: 10.13189/saj.2024.120112.*

(b): *Yuni Astuti, Syahrial Bakhtiar, Bekir Erhan Orhan, Erianti, Dina Amsari, Govindasamy Balasekaran, Zsolt Németh (2024). The Influence of Mental Training and Playing Circuit-Based Training Program on Student Volleyball Learning Outcomes. International Journal of Human Movement and Sports Sciences, 12(1), 99 - 105. DOI: 10.13189/saj.2024.120112.*

Abstract This research was motivated by the need for more application of physical education learning models in the form of games, especially in volleyball learning. It is known that many students feel bored and unenthusiastic when taking volleyball lessons. Apart from that, students find it difficult and are not mentally prepared to carry out volleyball techniques; as a result, they feel anxious or afraid when doing these techniques in front of other friends. This experimental type of research aims to determine the effect of mental training and playing circuits-based training programs on the learning outcomes of elementary school volleyball students. This study included 44 fifth-grade students from 2 classes at Sekolah Dasar Pembangunan Laboratorium Universitas Negeri Padang. Purposive sampling technique was utilised. A pre- and post-test of volleyball skills were determined by volleyball experts. The paired t-test was used to analyze the data. Data analysis revealed that mental training-based training programs and playing circuits affected the learning outcomes of volleyball for elementary school students at Sekolah Dasar Pembangunan Laboratorium Universitas Negeri Padang. Results indicated significant differences between pre- and post-quality basic volleyball technical skills test (pre: highest score: 70; lowest score: 60; average score: 64.09 ± 2.81 vs. post: highest score: 77; lowest score: 65; average score: 68.68 ± 3.09; $p = 0.000$). The learning model based on mental training and playing sequences may improve basic volleyball technical skills and increase students' self-confidence and motivation when participating in learning.

Keywords Skills Based, Sporting Performance, Sports Psychology

1. Introduction

Elementary school education serves a purpose and plays a vital role in the development of human resources. Elementary school students acquire a fundamental learning experience as a provision towards further education and the success of education in the subsequent stage is determined by the success of education in the preceding phase. Physical education and sports are part of the education

system implemented consciously and methodically through various physical activities to enhance physical abilities and skills, physical growth, intelligence, and character. Implementing education as a process in human growth and development lasts a lifetime, and physical education is one of the powerful components to stimulate this growth and development since physical education is strongly associated with human mobility. A substantial contribution to children's growth and development is attainable if physical education and sports learning programs in schools are established properly. These learning programs should include physical and spiritual harmony to prepare the individual to improve physical and spiritual abilities and fitness that could also help develop their personality. Akhmad et al. [1] revealed that the physical education lessons that employ traditional learning strategies indicated low motivation in students, as they are not active in learning that may lead to non-productive student learning outcomes. Therefore, it is necessary for teachers to upgrade their learning methods that may enhance student learning outcomes.

Hence, an exercise program capable of improving students' skills is required to achieve the objectives of physical education in elementary schools, including mental training and playing circuit-based training programs. Training is a type of activity that is done repeatedly for an extended period to achieve the best results. The implementation of the training program must cater to the abilities of the person undergoing training to achieve satisfactory training results. Chandler et al. [2] revealed that training involves the repeated execution of automated skills ranging from simple to complex movements to improve one's physical abilities. Training is, in other words, the actualization or implementation of previously planned training materials or forms.

Mental is the overall structure and psychological processes that are organized consciously and subconsciously. As a result, every psychological component will influence the athlete's strength and mental state. Mental training involves concentration, directing action to a goal according to a plan, and controlling feelings (emotions and thoughts) and psychophysical conditions to increase one's mental fortitude. Mental training is an effort to improve athletes' ability and mental endurance, which encompasses the athlete to develop mental toughness under any conditions, including internal and external obstacles throughout the competition [3], [4]. According to Afacan [5], mental training is a long-term and systematic exercise to develop and learn to control 1) attitude, 2) appearance, 3) emotions and emotional state (mood), and 4) physiological processes. Every athlete constantly confronts the psychological scenario of "hope for success" and "fear of failure". Hence, negative outcomes are relatively easy to overcome through mental training. Monzoni et al. [6], highlighted that mental training, specifically concentration training and personal technical analysis, effectively improves athletes' performance during competition. According to P. Subathra al. [7], mental training has significantly improved aggression and reduced anxiety in sports competitions. Meanwhile, according to the findings of the study, mental skills training in sports significantly impacts athletes' self-confidence.

Furthermore, Jarvis [8] argued that the implementation of mental training can be divided into two stages: the initial and the strengthening/advanced stages. This initial stage is a precursor to mental training, with the primary goal of forming an image of "image building" and preparing physical conditions for the following mental exercise. This stage's mental training includes, among other things, breathing exercises, concentration exercises, imagery or visualization, and image building [9]. These stages of mental development can be accomplished through various systems and techniques. The objectives achieved for each stage can also vary depending on the athlete's physical condition and psychological development, together with the interests of the sport in which the athlete participates.

Meanwhile, in the advanced stage, the objective is to enhance the mental components of the athlete. All mental training techniques must be directed at this advanced stage to strengthen psychological functions related to cognitive aspects (reason), conative (willingness), and emotional affective aspects. Xiong [10] contends that mental training is the primary training for competitive sports and the most crucial part of improving an athlete's abilities and strategies.

This mental training focuses on improving cognitive abilities such as concentration of attention, imagery, reaction speed and accuracy, and mindset restructuring. Mental training for the improvement and ability of the conative aspect (willingness) incorporates willpower training, concentration, contemplation, and relaxation [11]. Enhancing emotional well-being through mental training involves a multifaceted approach, encompassing biofeedback, self-control exercises utilizing self-suggestion techniques, and incorporating meditation to manage emotional symptoms [12]. Kaplan & Andre [13] concluded that getting psychological support during training and competition periods to prevent negative effects of anxiety. Additionally, playing is one of the main focus in physical education that can be used to realize educational goals. Playing can bring children positive physical, psychological, and social changes. Playing is a phenomenon that develops thoroughly in society and is done by almost every human daily. Even so, playing within the context of schoolwork still feels socially unacceptable. A series of games can enrich the learning system and make it more varied.

Furthermore, schools require a variety of materials and delivery methods. Modern education must promote independence, responsibility, material depth, creativity, communication skills, and other social competencies. Therefore, games are required as a form of education and knowledge in learning.

Adi [14] indicated the mental function as a driver, controller, control and command to carry out motor

activities. Learning motor skills and mastering their control is part of psychology's investigation on how students can learn sports skills quickly. The fundamental principles of sports psychology can be used to accelerate skill learning and mental preparation for peak sports performance. If students have pre-existing good mentality, interesting methods are needed to make it easier for them to master sports skills, including the playing sequence method.

Playing circuit is a form of learning method that requires students to be active in carrying out learning activities. Furthermore, a structured play approach allows students to have fun, undergo challenges, stimulate creativity, problem solving and motivates students. Moreover, educators play the role of a director or facilitator to facilitate the process of students' basic movement skills [15], [16]. Based on several expert opinions expressed previously, the importance of an approach or method with playing circuits to be given to students to improve their volleyball technical skills.

The significance of playing in schools is that these games impact learning. Play also allow students to be self-directed and intrinsically motivated to be actively engaged during lessons [17]. Moreover, this would also allow students to positively seek solutions to solve problems. Playing is an essential part of children's lives, and games play an important role in developing a child's personality. Playing is a self-execution effort (both mental and physical) that is exceptionally beneficial for the improvement and development of motivation, performance, and accomplishment in completing the tasks and interests of the organization more effectively. The essence of play is a genuine, voluntary, and enjoyable physical activity. According to Weisgram [18], the game's concept is to develop skills in both male and female students. Higueras-Rodr ǵuez [19] claimed that games have educational value and significant didactic resources. Moreover, Ritonga et al. [20] suggested that the play approach is appropriate for improving elementary school students' basic skills and personality values.

As stated by Kolokoltsev et al. [21], playing is a physical activity carried out voluntarily and earnestly to get a sense of pleasure. The play approach is a method of learning that is performed in the form of a playing circuit or games. According to Chandler et al. [2], the play approach is "learning given in the form or situation of the game." On the other hand, Fenanlampir et al. [22] stated, "The approach to playing in games is to increase students' awareness of the concept of playing through the application of appropriate techniques according to the problem or situation in the real game". Another point of view was expressed by Sucipto et al., [23] Brugnoli [24]: "The goal of teaching through play is to improve students' playing performance by combining playing awareness and the application of basic technical skills into the previous form". In addition, Khalil et al. [25] and Polat et al. [26] conducted research and discovered that physical education teachers were motivated to use playing circuit-based learning as a pedagogical method for teaching. Based on previous research, the authors decided to research the primary material in the education curriculum in elementary schools, which consists primarily of various types of ball games, both in teams and individually. One of the sports in the subject for elementary school students is a volleyball game that implements mental training and a circuit-based training program in the volleyball lesson plans.

Hence, based on previous research and literature reviews, this research aimed to determine the influence of mental training and playing circuits on improving the technical skills of elementary school students in volleyball.

2. Material & Methods

This study is a randomised crossover design. A total of 44 students from 2 classes in Sekolah Dasar Laboratorium Pembangunan Universitas Negeri Padang participated in this study. Participants were randomly assigned to mental training (MT) and control trial (CT). Prior to the intervention, participants performed a pre- and post-volleyball skills test using a target for service and a test for individual passing for 60 seconds and the number of both low passes and overhead passes were recorded. Volleyball experts conducted a quantity and quality test for the evaluation. Purposive sampling technique was utilised. MT was carried out by combining mental training and playing circuit training to improve basic volleyball technical abilities. Participants watched selected YouTube videos of volleyball games for 15 minutes to 30 minutes before they practiced on the field. This allowed students to appreciate what they see and hear and then be able to imagine the technical movements of volleyball when practising on the field. This trains the mental training aspects of the students to think through the movements they watched, concentrate on paying attention to the movements, have the motivation to be able to carry out volleyball technical movements, and become confident in their abilities. Meanwhile, the mental training aspect that is expected in the playing series is that students can work together in a team, be honest in the game, concentrate on making movements, be confident in carrying out every movement given and be able to evaluate these movements.

Participants also underwent a volleyball skill test that utilised a target for service and a test for individuals to pass the volleyball for 60 seconds (number of times for both low passing and overhead passing. Volleyball experts conducted a quantity and quality test for the evaluation. The data was analysed using SPSS paired-t test.

3. Results

Results indicated significant differences between pre- and post-quality volleyball skills test (pre: highest score: 70; lowest score: 60; average score: 64.09 ± 2.81 vs. post:

highest score: 77; lowest score: 65; average score: 68.68 ± 3.09; p = 0.000) (Table 1).

Furthermore, results also revealed significant differences between pre- and post-quantity volleyball skills test (pre: highest score: 22; lowest score: 3; average score: 9.41 ± 4.19 vs. post: highest score: 21, lowest score: 9, average score was 13.23 ± 3.04; p = 0.000) (Table 1). The frequency distribution of the pre- and post-quality volleyball skills and pre- and post-quantity volleyball skills are shown in the tables below (Tables 2 & 3).

Table 1. Pre- and Post-test Results of Quality and Quantity Volleyball Skills

Variables	Pre-test	Post-test	P Value
Quality	64.09 ± 2.81	68.68 ± 3.09	0.000
Quantity	9.41 ± 4.19	13.23 ± 3.04	0.000

Values are in mean ± standard deviation (SD). Pre- and post-test; quality; quantity.

* Indicates significant difference between pre- and post-test (p<0.005).

Table 2. Frequency Distribution of Preliminary Test Data Results and Final Tests of Student Volleyball Skills Based on the Quality

Interval Class	Category	Preliminary Test		Final Test	
		Absolute Frequency	Relative Frequency	Absolute Frequency	Relative Frequency
> 72	Very Good	0	0	2	9,09
68 – 72	Good	0	0	11	50
65 – 67	Moderate	8	36,36	9	40,91
61 – 64	Poor	12	54,55	0	0
< 61	Very Poor	2	9,09	0	0
Total		22	100	22	100

Table 3. Frequency Distribution of Preliminary Test Data Results and Final Tests of Student Volleyball Skills Based on The Quantity

Interval Class	Category	Preliminary Test		Final Test	
		Absolute Frequency	Relative Frequency	Absolute Frequency	Relative Frequency
> 18,1	Very Good	1	4,5	2	9,09
13,7 – 18,1	Good	1	4,5	6	27,27
9,1 – 13,6	Moderate	7	31,82	13	59,09
4,4 – 9,0	Poor	12	54,55	1	4,5
< 4,4	Very Poor	1	4,55	0	0
Total		22	100	22	100

From the results of the normality analysis of the initial test of quality values obtained, the value of sig (0.200) > α(0.05). In comparison, the normality of the final test of quality values obtained sig (0.196) > α(0.05). Meanwhile, from the results of the quantity value obtained, the value of sig (0.200) > α(0.05). The final test value for the quality value obtained was obtained by the value of sig (0.200) > α(0.05). Therefore, it is concluded that the data was normally distributed for all test results. Furthermore, from the results of hypothesis testing, the significant value for 2-tailed is 0.000 analysed by a one-way hypothesis test; the 2-tailed significant value must be divided by two into 0.000: 2 = 0.000. The value of sig (0.000) < α(0.05), therefore, H_0 is rejected and H_1 is accepted. Hence, the ability to utilise basic volleyball techniques after using mental training and playing a circuit-based training program is superior to that of basic volleyball techniques without using mental training and playing a circuit-based training program based on quality and quantity measurements.

Data analysis showed that volleyball skills improved in quality and quantity after being treated with mental training and playing a circuit-based training program. Improving students' technical abilities in volleyball demonstrated that the exercises implemented through mental training-based training programs and playing circuit impacted students positively. Therefore, if mental training and playing circuit-based training program are implemented during students' training programme and/or physical education lessons consistently, students' volleyball skills may continue to improve for the better [27]. Henceforth, the better the implementation of the mental training and playing circuit-based training program provided, the better the volleyball skills of the students, allowing them to achieve a skill they are proud of and participate in competitions such as the student's national sports Olympiad. Mental training and playing circuit-based training program can provide an additional guideline for sports, health, and physical education teachers to improve students' volleyball skills in school coaching.

Mental training is an exercise in which all aspects of the psyche deal with various types of pressure during a match. Mental skills are classified into three categories: (a) fundamental skills, (b) performance skills, and (c) facilitative skills Gumusgul [28]. Mental skills for athletes and coaches are personal development skills and team skills [29]–[33]. Using mental training and playing circuit-based training programs also improves students' basic movement skills, which can help them with volleyball skills, including coordination. Since coordination is essential in all movements, it is a process of muscle cooperation that results in a structured and directed movement that aims to form the movements required to implement technical skills. The greater the cooperation (coordination) of all motion elements involved, the better the motion that can or must be made.

Combining mental training and playing circuit-based training is practical in elementary schools. Elementary school-aged children are more receptive to cognitive and psychomotor learning, this will also aid in developing a holistic individual. The findings of this study are also supported by previous research that focused on volleyball skills training with a playing circuit implemented, which was found to be very effective for elementary school students [34]–[36].

4. Conclusions

Based on the data analysis and discussion findings, it can be concluded that training programs based on mental training and playing circuits should be incorporated during physical activities. The findings of this study revealed that the training program significantly affected the volleyball skills of these students. The results also concluded that the students' ability of basic volleyball techniques after using mental training and performing circuit-based training program significantly improved as compared to performing basic volleyball techniques without intervention. Consequently, coaches, physical education teachers and sports practitioners may consider implementing mental training and circuit-based training programs during training sessions and physical education lessons for athletes and students to improve volleyball skills and overall coordination.

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