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Rote Low Impact Aerobics Dance and Video Low Impact Aerobics Dance Can Increase Concentration in Adolescents

Poppy Elisano Arfanda[a*], Hasmyati[b], Syahruddin[c], Ians Aprilo[d], Arimbi[e], M. Adam Mappaompo[f], Ricardo Valentino Latuheru[g], Puspodari[h], Shidqi Hamdi Pratama Putera[i]

[a,b,c,d,e,f,g] Universitas Negeri Makassar, Indonesia
[h] Universitas Nusantara PGRI Kediri, Indonesia
[i] Universitas Negeri Surabaya, Indonesia

Correspondence: poppy.elisano@unm.ac.id
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Abstract

This study analyzes the differences between the concentration levels of the rote low-impact aerobics dance group and the video low-impact aerobics dance group. The subjects in this study were 36 adolescents aged 18-20 years who voluntarily participated. Subjects were divided ordinal pairing into two groups, namely 18 people in the rote low-impact aerobics dance group and 18 people in the video low-impact aerobics dance group. The duration of the exercise is 30 minutes sessions with an intensity of 50-70% HRmax, and the frequency of exercise is 3 times/week for 6 weeks. Concentration levels were evaluated pretest and posttest the intervention using the Grid Concentration Test. The data analysis used the Independent Sample Test with a significant level ($p \leq 0.05$). The results showed that there was an increase in the average concentration between the pretest and posttest in the rote low-impact aerobics dance group (scores 6.89 ± 2.45 and 9.56 ± 2.64, $p = 0.000$), and the video low-impact aerobics dance group (scores 7.39 ± 2.38 and 9.11 ± 2.45, $p = 0.000$). Based on the pretest and posttest data it was concluded that there was an increase in the level of concentration in both groups, but there was no difference between the rote low-impact aerobics dance and video low-impact aerobics dance on concentration.

Keywords: Aerobic exercise; concentration; rote low-impact aerobic dance; video dance

1. Introduction

Concentration is important in carrying out an activity so that you stay focused and can be completed properly. Along with the development of technology, the ease of all activities has an impact on decreasing one's level of concentration. With advances in technology, one does not need high concentration to carry out activities, because all activities can be recorded and stored in an online database. This will accelerate the decline in a person's cognitive level, which affects concentration. The main problem in this study is the decrease in one's concentration level. This research was conducted to improve concentration through rote aerobic low-impact exercises and video aerobic low-impact exercises.

According to several studies, exercise can improve spatial memory and executive function (Carmen Noguera et al., 2019). Spatial memory has representation in working memory, short-term memory, and long-term memory. Research shows that there are certain areas of the brain associated with spatial memory. Working memory can be described as a limited-capacity system that allows a person to temporarily store and process information. This temporary storage allows a person to complete or work on complex tasks while still being able to remember information. Short-term memory can be described as a system that allows a person to temporarily store and manage the required information. Working memory is often used synonymously with short-term memory (Diamond, 2013).

Aerobics is an activity that refers to the use of oxygen in the body's metabolic processes or energy generation (Nelson et al., 2022). Aerobic exercise is one of the most popular sports in the last few decades because it is classified as a group exercise, fun and non-competitive (Aikawa et al., 2021). Aerobics dance emphasizes the coordination of movements with the selected music (Rokka et al., 2019). Aerobic dance also involves attention, memory, sensory stimulation, and social interaction. Aerobics is a good exercise to improve cognitive ability, mood, and physical function (Wong et al., 2020). The more specific concentration of the mind in practice and competition can affect attention and concentration during sports activities. Someone who can train his concentration, then he will be able to control negative things that affect concentration during training and matches (Manikam, 2021).

Aerobic dance is gymnastics that is accompanied by music that is in harmony and is usually led by an instructor in aerobics there is the repetition of movements so it requires concentration in carrying out these movements. Concentration in aerobics is also needed to make the right movements, sometimes when they are lulled by joyful music and movements, the movements are sometimes wrong. Concentration is the ability to focus on the task at hand ignoring distractions (Reigal et al., 2020). While concentrating, one must remain focused on the progress of the movement being performed (Bastug, 2018).

Low impact aerobics dance is exercise that is performed with a few jumps and a little pressure on the joints, so the risk of injury in low impact aerobics is low (Ta&Bs, 2018). Low impact aerobic dance is characterized by slow movements, by walking as the basic movement and not jumping (Darsi, 2018). Low-impact aerobic exercise requires endurance and strength, as well as movement skills accompanied by slow-tempo music, so that harmonious movements can be created (Aghjayan et al., 2022). With this slow movement, low impact aerobics dance for both beginners and the elderly or people whose joints are prone to injury, it is hoped that with this low impact aerobics dance the participants can fully concentrate on the movements to be performed.

Aerobic dance can improve executive function, memory, and cognitive function and will always involve memory, attention, sensory arousal, and social interaction. Aerobic dance can be beneficial in improving cognitive function, mood, physical performance, and increasing the body's metabolism (Wong et al., 2020). Movement in aerobic dance requires a variety of cognitive abilities. The mechanism that occurs is aerobic dance increases blood flow to the brain and improves the function of the cardiovascular system and changes the entire metabolic system. Apart from that, physical and social activity, aerobic exercise can also improve overall brain function (Zhu et al., 2020). Exercise also increases brain volume, memory, and executive function (Miyazaki et al., 2022). Several cognitive functions, such as learning and memory to learn new movement patterns, attention to follow instructions, executive function to execute complex movement patterns, and social cognition to link movements with meaning and emotional expression in social interactions. In general concentration is needed.

Therefore, further research is needed to examine the effect of low-impact rote aerobic dance exercises and low-impact video aerobic dance exercises on concentration levels. We hypothesize that rote aerobic dance and low-impact video dance aerobics can increase concentration levels.

2. Method

This research is a quantitative study, which aims to reveal an increase in concentration in the rote low-impact aerobic dance group and the video low-impact aerobic dance group. This type of research is a quasi-experimental research with the Two Groups Pretest-Posttest Design. The research subjects were adolescents with an age range of 18-20 years totaling 36 people who live in the city of Makassar and were divided into 2 groups, each group consisting of 18 people. The first group was the rote low-

impact aerobic dance group and the second group was the video low-impact aerobics dance group. Before being given treatment, a pretest was held to collect initial data on concentration levels. Furthermore, the subject was given a rote low-impact aerobic dance treatment and a video low impact aerobic dance video. Both of these treatments were included in the low-impact category, the difference being that the rote low-impact aerobic dance group at the first meeting did aerobic dance by following the video movements, but in the second and subsequent meetings the subjects did aerobic dance without videos and an instructor, the subjects did the aerobic dance movements they memorize from the first meeting. For the video low-impact aerobic dance group, at each meeting they did aerobics by following the movements in the video, and the videos provided are the same from the beginning to the end of the training. The exercise was carried out for 30 minutes/exercise session with the exercise frequency being 3x/week for 6 weeks, after being given exercise for 6 weeks, posttest data were collected on concentration levels in both groups. Concentration measurement was done using the Grid Concentration Test instrument from Harris and Bette L. Harris, which is in the form of a grid of 10 x 10 squares, each containing 2 numbers starting from 00 to 99. Then the smallest was connected with the largest numbers using a line, within 1 minute.

The statistical analysis technique used the Statistical Package for Social Science (SPSS) version 25 software. The average differences were compared between the pretest and post-test using the Independent Sample Test. between the rote low-impact aerobics dance group and the video low-impact aerobics dance group. Statistical analysis used a significant level ($p \leq 0.05$). All data is shown as Mean ± Standard Deviation (SD).

Methods include the design, population, sample, data sources, techniques/instruments of data collection and data analysis procedures. Methods should make readers be able to reproduce the following procedure or protocol, therefore author(s) should provide sufficient detail to allow the work to be reproduced. Methods already published should be indicated by a reference: only relevant modifications should be described. Do not repeat the details of established methods and do not use statistical formulation.

3. Result

The subjects of this study were students of the Faculty of Sport and Health, Makassar State University who programmed gymnastics courses for the 2022-2023 academic year, were female with an age range of 18-20 years and had signed informed consent, so they would participate in activities from beginning to end. The results of this concentration increase research is presented in Table 1.

Table 1. Descriptive Statistics

	N	Means	Standard Deviation
Rote Low Impact Aerobic Dance Group Pretest	18	6.89	2.45
Rote Low Impact Aerobic Dance Group Posttest	18	9.56	2.64
Video Low Impact Aerobic Dance Group Pretest	18	7,39	2.38
Video Low Impact Aerobic Dance Group Posttest	18	9,11	2.45

*expressed as mean ± SD

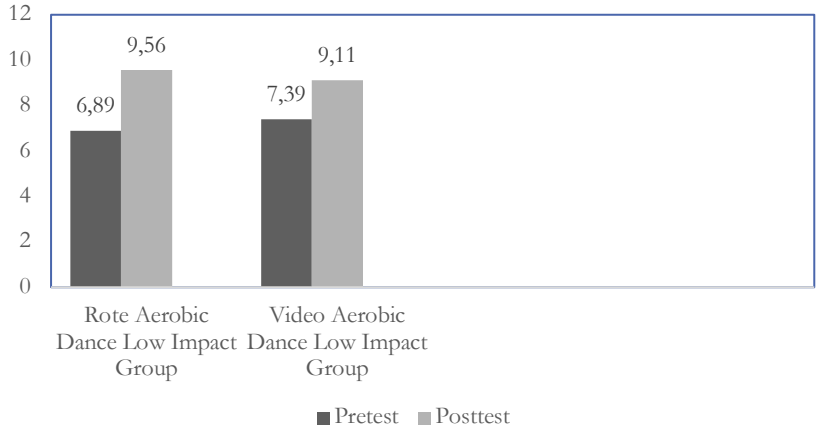

Figure 1. Average Concentration Levels of Pretest and Posttest

Based on table 1 and figure 1 it can be seen that there was an average increase for the group treated with rote low-impact aerobics dance, from an average pretest of 6.89 ± 2.45 to 9.56 ± 2.64, and for the group treated with video low impact aerobics dance increased from the average pretest 7.39 ± 2.38 to 9.11 ± 2.45.

Table 2. Homogeneity Test Results

	Levene's Test	
	f	**Sig**
Equal Variance Assume	0.003	0.959

Table 2 shows that the posttest data obtained from the rote low-impact aerobics dance and video low-impact aerobics dance groups were homogeneous, with a significant level above 0.05

Table 3. Paired Sample Test

Paired Difference				
	Mean	**SD**	**t**	**Sig**
Pretest-Posttest Rote Low Impact Aerobic Dance Group	2.67	1.28	8.82	0.00
Pretest-Posttest Video Low Impact Aerobic Dance Group	1.72	1.41	5.20	0.00

Table 3 shows the effect before and after being treated. In the low impact aerobics group, memorization between pretest and posttest averaged 2.67, standard deviation of 1.28, with a t test value of 2.82 and a significance level of 0.00. For the pretest and posttest of the low impact video aerobics group, the average was 1.72, the standard deviation was 1.41, the t test value was 5.20 and the significance level was 0.00.

Table 4. Independent Sample Test

	T-Test for Equality of Means		
	t	**df**	**Sig (2-tailed)**
Equal Variance Assume	0.621	34	0.538

Table 4 shows that the equal variance assumes t is 0.621 with Sig (2-tailed) 0.538 greater than 0.05, so it can be concluded that there is no difference between rote low-impact aerobic dance exercise and video low-impact aerobic dance exercise on concentration.

4. Discussion

This study aims to analyze the effect of rote low-impact aerobic dance and videos of low-impact aerobic dance on concentration levels. The main finding of our study was that rote low-impact aerobic dance was just as effective in increasing concentration levels as video low-impact aerobic dance. The concentration level of the study subjects was measured before and after the rote low-impact aerobic dance intervention and the dance low impact aerobic dance. This can be seen from the increase in pretest and posttest results, which show changes in concentration levels. The results of previous studies showed an average significant increase in concentration before and after the video low-impact aerobic exercise intervention which was carried out 3 times a week with a duration of 30 minutes for 18 exercises (Arfanda et al., 2022).

Positive relationships have been observed at an early age between acute physical activity and cognitive abilities such as attention, concentration, memory, working memory, cognitive flexibility, inhibitory control, and processing speed (Reigal et al., 2020; Scudder et al., 2014; Li et al., 2017). The results of this study are in line with the results of research conducted by Rehfeld (2018) states that aerobics dance causes an increase in volume in areas of the brain associated with higher cognitive processes such as working memory and attention and which are primarily affected by age-related decline in cognitive function. This is evidenced by the positive relationship between acute physical activity and cognitive abilities such as attention, concentration, memory, working memory, cognitive flexibility, inhibitory control, and processing speed in early childhood (Reigal et al., 2020; Scudder et al., 2014; Li et al., 2017). This cognitive function allows us to encode, store and retrieve information (C Noguera et al., 2020). So it can be said that concentration is a cognitive function

Concentration is the ability to focus on the changes that occur. Changes that occur quickly in the environment cause the concentration must also change rapidly. In low-impact aerobics, memorization requires the person doing it to continue to focus on the movements being performed. One of the effects of this aerobic dance exercise is to increase the level of concentration (Manikam, 2021). Aerobic dance intervention is more effective in preventing and slowing the development of mild cognitive impairment because it combines physical, social, and cognitive activities (Zhu et al., 2018). Aerobic dance training can objectively increase the intensity of cognitive performance (Castells-Sánchez et al., 2022). Studies reveal that moderate-intensity aerobic exercise plays an important role in maintaining brain health (Qi et al., 2018; Pranoto et al., 2020). Several physical activities associated with aerobic dance exercise have benefits as a method of increasing memory to strengthen neural connections. Aerobic dance exercises can improve cognitive skills (Sharma et al., 2017; Foster, 2013). Aerobic dance training also involves concentration and memory. Aerobic dance is a good sport to improve cognitive function (Wong et al., 2020). Aerobic dance is a unique model because it combines movement and music so that the brain and body have a purposefully created motor experience linked to creativity, performance, and agility (Teixeira-Machado et al., 2019). It is considered an activity that involves the coordination of movements with music, as well as the activation of the brain because it is constantly required to learn and remember the ever-changing steps (Baral, 2021; Douka et al., 2019).

Aerobic dance exercise is considered a way to improve cognitive function, enhance brain function, and reverse age-related brain atrophy (Mendez, 2020). Aerobic dance exercises can also improve memory in adults with mild cognitive impairment (Wong et al., 2020). Several other studies state that aerobic dance exercise can improve cardiorespiratory fitness, prevent several age-related diseases, and

improve physical and cognitive conditions (Vrinceanu et al., 2019; Predovan et al., 2019). Therefore, aerobic exercise has a myriad of health benefits and is effective in improving cognitive function related to memory, attention, and concentration which can support performance in carrying out daily activities and improve performance for athletes. And the last is the use of music during physical exercise can improve cognitive performance (Satoh et al., 2014).

5. Conclusion and Recommendation

Based on the results of the study it can be concluded that rote low-impact aerobics dance and video low impact aerobics dance can increase the concentration level of adolescents, so these two low-impact aerobics can be used as alternative exercises to increase concentration.

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