

Impact of Video-Based Aerobic Dance on Higher Students' Endurance and Concentration

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ABSTRACT

The objective of this study is to evaluate the effectiveness of a video-based aerobic dance program in improving students' cardiorespiratory endurance and concentration. The background of this study is based on the need to develop a flexible and adaptive physical exercise model in the digital era, especially to overcome sedentary lifestyles and cognitive decline among students. The research design used was a quasi-experimental study with a one-group pretest-posttest approach. The sample consisted of 20 students participating in the video-based aerobic dance program for six weeks, three times a week. The instruments used included the Beep Test to measure VO₂ max capacity and the Grid Concentration test to measure concentration. The results of the analysis showed a significant increase in both variables, with a significant value in the paired sample t-test of 0.00 ($p < 0.05$). This study concludes that video-based aerobic dance is effective in improving cardiorespiratory endurance and concentration of students and can be used as an alternative, innovative, and adaptive exercise in higher education environments.

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1. INTRODUCTION

Physical fitness is one of the important aspects that supports the quality of life and productivity of students, especially cardiorespiratory endurance, which plays a major role in supporting physical and cognitive activities (Gu et al., 2016; Zayed et al., 2024). In high academic demands, students often face various challenges such as a less active lifestyle, stress, and decreased ability to concentrate (Mofatteh, 2020; Pascoe et al., 2020). This condition requires interventions that not only focus on physical fitness but also on improving cognitive function. Aerobic dance is one form of exercise that has been proven effective in increasing heart-lung capacity and improving brain function, including focus and concentration (Oberlin et al., 2024; Ren et al., 2024; Yuan et al., 2022).

In today's digital era, the use of video-based media is a promising solution to increase participation in physical activity (de Maio Nascimento et al., 2023; Kwan et al., 2024),

especially among students who are familiar with technology. Video-based aerobic dance training offers flexibility of time and place, wider accessibility, and active engagement that can be tailored to individual needs. This is especially relevant after the pandemic, where online learning and physical activity have become new habits that continue to grow (Poon et al., 2024).

However, most previous studies have focused on the effectiveness of conventional aerobic dance (face-to-face) on improving physical fitness alone (Vahabi & Damba, 2015; Uijtdewilligen et al., 2019; Wong et al., 2023). There have not been many studies that explicitly examine the effectiveness of video-based aerobic dance in the context of improving physiological and cognitive abilities simultaneously, especially in groups of students.

This study aims to evaluate the effectiveness of a video-based aerobic dance program in improving cardiorespiratory endurance and concentration of college students. The novelty of this study lies in the integrative approach that combines the physiological and cognitive benefits of aerobic dance through digital media. The results of this study are expected to contribute to the development of adaptive, innovative, and relevant physical exercise models to meet the needs of today's young generation.

2. METHOD

This study used a quantitative approach with a quasi-experimental design of one group pretest-posttest design. The population in this study was active students from the Faculty of Sports and Health Sciences of Universitas Negeri Makassar. Samples were taken purposively with the criteria of 2nd semester students, aged 18–22 years, no history of heart disease or respiratory disorders, and not following a regular physical exercise program for the past 3 months. The number of samples was 20 people.

The instruments used in this study included a cardiorespiratory endurance test using the Multistage Fitness Test (Beep Test) to measure VO_2 max capacity. We used the digital version of the Grid Concentration Test as a concentration test to gauge our ability to focus and think accurately. A pretest was conducted on all participants to measure VO_2 max and initial concentration levels. All research subjects followed a 30–45-minute video-based aerobic dance program 3 times a week for 6 weeks. The videos were designed by certified professional instructors and packaged attractively to increase participation. A posttest was conducted on all participants after 6 weeks to measure changes in VO_2 max and concentration. Data was analyzed using a paired t-test to see the changes that occurred. Data were analyzed quantitatively using statistical software SPSS. Normality test using Shapiro-Wilk. Differences in pretest and posttest results were analyzed using a paired sample t-test, with a significance level of $\alpha = 0.05$.

3. RESULTS AND DISCUSSION

Results

Table 1 presents descriptive statistical data from the experimental group that followed the video-based aerobic dance program. The variables measured included

cardiovascular endurance and concentration. This measurement aims to obtain an initial picture of the distribution and tendency of data on both variables before further inferential analysis is carried out.

Table 1. Descriptive Statistics

Variables			N	Min	Max	Mean	SD
Video-Based Aerobic Dance	Cardiovascular Endurance	Pretest	20	21.10	38.50	28.13	4.80
		Posts	20	24.30	39.90	30.52	4.88
		Delta	20			2.39	
	Concentration	Pretest	20	3	12	7.39	2.38
		Posts	20	5	15	9.11	2.45
		Delta	20			1.72	

Table 1 presents descriptive data on participants' cardiovascular endurance and concentration before and after participating in the video-based aerobic dance program. Based on the pretest results, the average cardiovascular endurance of participants was 28.13 ml/kg/min, with a minimum value of 21.10 and a maximum of 38.50 and a standard deviation of 4.80. After the program was implemented for six weeks, there was an increase in the average in the posttest to 30.52, with a range of values between 24.30 and 39.90 and a standard deviation of 4.88. The difference, or delta average, between the posttest and pretest was 2.39. For the concentration variable, the average pretest score obtained by participants was 7.39, with a range of scores between 3 and 12 and a standard deviation of 2.38. After the intervention, the average increased to 9.11 with a minimum value of 5 and a maximum of 15 and a standard deviation of 2.45. The average difference was 1.72.

Table 2. Data Normality

Variable			Sig	Information
Video-Based Aerobic Dance	Cardiovascular Endurance	Pretest	,346	Normal
		Posts	,088	Normal
		Delta	,199	Normal
	Concentration	Pretest	,636	Normal
		Posts	,592	Normal
		Delta	,085	Normal

In Table 2, the results of the normality test were carried out on the pretest, posttest, and delta (difference) data of two variables, namely cardiovascular endurance and concentration in the video-based aerobic dance group. Based on the results of the Shapiro-Wilk test, it is known that all significance values (Sig.) for each variable are valued greater than 0.05. For the cardiovascular endurance variable, the significance value in the pretest was 0.346, the posttest 0.088, and the delta 0.199. Likewise, for the concentration variable, the significance value in the pretest was 0.636, in the posttest 0.592, and delta 0.085. All these values indicate that the data is normally distributed, by the criteria stating that data is considered normal if the Sig. value > 0.05.

Thus, the data in this study meets the assumption of normality so that it can be further analyzed using the parametric statistical technique of the t-test.

Table 3. Paired Sample T Test

Paired Samples Test		
Sig. (2-tailed)		
Video-Based Aerobic Dance	Pre - Pre-Post	
	Cardiovascular	0.00
	Endurance	
	Pre -	
	Post Concentration	0.00

Based on Table 3, the significance value for the comparison of pretest and posttest of cardiovascular endurance is 0.00, and for the concentration variable, the significance value is also 0.00. Since both values are below the standard significance limit ($\alpha = 0.05$), it can be concluded that there is a significant difference between the pretest and posttest values in both variables.

Discussion

Significant findings in this study strengthen the evidence that the use of video media in the implementation of physical exercise can be a practical and effective solution, especially in the context of higher education. Aerobic dance has been shown to produce significant physiological adaptations to the cardiovascular and respiratory systems. In general, descriptive results indicate that video-based aerobic dance programs have the potential to improve two important aspects of physical and mental health, namely cardiovascular endurance and concentration. These findings are in line with previous research results showing that structured aerobic activities, especially those involving cognitive and rhythmic aspects such as aerobic dance, can stimulate increased lung-heart capacity and brain executive function.

These adaptations include increased stroke volume, pulmonary ventilation efficiency, increased VO_2 max, and remodeling of the heart structure that supports increased physical work capacity (Taylor et al., 2021; Alhumaid et al., 2022; Arfanda et al., 2022; Puspodari et al., 2022). Aerobic dance improves the efficiency of the heart and blood vessels through structural and molecular changes (Song et al., 2022; Pinckard et al., 2019). Regular aerobic dance promotes cardiac remodeling and lowers resting heart rate (Martinez et al., 2021; Kyselovičová & Zemková, 2024). Aerobic dance over two years also showed a marked improvement in cardiorespiratory fitness. Even high-intensity training such as HIIT has been shown to accelerate the cardiorespiratory system's response to physical activity (Jovanović et al., 2024; Ito et al., 2024). Aerobic dance is not only effective as a form of enjoyable rhythmic exercise, but it is also scientifically proven to increase the efficiency of the heart and lungs through a profound physiological adaptation process (Ding, 2023; Sun & Jiang, 2023).

The results of increasing concentration indicate that aerobic dance performed with rhythm and visual instructions can stimulate cognitive function, especially in terms of attention and focus (Hoffmann et al., 2021; Ben Ayed et al., 2024; Arfanda et al., 2023). Aerobic physical activity significantly improves memory and executive function in adults without cognitive impairment (Singh et al., 2025; Zhang et al., 2023). Moderate intensity aerobic dance, such as cycling, can improve selective attention, working

memory, and problem-solving abilities (Blomstrand & Engvall, 2021; Ligeza et al., 2023). Dance-based aerobic exercise that naturally combines rhythm and visual cues effectively improves executive function and global cognitive function in healthy older adults (Hewston et al., 2021; Sánchez-Alcalá et al., 2024). These findings reinforce that aerobic dance with rhythmic and visual elements is not only physically healthy but also provides positive stimulation to cognitive function, especially in improving concentration and focus.

Video-based aerobic dance programs provide flexibility in implementing exercises, allowing students to participate in exercise sessions without space and time constraints. This is very relevant to the characteristics of today's students, who tend to be digitally active and require interactive and non-monotonous methods. This study also broadens insights into the integrative benefits of aerobic dance, not only in physiological but also psychological and cognitive aspects, which are still relatively rarely studied simultaneously in the context of digital media use.

4. CONCLUSION

Building upon the results of the study, it can be concluded that video-based aerobic dance is effective in improving cardiorespiratory endurance and concentration in students. Significant increases in both variables after following the program for six weeks indicate that this exercise can be used as an alternative intervention that is innovative and meets the needs of students in the digital era. The results of the analysis showed a significant increase in both variables, with a significant value in the paired sample t-test of 0.00 ($p < 0.05$). Additionally, the use of video media in physical exercise not only increases participation but also has a real impact on aspects of physical and mental health.

This study broadens insights into the integrative benefits of aerobic dance, not only in physiological but also psychological and cognitive aspects, which are still relatively rarely studied simultaneously in the context of digital media use.

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