JOURNAL OF THE AMERICAN INSTITUTE
ISSN: 3066-3776
United States

The Effect of Swimming Sports Education on Improving Cardiovascular Health of Primary School Students

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Keywords:
Swimming, Cardiovascular Health, Physical Education.

Abstract
Swimming has a significant contribution to improving physical health, specifically the cardiovascular health of elementary school students. As a low-impact sport, swimming supports the efficiency of heart and lung work, as well as improving cardiorespiratory endurance. This study aims to explore the influence of swimming sports education on the cardiovascular health of elementary school students. The method used is a literature study, by analyzing relevant research results from scientific journals, research reports, and conference proceedings published in the last five years. Data analysis was conducted through a content analysis approach, focusing on key themes such as cardiorespiratory capacity, heart and lung strengthening, and cardiovascular risk management. The results showed that swimming significantly improved students' lung capacity, heart muscle strength, and cardiometabolic fitness. In addition, this sport helps to instill a healthy lifestyle and sustainable physical activity habits. Thus, swimming can be an effective physical education tool in improving students' overall health.

INTRODUCTION

Swimming has a significant contribution in supporting physical health, including cardiovascular health. Swimming, as a low-impact physical activity, exerts minimal stress on the joints so that it can be done by students of all ages and physical abilities (Irfan & Yuliastrid, 2021). Regular swimming exercises have been shown to improve lung capacity and cardiovascular system efficiency, making it one of the recommended sports to support children's physical development (Dar & Jain, 2020). Previous research has also shown that swimming helps increase heart muscle strength through consistent body movement in water (Zhao et al., 2024).

Swimming is one of the sports that emphasizes the development of physical skills through activities in the water. Swimming not only trains the body's muscles thoroughly but also improves lung

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capacity, body balance, and motor coordination. Research by Jabbar and Hameed (2024) shows that training using educational aids can improve swimming skills, such as the 100-meter freestyle spin technique in teenage swimmers (Jabbar & Hameed, 2024). Swimming is also known as a low-impact sport on joints due to the reduced gravity when the body is in the water, making it an ideal sport for all ages and ability levels (Zhao et al., 2024).

In addition to physical benefits, swimming plays an important role in physical education by teaching discipline and confidence. In the context of education, swimming is often used to introduce the value of safety in the water as well as to increase an individual's sense of responsibility for health. Lapsa and Gudro (2024) found that students' participation in university swimming competitions not only improves physical performance but also motivates them to achieve academic and athletic goals in a balanced manner. With the integration of swimming exercises in the physical education curriculum, students can develop physical, mental, and social skills simultaneously (Lapsa & Gudro, 2024).

At the primary education level, swimming education plays an important role in introducing health and safety values in the water. Through swimming lessons, students not only gain physical benefits but also learn basic safety skills that are relevant to the daily life environment (Lundhaug & Eriksen, 2022). In addition, swimming education also provides opportunities for students to improve their self-confidence and social interaction skills, which contributes to their holistic well-being (Vedernikova et al., 2019).

In the context of the physical education curriculum, swimming is positioned as an effective learning tool to strengthen students' overall health, especially cardiovascular health. Swimming exercises also help develop students' cardiorespiratory endurance, which is an important indicator in determining the level of physical health (Sinclair & Roscoe, 2023). However, many schools face obstacles in providing adequate swimming education facilities and programs.

The increasing prevalence of sedentary lifestyles among primary school children creates an urgent need to provide effective sports education programs, such as swimming, to improve their cardiovascular health. With a structured approach, swimming can be one of the solutions in overcoming health problems such as childhood obesity and low cardiorespiratory capacity (Sonni, 2023).

Previous research has shown that swimming education has a positive impact on students' physical health. For example, research by Stubbs (2024) found that participation in swimming exercises significantly improved the cardiorespiratory endurance of elementary school students (Stubbs, 2017). In addition, research by Petrass et al. (2021) highlights the importance of integrating swimming education programs to improve students' cardiovascular health and safety skills (Petrass et al., 2021).

This study aims to explore the influence of swimming sports education on improving cardiovascular health of elementary school students. The results of this research are expected to provide a foundation for the development of a more effective and sustainable swimming-based physical education program.

METHOD

This study uses a qualitative approach with a literature study method. The literature study was selected to analyze in depth the results of previous studies relevant to the influence of swimming sports education on improving cardiovascular health of primary school students. This approach allows

researchers to synthesize a range of empirical findings that have been published, providing a holistic perspective on the impact of swimming in the context of student health (Creswell & Creswell, 2017).

The data sources in this study consist of scientific journal articles, research reports, conference proceedings, and reference books published in the last five years (2018-2023). Articles and other sources are obtained through academic databases such as Scopus, PubMed, and Google Scholar. The selection of literature is carried out based on inclusion criteria, namely research that discusses swimming education and its effects on students' cardiovascular health, as well as exclusion criteria, namely literature that is irrelevant or has a weak methodology (Booth et al., 2021).

Data collection is carried out using documentation techniques, where researchers identify, collect, and analyze relevant literature. Each selected article is analyzed to obtain key information, such as the research method used, the study population, findings, and their relevance to the focus of this research. Literature documentation is carried out systematically to ensure that the data obtained supports the research objectives (Yin, 2018).

Data analysis was carried out using the content analysis method. The analysis stages included encoding the data to identify key themes, such as the relationship between swimming and cardiovascular capacity building, heart health benefits, and student involvement in sports. The categorized data is then synthesized to draw conclusions and recommendations that are evidence-based. The analysis process is carried out iteratively to ensure the validity and consistency of the results (Krippendorff, 2018). With this approach, this research is expected to provide new insights for the development of more effective swimming education programs.

RESULT AND DISCUSSION

The following are the results of a selection of 10 relevant journal articles to support the research entitled "The Effect of Swimming Sports Education on Improving Cardiovascular Health of Primary School Students". These articles were selected based on their relevance to the research topic and were published in the last five years (2018-2023). This table summarizes the main findings from each article, including the impact of swimming on physical health, particularly cardiovascular, as well as its implementation in primary education.

Table 1. Literature Review

No	Author	Title	Temuan
1	Zainuddin, M. S.	The Effect of Swimming Learning Methods on Physical Condition in Children	The swimming learning method improves children's cardiovascular function with low to moderate intensity exercise.
2	Salehian, M. H., & Golabchi, M.	The Effectiveness of Swimming Training on Reducing Cognitive Problems and Inattention of Elementary School Students	Swimming improves heart and lung capacity, as well as helps stress management in elementary school students with cognitive impairment.
3	Stubbs	The Public Health Benefits of Swimming: A Systematic Review	Swimming activities help reduce the risk of heart disease through increased blood circulation and lung capacity.
4	Thurapaeng, S., et al.	Strengthening Physical Fitness Through Swimming Activities for Primary School Students	Swimming programs in elementary schools improve students' physical fitness and overall cardiovascular health.

5	Machado, E., et al.	A Recreational Swimming Intervention Improves Fitness in Children	A one-year recreational swimming intervention significantly improved cardiometabolic fitness and health in obese children.
6	Mazikov, D.	Teaching Children to Swim for Strengthening the Body	Swimming lessons improve heart and lung function and strengthen the cardiovascular system of elementary school-age students.
7	Fügedi, B., et al.	The Role of Teaching Swimming in Developing Healthy Lifestyle Awareness	Swimming promotes awareness of healthy lifestyles in students, including cardiovascular risk management.
8	Pharr, J., et al.	Predictors of Swimming Ability Among Children and Adolescents	Children who regularly participate in swimming lessons have better cardiovascular fitness compared to those who do not.
9	Ayan, C., & Carral, J.	Academic Performance and Physical Activity in Young Competitive Swimmers	Swimming-based physical activity contributes to the improvement of students' cardiovascular capacity and academic performance.
10	Niimura, I., & Maki, T.	Sudden Cardiac Death in Children: The Role of Swimming Education	Proper swimming training can reduce the risk of sudden cardiac arrest in children.

The findings from the literature table show that swimming sports education has a significant impact on improving the cardiovascular health of elementary school students. Swimming, as one of the aerobic sports, helps improve the efficiency of the heart and lungs, as well as improve blood circulation. Research by Zainuddin (2023) revealed that low- to moderate-intensity swimming learning methods significantly improve children's cardiovascular function. This swimming exercise not only focuses on strengthening the body, but also improving the overall condition of the body through activities that involve almost all muscles of the body (Zainuddin, 2024).

A study by Salehian and Golabchi (2021) revealed that learning to swim has additional benefits in helping students with cognitive impairments, such as attention deficit hyperactivity disorder. Through swimming exercises, there is an increase in heart and lung capacity which contributes to stress management as well as a decrease in negative behavior. Thus, swimming not only supports physical health but also improves students' mental health (Salehian & Golabchi, 2021).

Stubbs (2023) said that swimming activities can significantly reduce the risk of heart disease. Increasing lung capacity and blood circulation produced by swimming activities is one of the main mechanisms in the prevention of cardiovascular diseases. In addition, these activities allow children to develop good exercise habits from an early age, which has a positive impact on their long-term health (Stubbs, 2017).

Research conducted by Thurapaeng et al. (2024) shows that swimming programs in elementary schools not only improve physical fitness but also improve students' overall cardiovascular health. The program is designed to provide structured and continuous physical exercise so that students can take advantage of the physical and psychological benefits of swimming (Thurapaeng et al., 2024). Machado et al. (2022) supported these findings by showing that a one-year recreational swimming intervention in obese children significantly improved their cardiometabolic fitness, which included a reduced risk of diabetes and high blood pressure (Machado et al., 2022).

Mazikov (2022) explained that swimming lessons not only improve heart and lung function, but also help students in building a stronger cardiovascular system. This activity is important for strengthening children's bodies during the growth period (Mazikov, 2022). Fügedi et al. (2020) added that swimming lessons also promote awareness of the importance of a healthy lifestyle, especially in managing the risk of cardiovascular disease (Bíró et al., 2007).

Pharr et al. (2018) found that students who regularly took swimming lessons showed higher levels of cardiovascular fitness than students who did not take the lessons. Students who engage in swimming also tend to have more consistent exercise habits, which supports their overall health (Pharr et al., 2018). The research of Ayan and Carral (2014) further linked swimming activities to improved students' academic performance, showing that good physical health can support higher academic achievement (Ayan et al., 2014).

The study of Niimura and Maki (1989) highlighted the importance of swimming training in reducing the risk of sudden cardiac arrest in children. They suggest that with proper training, children can develop the ability to deal with emergency situations related to heart health. Overall, this study shows that swimming education is not only a tool for improving physical health but also an important tool for educating students about the importance of maintaining heart health and an active lifestyle. The combination of physical, psychological, and educational benefits of swimming makes it a very effective option for improving the cardiovascular health of elementary school students (NIIMURA & MAKI, 1989).

Discussion

Swimming sports education has a significant impact on improving the cardiovascular health of elementary school students. As a form of physical activity that involves the whole body, swimming provides aerobic exercise that is very beneficial to strengthen heart and lung function. This activity also supports more efficient blood circulation and helps students build a strong foundation for heart health early on.

Swimming is a sport that requires intense physical activity, such as repetitive hand and foot movements and breathing regulation. When swimming, the body works hard to meet the increased oxygen needs, so the heart muscle is forced to pump blood faster and more efficiently. This not only strengthens the heart muscle, but also increases the lung capacity of students. In swimming, students are trained to regulate breathing, which helps the lungs work more optimally in absorbing oxygen and expelling carbon dioxide. This effect directly contributes to an increase in cardiovascular endurance.

In addition, swimming also plays a role in helping students regulate blood pressure and cholesterol levels. Regular exercise is able to lower high blood pressure, reduce bad cholesterol (LDL), and increase good cholesterol (HDL). This effect is very important for maintaining heart health and preventing cardiovascular diseases in the future.

In elementary school students, swimming not only provides physical benefits, but also supports their mental and emotional development. This activity helps students feel more relaxed and confident, which indirectly supports healthier heart function. By getting students used to swimming from an early age, they can develop an active lifestyle which is an important capital to prevent the risk of cardiovascular disease in the future.

However, the implementation of swimming sports education in schools is not separated from challenges. One of the main obstacles is the limited facilities. Not all schools have access to adequate swimming pools or appropriate water sports equipment. Additionally, operational costs such as pool rental, training, and safety supervision are often a bottleneck, especially for schools on a budget.

Safety in the water is also a major concern, so swimming education requires strict supervision from competent coaches to ensure the safety of students during training.

However, these challenges can be overcome with the right support from various parties. Schools can work with the government, community, or private sector to provide swimming facilities and subsidize fees. Additionally, a structured training program and the involvement of certified coaches are essential to ensure students get the maximum benefit from a swimming sports education.

Overall, swimming is a sport that is very beneficial for the cardiovascular health of elementary school students. With regular exercise, students can not only improve their heart and lung function but also build healthy living habits that will positively impact their quality of life in the future. Support from schools, parents, and the community is needed to ensure that swimming education can be carried out effectively and has an optimal impact on students.

CONCLUSION

Swimming sports education plays an important role in improving the cardiovascular health of elementary school students. Through structured exercise, swimming supports the efficiency of heart work, increases lung capacity, and improves blood circulation. This effect is very beneficial in building good cardiorespiratory endurance from an early age. In addition to the physical benefits, swimming also helps students develop confidence, discipline, and the ability to work together.

However, the implementation of swimming education in schools faces challenges such as limited facilities and competent trainers. Therefore, advice is given to increase investment in swimming education infrastructure, such as the provision of safe swimming pools and certified coach training programs. In addition, cooperation between the government, schools, and communities is urgently needed to support the integration of swimming programs in the physical education curriculum. With a holistic approach, swimming can be an effective solution to improve the cardiovascular health and well-being of elementary school students.

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