Jurnal SPORTIF: Jurnal Penelitian Pembelajaran
Vol. 9 No. 2, August 2023, pp. 185 - 197
https://doi.org/10.29407/js_unpgri.v9i2.19982

The Effect of low impact aerobic gymnastics on improving physical fitness in students

Waluyo[1abcdef].

[1]Department of Physical Education, and Health, Faculty of Sports, Universitas Sebelas Maret Surakarta, Indonesia.

Received: 21 April 2023; Revised: 26 April 2023; Accepted: 29 April 2023; Available online: 03 Mei 2023.

Abstract

The importance of physical fitness as one of the supporting factors for student activities needs to be considered. Importance of physical fitness requires improvement and defense in its condition. Providing physical activity is one of the factors that can improve students' physical fitness. This study aimed to determine the effect of low-impact aerobic gymnastics on improving student fitness. This research method uses a pre-experimental design using one group pretest-posttest without using variable control. The study subjects used the Proportionate stratified random sampling technique by taking male students aged 13-15 in junior high school. The research instrument uses the Indonesian Physical Fitness Test to measure strength, speed, endurance, strength, and power. Data analysis techniques use normality and homogeneity prerequisite tests, and to determine the influence on variables using t-tests, data analysis procedures use SPSS 25. The results of the study said The results of calculations using the t-test approach method obtained 0.841. This result is greater than Ttabel, which amounted to 1,701 because the results of the analysis said there was a significant effect of low-impact aerobic exercise on physical fitness. This study concludes that low-impact aerobic exercise can improve students' physical fitness.

Keywords: Gymnastics, aerobic, physical fitness, student.

How to Cite: Waluyo, W. (2023). The Effect of low impact aerobic gymnastics on improving physical fitness in students. Jurnal SPORTIF : Jurnal Penelitian Pembelajaran, 9(2), 185-197. https://doi.org/10.29407/js_unpgri.v9i2.19982

Authors contribution: a – Preparing concepts; b – Formulating methods; c – Conducting research; d – Processing results; e – Interpretation and conclusions; f - Editing the final version

INTRODUCTION

Physical fitness is something that every human being must have. Good physical fitness will positively impact humans in carrying out daily activities without feeling excessive fatigue and not even causing health problems. Physical freshness is the ability or ability possessed by a person to do work efficiently without experiencing significant fatigue and still be able to enjoy free time well (Hidayat, 2019). Physical fitness is a person's quality to carry out activities according to his job optimally without causing health

Correspondence author: Waluyo, Universitas Sebelas Maret Surakarta, Indonesia.
Email: waluyo66@staff.uns.ac.id

problems and excessive fatigue (Allsabah et al., 2022). Based on the experts above, physical fitness is a dynamic, healthy degree of a person to carry out his activities optimally without causing health problems and excessive fatigue.

Physical education should not be separated from the overall purpose of education. In particular, physical education aims to achieve educational goals through physical activity. Doing planned and measurable physical activity allows students to improve their physical fitness. Students who do not have good physical fitness will not learn well because of a lack of enthusiasm for learning, dizziness, and sleepiness.

Physical education is a pedagogical model given that learning teams with mixed abilities work together so that all colleagues benefit from advantages and experience. Physical education gives students sufficient time to improve their skills and determine how to meet the team parts for a successful sports education season. Related to the student's perceptions of physical education, most agreed that they like sports, and some preferred sports activities carried out in the form of games. They expected that by attending physical education, they could excel in sports. They also expected that the teachers would provide a sense of security and that the learning method would provide interesting activities (Nugraha et al., 2022). Physical education is a curriculum developed in physical education programs at the elementary, junior high, and high school levels. This method provides a more authentic sports experience, which is more enjoyable for children and teenagers and goes beyond what is usually seen in physical education classes. The purpose of physical education is to make students experienced in physical education programs from grades four to 12 to be sufficiently skilled in various sports, dance, and fitness activities; more likely to be and remain engaged in physical activity during discretionary time; able to distinguish between good and bad sports practices whether in youth, school, or community sports; and more likely to engage with local sports organizations as adults to ensure that child and youth sports programs are designed to improve the well-being of those participating. Thus, sports

https://doi.org/10.29407/js_unpgri.v9i1.19982
9 (2) 2023 | 185-197

education aims to educate players in the fullest sense and help them develop as competent, literate, and enthusiastic sportsmen.

Promoting physical activity (PA) and healthy lifestyles has become a worldwide priority for public health authorities (Organization, 2018). Schools are critical for acting with children and adolescents to achieve this priority. Through physical education (PE), schools allow youths to be physically active and promote healthy lifestyles (Coledam & Ferraiol, 2017). Increased fitness can occur if students are given additional activities that involve physical, giving physical activity shows can improve fitness in students. Physical fitness is the body's ability to work effectively and efficiently. It is related to a person's ability to work efficiently, enjoy leisure time, and be healthy and strong in status over a lifetime. Physical fitness is the ability to lead a balanced and complete inventory life, or it can be considered to perform daily tasks without fatigue and high energy consumption. In addition to physical health, a person must possess such good attributes as human behavior based on moral principles. Physical education programs seriously consider physical fitness and try to improve physical fitness and overall well-being.

Fit individuals with good body health quality will be able to present in daily activities to increase productivity levels (Hidayat, 2019). Physical fitness has several components, namely heart endurance or the freshness of the heart, lung, and blood vessel systems to grow optimally, then muscle strength (strength), the body's ability to use endurance. (Pan & Mcnamara, 2022) The health of this body is said to be the same as the expertise to have in order to be able to undergo activities without facing significant fatigue, the health of the body in individuals has benefits as well as participating, such as additional energy for their activities. Physical fitness is important to support activities, especially for children with many activities.

Daily physical education's positive effects on physical fitness development in primary school children. Since only schools can reach all children over a prolonged period, daily structured exercise and physical education could provide a viable option for promoting physical fitness at

https://doi.org/10.29407/js_unpgri.v9i1.19982
9 (2) 2023 | 185-197

young ages. Given the beneficial association between physical fitness and physical activity, this may facilitate higher physical activity throughout childhood and potentially into adolescence (Greier et al., 2020; Marques et al., 2022). Research on physical fitness has been carried out, one of which is by (Kljajević et al., 2022), who explain that Physical activity positively affects the development and maintenance of fitness and physical activity. As far as students from different faculties, this study suggests that further investigation should be carried out to promote daily exercise, as it can benefit students' physical fitness and health-related activities. In addition, Chen et al. (2018), Given the significant role of physical fitness for participating in physical activity during physical education and recess, as well as playing sports/dances outside school, this study suggests that physical activity teachers should use a balanced approach to teach a variety of fitness-enhancing games and physical activities.

The type of physical activity is suitable for children to obtain physical health and fitness or freshness is the best gymnastics training. Maintaining and increasing fitness or physical freshness can be done by exercising in the form of gymnastics, which is done repeatedly with a frequency of exercise 3 to 5 times per week with a minimum time of 15 to 25 minutes. Puspodari et al. (2022) argue that rhythmic gymnastics is carried out to channel a sense of art or beauty to foster and improve the art of movement. Gymnastics activities will impact children's physical freshness, which is in accordance with research conducted by Sukmawati et al. (2021). Physical activity these gymnastics is that the physical activity applied can be used by teachers of the Early Childhood Education Program as a reference in learning early childhood movements, especially in kindergarten children, to make it more fun, and can improve children's physical fitness. Furthermore, according to Xu et al. (2020), Participation in 16 weeks/of meetings of gymnastics activities targeting rhythmic movement skills development and basic gymnastic exercises, the health-related physical fitness levels of children with IDD increased. In addition, compared to the pretest, significant

https://doi.org/10.29407/js_unpgri.v9i1.19982
9 (2) 2023 | 185-197

improvements were reported for most physical fitness parameters, such as muscle strength, aerobic capacity, and explosive strength.

In field observations, students lack physical activity, besides that, they have just been in the transition period of the pandemic and activity restrictions, so students feel that their fitness is not maintained and lack physical activity. This is seen by some students feeling exhausted when given physical activity, whose duration is very short. Currently, the biggest problem is that many students do passive activities with many activities such as playing with gadgets and doing a sedentary lifestyle. This makes the younger generation, especially students in schools, unaware of the amount of physical activity replaced by technology, thus making the factors lazy to do physical movement activities, especially elementary school students. This study aims to determine the effect of gymnastics exercises created by Indonesian children on improving students' physical fitness.

METHOD

This study is a pre-experimental design study with a design form using one group pretest-posttest design because researchers do not use control variables, and samples are not randomly selected so that the study results will show an increase in physical fitness before and after being given low-impact aerobic exercise treatment.

The research design used was one group pretest-posttest design, and experiments were carried out only on one group without a comparison group. Research design in the form of pictures as follows:

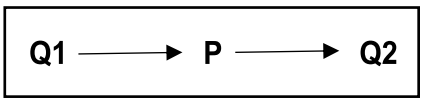

Figure 1. Research Design One Group Pretest Design

The subjects in this study were 30 students with an average age of 13-15 years male. This research technique uses Proportionate stratified random sampling by taking representatives from various levels in junior high school, which is usable with 30 students.

https://doi.org/10.29407/js_unpgri.v9i1.19982
9 (2) 2023 | 185-197

Research Procedure

This study involved junior high school students with an average age of 13-15 years with male gender. The subjects chosen are representatives of the class in the first warding school. The subject collection technique uses Proportionate stratified random sampling, taking representatives from various levels in junior high school, which is usable with 30 students. The instruments in this study consisted of Indonesian physical fitness tests, which included conducting tests: (1) 50-meter run, (2) hanging body lift for men and hanging elbow bend for women (pull up), (3) lying sitting (sit up), (4) vertical jump, (5) men's 1000 meters and women's 800 meters. The test results were tabulated by adjusting the norms of physical fitness tests according to the study subjects aged 13-15. The test by the instrument was carried out in the initial and final tests before the treatment was carried out in low-impact aerobic gymnastics. Treatment in the form of low-impact aerobic gymnastics was carried out for 16 meetings which were held 3 times every week.

RESULT

The results of this study are presented in a description of the data processing results by taking on the study results. The study involved 30 junior high school students with male gender. The results of the data were obtained from the initial test by looking at the physical fitness of students aged 13-15 years using the Indonesian physical fitness test instrument, and this was done to determine the results of physical fitness before being given treatment in the form of low impact aerobic gymnastics. They are, furthermore, giving this treatment for 16 meetings by conducting 3 meetings for a week. Furthermore, after the treatment is given to students, a posttest is carried out to determine the development of the student's physical fitness condition after being given treatment.

https://doi.org/10.29407/js_unpgri.v9i1.19982
9 (2) 2023 | 185-197

Table 1. Analysis of preliminary test data results and final physical fitness test

Test	N	Total	Mean	SD	Var
PreTest	30	363	12,1	2,37	5,610
PostTest	30	472	15,73	2,84	8,064

Based on the explanation of Table 1 after the initial test using the physical fitness test, it can be seen that the scores of the initial physical fitness test amounted to 30 students, for the total number of each test item, the initial test time was 363 seconds with an average score of 12.1 and SD 2.37. Then the overall number of each test item's final test time was 472 seconds with an average rating of 15.73 and SD of 2.84. Normality test testing can be done after processing the initial and final test data, and the results of the average and SD values are known. Once known, it then performs a normality test.

Table 2. Results of the normality test of the initial test and the final test of physical fitness

Tes	N	Mean	SD	L_{count}	L_{table}	Ket
PreTest	30	12,1	2,37	0. 106	0. 161	Normal
PostTest	30	15,73	2,84	0. 112	0. 161	Normal

The normality test results in the initial test calculated an L value = 0.106, smaller than the L_{table} = 0.16 with a significance level of 0.05. The data of this test include a normal distribution. The result is normal because the calculated L value 0.106 < from L_{table} 0.161 means the distribution of norms. Then the results of the anomalies test in the final test obtained calculated L value = 0.112, smaller than L_{table} = 0.161 with a significance level of 0.05. The data of this test include a normal distribution. The result is normal because the calculated L value 0.34 < from L_{table} 0.83 means a normal distribution. The homogeneity test can be done after knowing the results of the initial and final test variances, which can be calculated in the following way:

https://doi.org/10.29407/js_unpgri.v9i1.19982
9 (2) 2023 | 185-197

Table 3. Calculation Homogeneity

F_{Count}	F_{table}	Conclusion
28,961	4,01	Homogen ous

The homogeneity test results aim to determine whether the subjects are the same or not. The table above shows that the result is calculated as F value = 28.961, greater than F_{table} = 4.01. The data from this study are homogeneous or the same. The data of this study data are homogeneous. Based on these results can proceed to calculate the hypothesis t-test.

Table 4. Testing the value of the results of low-impact aerobic gymnastics exercises

T_{Count}	T_{Table}	Result
1.841	1.701	Not Significant

The result of the calculation using the t-test approach method obtained 0.841. This result is greater than T_{tabel}, which amounted to 1,701 because the results of the analysis said there was a significant effect of low-impact aerobic exercise on physical fitness.

DISCUSSION

From the calculation of the t-test at a significant level of α = 0.05 between the effects of low-impact aerobic gymnastics training on physical fitness, a calculation obtained 0.841. This result is greater than T_{tabel}, which amounted to 1,701 because the analysis results said the low-impact aerobic exercise significantly affected physical fitness. The results of this study support previous research that confirms that an exercise or physical activity program can improve cardiorespiratory breathing, resistance, flexibility, and external neuromotor activity in daily life and maintain physical fitness and health (Amatriain-Fernández et al., 2020; Warburton & Bredin, 2019). In addition, according to (Li et al., 2020), Physical fitness plays a role in the overall physical of children, mentally and psychologically, in everyday life in every activity carried out. Furthermore, physical maturity leads children to the spirit of learning and practicing to carry out the expected learning outcomes.

https://doi.org/10.29407/js_unpgri.v9i1.19982
9 (2) 2023 | 185-197

Consistent evidence shows that regular physical activity has numerous benefits for youth, including improved cognitive, emotional, social, and physical health. Despite these benefits, fewer than 60 percent of children (ages 6–11) and 30 percent of adolescents (ages 12–15) in the US report meeting national physical activity guidelines, with notable differences by sex, race and ethnicity, and location (Physical Activity Guidelines Advisory Committee, 2018). According to (Arghaya Mondal, 2015), gymnastics is a physical activity carried out as a separate sport or as training for other sports. According to Lambourne et al. (2013), gymnastics is done to channel a sense of art or beauty to build and improve the art of movement. Unlike other sports, which generally measure activity on certain objects, gymnastics refers to a form of motion done with an integrated and incarnate combination of every part of the body from the components of motor abilities such as strength, speed, balance, agility, and accuracy. It can be concluded that gymnastics is a sport that strings together movements by following certain music. It can be done as a training method to measure object activity according to the selected components. According to Dewi & Rifki (2020), Aerobic exercise regularly and measurably can shape the body to be more proportional, beautiful to look at and cause attractiveness, where body composition shows the ratio of a collection of muscles, bones, fat, and fluids. According to Herbert et al. (2020), aerobic exercise is carried out continuously with moderate to sub-maximal intensity using energy produced through the body's aerobic metabolic processes. Low-impact aerobic exercise can also increase physical fitness but not as high as high-impact exercise, this is because the components of physical condition that can be developed are only focused on leg strength and endurance and motivation of low-exercise participants because movements in following slow music rhythms tend to be boring. However, aerobic exercise with low impact has advantages, among others, the movements carried out are not too difficult, so all ages easily adapt to them, and concentration will be centered on all exercise activities without any hesitation in doing movements.

https://doi.org/10.29407/js_unpgri.v9i1.19982
9 (2) 2023 | 185-197

Physical fitness (Fonseca et al., 2021; Y. Xu et al., 2020) states that physical fitness is related to health (Health Related Fitness) which includes: cardiopulmonary endurance, muscle endurance, muscle strength, flexibility, and body composition. The statement means that the above components are needed to improve physical fitness, which shows that rhythmic gymnastics is also included to improve physical freshness. Physical freshness is an important factor for a person. A person can carry out good, regular, and directed work activities with good physical freshness. The level of physical freshness cannot be separated from the aspects that affect it. Thus, the form of exercise applied in developing the level of physical freshness should be exercises that can develop various components of physical condition that support physical freshness. In practice, the low-impact aerobic gymnastics exercises applied to this study lasted 16 meetings. It is expected that gymnastics participants can do low-impact aerobic exercise exercises with a continuous or uninterrupted frequency of 2-3 times in a while to get perfect results from the exercise process. In accordance with the results of this study, physical fitness among students is very important because by having physical fitness, students can do all activities without fatigue (Allsabah et al., 2022).

This research proves that providing physical activity to students in addition to providing new knowledge and experience for students to do more physical activity. Physical activity according to (Coledam & Ferraiol, 2017) that physical activity carried out by students contributes to improving student fitness and motivation. The study also provided input for teachers and parents to provide additional physical activity to support children's health. The limitations of this study are the limited number of subjects involved in the study and the characteristics of the research subjects. Therefore, researchers suggest increasing the number of subjects and characteristics of future findings so that they are formative. Subjects whose characteristics use male sex and the age of subjects 13-15 years so that in the future, it is necessary to increase the sex or age of subjects. Given the importance of physical fitness to be examined more deeply with various variables that can

https://doi.org/10.29407/js_unpgri.v9i1.19982
9 (2) 2023 | 185-197

increase it. In addition, research variables are not only physical fitness, other factors need to be investigated to understand better the impact of physical exercise in the form of gymnastics for student development.

CONCLUSION

These findings show that low-impact gymnastics can effectively improve the physical fitness of students aged 13-15 years. Physical activity in the form of gymnastics is a positive way to improve physical fitness by doing low-impact aerobic exercise to improve physical fitness. The results of this study can also be a reference for various physical activities that can be done to improve physical fitness. This study is limited to a small number of subjects in the future in order to be more varied so that the next researcher is to develop the number and other research variables related to child growth and development.

REFERENCES

Allsabah, M. A. H., Sugito., & Kurniawan, B. T. (2022). Level of physical activity, body mass index (BMI), and sleep patterns among school students. *Journal Sport Area*, *7*(1), 134–147. https://doi.org/https://doi.org/10.25299/sportarea.2022.vol7(1).8188

Amatriain-Fernández, S., Murillo-Rodríguez, E. S., Gronwald, T., Machado, S., & Budde, H. (2020). Benefits of physical activity and physical exercise in the time of pandemic. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12*. https://doi.org/10.1037/tra0000643

Arghaya Mondal, A. S. (2015). Comparative Study on Selected Physical Fitness Components among the\nPhysical Education Students of Different Universities in West Bengal State\n. *IOSR Journal of Sports and Physical Education (IOSR-JSPE)*, *2*(1).

Chen, W., Hammond-Bennett, A., Hypnar, A., & Mason, S. (2018). Health-related physical fitness and physical activity in elementary school students. *BMC Public Health*, *18*(1). https://doi.org/10.1186/s12889-018-5107-4

Coledam, D. H. C., & Ferraiol, P. F. (2017). Engagement in physical education classes and health among young people: Does sports practice matter? A cross-sectional study. *Sao Paulo Medical Journal*, *135*(6). https://doi.org/10.1590/1516-3180.2017.0111260617

Dewi, R., & Rifki, M. (2020). Pengaruh Senam Aerobik Terhadap Tingkat Kebugaran Jasmani Siswa. *Jurnal Stamina*, *3*(6).

Fonseca, A. P. L. M., de Azevedo, C. V. M., & Santos, R. M. R. (2021). Sleep

and health-related physical fitness in children and adolescents: a systematic review. In *Sleep Science* (Vol. 14, Issue 4). https://doi.org/10.5935/1984-0063.20200125

Greier, K., Drenowatz, C., Ruedl, G., Kopp, M., Burtscher, M., & Greier, C. (2020). Effect of Daily Physical Education on Physical Fitness in Elementary School Children. *Advances in Physical Education*, *10*(02). https://doi.org/10.4236/ape.2020.102009

Herbert, C., Meixner, F., Wiebking, C., & Gilg, V. (2020). Regular Physical Activity, Short-Term Exercise, Mental Health, and Well-Being Among University Students: The Results of an Online and a Laboratory Study. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.00509

Hidayat, S. (2019). PHYSICAL FITNESS STUDENTS 10-12 YEARS, GORONTALO CITY. *Jambura Journal of Sports Coaching*, *1*(1). https://doi.org/10.37311/jjsc.v1i1.1995

Kljajević, V., Stanković, M., Đorđević, D., Trkulja-Petković, D., Jovanović, R., Plazibat, K., Oršolić, M., Čurić, M., & Sporiš, G. (2022). Physical activity and physical fitness among university students—A systematic review. In *International Journal of Environmental Research and Public Health* (Vol. 19, Issue 1). https://doi.org/10.3390/ijerph19010158

Lambourne, K., Hansen, D. M., Szabo, A. N., Lee, J., Herrmann, S. D., & Donnelly, J. E. (2013). Indirect and direct relations between aerobic fitness, physical activity, and academic achievement in elementary school students. *Mental Health and Physical Activity*, *6*(3). https://doi.org/10.1016/j.mhpa.2013.06.002

Li, Y., Xia, X., Meng, F., & Zhang, C. (2020). Association Between Physical Fitness and Anxiety in Children: A Moderated Mediation Model of Agility and Resilience. *Frontiers in Public Health*, p. *8*. https://doi.org/10.3389/fpubh.2020.00468

Marques, A., Balsa, D., Domingos, M., Cavalheiro, R., Carreira, T., Moreira, T., Ribeiro, T., & Gouveia, É. R. (2022). The Attitude of Portuguese Physical Education Teachers toward Physical Fitness. *Children*, *9*(7). https://doi.org/10.3390/children9071005

Nugraha, B., Suharjana, & Lumintuarso, R. (2022). Perceptions of physical education students and teachers on physical education learning. *Cakrawala Pendidikan*, *41*(2). https://doi.org/10.21831/cp.v41i2.39887

Organization, W. H. (2018). The global action plan on physical activity 2018 - 2030: more active people for a healthier world. In *Geneva, Switzerland* (Vol. 28, Issue 6).

Pan, C. C., & Mcnamara, S. (2022). The Impact of Adapted Physical Education on Physical Fitness of Students with Intellectual Disabilities: A Three-year Study. *International Journal of Disability, Development, and Education*, *69*(4). https://doi.org/10.1080/1034912X.2020.1776851

Physical Activity Guidelines Advisory Committee. (2018). Physical Activity Guidelines Advisory Committee Scientific Report. *Department of Health and Human Services.*

Puspodari, Setijono, H., Wiriawan, O., Arfanda, P. E., Raharjo, S., Muharram, N. A., Himawanto, W., Allsabah, M. A. H., & Koestanto, S. H. (2022). Comparison of the Effect of High Impact Aerobic Dance Exercise Versus Zumba on Increasing Maximum Oxygen Volume in Adolescent Women. *Physical Education Theory and Methodology*, *22*(2), 166–172. https://doi.org/10.17309/tmfv.2022.2.03

Sukmawati, N., Dlis, F., Pelana, R., Muslimin, & Oktariyana. (2021). The effectiveness of the application of the cheerful and creative children's gymnastics model to improve the physical fitness of kindergarten children. *International Journal of Human Movement and Sports Sciences*, *9*(6). https://doi.org/10.13189/saj.2021.090605

Warburton, D. E. R., & Bredin, S. S. D. (2019). Health benefits of physical activity: A strengths-based approach. In *Journal of Clinical Medicine* (Vol. 8, Issue 12). https://doi.org/10.3390/jcm8122044

Xu, C., Yao, M., Kang, M., Duan, G., & Bocalini, D. S. (2020). Improving Physical Fitness of Children with Intellectual and Developmental Disabilities through an Adapted Rhythmic Gymnastics Program in China. *BioMed Research International*, *2020*. https://doi.org/10.1155/2020/2345607

Xu, Y., Mei, M., Wang, H., Yan, Q., & He, G. (2020). Association between weight status and physical fitness in Chinese mainland children and adolescents: A cross-sectional study. *International Journal of Environmental Research and Public Health*, *17*(7). https://doi.org/10.3390/ijerph17072468