

Analysis of the level of physical fitness of learners in physical education learning

**Imam Darmawan^{1abcde)*}, Mela Suharyanti^{2abc)}, Yopi Hutomo Bhakti^{3ab)}
Eki Aldapit^{4cde)}**

¹²³⁴ Department of Physical Education Study Program, Muhammadiyah University of Kotabumi, Indonesia

ABSTRACT

Physical fitness is an important factor that influences students' ability to participate in physical education learning, improve endurance, and support motor development and long-term health. Initial observations indicate variations in physical fitness levels among students, necessitating a more in-depth study. This study aims to analyze the physical fitness levels of fifth-grade students in physical education learning. The study used a quantitative approach with descriptive methods. The population in this study were all fifth-grade students of SD Negeri 6 Kelapa, with a sample of 30 students taken using a total sampling technique. The research instrument used the Indonesian Physical Fitness Test (TKJI) for ages 10–12 years, which consists of five test items. Data analysis was carried out using descriptive statistics in the form of score calculations, percentages, and categorization of physical fitness levels. The results of the study showed that the physical fitness levels of students were in the varied category, with a dominance in the moderate category. The results indicated that most students had sufficient physical fitness, but still needed improvement. The conclusion of this study is that the physical fitness levels of students still need to be improved through more programmed, varied, and fitness-oriented physical education learning. It is recommended that physical education teachers design more intensive and enjoyable learning activities to support improving students' physical fitness.

Keywords: analysis; levels; physical fitness; physical education; learning



Received: 11 January 2026; Accepted 28 June 2026; Published 02 August 2026

Copyright © 2025 Imam Darmawan, Mela Suharyanti, Yopi Hutomo Bhakti, Eki Aldapit

Corresponding Author: Imam Darmawan, Department of Physical Education Study Program, Muhammadiyah University of Kotabumi, Indonesia

 e-mail: freefireimam@gmail.com

How to Cite: Darmawan I., Suharyanti M., Bhakti YU., Aldapit E. (2026). Analysis of the level of physical fitness of learners in physical education learning, 6(2), 01-09, <https://doi.org/10.32665/citius.v6i2.6219>

Authors' Contribution: a – Study Design; b – Data Collection; c – Statistical Analysis; d – Manuscript Preparation; e – Funds Collection

INTRODUCTION

Physical education is an integral part of the education system which plays an important role in developing the physical, mental, emotional and social aspects of students. (Effendi et al., 2022; Iyakrus, 2018) Through physical education, students not only acquire movement skills but are also fostered to develop active and healthy lifestyle habits from an early age. These habits are crucial for supporting quality of life and preventing various health problems in the future. The success of physical education learning is greatly influenced by the physical fitness of students, as physical fitness is the foundation for optimal participation in various physical activities (Panggraita et al., 2020; Subrata, 2023).

Physical fitness is defined as a person's ability to carry out daily activities effectively and efficiently without experiencing excessive fatigue and still having energy reserves for other activities (Mu'arifin & Kurniawan, 2021). At the elementary school level, physical fitness is an important foundation for the development of students' motor skills, coordination, endurance, strength, and agility. Students with good physical fitness tend to be more active, enthusiastic, and able to participate optimally in physical education lessons.

However, technological advances and changes in modern lifestyles have resulted in a decline in children's physical activity levels. Children tend to engage in more sedentary activities such as playing with gadgets, watching television, and playing digital games (Hanifah et al., 2023; Putra & Anira, 2022). A sedentary lifestyle has the potential to reduce physical fitness levels, increase the risk of health problems, and negatively impact concentration and academic achievement (Nurlaela et al., 2024). This condition poses a serious challenge to the world of education, particularly in physical education instruction in elementary schools.

Various studies show that the physical fitness levels of elementary school students are in the moderate to low category. Sari, (2020), Wahid & Kurniawan, (2023) found that most elementary school students have sufficient physical fitness, but still need improvement through more structured learning. Research by Adi et al., (2025), Nurlaela et al., (2024) stated that low daily physical activity among students contributes to low endurance and muscle strength. Meanwhile, research by (Angreza & Purwanto, (2023) shows that a lack of variety in physical education instruction leads to students being less motivated to move actively. In general, these studies confirm that students' physical fitness remains a critical issue in physical education instruction in elementary schools and requires serious attention.

Physical fitness theoretically includes several main components, namely cardiorespiratory endurance, muscle strength, muscle endurance, flexibility, and body composition (Mahendra, 2023). These five components must be developed in a balanced manner through planned learning activities. The Indonesian Physical Fitness Test (TKJI) was developed as a standard instrument to measure the physical fitness of Indonesian children according to their age and physical condition (Haeril et al., 2022). The use of TKJI allows teachers and researchers to obtain an objective picture of the physical fitness condition of students.

From a pedagogical perspective, physical education instruction should focus not only on mastering sports techniques but also on improving overall physical fitness. This aligns with the concept of physical literacy, which emphasizes the importance of building students' self-confidence, motivation, and competence in lifelong physical activity (Whitehead, 2010). Although numerous studies have examined students' physical fitness, most have been conducted at the secondary school level or in different regional contexts. This study differs from previous studies in that it specifically analyzes the physical fitness levels of fifth-grade students at SD Negeri 6 Kelapa using the TKJI (Indonesian Physical Fitness Test) for ages 10–12 and a total sampling technique. Furthermore, this study focuses on the direct link between physical fitness and physical education instruction in elementary schools, rather than simply measuring general fitness.

The urgency of this research lies in the physical fitness of students as a basis for improving physical education instruction. The results are expected to serve as a reference for teachers in designing more effective, engaging, and fitness-oriented instruction. The contribution of this research is not only academic but also practical, particularly in supporting the improvement of the quality of physical education instruction in elementary schools. Based on the literature review, there is still limited research specifically examining the physical fitness levels of fifth-grade students at SD Negeri 6 Kelapa. Furthermore, there are not many studies that combine physical fitness analysis with the

context of physical education learning directly in elementary schools. This gap is the basis for conducting this study. This study aims to analyze the physical fitness levels of fifth-grade students in physical education learning at SD Negeri 6 Kelapa. The results of this analysis are expected to provide a realistic picture of the physical fitness conditions of students and serve as a basis for designing more effective learning strategies oriented towards improving physical fitness.

METHOD

This research uses a quantitative approach with a descriptive method (M. Sari et al., 2022). The descriptive method is used to objectively describe the condition or state of a research object without providing treatment or manipulation to the variables being studied. (Sugiono et al., 2023) This study aims to obtain a real picture of the physical fitness level of fifth grade students in physical education learning at SD Negeri 6 Kelapa.

Participants in this study included all 30 fifth-grade students of SD Negeri 6 Kelapa. The sampling technique used was total sampling, meaning the entire population was used as the research sample. This technique was chosen because the population size was relatively small, allowing for comprehensive measurements and more representative data. Thus, the sample's representativeness of the population was 100%.

The instrument used in this study was the Indonesian Physical Fitness Test (TKJI) for children aged 10–12. The TKJI is a standardized instrument developed by the Indonesian Ministry of National Education to reflect the characteristics of Indonesian children and has been widely used in physical education research (Kementerian Pendidikan Nasional, 2010).

Table 1. Indonesian Physical Fitness Test (TKJI)

No	Test Items	Measured Components	Measurement Objectives
1	Endurance running	Cardiovascular endurance	Knowing cardiorespiratory capacity
2	Arm strength & endurance test	Arm muscle strength and endurance	Measuring upper body muscle strength
3	Abdominal strength & endurance test	Abdominal muscle strength and endurance	Measuring core muscle strength
4	Leg muscle explosive power test	Explosive power (power) of leg muscles	Assessing explosive leg ability
5	Speed test	Movement speed	Measuring the ability to move quickly

The research procedure began with a preparatory stage, which involved obtaining research permits from the school and coordinating with the physical education teacher. Next, the researcher provided information to students about the research objectives and the procedures for administering the physical fitness test. During the implementation stage, students completed the entire TKJI test series in accordance with applicable instructions and implementation standards. Each student completed five test items sequentially under the supervision of the researcher and the physical education teacher to ensure safety and measurement accuracy. The results of each test item were recorded directly on the assessment sheet. The final stage was data collection and review to ensure completeness and accuracy before analysis.

The data obtained were analyzed using descriptive statistics. Data analysis was performed by calculating the score for each test item, adding up the total physical fitness score, and then converting the scores into physical fitness level categories based on the TKJI norms. The analysis results are

presented in the form of scores, percentages, and categorizations to provide a clear picture of the students' physical fitness levels.

RESULTS

The subjects in this study were all 30 fifth-grade students of SD Negeri 6 Kelapa. Based on gender, the students consisted of 16 males (53.33%) and 14 females (46.67%). This distribution shows that the number of male students is slightly higher than female students, but the difference is not significant. Thus, the composition of the research subjects is relatively balanced and can represent the class conditions as a whole.

Table 2. Distribution of Students by Gender

Gender	Number of people)	Percentage (%)
Man	16	53.33
Woman	14	46.67
Total	30	100

The results of physical fitness measurements using the Indonesian Physical Fitness Test (TKJI) indicate that students' physical fitness levels fall into varying categories. The distribution of physical fitness levels can be seen in Table 3.

Table 3. Distribution of Students' Physical Fitness Levels

Fitness Category	Amount	Percentage (%)
Very good	2	6.67
Good	8	26.67
Moderate	14	46.67
Not enough	5	16.67
Very less	1	3.33
Total	30	100

Based on Table 3, the majority of students are in the moderate category, with a percentage of 46.67%. This indicates that, in general, the level of physical fitness of students is sufficient, but still requires improvement. Ten students (33.34%) are in the good and very good categories, while six (20%) are in the poor and very poor categories. This indicates variations in physical fitness levels among students.

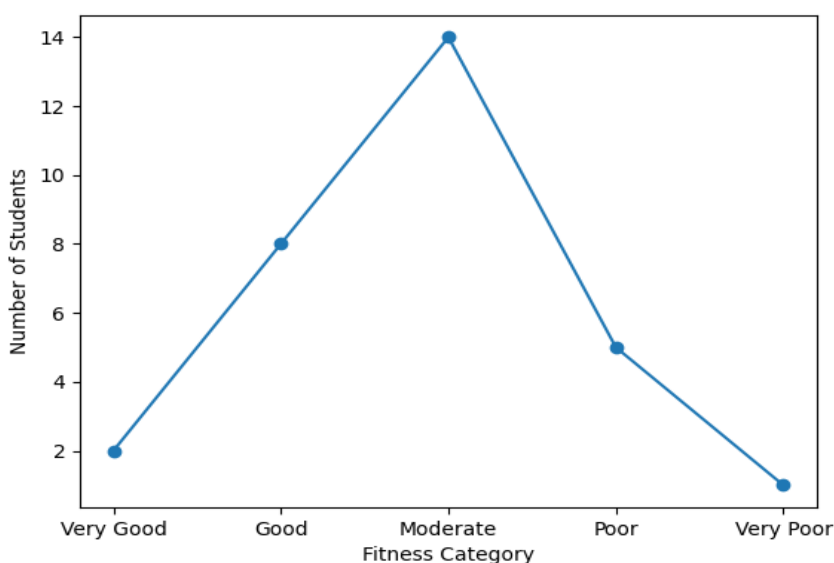


Figure 1. Distribution of Physical Fitness Levels

In addition to categorizing physical fitness levels, the research results were also analyzed based on the average score for each physical fitness component measured using the TKJI. The results of the average score calculations are presented in Table 4.

Table 4. Average Score of Students' Physical Fitness Components

Fitness Components	Average Score
Cardio-pulmonary endurance	3.1
Arm muscle strength	3.0
Abdominal muscle strength	2.9
Explosive power of leg muscles	3.2
Speed	3.0

Based on Table 4, the leg muscle explosive power component had the highest average score of 3.2, while abdominal muscle strength had the lowest average score of 2.9. These results indicate that the participants' leg explosive ability was relatively better than the other fitness components, while abdominal muscle strength still needed improvement. Overall, the average score for each component was in the moderate category, which is in line with the results of the general categorization of students' physical fitness levels.

DISCUSSION

The results of this study indicate that the physical fitness of fifth-grade students at SD Negeri 6 Kelapa is predominantly in the moderate category, with a spread that ranges from very good to very poor. This pattern suggests that most students already have a reasonable level of fitness, yet there is clear room to strengthen it through learning. One factor that helps explain this condition is the decline in students' daily physical activity as sedentary lifestyles become more common, since children now spend more time with gadgets, television, and digital games and have fewer chances to move actively. Because physical fitness is the main asset for optimal participation in physical education, examining the level of fitness becomes an important basis for evaluating and improving learning.

The findings of this study indicate that students' physical fitness levels are predominantly in the moderate category, with variations ranging from very good to very poor. Conceptually, this condition aligns with physical fitness theory, which states that fitness is the result of routine and planned physical activity habits (Adi et al., 2025; Costigan et al., 2024; Oksanen et al., 2024). If students' physical activity is limited to relatively short physical education lessons, the physical fitness achieved tends to be moderate. This finding reinforces the view that physical education instruction in elementary schools has not fully optimized the development of students' physical fitness.

The results of this study are also consistent with the findings (Adityatama et al., (2023), Puriana et al., (2024) confirms that low daily physical activity frequency contributes to low endurance and muscle strength in students. Thus, the findings of this study reinforce previous research that physical fitness in school-aged children remains an issue that requires serious attention in physical education instruction. However, this study adds a specific local context, namely fifth-grade students at SD Negeri 6 Kelapa, which has not been widely studied before.

The relatively superior explosive power of leg muscles in physical fitness compared to other components can be explained by the theory of children's motor development. At elementary school age, children spend much of their free play running, jumping, and performing short bursts of movement, and this repeated loading of the lower limbs is thought to stimulate the development of leg power more than the muscle groups that are rarely trained in everyday play. In line with the principle of specific adaptation, the body strengthens the components that are used most often, so the

leg power that children rely on during spontaneous games tends to develop earlier than core strength, which is seldom targeted in unstructured activity (Azkiyaa et al., 2024; Maifa, 2024; Yusfi et al., 2022). Conversely, the relatively lower abdominal muscle strength indicates that core-specific exercises have not been a focus in physical education instruction.

A novel and important aspect of this research lies in the direct link between physical fitness measurement results and the context of physical education learning in elementary schools. Many previous studies only report general fitness levels, without explicitly linking them to classroom learning practices. This research shows that variations in students' physical fitness levels reflect the quality and intensity of physical education learning they receive (Priono & Lestari, 2024; Rahmawati & Pradipta, 2023; Wijayanto, 2023). This finding reinforces the concept that physical education is not merely a supplementary subject, but plays a strategic role in shaping students' physical fitness and active lifestyles.

The impact of this research's findings is significant for educational practice. Physical education teachers need to design more structured, varied learning experiences that focus on improving physical fitness, not just mastering game techniques. Integrating fitness training, such as circuit training, active play, and fitness-based activities, can be a solution for improving endurance, strength, and other fitness components. Furthermore, schools can encourage an active lifestyle through extracurricular activities, morning exercise, or daily physical activity programs. This aligns with the WHO (2020) recommendation on the importance of at least 60 minutes of physical activity per day for school-age children.

However, this study has several limitations. First, the number of subjects was relatively small and limited to one school, so the generalizability of the results is still limited. Second, this study was descriptive in nature and did not examine in-depth factors that cause low or high physical fitness, such as daily activity patterns, family support, or school facilities. Third, this study did not examine differences in physical fitness based on gender or socioeconomic background. Therefore, future research is recommended to involve a larger sample size, use a more analytical research design, and comprehensively examine the factors influencing physical fitness.

CONCLUSION

This study concludes that the physical fitness of fifth-grade students in physical education learning at SD Negeri 6 Kelapa falls mainly in the moderate category, with levels that vary from very good to very poor. The objective of analyzing students' physical fitness has therefore been achieved. The contribution of this study lies in its specific focus on the elementary school context. It measures fitness comprehensively with the TKJI and links the results directly to learning practices, which adds to knowledge in the field of physical education. Methodologically, the study also shows that a quantitative descriptive approach with total sampling is effective for describing the fitness profile of an entire class. At the same time, the findings should be read with care, since the data come from a single school with a relatively small number of students, so they cannot yet be generalized to a wider population. For practice, the results give teachers a basis for designing learning that is more structured, varied, and oriented toward fitness. For future research, it is recommended that studies involve a larger and more diverse sample and examine the factors that influence students' physical fitness in greater depth.

ACKNOWLEDGEMENTS

The author would like to express his deepest gratitude to the Principal of SD Negeri 6 Kelapa, the Physical Education teacher, and all fifth-grade students who participated in this research for their cooperation, support, and willingness throughout the research process. He also expresses his gratitude to all parties who have assisted, directly or indirectly, in ensuring the successful completion of this research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

REFERENCES

- Adi, S., Soenyoto, T., Aliriad, H., & Utama, M. B. R. (2025). *Manajemen Aktivitas Fisik Siswa*. Cahya Ghani Recovery.
- Adityatama, F., Sartono, S., Hadiana, O., & Muhtarom, D. (2023). Pengaruh interval training dan fartlek training terhadap peningkatan daya tahan. In *Jurnal Pendidikan Jasmani Kesehatan dan Rekreasi (Penjaskesrek)* (Vol. 10, Issue 2, pp. 80–89). Sekolah Tinggi Keguruan dan Ilmu Pendidikan (STKIP) Melawi. <https://doi.org/10.46368/jpkr.v10i2.1298>
- Angreza, B., & Purwanto, D. (2023). Inovasi pembelajaran penjas berbasis permainan tradisional di SDN inti tomoli. *Multilateral Jurnal Pendidikan Jasmani Dan Olahraga*, 22(4), 99–106. <https://doi.org/10.20527/multilateral.v22i4.16577>
- Azkiyaa, A. A., Subekti, N., & Nurhidayat, N. (2024). Hubungan Power Otot Tungkai dan Panjang Tungkai dengan Kemampuan Lari 100 Meter. In *VENUE : Jurnal Olahraga* (Vol. 1, Issue 1, pp. 34–38). CV. Java Mutiara Media. <https://doi.org/10.71264/venue.v1i1.18>
- Barranco-Ruiz, Y., & Villa-González, E. (2020). Health-Related Physical Fitness Benefits in Sedentary Women Employees after an Exercise Intervention with Zumba Fitness®. In *International Journal of Environmental Research and Public Health* (Vol. 17, Issue 8, p. 2632). MDPI AG. <https://doi.org/10.3390/ijerph17082632>
- Costigan, S., Gråstén, A., Huhtiniemi, M., Kolunsarka, I., Lubans, D. R., & Jaakkola, T. (2024). Longitudinal Associations Between Enjoyment of Physical Education, Cardiorespiratory Fitness, and Muscular Fitness Among Finnish Adolescents. In *Scandinavian journal of medicine & science in sports* (Vol. 34, Issue 6). <https://doi.org/10.1111/sms.14678>
- Effendi, Y., Cahyani, O. D., & S, A. (2022). Motivasi belajar siswa pembelajaran pendidikan jasmani. In *Citius : Jurnal Pendidikan Jasmani, Olahraga, dan Kesehatan* (Vol. 1, Issue 2, pp. 26–30). Universitas Nahdlatul Ulama Sunan Giri Bojonegoro. <https://doi.org/10.32665/citius.v1i2.272>
- Haeril, H., Syafruddin, M. A., Yusuf, A., & Asri, A. (2022). PkM pelatihan penerapan tes kebugaran jasmani indonesia (TKJI). *Jurnal Pengabdian Olahraga Masyarakat (JPOM)*, 3(1), 22–26. <https://doi.org/10.26877/jpom.v3i1.11897>
- Hanifah, L. , Nasrulloh, N. , & Sufyan, D. L. (2023). Sedentary Behavior and Lack of Physical Activity among Children in Indonesia. *Children (Basel, Switzerland)*, 10(8), 1283. <https://doi.org/10.3390/children10081283>
- Iyakrus, I. (2018). Pendidikan Jasmani, Olahraga Dan Prestasi. *Altius: Jurnal Ilmu Olahraga Dan Kesehatan*, 7(2). <https://doi.org/10.36706/altius.v7i2.8110>
- Kementerian Pendidikan Nasional. (2010). *Tes Kesegaran Jasmani Indonesia untuk Anak Umur 10–12 Tahun*. Jakarta: Pusat Pengembangan Kualitas Jasmani.

- Mahendra, I. K. A. A. (2023). Perbandingan Indeks Massa Tubuh Normal Dan Overweight Terhadap Daya Tahan Kardiorespirasi Dan Kebugaran Jasmani Pada Mahasiswa Universitas Dhyana Pura. In *Physiotherapy Health Science (PhysioHS)* (Vol. 6, Issue 2). Universitas Muhammadiyah Malang. <https://doi.org/10.22219/physiohs.v6i2.28712>
- Maifa, S. (2024). Analisis power otot tungkai dan kecepatan lari terhadap kemampuan lompat jauh. In *Jurnal Porkes* (Vol. 7, Issue 1, pp. 595–605). Universitas Hamzanwadi. <https://doi.org/10.29408/porkes.v7i1.25973>
- Mu'arifin, M., & Kurniawan, A. W. (2021). Konsep penelitian pengembangan dalam praktik pembelajaran pendidikan jasmani. In *Multilateral : Jurnal Pendidikan Jasmani dan Olahraga* (Vol. 20, Issue 2, p. 102). Center for Journal Management and Publication, Lambung Mangkurat University. <https://doi.org/10.20527/multilateral.v20i2.10587>
- Nurlaela, N., Komariah, L., & Rahmat, A. (2024). Pengaruh Aktivitas Fisik, Kesehatan Gizi, dan Kebugaran Jasmani Terhadap Hasil Belajar pada Pembelajaran Penjas. *Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*, 7(2), 794–804. <https://doi.org/10.31539/jpjo.v7i2.9923>
- Oksanen, P., Tikanmäki, M., Tulppo, M. P., Niemelä, M., Korpelainen, R., & Kajantie, E. (2024). Physical Activity, Fitness, and Cardiac Autonomic Function among Adults Born Postterm. In *American journal of epidemiology*. <https://doi.org/10.1093/aje/kwae150>
- Panggraita, G. N., Tresnowati, I., & Putri, M. W. (2020). Profil Tingkat Kebugaran Jasmani Mahasiswa Program Studi Pendidikan Jasmani. *Jendela Olahraga*, 5(2), 27–33. <https://doi.org/10.26877/jo.v5i2.5924>
- Priono, J., & Lestari, D. A. (2024). Analisis Tingkat Kebugaran Jasmani Mahasiswa PJKR. In *Jendela Olahraga* (Vol. 9, Issue 1, pp. 168–178). Universitas PGRI Semarang. <https://doi.org/10.26877/jo.v9i1.17945>
- Puriana, R. H., Putranto, N. Y., Aran, K. A., & Azmi, K. (2024). Pengaruh Interval Training dan Shuttle Run Terhadap Daya Tahan Cardiovascular. In *Jurnal Porkes* (Vol. 7, Issue 2, pp. 1209–1219). Universitas Hamzanwadi. <https://doi.org/10.29408/porkes.v7i2.28128>
- Putra, D. R. A., & Anira, A. (2022). Sedentary Behavior of Elementary School Students During the Covid-19 Pandemic. In *TEGAR: Journal of Teaching Physical Education in Elementary School* (Vol. 6, Issue 1, pp. 29–34). Universitas Pendidikan Indonesia (UPI). <https://doi.org/10.17509/tegar.v6i1.51489>
- Rahmawati, J. P., & Pradipta, A. W. (2023). Analisis Kebugaran Jasmani Ekstrakurikuler Bola Basket. In *Prosiding Seminar Nasional IKIP Budi Utomo* (Vol. 4, Issue 1, pp. 220–227). IKIP Budi Utomo Malang. <https://doi.org/10.33503/prosiding.v4i01.3599>
- Sari, D. N. (2020). Tinjauan Kebugaran Jasmani Siswa Sekolah Dasar. *Jurnal Sporta Saintika*, 5(2), 133–138. <https://doi.org/10.24036/sporta.v5i2.149>
- Sari, M., Rachman, H., Juli Astuti, N., Win Afgani, M., & Abdullah Siroj, R. (2022). Explanatory Survey dalam Metode Penelitian Deskriptif Kuantitatif. *Jurnal Pendidikan Sains Dan Komputer*, 3(01), 10–16. <https://doi.org/10.47709/jpsk.v3i01.1953>
- Stults-Kolehmainen, M. A., Gilson, T. A., SantaBarbara, N., McKee, P. C., Sinha, R., Bartholomew, J. B., Boullosa, D., Budnick, C. J., Bueno, F. A., Haughton, A., Barker, J. L., & Ash, G. I. (2023). Qualitative and quantitative evidence of motivation states for physical activity, exercise and being sedentary from university student focus groups. *Frontiers in Sports and Active Living*, 5. <https://doi.org/https://doi.org/10.3389/fspor.2023.1033619>

- Subrata, I. P. N. N. (2023). Dukungan Orangtua dan Lingkungan Sosial Terhadap Motivasi Belajar dan Hasil Belajar Pendidikan Jasmani, Olahraga, dan Kesehatan. In *Jurnal Ilmu Keolahragaan Undiksha* (Vol. 11, Issue 1, pp. 7–15). Universitas Pendidikan Ganesha. <https://doi.org/10.23887/jiku.v11i1.56214>
- Sugiono, Yudha, M. D. M. N., & Basuki, N. (2023). Efektifitas antara Latihan High Intensity Interval Training dengan Moderate Intensity Continuous Training pada Prilaku Sedentary terhadap Perubahan Heart Rate recovery. In *Physiotherapy Health Science (PhysioHS)* (Vol. 5, Issue 1). Universitas Muhammadiyah Malang. <https://doi.org/10.22219/physiohs.v5i1.25882>
- Wahid, W. N., & Kurniawan, A. W. (2023). Survei Kebugaran Jasmani Pada Siswa Sekolah Dasar. In *Jurnal Master Penjas & Olahraga* (Vol. 4, Issue 1, pp. 270–281). STKIP Pasundan. <https://doi.org/10.37742/jmpo.v4i1.77>
- Whitehead, M. (2010). *Physical Literacy: Throughout the Lifecourse*. London: Routledge.
- Wijayanto, A. (2023). *Aneka Permainan Kebugaran Jasmani*. Center for Open Science. <https://doi.org/10.31219/osf.io/ys9mp>
- Yusfi, H., Bayu, W. I., Giartama, G., Destriani, D., & Solahuddin, S. (2022). Analisis kebutuhan alat ukur power otot tungkai berbasis aplikasi. In *Altius: Jurnal Ilmu Olahraga dan Kesehatan* (Vol. 11, Issue 2, pp. 303–310). Universitas Sriwijaya - Pusat Inovasi Pembelajaran Unsri. <https://doi.org/10.36706/altius.v11i2.19311>