



HJSE

Holistic Journal of Sport Education

E-ISSN: 2809-9974

<https://journal.uniga.ac.id/index.php/penjas>

DOI: 10.52434/penjas.v5i2.44241



**SURVEY OF STUDENTS AT STATE JUNIOR HIGH SCHOOL
NO. 7, SORONG CITY**

*Bernat Ramandei^{1-ABCDE}, Saiful Anwar^{1-ACD}, Harmaman^{1-ABC}

¹Department of Physical Education, Universitas Pendidikan Muhammadiyah Sorong, Indonesia

Keywords:

physical fitness;
junior high school
students; physical
education; fitness
assessment.

Abstract

Physical fitness is a fundamental component of students' health and plays an essential role in supporting physical performance, learning participation, and overall well-being. Monitoring students' physical fitness levels provides valuable evidence for evaluating school-based physical education programs and designing appropriate interventions to promote healthy lifestyles. However, information regarding the physical fitness profile of junior high school students in Eastern Indonesia remains limited. Therefore, this study aimed to assess the physical fitness level of students at SMP Negeri 7 Kota Sorong. A quantitative descriptive survey design was employed involving 30 students selected as research participants. Physical fitness was assessed using the Indonesian Physical Fitness Test, which comprised five test items: a 50-m sprint, pull-up, 60-second sit-up, vertical jump, and 1000-m run. The collected data were analyzed descriptively using percentage distribution to classify students' physical fitness levels. The findings revealed that the majority of students demonstrated a moderate level of physical fitness (38%), followed by good (23%), poor (18%), very good (11%), and very poor (10%) categories. Overall, the physical fitness profile of the participants was classified as moderate, indicating that although most students had achieved an acceptable level of fitness, there remains considerable room for improvement. This study provides baseline evidence regarding the physical fitness status of junior high school students and highlights the need for structured, regular, and sustainable physical activity programs within school settings to enhance students' physical fitness and support long-term health outcomes.

Received: April 13, 2026

Accepted: June
16, 2026

Published: June
30, 2026

Authors' contribution:

A - Conception and design of the study; B - Acquisition of data; C - Analysis and interpretation of data; D - Manuscript preparation; E - Obtaining funding

Correspondence:

Bernat Ramandei

Email: bernatramandey97@gmail.com



INTRODUCTION

Physical fitness is widely recognized as a fundamental component of adolescent health because it supports physical development, psychological well-being, and academic performance (Athaya et al., 2023; Suniga et al., 2025). During adolescence,



adequate physical fitness contributes to improved cardiovascular function, musculoskeletal health, cognitive performance, and emotional regulation (Hardinata et al., 2024; Zulfadila et al., 2025). Conversely, insufficient physical fitness is associated with reduced learning readiness, increased fatigue, and a greater risk of non-communicable diseases later in life. Consequently, monitoring students' physical fitness has become an important indicator for evaluating the effectiveness of school-based physical education programs and promoting lifelong healthy lifestyles (Mashud, Arifin, Warni, Samodra, et al., 2024; Rismanto et al., 2024; Suratmin et al., 2024).

Schools play a strategic role in developing students' physical fitness through structured physical education, regular physical activity, and sports participation. Previous studies have demonstrated that physically active students tend to achieve better academic performance, greater concentration, improved executive function, and higher psychological well-being than their less active peers (Nugraha et al., 2024; Purba et al., 2024; Suryadi et al., 2023). Regular participation in physical activity also contributes to the development of motor competence, social interaction, and healthy behavioral habits that extend into adulthood. Therefore, physical fitness should be considered not only as an educational outcome but also as an essential public health indicator among school-aged children (Ardian et al., 2024; Mashud, Arifin, Warni, Samodra, Y Touvan, et al., 2024; Suryadi et al., 2024).

Physical fitness is a multidimensional construct consisting of speed, muscular strength, muscular endurance, explosive power, and cardiorespiratory endurance (Brown, 1996; Pour Abbasi et al., 2022; Ruiz-Esteban et al., 2020). These components collectively determine an individual's ability to perform daily activities efficiently without excessive fatigue while maintaining sufficient energy for recreational and social activities. Within the context of physical education, evaluating these components provides objective information regarding students' functional capacity and serves as an important basis for designing appropriate learning and training programs (Cataldi et al., 2021; Firdaus & Emral, 2019; VanDerVeer et al., 2021).

Although numerous studies have investigated physical fitness among adolescents, most have focused on the relationship between physical activity and health outcomes, intervention-based exercise programs, or comparisons across age groups and genders. Comparatively fewer studies have described the overall physical fitness profile of junior high school students in geographically underrepresented regions such as Eastern Indonesia (Khairuddin et al., 2023; Kusuma et al., 2021). Moreover, empirical data concerning the physical fitness status of students in Sorong City remain scarce, limiting the availability of evidence needed for evaluating school-based physical education programs and developing context-specific health promotion strategies. This limitation represents an important research gap because regional differences in lifestyle, environmental characteristics, and opportunities for physical activity may influence students' physical fitness profiles.

The novelty of this study lies in providing a comprehensive descriptive profile of physical fitness among junior high school students at SMP Negeri 7 Kota Sorong using standardized physical fitness assessments. Unlike previous studies that primarily emphasized intervention outcomes or examined physical activity behavior, this research establishes baseline empirical evidence regarding students' physical fitness levels in Eastern Indonesia. The findings are expected to support curriculum evaluation, inform school-based physical education planning, and provide practical recommendations for designing sustainable physical activity programs aimed at improving students' health and physical fitness (de Almeida Santana et al., 2023; Lo et al., 2017; Zhu et al., 2017).

Therefore, this study aims to determine the physical fitness level of students at SMP Negeri 7 Kota Sorong. The results are expected to enrich the literature on adolescent physical fitness while providing evidence-based information for teachers, schools, and policymakers in developing more effective physical education programs and promoting healthy lifestyles among junior high school students.

RESEARCH METHODS

Research Design

This study employed a quantitative descriptive survey design to determine the physical fitness level of students at SMP Negeri 7 Kota Sorong. A descriptive approach was chosen because the objective of the study was to describe the current physical fitness profile of the participants without implementing any intervention or experimental treatment. The study focused on measuring students' physical fitness using standardized fitness tests and classifying the results into predetermined fitness categories. The findings were intended to provide baseline evidence for evaluating school-based physical education programs and supporting the development of strategies to improve students' physical fitness.

Physical fitness was assessed using the Indonesian Physical Fitness Test (Tes Kebugaran Jasmani Indonesia/TKJI), which consisted of five test items: a 50-m sprint to assess speed, pull-up (or flexed-arm hang according to participant category) to assess upper-body muscular endurance, a 60-second sit-up test to measure abdominal muscular endurance, a vertical jump test to evaluate lower-body explosive power, and a 1000-m run to assess cardiorespiratory endurance (Bile & Suharharjana, 2019; Dede Pebriandi Sihotang & Novita, 2021; Sani & Hariadi, 2020). The scores from each test component were converted into standardized fitness scores and summed to obtain the overall physical fitness score for each participant.

Participants

The participants consisted of 30 students from SMP Negeri 7 Kota Sorong who met the inclusion criteria of being actively enrolled in school, participating in physical

education classes, and being physically able to complete all physical fitness assessments. Participants were selected using a total sampling technique because all eligible students were included in the study. Prior to data collection, participants received standardized instructions regarding the testing procedures to ensure uniformity during assessment. All physical fitness tests were administered under the supervision of the research team following standardized testing protocols to minimize measurement error and ensure participant safety.

Data Analysis

The collected data were analyzed using descriptive statistical techniques with IBM SPSS Statistics (Version 26). Descriptive statistics included the frequency, percentage, mean, standard deviation, minimum score, and maximum score to summarize participants' physical fitness performance. Participants' overall fitness scores were subsequently classified into five categories (very poor, poor, moderate, good, and very good) according to the Indonesian Physical Fitness Test norms. The results were presented in tables and graphical distributions to facilitate interpretation of the students' physical fitness profile.

RESULTS AND DISCUSSION

Results

A total of 30 students from SMP Negeri 7 Kota Sorong participated in this study. Physical fitness was assessed using five standardized fitness tests, including the 50-m sprint, pull-up, 60-second sit-up, vertical jump, and 1000-m run. The distribution of students' performance across each fitness component is presented in the following tables.

Table 1.
Distribution of Students' Sprint Performance

Category	Time (s)	Frequency (n)	Percentage (%)
Very Good	≤ 7.5	5	16.7
Good	7.6–8.5	9	30.0
Moderate	8.6–9.5	10	33.3
Poor	9.6–10.5	4	13.3
Very Poor	≥ 10.6	2	6.7
Total		30	100

The 50-m sprint test demonstrated that most students (33.3%) were classified in the moderate category, followed by the good category (30.0%). Only 16.7% achieved the very good category, whereas 20.0% of students were categorized as poor or very poor. These findings indicate that students generally exhibited moderate sprint performance.

Table 2.



Distribution of Students' Pull-Up Performance

Category	Repetitions	Frequency (n)	Percentage (%)
Very Good	≥ 15	3	10.0
Good	11–14	6	20.0
Moderate	6–10	12	40.0
Poor	3–5	6	20.0
Very Poor	≤ 2	3	10.0
Total		30	100

The pull-up assessment revealed that 40.0% of participants demonstrated moderate upper-body muscular strength and endurance. The proportions of students classified as good and poor were identical (20.0%), while 10.0% achieved the very good category and another 10.0% were categorized as very poor.

Table 3.

Distribution of Students' Sit-Up Performance

Category	Repetitions	Frequency (n)	Percentage (%)
Very Good	≥ 40	4	13.3
Good	31–39	7	23.3
Moderate	21–30	12	40.0
Poor	11–20	5	16.7
Very Poor	≤ 10	2	6.7
Total		30	100

The sit-up test showed that the largest proportion of students (40.0%) achieved the moderate category. Meanwhile, 23.3% demonstrated good abdominal muscular endurance, whereas only 13.3% were categorized as very good. Overall, abdominal muscular endurance among participants was considered moderate.

Table 4.

Distribution of Students' Vertical Jump Performance

Category	Height (cm)	Frequency (n)	Percentage (%)
Very Good	≥ 65	3	10.0
Good	55–64	7	23.3
Moderate	45–54	11	36.7
Poor	35–44	6	20.0
Very Poor	≤ 34	3	10.0
Total		30	100

Most participants (36.7%) demonstrated moderate lower-limb explosive power. Students classified as good represented 23.3%, while 20.0% were categorized as poor. Equal proportions (10.0%) were observed in the very good and very poor categories.

Table 5.
Distribution of Students' 1000-m Run Performance

Category	Time (min)	Frequency (n)	Percentage (%)
Very Good	≤3.5	2	6.7
Good	3.6–4.5	6	20.0
Moderate	4.6–5.5	13	43.3
Poor	5.6–6.5	6	20.0
Very Poor	≥6.6	3	10.0
Total		30	100

The 1000-m run results indicated that cardiorespiratory endurance was predominantly classified as moderate (43.3%). The proportions of students categorized as good and poor were identical (20.0%), whereas only 6.7% achieved the very good category.

Table 6.
Overall Distribution of Physical Fitness Levels

Category	Percentage (%)
Very Good	11
Good	23
Moderate	38
Poor	18
Very Poor	10

Overall, the physical fitness profile of students at SMP Negeri 7 Kota Sorong was predominantly classified as moderate (38%), followed by good (23%), poor (18%), very good (11%), and very poor (10%). A consistent pattern was observed across all five fitness components, where the moderate category represented the largest proportion of participants. These findings indicate that although students generally demonstrated an acceptable level of physical fitness, improvements in several fitness components are still required to achieve higher levels of physical performance.

Discussion

The present study examined the physical fitness profile of students at SMP Negeri 7 Kota Sorong using five components of the Indonesian Physical Fitness Test. Overall, the findings indicate that the majority of participants were classified within the moderate category across all fitness components, including speed, upper-body muscular strength and endurance, abdominal muscular endurance, lower-limb explosive power, and cardiorespiratory endurance. This pattern suggests that although students have achieved an acceptable level of physical fitness to support daily activities and participation in physical education, their fitness has not yet reached the level considered optimal for maximizing health and physical performance (Kochetkov, 2021; Li et al., 2022; Ushijima et al., 2016).

The predominance of moderate performance in the 50-m sprint indicates that students possess an adequate level of speed but still have considerable potential for improvement (Gale et al., 2021; Wu et al., 2023). Speed is a fundamental component of physical fitness because it underpins performance in many sports and facilitates rapid movement during daily physical activities (Willoughby et al., 2016). Previous studies have shown that sprint performance in adolescents is strongly influenced by neuromuscular coordination, lower-limb muscle strength, and habitual participation in moderate-to-vigorous physical activity. Students who regularly engage in structured sports or extracurricular physical activities generally demonstrate superior sprint performance compared with their less active peers. Therefore, the moderate sprint performance observed in this study may reflect insufficient exposure to structured speed-oriented training (Litleskare et al., 2020; Stojanović et al., 2021).

Upper-body muscular strength and endurance, assessed through the pull-up test, were also predominantly classified as moderate. This finding suggests that many students have not yet developed sufficient muscular endurance to perform repeated upper-body movements efficiently (De La Motte et al., 2017; Ghobadi et al., 2022; Zhao et al., 2022). Similar findings have been reported in studies of junior high school students, where inadequate muscular fitness was associated with low participation in resistance-based physical activities and a predominantly sedentary lifestyle. Because muscular strength contributes not only to sports performance but also to posture, injury prevention, and functional movement, improving this component should become an important objective of school-based physical education (Allen et al., 2014; Jonvik et al., 2019; T Balachandran et al., 2023).

The sit-up test demonstrated that abdominal muscular endurance was generally moderate among participants. Core muscular endurance plays an essential role in maintaining postural stability, improving movement efficiency, and supporting performance during dynamic physical activities (Boguszewski et al., 2021; Cabeza-Ruiz et al., 2019; Henriques-Neto et al., 2020). Research in adolescent populations has consistently demonstrated that students with stronger core musculature tend to exhibit better motor coordination, balance, and overall physical fitness. Consequently, integrating structured core-strengthening exercises into physical education lessons

may enhance students' functional movement capacity and overall fitness (McMillan & Erdmann, 2010; Meiriawati, 2013; Yin et al., 2018).

Lower-limb explosive power, evaluated using the vertical jump test, also showed a predominance of moderate performance. Explosive power is closely related to the ability to generate force rapidly and is an important determinant of success in many sports involving jumping, sprinting, and rapid changes of direction (AragonVargas et al., 2008, 2008; Liu & Zeng, 2023). The present findings suggest that students have developed basic lower-limb power but may require more systematic neuromuscular training to further improve explosive performance. Previous investigations have demonstrated that plyometric training and multidirectional movement exercises effectively enhance lower-limb power and athletic performance among adolescents (Ahmadabadi et al., 2023; Mroczek et al., 2018; Wang et al., 2024).

Cardiorespiratory endurance, measured through the 1000-m run, represented the component with the highest proportion of students classified in the moderate category. Aerobic fitness is widely recognized as one of the strongest indicators of health in children and adolescents because it is associated with cardiovascular function, metabolic health, cognitive performance, and psychological well-being (Akbar et al., 2022; Marco et al., 2023; Shaw et al., 2019; Singh et al., 2022). Although the present findings indicate that most students have adequate aerobic capacity, the presence of participants in the poor and very poor categories suggests that disparities in habitual physical activity, nutritional status, and lifestyle behaviors may influence endurance performance (Nubatonis et al., 2024; Suniga et al., 2025). Previous longitudinal studies have consistently reported that regular participation in moderate-to-vigorous physical activity substantially improves aerobic fitness and reduces the risk of chronic disease during adolescence.

Taken together, these findings indicate that the overall physical fitness of students at SMP Negeri 7 Kota Sorong remains at a moderate level. This outcome is likely influenced by multiple interacting factors, including the frequency of physical activity, nutritional habits, motivation to participate in sports, biological maturation, and the availability of school sports facilities. Physical fitness among adolescents is increasingly recognized as a multidimensional construct that is shaped by both individual and environmental factors rather than by participation in physical education classes alone (Athaya et al., 2023; Suniga et al., 2025; Yusroni, 2024). Consequently, comprehensive school-based strategies involving regular physical education, extracurricular sports participation, active lifestyles, and family support are required to improve students' physical fitness (Da'i et al., 2024; Hardinata et al., 2024; Zulnadila et al., 2025).

The present study contributes to the literature by providing baseline evidence regarding the physical fitness profile of junior high school students in Eastern Indonesia, a region that remains underrepresented in national and international

research. These findings may serve as an evidence base for evaluating physical education curricula, monitoring students' health-related fitness, and designing targeted intervention programs aimed at improving physical fitness among adolescents. Future studies should include larger and more diverse samples, examine potential determinants such as physical activity level, nutritional status, body composition, and socioeconomic background, and employ longitudinal or intervention-based designs to better understand factors influencing physical fitness development among Indonesian adolescents.

CONCLUSION

This study analyzed the passing and shooting skills of fifth-semester Physical Education students at Universitas Pendidikan Muhammadiyah (UNIMUDA) Sorong. The findings indicate that the participants generally demonstrated satisfactory technical competence, with most students classified in the good and very good categories for both passing and shooting, while no participants were categorized as having poor performance. These results suggest that the students have acquired the fundamental technical skills required to support effective futsal performance, although variations in individual ability indicate that further technical development is still necessary. The study contributes to the existing literature by providing baseline empirical evidence on the technical proficiency of Physical Education students, which can be used as a reference for evaluating practical learning outcomes and developing evidence-based futsal training programs in higher education. From a practical perspective, the findings may assist lecturers and coaches in identifying students' strengths and weaknesses and in designing more targeted technical training focused on improving passing accuracy, shooting precision, and game performance.

This study is limited by its relatively small sample size and the inclusion of participants from a single university, which may restrict the generalizability of the findings. Future studies should involve larger and more diverse samples from multiple institutions, incorporate physical and tactical performance variables, and examine the relationships between technical skills, physical fitness, and match performance to obtain a more comprehensive understanding of futsal player development.

Conflict of interest

The authors declare no conflict of interest.

Funding

No external funding information was provided for this revision.

REFERENCES

Ahmadabadi, S., Rjabi, H., Gharakhanlou, R., Talebian, S., & Basereh, A. (2023). Effects of a 4-week plyometric training on activity patterns during different



- phases of one-leg drop jump with focus on jump height. *Scientific Reports*, 13(1), 9192. <https://doi.org/10.1038/s41598-023-36461-1>
- Akbar, S., Soh, K. G., Jazaily Mohd Nasiruddin, N., Bashir, M., Cao, S., & Soh, K. L. (2022). Effects of neuromuscular training on athletes physical fitness in sports: A systematic review. In *Frontiers in Physiology*. <https://doi.org/10.3389/fphys.2022.939042>
- Allen, B. ., Hannon, J. ., Burns, R. ., & Williams, S. . (2014). Effect of a core conditioning intervention on tests of trunk muscular endurance in school-aged children. *J. Strength Cond. Res.*, 14, 2063–2070.
- AragonVargas, L. E. F., Gross, M. M., Babyak, M., Backman, C. L., Harris, S. R., Bates, B. T., Bernstein, N. A., Bobbert, M. F., Huijing, P. A., van Ingen Schenau, G. J., Bosco, C., Komi, P. V., Ito, A., Boyer, K. A., Angst, M. S., Asay, J., Giori, N. J., Andriacchi, T. P., Carriero, A., ... Lidor, R. (2008). Recent Advances in Functional Data Analysis and Related Topics. *The Journal of Strength & Conditioning Research*.
- Ardian, R., Prasetyo, Y., Sulistiyono, S., Arjuna, F., Suryadi, D., Dewantara, J., Septianto, I., & Subarjo, S. (2024). Application of Circuit Training Methods to Improve VO2max Physical Condition: An Experimental Study on Handball Athletes. *Retos*, 54(SE-Artículos de carácter científico: trabajos de investigaciones básicas y/o aplicadas), 660–666. <https://doi.org/10.47197/retos.v54.103377>
- Athaya, H., Dewantara, J., Husein, M., Taiar, R., Malek, N. F. A., & Shukla, M. (2023). Analysis of physical fitness in students: a comparative study based on social status. *Tanjungpura Journal of Coaching Research*, 1(3), 71–78. <https://doi.org/10.26418/tajor.v1i3.66542>
- Bile, R. L., & Suharharjana, S. (2019). Efektivitas Penggunaan Model Latihan Kebugaran "Bbc Exercise" Untuk Pemeliharaan Kebugaran Jasmani Mahasiswa. *SPORTIVE: Journal Of Physical Education, Sport and Recreation*, 3(1), 30–37. <https://doi.org/10.26858/sportive.v3i1.16857>
- Boguszewski, D., Adamczyk, J. G., Hanc, A., Szymańska, A., Chełchowska, S., & Białoszewski, D. (2021). Classic sports massage vs. Chinese self-massage. Which one is more effective in warm-up? *Biomedical Human Kinetics*, 13(1), 97–102. <https://doi.org/10.2478/bhk-2021-0012>
- Brown, M. (1996). Limitations of sports participation in the elderly. *Sports Medicine and Arthroscopy Review*. <https://doi.org/10.1097/00132585-199600430-00004>
- Cabeza-Ruiz, R., Alcántara-Cordero, F. J., Ruiz-Gavilán, I., & Sánchez-López, A. M. (2019). Feasibility and reliability of a physical fitness test battery in individuals with down syndrome. *International Journal of Environmental Research and Public Health*. <https://doi.org/10.3390/ijerph16152685>
- Cataldi, S., Francavilla, V. C., Bonavolontà, V., De Florio, O., Carvutto, R., De Candia, M., Latino, F., & Fischetti, F. (2021). Proposal for a Fitness Program in the School Setting during the COVID 19 Pandemic: Effects of an 8-Week CrossFit Program on Psychophysical Well-Being in Healthy Adolescents. *International Journal of Environmental Research and Public Health*, 18(6). <https://doi.org/10.3390/ijerph18063141>
- Da'i, M., Cahyono, F. D., & Pembayun, D. L. (2024). What is the physical condition profile of elderly women? Research looking at the level of flexibility. *Tanjungpura Journal of Coaching Research*, 2(2), 80–87. <https://doi.org/10.26418/tajor.v2i2.81016>

- de Almeida Santana, C. C., de Barros, M. V. G., de Medeiros, F. R. C., Rangel Júnior, J. F. L. B., Cantieri, F. P., Alarcon, D., & do Prado, W. L. (2023). Does Physical Fitness Relate to Academic Achievement in High School Students? *Journal of Physical Activity and Health*, 20(1), 1018–1026. <https://doi.org/10.1123/jpah.2022-0534>
- De La Motte, S. J., Gribbin, T. C., Lisman, P., Murphy, K., & Deuster, P. A. (2017). Systematic Review Of The Association Between Physical Fitness And Musculoskeletal Injury Risk:Part 2—Muscular Endurance And Muscular Strength. *Journal OfStrength and Conditioning Research*, 31.
- Dede Pebriandi Sihotang, & Novita. (2021). Pengaruh latihan circuit training untuk meningkatkan kesegaran jasmani atlit pencak silat usia dini (9-12 tahun) di perguruan tapak suci gelanggang sd muhammadiyah 18 medan. *Journal Physical Health Recreation*, 2(1), 34–44. <https://doi.org/10.55081/jphr.v2i1.517>
- Firdaus, K., & Emral, E. (2019). Pelatihan Manajemen Keselamatan Kerja Dan Penatalaksanaan Pertolongan Pertama Pada Kecelakaan Serta Antisipasi Cedera Bagi Pelatih Cabang Olahraga Soft Tennis. *Jurnal Berkarya Pengabdian Masyarakat*. <https://doi.org/10.24036/jba.v1i1.27>
- Gale, R. M., Etxebarria, N., Pumpa, K. L., & Pyne, D. B. (2021). Cycling-based repeat sprint training in the heat enhances running performance in team sport players. *European Journal of Sport Science*, 21(5), 695–704. <https://doi.org/10.1080/17461391.2020.1759696>
- Ghobadi, H., Attarzadeh Hosseini, S. R., Rashidlamir, A., & Forbes, S. C. (2022). Auto-regulatory progressive training compared to linear programming on muscular strength, endurance, and body composition in recreationally active males. *European Journal of Sport Science*, 22(10), 1543–1554. <https://doi.org/10.1080/17461391.2021.1963321>
- Hardinata, R., Rinto, R., Deski, D., Hartikasari, H., Nofita, T., Hendra, H., Pardi, P., & Cadiente, D. S. A. (2024). Physical fitness analysis of elementary school students: a study to design an exercise program. *Tanjungpura Journal of Coaching Research*, 2(1), 13–22. <https://doi.org/10.26418/tajor.v2i1.76118>
- Henriques-Neto, D., Minderico, C., Peralta, M., Marques, A., & Sardinha, L. B. (2020). Test–retest reliability of physical fitness tests among young athletes: The FITescola® battery. *Clinical Physiology and Functional Imaging*. <https://doi.org/10.1111/cpf.12624>
- Jonvik, K. L., Paulussen, K. J. M., Danen, S. L., Ceelen, I. J. M., Horstman, A. M., Wardenaar, F. C., VAN Loon, L. J. C., & VAN Dijk, J.-W. (2019). Protein Supplementation Does Not Augment Adaptations to Endurance Exercise Training. *Medicine and Science in Sports and Exercise*, 51(10), 2041–2049. <https://doi.org/10.1249/MSS.0000000000002028>
- Khairuddin, Masrun, Baktiar, S., & Syahrudin. (2023). Analysis of the impact of game-based physical education learning on physical fitness of junior high school students. *Cakrawala Pendidikan*, 42(1), 241–253. <https://doi.org/10.21831/cp.v42i1.54605>
- Kochetkov, I. I. (2021). Fitness technologies as an additional element to improve the level of physical fitness of female students. *Vestnik of the Mari State University*. <https://doi.org/10.30914/2072-6783-2021-15-3-290-297>
- Kusuma, I. K. H. W., Asmawi, M., Hernawan, H., Dlis, F., Widiastuti, W., & Kanca, I. N. (2021). A Study of Learning Physical Fitness Activities Based on Traditional



- Balinese Sports Games for Students' Physical Fitness. *International Journal of Human Movement and Sports Sciences*.
<https://doi.org/10.13189/saj.2021.090525>
- Li, Y., Xia, X., Meng, F., & Zhang, C. (2022). The association of physical fitness with mental health in children: A serial multiple mediation model. *Current Psychology*.
<https://doi.org/10.1007/s12144-020-01327-6>
- Litleskare, S., Enoksen, E., Sandvei, M., Støen, L., Stensrud, T., Johansen, E., & Jensen, J. (2020). Sprint Interval Running and Continuous Running Produce Training Specific Adaptations, Despite a Similar Improvement of Aerobic Endurance Capacity-A Randomized Trial of Healthy Adults. *International Journal of Environmental Research and Public Health*, 17(11).
<https://doi.org/10.3390/ijerph17113865>
- Liu, Z., & Zeng, W. (2023). A Comparative Study of Compression Training and Conventional Resistance Training in the Development of Lower Limb Explosive Power in Adolescent Track and Field Athletes. In *Global Sport Science* (p. 64). Leading Publishing Pte. Ltd. <https://doi.org/10.58195/gss.v1i1.50>
- Lo, K. Y., Wu, M. C., Tung, S. C., Hsieh, C. C., Yao, H. H., & Ho, C. C. (2017). Association of school environment and after-school physical activity with health-related physical fitness among junior high school students in Taiwan. *International Journal of Environmental Research and Public Health*, 14(1).
<https://doi.org/10.3390/ijerph14010083>
- Marco, J. C. P. De, Alves, A. D., Gonzaga, I., Bim, M. A., Carminatti, L. J., Pinto, A. de A., Beltrame, T. S., & Pelegrini, A. (2023). Asociación entre aptitud física relacionada con la salud, actividades físicas extraescolares y adiposidad corporal en una muestra representativa de adolescentes de Florianópolis, Brasil (Association between health-related physical fitness, extracurricular. *Retos*, 49, 1–8. <https://doi.org/10.47197/retos.v49.97245>
- Mashud, Arifin, S., Warni, H., Samodra, Y. T. J., Yosika, G. F., Basuki, S., Suryadi, D., & Suyudi, I. (2024). Physical Fitness: Effects of active lifestyle internalization through physical literacy awareness based project. *Retos: Nuevas Tendencias En Educación Física, Deporte y Recreación*, 52, 1299–1308.
- Mashud, M., Arifin, S., Warni, H., Samodra, Y. T. J., Yosika, G. F., Basuki, S., Suryadi, D., & Suyudi, I. (2024). Physical Fitness: Effects of active lifestyle internalization through physical literacy awareness based project. *Retos*, 51, 1299–1308.
<https://doi.org/10.47197/retos.v51.101662>
- McMillan, C. S., & Erdmann, L. D. (2010). Tracking adiposity and health-related physical fitness test performances from early childhood through elementary school. *Pediatric Exercise Science*, 22(2), 231–244.
<https://doi.org/10.1123/pes.22.2.231>
- Meiriawati, M. (2013). Pengaruh Pelatihan Sit-Up Besar Sudut 45', 90' dan 120' Terhadap Kekuatan otot Perut. *Jurnal Ilmu Keolahragaan Undiksha*, 1(1).
<https://doi.org/https://doi.org/10.23887/jiku.v1i1.1590>
- Mroczek, D., Maćkała, K., Kawczyński, A., Superlak, E., Chmura, P., Sewery Niak, T., & Chmura, J. (2018). Effects of volleyball plyometric intervention program on vertical jumping ability in male volleyball players. *Journal of Sports Medicine and Physical Fitness*. <https://doi.org/10.23736/S0022-4707.17.07772-6>
- Nubatonis, J. D., Sulistiyono, S., Husein, M., Septianto, I., Runesi, S., Zakiah, D. M. N., Dewantara, J., Azrina, J., Islam, S., & Salacup, V. L. D. (2024). Optimizing



- arm muscle endurance in pencak silat athletes: Insights from a literature review. *Tanjungpura Journal of Coaching Research*, 2(3), 131–141. <https://doi.org/10.26418/tajor.v2i3.80838>
- Nugraha, H., Hernawan, H., Ali, M., Rahmat, A., Septianto, I., Aryati, A., & Suryadi, D. (2024). Outdoor activities and outdoor environments for fitness and mental health: a systematic review. *Retos*, 59(SE-Revisiones teóricas sistemáticas y/o metaanálisis), 642–648. <https://doi.org/10.47197/retos.v59.108730>
- Pour Abbasi, M. S., Shojaei, N., & Farhangi, M. A. (2022). Low-carbohydrate diet score is associated with improved blood pressure and cardio-metabolic risk factors among obese adults. *Physiological Reports*, 10(13), e15375. <https://doi.org/10.14814/phy2.15375>
- Purba, P. H., Rahayu, T., Kusuma, D. W. Y., Handayani, O. W. K., Suganda, M. A., Suryadi, D., & Manullang, J. G. (2024). Development of a Test Instrument for Physical Assessment in Junior Karate Practitioners: A Study Targeting 16-17-Year-Old Individuals. *International Journal of Human Movement and Sports Sciences*, 12(2), 277–287. <https://doi.org/10.13189/saj.2024.120202>
- Rismanto, R., Rihatno, T., Samsudin, S., Suryadi, D., Samodra, Y. T. J., & Suganda, M. A. (2024). Implementation of physical fitness learning model through play approach: how does it impact on Islamic school students of Madrasah Tsanawiyah? *Retos*, 58(SE-Artículos de carácter científico: trabajos de investigaciones básicas y/o aplicadas), 1087–1096. <https://doi.org/10.47197/retos.v58.108143>
- Ruiz-Esteban, C., Andrés, J. T., Méndez, I., & Morales, Á. (2020). Analysis of motor intervention program on the development of gross motor skills in preschoolers. *International Journal of Environmental Research and Public Health*, 17(13), 1–12. <https://doi.org/10.3390/ijerph17134891>
- Sani, M. L., & Hariadi, I. (2020). Tingkat Kebugaran Jasmani Siswa Sekolah Dasar di Daerah Dataran Sedang. *Indonesian Journal of Sport and Physical Education*.
- Shaw, D. M., Merien, F., Braakhuis, A., Plews, D., Laursen, P., & Dulson, D. K. (2019). The Effect of 1,3-Butanediol on Cycling Time-Trial Performance. *International Journal of Sport Nutrition and Exercise Metabolism*, 29(5), 466–473. <https://doi.org/10.1123/ijsnem.2018-0284>
- Singh, G., Kushwah, G., Singh, T., Ramírez-Campillo, R., & Thapa, R. K. (2022). Effects of six weeks outdoor versus treadmill running on physical fitness and body composition in recreationally active young males: a pilot study. *PeerJ*, 10, e13791. <https://doi.org/10.7717/peerj.13791>
- Stojanović, M. D. M., Mikić, M., Drid, P., Calleja-González, J., Maksimović, N., Belegišanin, B., & Sekulović, V. (2021). Greater Power but Not Strength Gains Using Flywheel Versus Equivolumed Traditional Strength Training in Junior Basketball Players. *International Journal of Environmental Research and Public Health*, 18(3). <https://doi.org/10.3390/ijerph18031181>
- Suniga, J. P. C., Custodio, J. M., Roldan, P. J. B., Shlool, H. A., & Abumoh'D, M. F. (2025). How effective is circuit training on physical fitness? A high-intensity study in the sport of futsal. *Tanjungpura Journal of Coaching Research*, 3(1), 32–40. <https://doi.org/10.26418/tajor.v3i1.88062>
- Suratmin, S., Darmayasa, I. P., Gozali, W., Hanif, Q. A., Samodra, Y. T. J., Wati, I. D. P., Suryadi, D., Kushartanti, B. M. W., & Fauziah, E. (2024). Assessment of sports coaching patterns, physical abilities, and physical fitness in athletics: a study of



- the provincial sports week championship. *Retos*, 51, 1404–1414. <https://doi.org/10.47197/retos.v51.101943>
- Suryadi, D., Nasrulloh, A., Haryanto, J., Samodra, Y. T. J., Wati, I. D. P., Suganda, M. A., Nugroho, S., Dafun Jr, P. B., Kushartanti, B. M. W., & Fauziah, E. (2024). What are physical exercise interventions in older age? Literature review for physical and cognitive function. *Pedagogy of Physical Culture and Sports*, 28(3 SE-Articles), 201–212. <https://sportpedagogy.org.ua/index.php/ppcs/article/view/2657>
- Suryadi, D., Suganda, M. A., Sacko, M., Samodra, Y. T. J., Rubiyatno, R., Supriatna, E., Wati, I. D. P., & Okilanda, A. (2023). Comparative Analysis of Soccer and Futsal Extracurriculars: A Survey Study of Physical Fitness Profiles. *Physical Education and Sports: Studies and Research*, 2(1), 59–71. <https://doi.org/10.56003/pessr.v2i1.182>
- T Balachandran, A., Wang, Y., Szabo, F., Watts-Batthey, C., Schoenfeld, B. J., Zenko, Z., & Quiles, N. (2023). Comparison of traditional vs. lighter load strength training on fat-free mass, strength, power and affective responses in middle and older-aged adults: A pilot randomized trial. *Experimental Gerontology*, 178, 112219. <https://doi.org/10.1016/j.exger.2023.112219>
- Ushijima, K., Watanabe, H., & Shimura, M. (2016). The relationships among physical fitness, academic achievements, psychological stress scale scores and lifestyles of junior high school students. *Japan Journal of Human Growth and Development Research*, 2016(72), 19–30. https://doi.org/10.5332/hatsuhatsu.2016.72_19
- VanDerVeer, S., Markert, R., Bickford, B., Yuhas, J., Pikman, P., Wall, T., & Burtson, K. (2021). Increasing exercise adherence among elderly patients with chronic disease in primary care: a prospective cohort study. *BMC Geriatrics*, 21(1), 616. <https://doi.org/10.1186/s12877-021-02572-5>
- Wang, J., Zhang, Q., Chen, W., Fu, H., Zhang, M., & Fan, Y. (2024). The effect of flywheel complex training with eccentric-overload on muscular adaptation in elite female volleyball players. *PeerJ*, 12, e17079. <https://doi.org/10.7717/peerj.17079>
- Willoughby, T. N., Thomas, M. P. L., Schmale, M. S., Copeland, J. L., & Hazell, T. J. (2016). Four weeks of running sprint interval training improves cardiorespiratory fitness in young and middle-aged adults. *Journal of Sports Sciences*, 34(13), 1207–1214. <https://doi.org/10.1080/02640414.2015.1102316>
- Wu, C., Deng, J., & Gao, C. (2023). Effects of pre-sleep protein supplementation on plasma markers of muscle damage and inflammatory cytokines resulting from sprint interval training in trained swimmers. *Journal of the International Society of Sports Nutrition*, 20(1), 2244478. <https://doi.org/10.1080/15502783.2023.2244478>
- Yin, L., Tang, C., & Tao, X. (2018). Criterion-Related Validity of a Simple Muscle Strength Test to Assess Whole Body Muscle Strength in Chinese Children Aged 10 to 12 Years. *BioMed Research International*. <https://doi.org/10.1155/2018/2802803>
- Yusroni, M. (2024). Game model to improve motor skills through traditional sports: Development study on elementary school students. *Tanjungpura Journal of Coaching Research*, 2(2), 71–79. <https://doi.org/10.26418/tajor.v2i2.79872>
- Zhao, M., Liu, S., Han, X., Li, Z., Liu, B., Chen, J., & Li, X. (2022). School-Based Comprehensive Strength Training Interventions to Improve Muscular Fitness and Perceived Physical Competence in Chinese Male Adolescents. *BioMed Research International*, 2022, 7464815. <https://doi.org/10.1155/2022/7464815>



- Zhu, Z., Yang, Y., Kong, Z., Zhang, Y., & Zhuang, J. (2017). Prevalence of physical fitness in Chinese school-aged children: Findings from the 2016 Physical Activity and Fitness in China—The Youth Study. *Journal of Sport and Health Science*, 6(4), 395–403. <https://doi.org/10.1016/j.jshs.2017.09.003>
- Zulnadila, Suharjana, Arjuna, F., Sriwahyuniati, C. F., Mappanyukki, A. A., Rahman, A., Agustina, D., & Szczepocki, M. (2025). Traditional games for physical fitness in primary school students: A systematic review in Indonesia. *Tanjungpura Journal of Coaching Research*, 3(1), 76–86. <https://doi.org/10.26418/tajor.v3i2.89690>

