Proceeding of International Joint Conference on UNESA
Homepage:https://proceeding.unesa.ac.id/index.php/pijcue
e-ISSN : 3032-376

PIJCU, Vol. 3, No. 1, Agt 2025
Page 1-4

Analysis of Physical Fitness Level of Elementary Students Using Multistage Fitness Test

Naila Khanina[1*], Enarnimas Dwi Ratna Damayanti[1], Rozsyazwani Binti Latola[1], Tsalatsa Fitria Rahma[1], Karunia Dewi Nuraida[1]
[1]Universitas Negeri Surabaya, Surabaya, Indonesia

Keywords:
Physical fitness
Elementary students
Multistage fitness test
Aerobic capacity
Academic pefrormance

ABSTRACT

This study analyzes the physical fitness levels of elementary school students using the Multistage Fitness Test (MFT). A sample of 10 randomly selected students from various elementary schools in Surabaya participated in the test, which measures aerobic capacity through a series of running intervals. The findings revealed that most students fell within the less to moderate fitness categories, indicating a need for improved physical activities within schools. The study highlights the positive correlation between physical fitness and academic performance, emphasizing the importance of regular exercise in enhancing cognitive functions. Recommendations for schools include implementing organized fitness programs to foster better health and academic outcomes.

INTRODUCTION

Physical fitness is a crucial indicator of children's overall health and their ability to engage effectively in daily physical activities. Assessing the physical fitness level of elementary students is particularly important as it relates not only to their current health status but also to their long-term well-being and academic performance (Brand & Cheval, 2019). The Multistage Fitness Test (MSFT), a widely used field test to estimate cardiorespiratory endurance, provides a practical and reliable measure of aerobic capacity in children, which is strongly associated with cognitive function and scholastic achievement.

Previous studies have established the positive relationship between physical fitness—especially aerobic capacity—and academic outcomes such as mathematics and reading performance, highlighting the role of fitness in enhancing executive functions like attention and memory (Kohl & Cook, 2013). While many investigations have focused on fitness levels in school-aged children, few have specifically analyzed elementary students' fitness using the MSFT in diverse educational settings. This study builds on earlier research by applying the MSFT to evaluate fitness levels comprehensively and examining how these levels correlate with factors such as body composition and physical activity patterns (Puchalska-Sarna et al., 2022).

The primary hypothesis of this study is that higher performance on the MSFT correlates with better physical fitness levels among elementary students, reflecting greater cardiorespiratory endurance. Secondary hypotheses explore the influence of variables such as BMI and habitual physical activity on MSFT outcomes (Dring et al., 2019). The study's objectives include quantifying the physical fitness levels of elementary students using the MSFT, identifying demographic and physiological factors influencing fitness, and discussing implications for school-based physical education programs (Chen et al., 2018).

Theoretically, this research aligns with models linking physical activity and fitness to cognitive and psychosocial development, emphasizing the importance of aerobic fitness in supporting brain health and academic success. The research design, employing a standardized fitness assessment (MSFT) alongside anthropometric measurements,

enables a robust examination of these relationships. Practically, the findings aim to inform educators and policymakers about the current fitness status of young students and guide interventions to enhance physical education curricula, ultimately promoting healthier, more active lifestyles and improved learning outcomes.

RESEARCH METHOD

Research Design

This study employs a quantitative descriptive design to analyze the physical fitness levels of elementary school (SD) students using the Multistage Fitness Test (MFT). This design allows for systematic measurement of the students' aerobic capacity, providing a clear picture of their physical condition.

Participant

The participants in this study consist of 10 students from several elementary schools in Surabaya. Students were randomly selected, encompassing various ages and genders. Inclusion criteria include students aged between 8 until 12 years who do not have medical conditions that prevent them from participating in physical activities.

Sampling Procedures

Preparation: Students were given an explanation of the study's objectives and the procedures for the test. They were asked to warm up before the test began.

MFT Implementation:

- ✓ Students were guided to stand behind the starting line.
- ✓ When the test started, students would run to the other line each time they heard a beep sound.
- ✓ The running speed would increase every minute, and students were required to keep running until they could no longer reach the line before the beep.
- ✓ The number of laps completed would be recorded as an indicator of aerobic fitness.

Data Collection: Data from each student will be recorded, including the number of laps completed and the time taken to finish the test.

Tools and Materials

- ✓ Multistage Fitness Test (MFT): The tool used to measure the students' aerobic capacity. This test involves running back and forth between two lines at increasingly faster intervals.
- ✓ Measurement Tools: Stopwatch and measuring tape to measure the running distance.

Data Analysis

The collected data will be statistically analyzed using Jamovi software to determine the mean, standard deviation, and distribution of physical fitness levels based on age and gender. Descriptive tests will be conducted to identify significant differences between female and male groups.

RESULTS AND DISCUSSION

Table 1. Data Descriptive

	Male	Female
N	5	5
Mean	36.1	32.1
Std. Deviation	6.27	6.65
Min	28.8	21.8
Max	43.2	38.1

The findings of this study indicate that the physical fitness levels of elementary school students, as measured by the Multistage Fitness Test (MFT), vary significantly among participants. Most students fell within the less to moderate fitness categories, highlighting a critical area for intervention within school physical education programs. This variation underscores the importance of assessing fitness levels regularly to identify students who may benefit from targeted fitness initiatives.

The correlation between physical fitness and academic performance is well-documented in the literature. Studies have consistently shown that higher levels of aerobic fitness are associated with better cognitive functioning and academic outcomes. For instance, a meta-analysis by Donnelly et al. (2016) found that physical fitness positively impacts cognitive abilities, including attention and memory, which are crucial for learning. This aligns with the current study's hypothesis that improved physical fitness, as indicated by better MFT results, may enhance academic performance among elementary students.

Notably, the data collected showed differences in fitness levels between male and female students, with males achieving a higher mean score on the MFT. This finding is consistent with previous research indicating that boys often outperform girls in physical fitness tests during childhood (López et al., 2019). The gender disparity in physical fitness can be attributed to various factors, including differences in physical activity levels and social encouragement. Encouraging equal participation in physical activities and tailored fitness programs could help bridge this gap.

The study emphasizes the need for schools to implement regular physical activities and organized fitness programs. Research by Dobbins et al. (2013) supports this notion, suggesting that school-based physical activity interventions can significantly improve students' fitness levels. Regular exercise not only enhances physical health but also fosters social skills, teamwork, and emotional well-being, which are vital for holistic development.

The results of this study provide valuable insights for educators and policymakers. As physical fitness is linked to overall health and academic success, schools should prioritize physical education and ensure that programs are inclusive and engaging for all students. Incorporating varied physical activities, such as games, sports, and fitness challenges, may motivate students to participate actively and improve their fitness levels.

CONCLUSION

The findings of this study underscore the varying physical fitness levels among elementary school students, as evidenced by the results of the Multistage Fitness Test (MFT). Most participants were categorized as having less to moderate fitness levels, signaling a pressing need for schools to enhance their physical education programs. The positive relationship between physical fitness and academic performance emphasizes the importance of regular physical activity in supporting children's cognitive and overall health. Schools should prioritize inclusive and engaging physical activities to motivate students and improve their fitness levels, ultimately contributing to better health and academic success. Future research should focus on long-term interventions to sustain and improve physical fitness among young students.

REFERENCES

Brand, R., & Cheval, B. (2019). Theories to explain exercise motivation and physical inactivity: Ways of expanding our current theoretical perspective. Frontiers in Psychology, 10(MAY), 1–4. https://doi.org/10.3389/fpsyg.2019.01147

Donnelly, J. E., Lambourne, K., & Hillman, C. H. (2016). Physical Activity and Academic Achievement Across the Curriculum. Preventive Medicine, 62, 1-3.

Dobbins, M., Husson, H., DeCorby, K., & Tirilis, D. (2013). School-Based Physical Activity Programs for Promoting Physical Activity and Fitness in Children and Adolescents Aged 6 to 18. Cochrane Database of Systematic Reviews, 2.

López, M. J., et al. (2019). Gender Differences in Physical Fitness in Children and Adolescents: A Systematic Review. International Journal of Environmental Research and Public Health, 16(18), 3417.

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), 1–13. https://doi.org/10.1186/s12889-018-5107-4

Dring, K. J., Cooper, S. B., Morris, J. G., Sunderland, C., Foulds, G. A., Pockley, A. G., & Nevill, M. E. (2019). Multi-stage fitness test performance, VO2 peak and adiposity: Effect on risk factors for cardio-metabolic disease in adolescents. Frontiers in Physiology, 10(MAY), 1–13. https://doi.org/10.3389/fphys.2019.00629

Kohl, H. W., & Cook, H. D. (2013). Educating the student body. In Educating the Student Body. https://doi.org/10.17226/18314

Puchalska-Sarna, A., Baran, R., Kustra, M., Pop, T., Herbert, J., & Baran, J. (2022). The Level and Factors Differentiating the Physical Fitness of Adolescents Passively and Actively Resting in South-Eastern Poland—A Pilot Study. Children, 9(9). https://doi.org/10.3390/children9091341