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Strategies to Improve the Learning Outcomes of Elementary School Students in Sports Practice in Padang City

Nabilla Wahyuni Deevona¹⁾, Wilda Welis²⁾✉, Rika Sepriani³⁾, Nugroho Susanto⁴⁾

¹⁾ Universitas Negeri Padang, Padang, Indonesia
E-mail: nabillawahyuni20@gmail.com

✉²⁾ Universitas Negeri Padang, Padang, Indonesia
E-mail: wildawelis@fik.unp.ac.id

³⁾ Universitas Negeri Padang, Padang, Indonesia
E-mail: rikasepriani@fik.unp.ac.id

⁴⁾ Universitas Negeri Padang, Padang, Indonesia
E-mail: nugrohosusanto@fik.unp.ac.id

✉ Correspondence Author

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Abstract

This study analyzes how nutritional status, physical fitness, and motor skills affect PJOK practical learning outcomes among 54 students at SDN 04 Kampung Olo, Padang. Using path analysis, BMI, fitness tests, and motor skill assessments were used to measure the variables, while learning outcomes were evaluated through PJOK performance. Nutritional status, physical fitness, and motor skills have a significant direct effect on the practical learning outcomes of physical education students in Padang City, with contributions of 37.8% ($p = 0.006$), 28.8% ($p = 0.012$), and 25.2% ($p = 0.004$), respectively. Nutritional status also has an indirect effect through physical fitness, contributing 7.3% (p for the path from nutritional status to physical fitness = 0.065; p for physical fitness to learning outcomes = 0.012) and through motor skills by 4.1% (p path from nutritional status to motor skills = 0.244; p from motor skills to learning outcomes = 0.004), although the influence through motor skills was less significant. Physical fitness had a significant indirect influence through motor skills by 21.1% ($p = 0.000$ and $p = 0.004$).

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INTRODUCTION

Physical education plays a vital role in developing students' physical, mental, and social competencies, particularly at the elementary school level (Adrian et al., 2023; Idham et al., 2022). In Indonesia, PJOK is an essential component of the curriculum that emphasizes practical learning outcomes, such as the mastery of motor skills and physical abilities. These outcomes reflect

students' overall physical competence and readiness to engage in lifelong physical activity. However, student performance in PJOK practical tasks often varies significantly, influenced by several physical and developmental factors.

Among the key factors that may affect students' success in PJOK are nutritional status, physical fitness, and motor skills. Nutritional status, commonly measured using Body Mass Index (BMI), plays a fundamental role in children's physical development and energy levels. Adequate nutrition supports muscle development, bone strength, and overall growth, all of which are crucial for participating in physical activities. Malnutrition or imbalanced diets, on the other hand, may hinder a student's ability to perform well in practical physical education tasks (Kapti & Winarno, 2022; Ridho et al., 2025).

Physical fitness is another critical component influencing student performance in PJOK. It encompasses various aspects such as cardiovascular endurance, muscular strength, flexibility, and body composition. Students with higher levels of physical fitness are better equipped to engage in sustained physical activity, perform movement tasks efficiently, and recover quickly from exertion. As physical fitness improves, so does the student's capacity to meet the physical demands of PJOK learning activities (Indrayogi, 2020; Wahid & Kurniawan, 2023).

In addition to fitness, motor skills play a central role in students' ability to participate and succeed in physical education. Basic motor skills such as running, jumping, balancing, and throwing form the foundation for more complex movement patterns required in PJOK activities. Students who develop motor proficiency early are more likely to perform confidently and effectively during practical sessions. Poor motor skills can limit students' engagement and reduce their motivation, ultimately affecting their learning outcomes (Aulia et al., 2022; Lovita et al., 2023).

Given the importance of these three factors, this study aims to analyze the direct and indirect effects of nutritional status, physical fitness, and motor skills on practical learning outcomes in PJOK among elementary school students in Padang City. By using a quantitative survey method with path analysis, this research seeks to uncover how these variables interact and contribute to students' performance. Understanding these relationships can help educators and policymakers develop more targeted interventions to enhance the quality and effectiveness of physical education at the elementary level.

METHODS

This study employed a quantitative research design using a survey method with path analysis to examine the direct and indirect effects of nutritional status, physical fitness, and motor skills on the practical learning outcomes of PJOK. The research was conducted at SDN 04 Kampung Olo in Padang City, with a total sample of 54 students from grades five and six selected through total sampling. Nutritional status was assessed using Body Mass Index (BMI) calculations based on students' height and weight measurements. Physical fitness was measured using a standardized fitness test battery, which included components such as cardiovascular endurance, strength, and flexibility. Motor skills were evaluated through basic movement skill tests relevant to PJOK activities. Practical learning outcomes were assessed through performance-based evaluations during physical education sessions, focusing on students' ability to execute physical tasks and apply learned motor skills.

RESULT AND DISCUSSION

This study investigates the influence of nutritional status, physical fitness, and motor skills on the practical learning outcomes of physical education (PJOK) among elementary school students in Padang City. Using path analysis, both direct and indirect effects of these variables were examined to understand how students' physical conditions contribute to their performance in practical PJOK activities. The measurements included BMI for nutritional status, a standardized test for physical fitness, and basic motor skill assessments. The following table presents a summary of the statistical findings, showing the magnitude and significance of each variable's effect on students' learning outcomes.

Table 1. Direct and Indirect Effects on PJOK Practical Learning Outcomes

No	Variable Path	Type of Influence	Contribution (%)	p-value(s)	Remarks
1	Nutritional Status → Learning Outcome	Direct	37.8	0.006	Significant effect
2	Physical Fitness → Learning Outcome	Direct	28.8	0.012	Significant effect
3	Motor Skills → Learning Outcome	Direct	25.2	0.004	Significant effect
4	Nutritional Status → Physical Fitness → Learning Outcome	Indirect	7.3	0.065 → 0.012	Indirect pathway (marginal from nutritional status to physical fitness, significant from physical fitness to outcome)
5	Nutritional Status → Motor Skills → Learning Outcome	Indirect	4.1	0.244 → 0.004	Indirect pathway (non-significant from nutritional status to motor skills)
6	Physical Fitness → Motor Skills → Learning Outcome	Indirect	21.1	0.000 → 0.004	Highly significant indirect effect

The table shows that nutritional status, physical fitness, and motor skills all have significant direct effects on PJOK learning outcomes, contributing 37.8%, 28.8%, and 25.2%, respectively, with p-values indicating statistical significance. Furthermore, indirect effects exist: nutritional status influences outcomes indirectly through physical fitness (7.3% contribution) and motor skills (4.1% contribution), although the pathway through motor skills is less significant due to a non-significant p-value in the first step. Additionally, physical fitness exerts a highly significant indirect effect via motor skills, contributing 21.1% to the learning outcomes, highlighting the complex interplay among these variables in determining students' practical performance in physical education.

DISCUSSION

The findings of this study confirm that nutritional status has a significant direct impact on students' practical learning outcomes in PJOK. With a contribution of 37.8%, it is the most influential factor among the three examined. This result supports the idea that adequate nutrition is fundamental to optimal physical development, which in turn affects students' ability to perform

physical tasks effectively. Well-nourished students are more likely to have the strength, energy, and endurance necessary for physical activities, which contributes to better performance during PJOK classes (Al Hafiz et al., 2024; W. S. Putra, 2025).

Physical fitness was also shown to significantly influence practical learning outcomes, contributing 28.8% directly. Students who are physically fit can better endure and perform various physical education activities, which require stamina, coordination, and body control. These findings are consistent with existing literature that emphasizes the strong relationship between physical fitness and motor performance. Improved cardiovascular endurance, muscular strength, and flexibility likely enhance students' ability to engage actively in practical lessons, improving their overall PJOK achievement (Hernando & Atradinah, 2020; R. S. Putra et al., 2024).

Similarly, motor skills were found to have a significant direct effect on learning outcomes, accounting for 25.2%. Motor skills form the foundation of physical education, as they involve the ability to control body movements, balance, and coordination. Students with higher motor skill proficiency are typically more confident and capable in performing PJOK tasks, which may lead to higher assessment scores. This suggests the importance of developing basic motor skills from an early age to ensure consistent progress in physical education outcomes (Buulolo & Jainurakhma, 2025; R. S. N. Putra et al., 2023).

In terms of indirect effects, nutritional status was found to influence learning outcomes through physical fitness (7.3%) and through motor skills (4.1%). Although the path from nutritional status to physical fitness approached statistical significance ($p = 0.065$), the path through motor skills was weaker ($p = 0.244$). This suggests that while good nutrition contributes to physical development, its effects may be more prominent when mediated by improvements in physical fitness rather than directly enhancing motor skills. These results highlight the interconnectedness of these variables, where physical fitness serves as a bridge between nutrition and performance.

The strongest indirect pathway was found between physical fitness and motor skills (21.1%), indicating that physically fit students tend to have better motor coordination, which in turn leads to improved learning outcomes. This emphasizes the cascading effect where enhancing one aspect of physical condition can lead to improvements in another, ultimately boosting academic performance in physical education. Overall, the study demonstrates that improving students' physical condition holistically through better nutrition, fitness programs, and motor skill development can significantly enhance their PJOK practical learning outcomes (Fajaryanto et al., 2022; Mulyana et al., 2024).

CONCLUSIONS

Based on the results of this study, it can be concluded that nutritional status, physical fitness, and motor skills each have a significant direct impact on the practical learning outcomes of PJOK among elementary school students in Padang City. Additionally, these variables also influence learning outcomes indirectly, particularly through the mediating roles of physical fitness and motor skills. Nutritional status plays a foundational role, while physical fitness and motor skills serve as key functional factors that enhance students' performance in physical education. These findings support the research objective by demonstrating both the direct and indirect relationships between physical condition variables and practical learning outcomes, emphasizing the need for an integrated approach to improving students' physical education achievement.

CONFLICTS OF INTEREST STATEMENT

Regarding this study, the author declares that there is no conflict of interest.

AUTHOR CONTRIBUTIONS

Study concept and design: Nabilla Wahyuni Deevona. Acquisition of data: Wilda Welis. Analysis and interpretation of data: Rika Sepriani. Drafting the manuscript: Nabilla Wahyuni Deevona. Critical revision of the manuscript for important intellectual content: Nugroho Susanto. Statistical analysis: Nabilla Wahyuni Deevona.

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