

The effect of nutritional status, physical activity, and family support on the physical fitness of elementary school students in Tongkuno District, Muna Regency, Southeast Sulawesi

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Abstract

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This study aims to determine: (1) the effect of nutritional status on physical fitness, (2) analyze the effect of physical activity on physical fitness, (3) examine family support in influencing physical fitness, and (4) the simultaneous influence of nutritional status, physical activity, and family support on the physical fitness of elementary School Students in Tongkuno District, Muna Regency.

This study uses a quantitative approach using a cross-sectional design. The population in this study were elementary School Students in Tongkuno District, Muna Regency. The sample used was 245 students selected using cluster sampling. Nutritional status was measured using the body mass index for age (BMI/A), physical activity was measured using the Physical Activity Questionnaire for Older Children (PAQ-C), family support was measured using a questionnaire based on Cohen, Wills, and House's social support theory, while physical fitness was measured using the Indonesian Student Fitness Test (TKSI). Data analysis was conducted descriptively and inferentially using multiple linear regression with the help of SPSS.

The results of the study were as follows: (1) nutritional status had a positive and significant effect on students' physical fitness ($\beta = 0.272$; $p = 0.000$), (2) physical activity had a positive and significant effect on students' physical fitness ($\beta = 1.423$; $p = 0.000$), (3) family support had a positive but insignificant effect on students' physical fitness ($\beta = 0.020$; $p = 0.370$). (4) Simultaneously, nutritional status, physical activity, and family support significantly influenced students' physical fitness with an F-value of 75.805 and a significance level of 0.000.

Keywords: Nutritional status, physical activity, family support, physical fitness, elementary school students

Introduction

Physical education at the elementary school level plays a strategic role in fostering health, fitness, and character development in students. Education is a conscious and planned effort to create a learning environment and process that allows students to develop their potential, both spiritually and physically. In this context, physical education, sports, and health (PJOK) is an integral part of the elementary school curriculum, aiming to develop students' physical, mental, social, and emotional aspects comprehensively (Ministry of Education and Culture of the Republic of Indonesia, 2021) ^[29].

One of the main goals of physical education is to improve students' physical fitness. Physical fitness reflects the body's ability to perform daily activities effectively without experiencing excessive fatigue, while still having energy reserves for other activities. Physical fitness includes components of cardiorespiratory endurance, muscle strength and endurance, flexibility, and coordination and agility. A child's physical fitness level is influenced not only by biological factors, but also by the environment and lifestyle, particularly the pattern of physical activity performed regularly (Strong *et al.*, 2005; World Health Organization, 2020) ^[48, 56].

Although improving physical fitness is one of the primary goals of Physical Education (PJOK), various studies have shown that the physical fitness levels of school-age children in Indonesia remain relatively low. This low level of physical fitness is indicated by decreased endurance and

muscle strength, as well as low participation in adequate physical activity. This situation is a concern because physical fitness is closely linked to children's future health, academic achievement, productivity, and quality of life.

Nutritional status is a fundamental factor influencing the physical fitness of elementary school students. Good nutritional status ensures that energy and macro- and micronutrient needs are met for optimal growth, development, and physical activity. Conversely, poor nutritional status can inhibit muscle growth, reduce endurance, and limit a child's physical work capacity. This is in line with balanced nutrition guidelines, which emphasize the importance of adequate nutritional intake to support the health and physical fitness of school-age children (Ministry of Health of the Republic of Indonesia, 2020; Soetjiningsih & Ranuh, 2015) ^[26, 47].

The nutritional status of school-age children in Indonesia remains a serious challenge. One persistent nutritional problem is stunting, a result of chronic malnutrition. According to the 2022^[7] Indonesian Nutritional Status Survey (SSGI), the prevalence of stunting in Indonesia remains at 21.6 percent. This figure indicates that more than one in five Indonesian children still experiences growth disorders due to chronic malnutrition (Ministry of Health of the Republic of Indonesia, 2022) ^[27]. Stunting is a condition of impaired linear growth due to long-term chronic malnutrition, repeated infections, and an unfavorable environment, resulting in a child's height for age below -2 standard deviations based on the WHO Child Growth

Standards. The impact of stunting is not limited to stunted growth but is also associated with decreased muscle mass and strength, cardiorespiratory capacity, physical endurance, metabolic function, and physical fitness. Furthermore, stunting impacts cognitive development and productivity in adulthood, and increases the risk of non-communicable diseases later in life. World Health Organization (WHO). (2024) ^[58]. This condition shows that nutritional status problems are still an obstacle in efforts to improve students' physical fitness.

Besides nutritional status, physical activity is a major determinant of students' physical fitness. Regular, moderate-to-high-intensity physical activity has been shown to improve cardiorespiratory endurance, muscle strength, motor skills, and overall health. However, technological advancements and changes in modern lifestyles have led to an increase in sedentary behavior among school-age children. Children tend to spend more time using gadgets, playing digital games, watching television, or engaging in sedentary activities. This phenomenon has led to a decline in physical activity levels and has impacted children's physical fitness globally (Guthold *et al.*, 2020; World Health Organization, 2020) ^[21].

Another equally important factor is family support. The family is the primary educational environment and plays a significant role in shaping children's healthy lifestyle habits, including diet, physical activity, and rest patterns. Family support, including providing nutritious food, motivating them to exercise, supervising their activities, and leading by example, is crucial for children's success in achieving optimal physical fitness. This aligns with developmental ecology theory, which states that the immediate environment, particularly the family, directly influences a child's physical and behavioral development (Bronfenbrenner, 1994; Santrock, 2018) ^[9, 39].

Based on initial observations and informal interviews with physical education teachers at several elementary schools in Tongkuno District, various issues related to the four research variables were still identified. Regarding physical fitness, teachers revealed that some students still experience fatigue during physical education lessons, particularly during activities requiring endurance and physical strength. This indicates that students' physical fitness levels are not optimal.

Regarding nutritional status, the teacher stated that there are still students who are relatively thin or overweight. Furthermore, the habit of bringing nutritionally unbalanced lunches and low consumption of nutritious foods are still common. This situation indicates that meeting students' nutritional needs does not fully support optimal growth and physical fitness.

In terms of physical activity, most students are known to have low levels of physical activity outside of school hours. After school, students spend more time watching television, playing with gadgets, or engaging in other sedentary activities than participating in traditional games, sports, or recreational physical activities. This low level of physical activity is suspected to be one of the causes of students' suboptimal physical fitness levels.

Meanwhile, from the perspective of family support, observations indicate that not all parents have adequate understanding and concern regarding the importance of nutrition, physical activity, and exercise for children. Some parents are unable to consistently provide nutritious food due to economic constraints, while others lack the

motivation or opportunity for their children to engage in physical activity outside of school hours. This situation indicates that family support for developing healthy lifestyles in children is still suboptimal.

Based on these facts, there is a clear gap between the ideal goal of physical education, which aims to create healthy and fit students, and the actual conditions in the field, which show low student physical fitness, suboptimal nutritional status, low physical activity, and limited family support. This situation indicates that the achievement of physical education goals is not fully supported by factors that influence student physical fitness. On the other hand, previous research generally examines the influence of nutritional status, physical activity, and family support separately on physical fitness. Research that simultaneously examines these three variables in elementary school students, particularly in Tongkuno District, Muna Regency, is still very limited. However, social, economic, cultural, and geographical characteristics of the region can influence the relationship between these variables. Therefore, there is still a gap between these variables. research gap which needs to be filled through research that integrates these three factors in one analysis model.

Based on this description, research on the influence of nutritional status, physical activity, and family support on the physical fitness of elementary school students in Tongkuno District, Muna Regency, is important. This research is expected to provide empirical evidence regarding the contribution of each variable to student physical fitness, as well as serve as a scientific basis for developing policies and strategies to improve children's health and physical fitness through synergy between schools, families, and local governments.

Research Method

This research uses a quantitative approach with a design cross-sectional. This design was chosen because data collection was conducted at a specific point in time to determine the effect of nutritional status, physical activity, and family support on the physical fitness of elementary school students. The analysis used was multiple regression to see the partial and simultaneous effects of the independent variables on the dependent variable. Through this approach, this study is expected to provide empirical evidence regarding the significant contribution of nutritional status, physical activity, and family support to the physical fitness of elementary school students, so that the results of the study can be the basis for developing strategies to improve physical fitness through synergy between schools, families, and related parties.

Place and Time of Research the research was conducted at an elementary school in Tongkuno District, Muna Regency. The research was conducted in the even semester of the 2026 academic year, namely December – July 2026 which included the preparation stage, data collection, and data analysis. The population of this research was all elementary school students in grades V and VI in Tongkuno District, Muna Regency. Based on the recapitulation data of students in 19 elementary school education units (1 private elementary school and 18 public elementary schools), the total population of students in grades V and VI was 634 students, with the following details: (1) Grade V: 290 students, (2) Grade VI: 344 students.

Data Collection Techniques

The data collection technique in this study was carried out through direct measurement. And Filling out the questionnaire according to the characteristics of each research variable. Direct measurements were used to obtain data on nutritional status and physical fitness.,while filling out the questionnaire is used to obtain physical activity data and family support. Data collection was conducted in each elementary school that served as the research location after obtaining permission from the school. During the research, the researcher was assisted by the Physical Education (PJOK) teacher and the homeroom teacher, who had been briefed on the measurement procedures and instrument filling, so that the data collection process could proceed systematically, objectively, and in accordance with research standards. The research instruments were collected using anthropometric methods, namely by measuring the respondents' weight and height. The use of anthropometric methods was chosen because it is the most practical, objective, and widely used method to assess the nutritional status of school-age children in research and health surveys (Gibson, 2005; Supariasa et al., 2016^[19, 51]; Ministry of Health of the Republic of Indonesia, 2020)^[26]. Weight was measured using a digital scale and height was measured using a digital scale.Microtoise. Physical activity data in this study were collected using a questionnaire.Physical Activity Questionnaire for Older Children (PAQ-C).

Research Results

Table 1: Results of Simultaneous Hypothesis Testing

Variables	F count	Say.	R	R Square	Results
Nutritional Status, Physical Activity, and Family Support for Physical Fitness	75,805	0,000	0,697	0,485	Hypothesis accepted

Based on Table 18, the calculated F value is 75.805 with a significance value of 0.000 (<0.05). These results indicate that nutritional status, physical activity, and family support simultaneously have a significant effect on the physical fitness of elementary school students, so that the fourth hypothesis is accepted. In addition, the correlation coefficient (R) value of 0.697 indicates that the relationship between the three independent variables and physical fitness is in the strong category. Meanwhile, the determination coefficient (R Square) value of 0.485 indicates that 48.5% of the variation in students' physical fitness can be explained by nutritional status, physical activity, and family support together, while the remaining 51.5% is influenced by other factors outside the research model.

Discussion

a. The simultaneous influence of nutritional status, physical activity, and family support on the physical fitness of elementary school students

The results of multiple linear regression analysis indicate that nutritional status, physical activity, and family support simultaneously have a significant effect on the physical fitness of elementary school students. This is evidenced by the results of the F test which shows a calculated F value of 75.805 with a significance level of 0.000 (<0.05). Thus, the hypothesis stating that nutritional status, physical activity,

and family support simultaneously influence the physical fitness of elementary school students can be accepted. In addition, the coefficient of determination (R^2) value of 0.485 indicates that 48.5% of the variation in students' physical fitness can be explained by these three variables, while the remaining 51.5% is influenced by other factors not examined in this study, such as sleep patterns, genetic factors, sedentary habits, social environment, health conditions, and psychological factors.

These findings indicate that students' physical fitness is the result of the interaction of various factors, including biological, behavioral, and family environment. Together, good nutritional status, adequate physical activity, and adequate family support will contribute to improving students' physical ability to perform daily activities without experiencing excessive fatigue.

Theoretically, physical fitness is the result of the interaction of various biological, behavioral, social, and environmental determinants that influence a person's ability to perform physical activity optimally. The World Health Organization (2020)^[56] explains that children's physical fitness is influenced by a combination of regular physical activity, good nutritional status, a supportive family environment, and consistently implemented healthy lifestyle behaviors. These factors interact to shape a child's cardiorespiratory capacity, muscle strength, endurance, flexibility, and motor skills.

In line with this, the American College of Sports Medicine (ACSM, 2022)^[3] states that physical fitness is not solely determined by physical exercise but is also influenced by nutritional status, body composition, an active lifestyle, health conditions, and social support. A balance between adequate nutritional intake and regular physical activity will result in physiological adaptations in the form of improved heart, lung, musculoskeletal, and energy metabolism function, thereby improving physical fitness levels.

The results of this study support those of Marques *et al.* (2022)^[7], who found that nutritional quality, physical activity, and the family environment collectively contribute to improving children's physical fitness. Children who eat healthily, are physically active, and receive family support demonstrate better fitness levels than those who lack this combination of factors.

Research by Silva *et al.* (2022)^[30] also shows that nutritional status and physical activity are the main determinants of physical fitness in school-age children. Children with normal nutritional status and high levels of physical activity have better cardiorespiratory capacity, muscle strength, and endurance than children with nutritional deficiencies or low levels of physical activity.

Furthermore, Liu, Chen, and Li (2023)^[34] explained that family support plays a role in shaping children's healthy lifestyles through fostering physical activity habits, monitoring diet, and providing motivation to participate in sports. This support does not always have a direct impact on physical fitness, but it does contribute by increasing physical activity and establishing a sustainable healthy lifestyle.

In addition, Aubert *et al.* (2022)^[7] through Global Matrix 4.0 reports that children's physical fitness is influenced by a combination of interrelated factors, including nutritional status, physical activity, family environment, school environment, and policies that support an active lifestyle. Therefore, improving children's physical fitness requires a

comprehensive approach through collaboration between families, schools, health workers, and the government.

Based on the theory and research results, it can be understood that the physical fitness of elementary school students is the result of the interaction between biological factors (nutritional status), behavioral factors (physical activity), and social environmental factors (family support). These three factors complement each other in improving students' physical abilities to perform daily activities optimally. Therefore, this study examines the simultaneous influence of nutritional status, physical activity, and family support on the physical fitness of elementary school students as a multidimensional model.

Based on the results of observations during the study at five elementary schools in Tongkuno District, namely UPTD SD Negeri 4 Tongkuno, UPTD SD Negeri 7 Tongkuno, UPTD SD Negeri 8 Tongkuno, SD Swasta Islam Terpadu Ibnu Abbas II, and MIN 1 Wakuru, it was found that most students had normal nutritional status and moderate physical activity. Students who had good nutritional status and were active in various physical activities tended to show better abilities in completing the Indonesian Student Fitness Test (TKSI) series, especially in the 600-meter running test and the 8 × 10-meter shuttle run.

During the study, researchers observed that students who ate regularly and engaged in regular physical activities such as playing soccer, cycling, walking to school, and actively participating in physical education classes demonstrated better endurance and motor coordination than less active students. Conversely, some students with poor nutrition and low physical activity tended to fatigue more quickly during fitness tests.

On the other hand, although most parents pay attention to their children's health, the form of family support provided is still primarily emotional and motivational, while direct involvement in sports activities with children is relatively limited. This is due to the busy schedules of parents, most of whom work as farmers, fishermen, traders, and other informal sector workers. This situation results in the direct influence of family support on physical fitness being less strong than the influence of nutritional status and physical activity.

Field observations also indicate that the rural environment in Tongkuno District provides ample opportunities for children to engage in natural physical activity through traditional games, walking, and helping their parents with daily chores. These conditions indirectly support improved student physical fitness.

The findings of this study indicate that improving the physical fitness of elementary school students cannot be achieved through a single approach, but rather requires a holistic and integrated approach. Efforts to improve physical fitness must be carried out through ensuring good nutritional status, encouraging regular physical activity, and increasing the role of families in fostering healthy lifestyles in children. The implications of this study suggest that schools, families, community health centers, and local governments need to collaborate in developing programs to improve students' physical fitness through nutrition education, strengthening the School Health Program (UKS), optimizing physical education instruction, providing adequate sports facilities, and increasing parental awareness in supporting children's active lifestyles. With this comprehensive approach, the

quality of health and physical fitness of elementary school students can be sustainably improved.

Conclusion

Nutritional status, physical activity, and family support simultaneously significantly influence the physical fitness of elementary school students. This is evidenced by the calculated F value of 75.805 and a significance level of 0.000 (<0.05). The coefficient of determination (R^2) value of 0.485 indicates that 48.5% of the variation in students' physical fitness can be explained by nutritional status, physical activity, and family support, while the remaining 51.5% is influenced by other factors not examined in this study.

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