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# The Relationship of Motor Ability to the Level of Physical Fitness of State Elementary School Students 3 Years Aged 10-12 Years

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## Abstract

Physical fitness among elementary school students is an important factor in supporting optimal growth, learning participation, and the development of healthy lifestyles from an early age. At the elementary school level, motor skills such as speed, agility, strength, balance, and endurance are essential components that influence students' physical activity performance and overall fitness condition. This study aims to analyze the relationship between motor skills and physical fitness levels among students of State Elementary School 3 Wonosari aged 10–12 years. This research employed a quantitative approach with a correlational design to determine the direction and strength of the relationship between variables without providing any specific treatment. The research population consisted of all fourth-grade students totaling 55 students, and the sampling technique used was total sampling. Motor skills were measured through a 30-meter sprint test (speed), Illinois Agility Test (agility), Vertical Jump (leg muscle strength/power), Stork Stand (balance), and a 1000-meter run (endurance). The level of physical fitness was measured using the Indonesian Physical Fitness Test (TKJI) instrument according to the norms for ages 10–12 years. Before hypothesis testing, the data were analyzed through prerequisite tests, namely the normality test and linearity test, to ensure that the assumptions of parametric analysis were met. The analysis of the relationship between variables was conducted using the Pearson Product-Moment correlation test with a significance level of $\alpha = 0.05$. The results of the analysis indicated a positive and significant relationship between motor skills and students' physical fitness levels, with the strength of the relationship categorized as moderate to strong. Based on these findings, it can be concluded that the better the students' motor skills, the higher their level of physical fitness. The implications of this study emphasize the importance of developing basic motor components in physical education learning at the elementary school level as a systematic effort to improve students' physical fitness optimally and sustainably.

## How to Cite

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## INTRODUCTION

Physical education in elementary school has a strategic role in shaping the basis of students' physical abilities and character (Tri, 2020). At primary school age, especially the 9-10 year age range, children are at a golden age to develop basic motor skills (Permatasari, 2023). Good motor skills are not just about movement skills, but are a major prerequisite for the creation of an optimal level of physical fitness. (Riski Septiadevana, Ghaida Yunita Rahmani & Abdillah, 2024)

Sport is an activity that involves physical activity in certain ways and regulations to increase human resources to be more resilient. The essence of sport is also a physical activity that contains the nature of play and contains a struggle against oneself or with others, or a confrontation with the elements of nature (Stuart, 2025) Advances in science and technology have led to rapid changes in various aspects of human life, resulting in globalization and free markets.

Physical fitness is one of the important factors in supporting the development of elementary school-age children (Permatasari, 2023) Children who have a good level of physical fitness will be able to participate in learning and play activities optimally without feeling tired easily. On the other hand, children with low physical fitness tend to be less active, tired quickly, and at risk of impaired posture and learning concentration.

Motor skills are dynamic movements and require good physical conditions such as strength, endurance, speed, flexibility, and agility. Gross motor skills, including running, jumping, throwing, catching, and balance, are the foundation of elementary school children's physical development (Sanzali & Abdulaziz, 2025) These skills not only determine a child's ability to participate in daily physical activity and physical education lessons, but are also strongly related to fitness status and long-term health potential.

The results of the Pre-Research with Physical Education, Sports, and Health (Physical Education ) teachers at State Elementary School 3 Wonosari stated that the physical motor condition of State Elementary School 3 Wonosari students is still lacking. The preliminary survey conducted with Physical Education, Sports, and Health teachers at State Elementary School 3 Wonosari showed that many students still have low motor skill abilities and insufficient physical fitness levels. Most students experience difficulties in agility, balance, speed, and leg strength, while only the endurance component appears to be relatively adequate. Teachers also reported that many students become tired easily during physical activities and are less active in sports lessons. These findings indicate that the students' physical condition has not yet reached the expected standards for children aged 10–12 years.

Several previous studies support the existence of a relationship between motor skills and physical fitness. (Permatasari, 2023) found that fundamental motor skills have a significant relationship with the physical fitness of students aged 10–11 years. (Naslichori et al., 2022) also explained that motor skill development plays an important role in improving elementary school students' physical performance. In addition, (Riski Septiadevana, Ghaida Yunita Rahmani & Abdillah, 2024) emphasized that motor development is one of the main factors influencing children's participation in physical activities and their overall health status. These previous studies strengthen the assumption that better motor skills contribute positively to higher levels of physical fitness among elementary school students.

This study aims to determine the relationship between motor skills and the level of physical fitness among students of State Elementary School 3 Wonosari aged 10–12 years. In addition, this study seeks to identify which components of motor skills, such as speed, agility, strength, balance, and endurance, have the strongest relationship with students' physical fitness levels.

The novelty of this study lies in its comprehensive analysis of multiple motor skill components simultaneously, including speed, agility, leg strength, balance, and endurance, in relation to physical fitness among elementary school students aged 10–12 years. Unlike previous studies that often focused on only one or two motor components, this research provides a broader understanding of how each motor ability contributes to students' overall physical fitness. Furthermore, this study specifically examines students of State Elementary School 3 Wonosari, providing contextual findings that can be used as a basis for improving physical education programs at the elementary school level.(Anang Awan Gita, 2020).

## METHOD

This study uses a quantitative approach with a correlational design that aims to analyze

the relationship between motor ability and physical fitness level of elementary school students (Scott, 2023). The independent variable in this study was motor ability, while the bound variable was the level of physical fitness. The research subjects were all grade IV students of State Elementary School 3 Wonosari totaling 55 people, with a sampling technique using total sampling. The research is non-experimental because it does not provide special treatment, but measures the relationship between variables based on empirical data obtained in the field.

Data collection was carried out through a series of standardized field physical tests, including a 30-meter run (speed), the Illinois Agility Test (agility), Vertical Jump (explosive power of the leg muscles), and the Stork Stand (balance) to measure motor skills. The level of physical fitness was measured using a 1000-meter running test with reference to the norms of the Indonesian Physical Fitness Test (TKJI) aged 10–12 years. The data obtained is in the form of a quantitative score from direct measurements, which is further categorized according to applicable norms. All data collection procedures are carried out according to the standards for the implementation of fitness tests to ensure the validity and reliability of measurement results.

Data analysis is carried out through prerequisite tests in the form of normality tests and linearity tests to ensure the fulfillment of parametric analysis assumptions. Hypothesis testing was carried out using the Pearson Product-Moment correlation at a significance level of 0.05 to determine the direction and strength of the relationship between motor ability and physical fitness level. The interpretation of correlation coefficients refers to the criteria of the relationship level in order to give a substantive meaning to the study.

## RESULTS AND DISCUSSION

This study involved 55 4th grade students of State Elementary School 3 Wonosari as a research sample. The data collected included five components of basic motor skills and physical fitness levels.

The assessment norms below are adjusted for elementary school age children (10-12 years old) based on the Indonesian Physical Fitness Test (TKJI) instrument and gross motor ability test standards commonly used in sports literature **Table 1.**

Based on the results of the physical tests that have been carried out, an overview of students' motor abilities is obtained as listed in **Table 2**.

**Table 1.** Normative Assessment Data (Age 10-12 Years)

| Category | 30m Run (Speed) | Illinois Agility Test (Agility) | Vertical Jump (Leg Strength) | Stork Stand (Balance) | 1000m Run (Endurance) |
|---|---|---|---|---|---|
| Excellent | < 4.8 seconds | < 15.2 seconds | > 46 cm | > 50 seconds | < 4'30" |
| Good | 4.9 – 5.4 seconds | 15.3 – 16.1 seconds | 38 – 45 cm | 31 – 50 seconds | 4'31" – 5'15" |
| Enough | 5.5 – 6.1 seconds | 16.2 – 18.1 seconds | 30 – 37 cm | 11 – 30 seconds | 5'16" – 6'30" |
| Less | 6.2 – 6.9 seconds | 18.2 – 19.3 seconds | 22 – 29 cm | 5 – 10 seconds | 6'31" – 7'30" |
| Very Little | > 7.0 seconds | > 19.4 seconds | < 22 cm | < 5 seconds | > 7'31" |

**Table 2.** Descriptive Statistics of Students' Motor Ability (N=55)

| Variabel | Value | Category Min | Category Max | Average (Mean) | Category |
|---|---|---|---|---|---|
| Speed (30m Run) | Seconds | 4,58 | 9,94 | 7,21 | Less |
| Agility (Illinois Test) | Seconds | 20,05 | 30,94 | 24,12 | Very Low |
| Energy (Foot Power) | Weight/ cm | 16 | 37 | 25,4 | Less |
| Balance (Stork Stand) | Seconds | 4,24 | 8,49 | 5,52 | Less |
| Endurance (Running) | Minutes | 4.10 | 5.23 | 4.62 | Enough |

The data above shows that most of the students' motor components are still in the "Less" to "Very Less" category, except for the endurance component which shows "Sufficient" results.

Based on statistical analysis conducted on 55 respondents, the following is the relationship between each component of motor ability (Variable X) and Physical Fitness Level (Variable Y).

**Table 3.** Pearson Correlation Test Results (Product Moment)

| Variable motor skills | Correlation Coefficient (r) | Significance (p) | The Power of Relationships |
|---|---|---|---|
| Speed ( )X_1 | 0,682 | 0 | Strong |
| ( )X_2 | 0,741 | 0 | Strong |
| Leg Strength ( )X_3 | 0,594 | 0,001 | Quite Powerful |
| Balance ( ) X_4 | 0,428 | 0,014 | Quite Powerful |
| Durability ( )X_5 | 0,812 | 0 | Very Powerful |
| Simultaneous (Total X to Y) | 0,765 | 0 | Strong |

The results of the moment correlation analysis of Pearson products showed that the motor ability variable had a significant positive relationship with the level of physical fitness of students

($r = 0.765$; $p < 0.05$). The higher the motor skills a student has, especially in terms of endurance and agility, the better the level of physical fitness achieved. These findings confirm that the development of basic movement skills in primary school is an important step towards improving students' overall physical health.

Based on the results of the study, it was found that there was a significant and positive relationship between motor skills and the level of physical fitness of State Elementary School 3 Wonosari students aged 10-12 years. This is evidenced by the acquisition of a correlation coefficient of 0.765 which indicates the level of relationship in the Strong category.

**Student Motor Ability Profile**

Based on the descriptive data, the majority of students' motor components were still below the normative standards for children aged 10–12 years. The agility and balance aspects showed the lowest average values and were categorized as "Very Poor." Agility refers to the ability to change body position quickly and accurately, while balance is related to maintaining body stability during movement. Low scores in these components indicate that students' neuromuscular coordination has not been optimally developed through physical activities both at school and outside school. This finding is in line with(Sanzali & Abdulaziz, 2025), who stated that gross motor development in elementary school students is highly influenced by the frequency and quality of physical activities performed during childhood.

In contrast, students showed better performance in the endurance component, with an average running time of 4.65 minutes, which falls into the "Sufficient" category. This suggests that students already have relatively good aerobic capacity. However, they still lack other supporting motor components, such as speed, leg strength, and agility, which are needed to maximize their physical fitness performance. Similar findings were reported by (Permatasari, 2023), who found that elementary school students often demonstrate better endurance compared to other motor skill components due to their daily physical activities.

**The Relationship between Motor Ability and Physical Fitness**

The results of the Pearson correlation test strengthen the theory that motor ability is the foundation of physical fitness. A strong correlation coefficient ($r = 0.765$) indicates that improvements in students' basic motor skills, such as running speed, jumping ability, and body balance, are directly associated with better physical fitness performance. This finding supports the view of(Naslichori et al., 2022), who explained that motor ability development is an essential factor in improving the physical fitness and overall physical performance of elementary school students.

Among all motor variables, endurance and agility showed the strongest correlations with physical fitness. This result is reasonable because the Indonesian Physical Fitness Test (TKJI) largely depends on cardiorespiratory endurance and coordinated body movement. Endurance reflects the body's ability to sustain physical activity over time, while agility enables students to move efficiently during physical tasks. (Riski Septiadevana, Ghaida Yunita Rahmani & Abdillah, 2024) also emphasized that endurance and agility are among the most influential factors affecting children's physical activity participation and health status.

**Implications for Physical Education**

These findings have important implications for Physical Education, Sports, and Health teachers at State Elementary School 3 Wonosari. Since motor ability contributes 58.5% to students' physical fitness levels, physical education learning should not only focus on recreational games but should also include structured gross motor exercises. Activities such as sprint training, jumping exercises, agility drills, and balance exercises should be integrated regularly into the learning process. According to (Tri, 2020), game-based and structured physical activities are effective strategies for improving children's physical fitness and motor development.

Furthermore, improving students' basic motor skills during the elementary school years is very important because this period is considered a "golden age" for physical development. Better motor skills not only improve students' academic fitness scores but also help build healthy lifestyles and reduce the risk of obesity and health problems in the future. This statement is supported by Hendraningrat and (Hendraningrat & Fauziah, 2022), who argued that early motor stimulation has a long-term impact on children's physical, cognitive, and social development.

Although this study successfully identified a significant relationship between motor ability and physical fitness, it still has several limitations. First, the study only involved students from one elementary school, so the findings cannot be generalized to all elementary school students. Second, this research only focused on physical and

motor variables without considering other factors that may influence physical fitness, such as nutritional status, body mass index, physical activity habits, and socioeconomic background. (Sugiyono, 2023) explained that correlational research often has limitations in controlling external variables that may affect the results.

In addition, the findings showed that endurance was relatively better than other motor components, which differs slightly from the initial expectation that all motor components would be equally low. This suggests that students may already be accustomed to moderate daily physical activities but still lack specific exercises that improve agility, strength, and balance.

Therefore, future researchers are suggested to involve larger and more diverse samples from different schools and regions. Further studies should also include additional variables such as nutrition, exercise habits, parental support, and lifestyle factors to provide a more comprehensive understanding of students' physical fitness. Moreover, Pysical Education teachers are encouraged to design more varied and structured exercise programs to improve students' motor skills comprehensively.

## CONCLUSION

Based on the results of data analysis and discussion in the study on the relationship between motor ability and physical fitness level of State Elementary School 3 Wonosari students aged 9-10 years, it can be concluded that in general, the motor ability of grade IV students is still in the "lacking" category. This can be seen from the low achievement in the aspects of agility and balance which is still far below the normative standards of children aged 9-10 years. However, in the aspect of endurance, students show relatively better potential because they are in the "sufficient" category, thus showing that students' aerobic capacity has developed even though it has not been optimally supported by other motor components.

In addition, the results of the study show that there is a positive and influential relationship between motor skills and the level of physical fitness of students. A correlation coefficient value (r) of 0.765 indicates a strong level of connection, which means that the better a student's motor skills including speed, agility, strength, balance, and endurance the higher their level of physical fitness. Furthermore, motor ability contributed 58.5% to the variation in students' physical fitness levels, which confirms that the mastery of gross motor movements is the dominant factor in determining the physical quality of elementary school students. These findings show the importance of systematically developing motor skills in physical education learning to improve overall physical fitness.

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