



## Analysis of Fundamental Motor Skills of Students Aged 7 to 9 Years in West Sumatra Province

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### Abstract

Fundamental movement skills are the main element that determines a person's ability to engage in physical activity. This study aims to describe differences in students' basic movement skills based on ages group. This study design was descriptive using a cross-sectional approach. Fundamental motor skills were evaluated using the TGMD-2 instrument. The research subjects were elementary school students in grades 1, 2 and 3 in West Sumatra who were determined purposively with details (N=204; boys =102 and girls =102). The data were analyzed using the IBM SPSS statistics program version 25. The average Gross Motor Quotients (M=82.15, SD=10.5) was obtained and tended to decrease with age. Average Gross Motor Quotients of the 7 year age group (M=85.79 SD=7.8), the 8 year age group (M=82.31 SD=10.41) and the 9 year age group (M=78.34 SD=11.7). The results of the one-way ANOVA test between age groups showed that there was a significant difference in the average GMQ of students (p value <0.05). In general, students' fundamental motor skills are below average, male students are superior to female students in all age groups.

**Keywords:** Fundamental Motor Skill, Locomotor, Object Control, Primary School Student.

### INTRODUCTION

Fundamental motor skills are important points that form the basis of skills that will form the foundation of human movement. (Pangrazi & Beighle, 2019). Apart from being the "ABC" of movement, (Goodway et al., 2014) Fundamental motor skills are also building blocks, which are basic competencies for carrying out physical activities and specific movements, including movements in sports in the future, (Buns & LaValle, 2020 ; Engel et al., 2018 ; Logan et al., 2018). Fundamental motor skills are the basis for realizing correct movements and are very basic movement abilities that a child must have from an early age. (van der Fels et al., 2015).

According to Pang & Fong (2009) Fundamental motor skills cannot develop on their own as a child gets older, but must be taught, practiced and combined with other movement patterns in structured physical activities. The results of Li's 2009 research explain that fundamental motor skills develop effectively when taught to children aged 3 to 10 years (Lin & Yang, 2015). Fundamental motor skills will not actually emerge and develop naturally as a result of maturation, but these skills really need to be taught in a systematic and structured motor skills program during the early years of a student's childhood. (Goodway & Branta, 2003 ; Valentini & Rudisill, 2004 ; Oktarifaldi et al., 2024).

There are many factors that influence children's mastery of basic movement skills, one of which is the physical activity they do (Chan et al., 2019). Studies reveal that fitter children perform better academically in physical activity than their less fit peers (de Bruijn et al., 2018; Santana et al., 2017). On the other hand, children with low levels of gross motor competence tend to be less active in physical activities (Hardy et al., 2012). It is understandable that children who are fitter will tend to be active and skilled in physical activities, while this fitness is obtained if they have good basic movement skills.

The importance of developing basic movement skill competencies among children has been sought and emphasized by experts, researchers and policy makers throughout the world as outlined in the physical education curriculum in elementary schools (U.S Department HHS, 2018). In Indonesia, based on the results of studies and research, it has been revealed that the mastery of fundamental motor skills of early childhood children is relatively low and the competencies they possess are still minimal and do not match their age level (Oktarifaldi et al., 2019). Meanwhile, the competency and fundamental motor skills possessed by children at elementary school age (locomotor and object control) should be approaching a perfect to perfect level (Goodway et al., 2019).

Research reveals that good fundamental motor skills are supported by gross motor coordination skills (i.e., the use of large muscles when moving the whole body, maintaining balance against gravity and interacting with objects) which will later support the learning of specific movement skills, including in certain sports (Loprinzi et al., 2015; Cattuzzo et al., 2016). Gabbard explained that elementary school and physical education learning are believed to be one of the most influential factors in building and developing children's motor skills and promoting physical activity which is the foundation for realizing other motor skills (Jarvis et al., 2022).

Low motor competence can be a barrier to learning additional sports skills and various sequential and cumulative motor skills in childhood. Furthermore, a high level of

motor competence will help achieve additional skill development in transition skills as well as more complex sports skills (Brian et al., 2020). Based on the previous description, the importance of basic motor skills from an early age is the main reason for researchers to conduct this research. Furthermore, this study also aims to examine the development of children's motor skills in the 7, 8, and 9-year-old age group. As is known, the crucial age for teaching and developing motor skills is 3 to 10 years old, or before students enter the fourth grade of elementary school.

Teachers must understand the purpose of physical education in elementary schools, which is to stimulate physical growth and development. Based on existing conditions, a study is needed to determine students' motor skills in West Sumatra Province, Indonesia. Based on the author's research, other researchers have rarely published research on students' basic motor skills competencies in elementary schools. This study is expected to serve as a baseline for teachers, parents, and policymakers in analyzing gaps and actual conditions in West Sumatra regarding student motor skills competencies.

## ***METHOD***

This research is a descriptive study with a cross-sectional design. The subjects were elementary school students aged 7 to 9 years. The sample consisted of 204 students, 102 boys and 102 girls, with 68 students aged 7, 68 students aged 8, and 68 students aged 9. Students' fundamental motor skills were evaluated using the Test of Gross Motor Development Second Edition (TGMD-2) instrument (Dale A Ulrich, 2000). Data analysis used a descriptive method, student age (date, month and year of birth) was converted to compare the skills obtained with the norms in the TGMD-2 instrument reference before determining the maximum and minimum scores, using the average and standard deviation. After testing the data for normality, a one-way ANOVA test was used to see the difference in average Gross Motor Quotients (GMQ) between the 7, 8 and 9 years age groups. All data were analyzed using the IBM SPSS Statistics version 25 program.

## ***RESULTS AND DISCUSSION***

### ***Results***

Based on measurements of 204 students in the age group of 7, 8 and 9 years, it was found that students' fundamental motor skills were generally classified as below average with Gross Motor Quotients ( $M=82.15$  and standard deviation  $=10.05$ ). There were significant differences between age groups, with male students outperforming female students. These findings also revealed that female students had a lower average score in the

9-year-old age group. For more details, see Table 1, a summary of the gross motor quotient (GMQ) data.

**Table 1. Acquisition of Fundamental Motor Skills by age group**

|                | Group   | N   | <i>Fundamental Motor Skill</i> |     |         |       |               |
|----------------|---------|-----|--------------------------------|-----|---------|-------|---------------|
|                |         |     | Max                            | Min | Average | Std   | Rating        |
| <b>Global</b>  | General | 204 | 109                            | 46  | 82.15   | 10.05 | Below Average |
|                | Male    | 102 | 109                            | 55  | 84.29   | 9.83  | Below Average |
|                | Female  | 102 | 109                            | 46  | 80      | 10.7  | Below Average |
| <b>7 years</b> | General | 68  | 106                            | 67  | 85.79   | 7.8   | Below Average |
|                | Male    | 34  | 106                            | 73  | 88.35   | 6.9   | Below Average |
|                | Female  | 34  | 103                            | 67  | 83.23   | 7.7   | Below Average |
| <b>8 years</b> | General | 68  | 109                            | 55  | 82.31   | 10.41 | Below Average |
|                | Male    | 34  | 109                            | 55  | 84.29   | 10.21 | Below Average |
|                | Female  | 34  | 109                            | 64  | 80.32   | 10.37 | Below Average |
| <b>9 years</b> | General | 68  | 109                            | 46  | 78.34   | 11.7  | Low           |
|                | Male    | 34  | 106                            | 58  | 80.24   | 10.5  | Below Average |
|                | Female  | 34  | 109                            | 46  | 76.44   | 12.62 | Low           |

\*GMQ average rating scale obtained by students, source: Ulrich (2000).

Based on the data analysis conducted, seven categories were converted into descriptive ratings for the students in this study: (very superior, superior, above average, average, below average, low, and very low). According to table 2, the gross motor quotients obtained in each age group show an advantage for male students, while the seven year old age group is the most superior, followed by the 8 year old age group and the 9 year old age group is in last place. No students were found in the above-average, superior, or very superior categories across all age groups. This can be seen in Table 2 below.

**Table 2. Gross Motor Quotient Fundamental Motor Skill Achievement**

| GROSS MOTOR QUOTIENT | 7 years-old |      |        | 8 years-old |      |        | 9 years-old |      |        | DESCRIPTIVE   |
|----------------------|-------------|------|--------|-------------|------|--------|-------------|------|--------|---------------|
|                      | General     | Male | Female | General     | Male | Female | General     | Male | Female | RATING        |
| >130                 | 0           | 0    | 0      | 0           | 0    | 0      | 0           | 0    | 0      | Very Superior |
| 121 - 130            | 0           | 0    | 0      | 0           | 0    | 0      | 0           | 0    | 0      | Superior      |
| 111 - 120            | 0           | 0    | 0      | 0           | 0    | 0      | 0           | 0    | 0      | Above Average |
| 90 – 110             | 23          | 16   | 7      | 16          | 10   | 6      | 11          | 5    | 6      | Average       |
| 80 – 89              | 31          | 15   | 16     | 24          | 12   | 12     | 18          | 13   | 4      | Below Average |
| 70 – 79              | 13          | 3    | 10     | 22          | 11   | 11     | 27          | 12   | 15     | Low           |
| < 70                 | 1           | 0    | 1      | 6           | 1    | 5      | 12          | 4    | 8      | Very Low      |

\*GMQ rating scale age group obtained by students, source: Ulrich (2000)

Acquisition of locomotor sub-skills and object control of students, data analysis revealed that in the 7 and 8 year age groups, it was revealed that in locomotor skills, male

students had almost the same skills and the 9 year age group was slightly lower. Likewise, female students have almost the same locomotor skills between the ages of 7 and 8 years, but at the age of 9 years it is slightly lower. In object control skills, male students in the 7-year-old age group are superior compared to the 8- and 9-year-old age groups. Meanwhile, for female students, object control skills are superior to those in the 7-year-old age group. It can be seen and understood that the skills that are generally mastered by students are locomotor skills, while object control skills are still difficult for students to master. This is evidenced by the fact that both boys and girls are still in the low category across all age groups, except for boys in the 7-year-old age group, who are below average. For more details, see Table 3 below.

**Table 3. Average acquisition of Locomotor and Object Control skills by age group**

| Group   | N  | Gender | Sub Skills     | Standar Score | Descriptive Rating |
|---------|----|--------|----------------|---------------|--------------------|
| 7 years | 68 | Male   | Locomotor      | 9.97          | Average            |
|         |    |        | Object Control | 6.15          | Below Average      |
|         |    | Female | Locomotor      | 8.5           | Average            |
|         |    |        | Object Control | 5.91          | Low                |
| 8 years | 68 | Male   | Locomotor      | 9.62          | Average            |
|         |    |        | Object Control | 5.15          | Low                |
|         |    | Female | Locomotor      | 8             | Average            |
|         |    |        | Object Control | 5.44          | Low                |
| 9 years | 68 | Male   | Locomotor      | 8.59          | Average            |
|         |    |        | Object Control | 4.82          | Low                |
|         |    | Female | Locomotor      | 7.06          | Below Average      |
|         |    |        | Object Control | 4.88          | Low                |

The data description continues by describing the locomotor skills of students in the three age groups, from each age group only the 7 year group was found to be in the superior category (1.47%), then (5.88%) students were in the above average category, (70.59%) students were in the average category, (16.18%) students were below average and (5.88%) students were in the low category. In the 8 year age group, (8.82%) students were found to be in the above average category, (66.18%) students were in the average category, (17.65%) students were in the below average category, (5.88%) students were in the low category and (1.47%) students were in the very low category. In the 9-year-old age group, 4.41% were found to be in the above-average category, 50% in the average category, 25% in the below-average category, 17.65% in the low category, and 2.94% in the very low category. For more details, please see histogram 1 below.

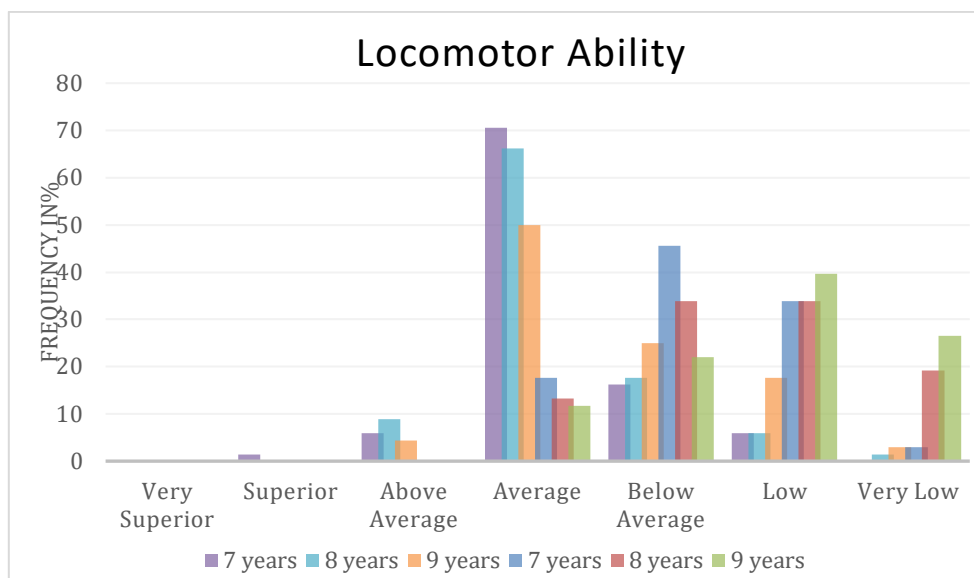


**Figure 1. Histogram of comparative description of FMS at ages 7, 8 and 9 years**

The object control skills of the 7 year old age group can be described, found (17.65%) students are in the average category, (45.69%) students are below average, (7.5%) students are in the low category and (33.82%) students are in the very low category and (2.94%) in the very low category. For the 8 year age group, (13.24%) students were found to be in the average category, (33.82%) students were in the below average category, (33.83%) students were in the low category and (19.12%) students were in the very low category. Furthermore, in the 9-year-old age group, 11.76% of students were found to be in the average category, 22.06% of students were in the below-average category, 39.71% of students were in the low category, and 26.41% of students were in the very low category. For more clarity, see histogram 2 below.

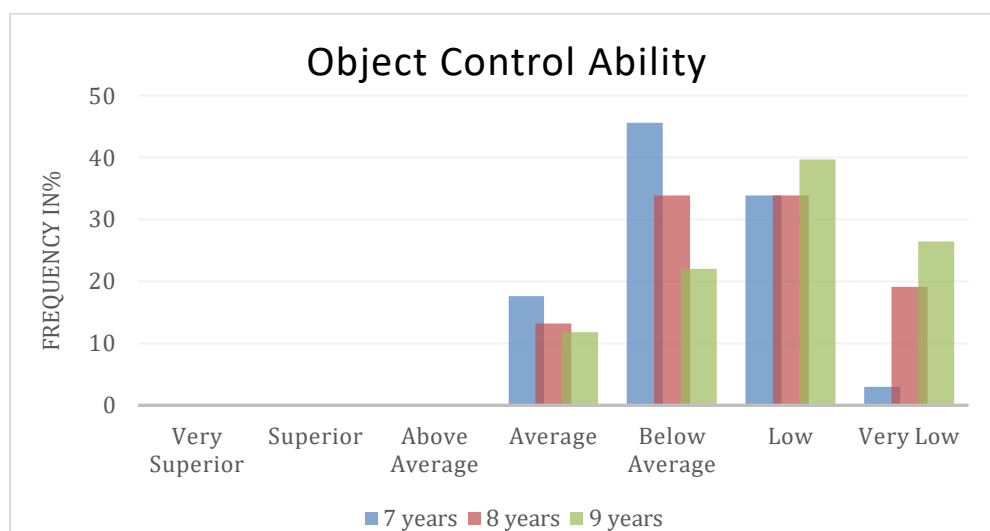


**Figure 2. Histogram of comparative description of FMS ages 7, 8 and 9 years**

To see the difference in the average competency possessed between student age groups, data normality testing was carried out before the researcher conducted a one-way ANOVA test which aimed to see the difference in the average basic movement skills of students between the 7, 8 and 9 year old age groups. The Kolmogorov-Smirnov test was conducted on age groups, the 7-year-old age group found sig. (0.065 > 0.05), the 8-year-old age group found sig. (0.058 > 0.05) and the 9-year-old age group found sig. (0.062 > 0.05). It can be concluded that the three age groups are normally distributed. Furthermore, a one-way ANOVA test was conducted to see the differences in age groups. The test results showed (F count was 7.756 and a sig. value of 0.01). This can be interpreted that there is a significant difference in basic motor skills between the age groups of 7, 8, and 9 years of lower grade elementary school students in West Sumatra.

### **Discussion**

The results of this study reveal the actual conditions that occur in relation to students' mastery of basic movement skills. The findings in this study revealed that, in general, students' basic motor skills were classified as below average, male students were classified as below average and were generally superior to female students, whose skills were still classified as low, but in terms of object control skills, female students were seen to be slightly superior to male students. The findings in this study revealed that, in general, students' basic motor skills were classified as below average, male students were classified as below average and were generally superior to female students, whose skills were still classified as low, but in terms of object control skills, female students were seen to be slightly superior to male students.

The fact that students' basic motor skills are still not good as revealed in this research requires many parties to think about solutions that can solve this problem. Goodway et al, said that when students are at elementary school age, their basic motor skills should be approaching a perfect level or already perfect. (Goodway et al., 2019). However, the findings in this study revealed that the competencies achieved by students were still inadequate. In line with previous studies, most research revealed that elementary school-aged children were found to have low competence and inadequate skills in FMS (Brian et al., 2019; Nobre et al., 2018). While research findings reveal a better level of FMS mastery will help achieve additional skill development in building transition skills as well as more complex sports skills for each child in the future (Brian et al., 2020).

Looking at the findings in this study, the basic motor skills of students in the 7-year-old age group are superior compared to those in the 8-year-old age group, then they appear to decrease at the age of 9 years. This finding certainly challenges the assumption

held by many people, including teachers and parents, that FMS development is not linear with age. Children aged 6 and 9 years experienced delays in their fundamental motor skills compared to expected development. The development of 6-year-old children was assessed as low, while that of 9-year-old children was assessed as very low. These results can be interpreted as an important indicator that our children may be prevented from engaging in further physical activity due to their lack of basic motor skills compared to their peers (Rodrigues et al., 2015).

There are many efforts that can be made to improve and develop students' basic movement skills, the dominant thing that can be done is to optimize physical education learning in elementary schools. Bolger and team, said social and environmental factors such as the influence of family, peers, teachers, and the physical environment are the dominant predictors that affect the physical activity of male and female students (Bolger et al., 2021; Saparia et al., 2023). Furthermore, student competencies regarding FMS are obtained through variations and combinations of active games and structured and adequate training programs by teachers/trainers (Engel et al., 2018). Recommending quality physical education will be able to provide students with various physical and fitness exercises that are appropriate to student development. Furthermore, it can also be realized using effective learning strategies to maximize students' learning time and participation in physical education learning (Van Beurden et al., 2003).

Physical education teachers are the dominant factor and element that plays an important role in building, developing and improving student competencies through physical education learning programs in schools. Equipping teachers with FMS skills and knowledge is an effort to improve students' motor skills (Eddy et al., 2021). Locomotor movement and object control develop through a process of "levels." Levels here can be interpreted as stages of development characterized by several distinctive developmental characteristics. In general, locomotor movements and object-controlled movements have three to five levels (stages) of development. Understanding these stages of basic movement development will make it easier for teachers to teach basic movements (Goodway et al., 2019). By understanding the level or development of each step of basic movement by physical education teachers, it is believed that it will have a positive effect on teachers in implementing more meaningful learning programs.

It's necessary to optimize the physical education process through qualified teachers to implement FMS learning in schools. In this case, more than one method and approach can be used in the same lesson, depending on its objectives and the content students will learn (Metzler, 2011). Furthermore, a more focused and structured strategy is needed to

highlight the importance of developing FMS in the elementary school environment. An alternative is to continue to look for low to moderate levels of FMS in children who have potential deficits in physical activity engagement (Jarvis et al., 2022). In addition, teacher competence in evaluating also needs to be considered because based on the initial evaluation, teachers can prepare effective learning programs.

Children will have the opportunity to participate in physical activities and sports at school during physical education lessons and extracurricular activities. Matos et al., (2022) said that it was necessary to develop research regarding motor coordination because it was believed to contribute directly to improving the ability to manipulate an object control using the upper and lower limbs in addition to the ability to move the body. Based on the previous explanation, it is necessary to provide assistance in motor competence for teachers so that it can be realized optimally (Oktarifaldi et al., 2021).

Coordination skills need to be recommended to physical education teachers for consideration in learning programs. Oktavianus et al., (2021) He explained that every teacher and sports coach must be a motivator and inspiration in providing an understanding of the importance of optimal movement for each child. Teachers and coaches need to make efforts to improve students' motor coordination skills. Coordination exercises can be realized by providing variations and combinations of movement forms that lead to the required techniques (Marta & Oktarifaldi, 2020). Furthermore, coordination is needed to integrate movements to get optimal results (Marta, 2020). It is understandable that it is necessary for teachers and all related parties to consider carefully and systematically in compiling physical education learning materials in elementary schools, so that the gaps that occur can be minimized and students' basic movement skills can be improved.

## ***CONCLUSION***

The level of basic movement skills of students in West Sumatra Province is below average, necessitating efforts to improve them through effective physical education instruction. These findings recommend interventions and optimization of physical education instruction in schools. Furthermore, it is recommended that physical education teachers develop systematic and effective learning programs to improve students' basic movement skills in a structured manner and through unstructured physical activities.

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