



Comparative Analysis of Basic Movement Skills and BMI of Elementary School Students in Lower Grade Elementary School in Full Day and Regular Schools

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History Article

Received March 2026

Approved April 2026

Published vol 13 no 1 2026

Keywords

Body Mass Index; Basic Movement Skills; Elementary School

Abstract

Differences in students daily physical activity patterns also contribute to variations in their fundamental movement skills. This study aims to analyze the comparison of basic movement skills and Body Mass Index (BMI) of low-grade elementary school students in schools with full day systems and regular schools. The research method used is quantitative and comparative with an ex post facto approach. The research sample amounted to 96 elementary school students in Cibeunying Kaler District, consisting of 48 regular school students and 48 full-day school students, with a simple random sampling technique. The research instrument used basic motion skill tests which included locomotor, non-locomotor, and manipulative movements, as well as BMI measurements based on WHO standards. Data analysis was carried out descriptively and inferentially using parametric statistical tests. The results of the study showed that the basic movement skills of regular school students were higher than that of full-day school students. In addition, full-day school students have a higher percentage of obesity BMI than regular school students. These findings suggest that differences in learning systems have the potential to affect physical activity, basic movement skills, and students' BMI conditions. The conclusion is that differences in the education system and BMI categories are associated with variations in students' fundamental movement skills, where regular school students and those with normal BMI tend to demonstrate better performance.

How to Cite

Nugraha, A. D., Firmansyah, H., & Gumilar, A. (2026). Comparative Analysis of Basic Movement Skills and BMI of Elementary School Students in Lower Grade Elementary School in Full Day and Regular Schools. *Journal of Physical Education, Health and Sport*, 13 (1), 227-235.

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INTRODUCTION

The elementary school environment reflects a diversity of students' body postures, such as tall, short, thin, and overweight, which indicate differences in their daily physical activities. Some children actively play outdoors after school, while others tend to be passive by watching television or lying in bed due to fatigue after a full day of learning at school. These differences in activity patterns contribute to variations in physical development. Physical activity is an important factor in determining the physical development of elementary school-aged children (Rizal, 2021).

Physical development progresses gradually and encompasses several aspects of bodily growth. Notably, it incorporates increased sensory stability, advancement in motor skills, and health conditions that facilitate daily functioning (Fikriyah, 2021).

Optimal physical development will help improve basic movement skills in elementary school-age children. Basic movement skills play a role in helping children regulate balance and coordination of body movements, while building more complex skills that are useful for their growth and developmental processes (Pratama & Nurrochmah, 2022).

Basic movement skills include three basic types of movement, namely locomotor, non-locomotor, and manipulative movement (Muttaqin, 2025). Locomotor movements involve moving the body from one point to another, such as walking, running, jumping, and rolling. Non-locomotor movements are inversely proportional to locomotor movements that involve moving from one place to another, such as bending and twisting the body. Manipulative movements are the ability or expertise of the body to perform physical activities using objects or tools, such as throwing, catching, kicking, or dribbling (Kurniawan et al., 2022).

Basic movement skills are the main foundation in supporting various learning processes, play activities, social interactions, and play an important role in shaping children's confidence. Basic movement skills are also a strong basis for the development of children's cognitive abilities (Pangkey & Mahfud, 2020). Basic movement skills need to be developed because they play a crucial role in shaping individual independence, allowing individuals to be less dependent on others. In addition, this ability also supports intellectual development and allows a person to actively participate in various activities (Darajat et al., 2024). Regular physical

activity can have a positive impact as well as significantly strengthen the brain's work response (Nuryadi et al., 2018).

Learning basic movement skills from an early age is very important. If children do not get adequate learning related to these skills, they can potentially have difficulty mastering more complex skills, including various techniques in sports (Gumilar et al., 2023). Elementary school is a very ideal time to develop children's basic movement skills, instill physical active habits, and benefit from quality education and training in the field of basic movement skills (Muzakki et al., 2025).

At the age of elementary schoolers, they spend their time in three interconnected places: school, home, and play (Qomariah & Hamidah, 2022). At the elementary school level, the learning process is usually divided into two stages according to the characteristics and level of development of students, namely for the lower and upper classes. The lower class includes students in grades 1, 2, and 3, while the upper class includes grades 4, 5, and 6 (Syadiah et al., 2025). At the elementary school stage of the lower grade, students experience development in various aspects of skills. Among them are social skills and basic movement skills. In this phase, their physical growth is mature enough, so they are able to better regulate the balance of the body and show more directed coordination of movements (Swihadayani, 2023).

The school environment is one of the factors that affect the development of basic movement skills in children (Siregar et al., 2025). Every student who goes to elementary school will learn a variety of subjects. One of the subjects taught in elementary school is Physical Education, Sports, and Health (PE). This subject has a crucial role in providing opportunities for children to be directly involved in various active movement experiences involving physical activities, games, and activities that are systematically arranged (Andriansyah et al., 2025).

Physical education plays a role in improving students' physical abilities through activities that are in accordance with their developmental stages. Structured activities help develop basic movement skills such as maintaining balance, muscle strength, agility, and body coordination (Rahmadani et al., 2025). This subject aims to maintain health and improve motor skills, while instilling values such as cooperation, sportsmanship, and student discipline. In general, physical education consists of two types of learning, namely theoretical learning

and practical learning (Halim et al., 2023). PE learning requires students to be actively involved in movement activities, think critically, establish social interactions, and control emotions during the activity process (Akmal Kusuma & Firmansyah, 2025).

One of the factors that affects basic movement skills in school-age children is Body Mass Index (BMI) (Sunarni et al., 2019). Body Mass Index (BMI) is a method used to measure the balance between a person's height and weight to assess the proportionality of their body. The more ideal the proportion of weight and height of a person, the better the potential for their movement. On the other hand, the imbalance of its proportions can have an impact on limitations or obstacles in its ability to move. (Bakhtiar et al., 2020)

In Indonesia, the education system in elementary schools has undergone a transformation which is divided into two types of services, namely regular programs and full-day programs, which are distinguished from the duration of learning in schools (Lia et al., 2025). Regular school is a learning system that is carried out only for half a day or 4-5 hours in one day of learning activities (Fratama, 2024). The full-day policy began to be implemented in 2017 through a regulation that stipulates that the learning process in elementary schools is carried out for eight hours per day and lasts five days a week (Pebriana, 2025). This policy is designed to improve the quality of education, reduce the gap between public and private schools, and open up greater opportunities for students to develop their potential in various fields of education. (Jannah et al., 2024)

Students' activities in the full-day system have a higher intensity compared to students in the regular system, because there are additional subjects in the curriculum structure, and have an impact on reducing the allocation of rest time and physical activity, since most of the learning time is used to follow the learning process in the classroom. According to research on the relationship between the (Mufti Wirawan et al., 2016). learning environment and emotional well-being, it is shown that with a tight learning schedule at school, a curriculum that is not in accordance with students' abilities, and excessive academic pressure can be a stress factor for students. The full day system is considered to focus more on the development of students' cognitive aspects and pay less attention to the development of affective aspects. The imbalance between academic pressure and the fulfillment of emotional needs

can cause students to feel burdened and stressed, lose time for self-exploration, and limitations in making social connections outside of school (Faizah et al., 2020).

The purpose of this study is to analyze and identify the differences in fundamental motor skills and Body Mass Index (BMI) among lower-grade elementary school students in two different education systems, namely full-day school and regular school. This study also aims to examine whether the longer learning duration in full-day school has a significant impact on students' motor skills and physical condition compared to those in regular schools.

The novelty of this research lies in its comparative analysis that simultaneously integrates fundamental motor skills and Body Mass Index (BMI) among lower-grade elementary students based on differences in full-day and regular school systems, which has rarely been studied in an integrated manner.

METHOD

This study uses a quantitative comparative method with an ex post facto approach. According to Sugiyono, this research was conducted on a specific population or sample, usually with a random sampling technique. Data is collected using standardized instruments and statistically analyzed to obtain objective conclusions. One form of quantitative method is comparative, which is used to compare two or more treatments, situations or programs. The goal is to see the differences between the elements in a research system (Azhari et al., 2023).

With an ex post facto approach, this study was conducted to compare two groups that have formed naturally. In this study, the students of the lower class in school (Aisyah et al., 2025). Full-Day and a regular school in the northern part of the district. Without any manipulation or special treatment from the researcher. Sampling using simple random sampling, with the Slovin method. According to Sugiyono, the slovin method is a calculation used to determine the size of the sample that is considered to be able to present the entire population. The source of the research data was 96 students. With the division of 48 regular school students and 48 full-day school students (Wulandari & Wahyudi, 2022).

The instrument used in this study is a basic movement skill test instrument prepared by Suherman (2008) and developed by Gumilar (2011). The instrument contains various types of basic movement skills that are generally carried out by children in daily activities, such as running, jum-

ping, throwing, catching, and kicking. To measure Body Mass Index in children using references from WHO (2007) and the Ministry of Health of the Republic of Indonesia (2010).

$$\text{BMI} = \frac{\text{Weight}}{(\text{Height})^2}$$

Weight in kilograms (Kg)
Height in meters (m)

Figure 1. BMI Reference Formula.

RESULTS AND DISCUSSION

The results of the data obtained based on research on basic movement skills and BMI in 48 regular elementary school students and 48 full-day elementary school students in Cibeunying Kaler District, Bandung, are as follows:

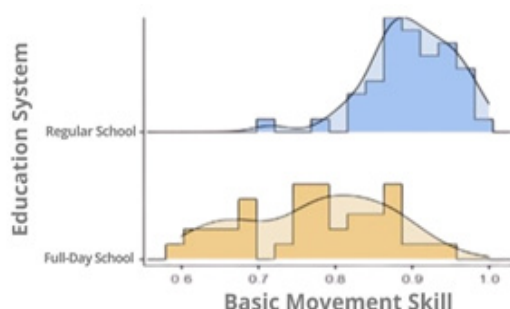


Figure 2. Graph of the distribution of basic movement skills data in each group

Based on the **Figure 2**, in Regular Schools, the data distribution is more concentrated at high scores (around 0.85–1.00), while in Full Day Schools, the distribution is more widespread and tends to be at slightly lower scores. The shape of the curve in both groups appeared to resemble the normal distribution, although the variation in the Full Day School looked larger.

Table 1. Recapitulation of Extracurricular Participation for Regular Elementary and Full-Day Elementary School Students

Extracurricular	Regular School		Full-Day School	
	Frequency (n)	(%)	Frequency (n)	(%)
Futsal	6	12,50%	5	10,42%
Karate	2	4,17%	3	6,25%
Swimming	2	4,17%	6	12,50%
Football	2	4,17%	–	–
Silat	7	14,58%	1	2,08%

Taekwondo	9	18,75%	3	6,25%
Dance	3	6,25%	–	–
do not participate in eskul	17	35,41%	30	62,50%
Total	48	100%	48	100%

The **Table 1** illustrates the percentage of participation in extracurricular activities of Regular Elementary and Full Day Elementary School students. In Regular Elementary School, the highest percentage is found in Taekwondo (18.75%) and Silat (14.58%), followed by Futsal (12.50%), while the percentage of students who do not participate in eskul is still quite large, at 35.41%. In Full Day Elementary School, the percentage of students who did not participate in extracurricular activities was much higher, at 62.50%, indicating that most students were not involved in extracurricular activities. The most participated activities in Full Day Elementary School were Swimming (12.50%) and Futsal (10.42%), while Football and Dance were not attended by students at all. The percentage of extracurricular participation in regular elementary schools is higher and more diverse than that of full-day schools, which indicates that students in regular schools have a greater chance of engaging in physical activity outside of class hours than students in full-day schools.

Table 2. BMI Percentage in Regular Elementary School

BMI	Quantity	percentage (%)
Underweight	6	12,5%
Normal	38	79,17%
Overweight	3	6,25%
Obesity	1	2,08%
Total	48	100%

Based on the **Table 2**, overall the percentage of students with normal BMI has the highest percentage of 38 people or 79.17% and students with obese BMI have the lowest percentage of 1 person or 2.08% of the whole.

Table 3. BMI Percentage in Full-Day Elementary School

BMI	Quantity	percentage (%)
Underweight	0	0%
Normal	32	66,7%
Overweight	0	0%
Obesity	16	33,3%
Total	48	100%

Based on the **Table 3**, overall the highest percentage was in students with a normal BMI of 32 students or 66.7%, students with an obese BMI of 33.3% or 16 students and no students with a thin BMI and an obese BMI in the results of full-day elementary school research.

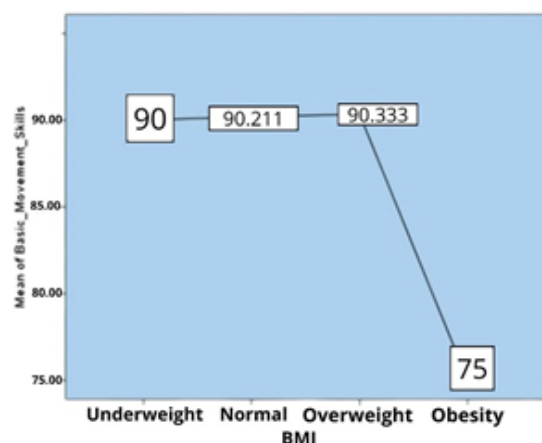


Figure 3. Analysis of basic movement skills based on BMI in regular elementary school students

Based on the data in **Figure 3**, the normal BMI category shows a relatively superior achievement of basic movement skills (BMS) compared to other categories. The normal group has a mean of 90.21, which is one of the highest mid-values among all categories. In addition, the maximum score in this group is close to 100, which indicates that a number of students with normal BMI are able to achieve an excellent level of skill. Although the range of values in the normal category is quite wide, which is around 72 to 100 (with one value of around 0.72 as an outlier), this condition reflects the variation in ability as well as the potential for optimal skill achievement in the group. The wider distribution of scores indicates more diverse skill development dynamics in students with normal BMIs.

On the other hand, the obese category has a mean of 90.34 with a range of 87–98, the thin category has a mean of 90.00 with a narrow range of 87–93, and the obesity category is 75 which is a single value. Although some categories showed relatively high scores, the median consistency and maximum score achievement in the normal group indicated that students with a normal BMI tended to have more optimal levels of basic movement skills than the other categories. These data show that normal BMI correlates with relatively better achievement of basic movement skills as well as a more varied distribution of abilities and differences in average patterns between these categories indicate that BMI status has an in-

fluence on the level of basic movement skills in the context of this study.

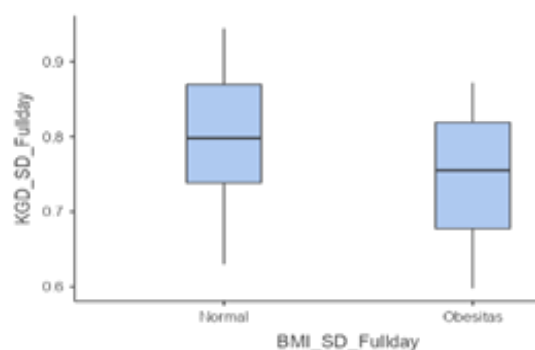


Figure 4. Analysis of basic movement skills based on BMI in full-day elementary school students.

Based on **Figure 4**, it can be seen that full-day elementary school students with normal BMI show higher achievement of basic movement skills (BMS) than students with obese BMI. The median value in the normal group was around 0.80, while in the median obesity group it was lower, which was around 0.75. This difference of about 0.05 points shows a significant difference in the context of scores that are in the range of 0.60–0.90. In terms of the range of values, the normal group had a score of around 0.60 to 0.95, with most of the data (interquartile range) in the range of 0.74–0.86. This shows that the majority of students with a normal BMI achieve a score above 0.74, which falls into the good category. Meanwhile, in the obesity group, the value range was around 0.51 to 0.87, with most scores concentrated in the range of 0.68–0.78. This indicates that the distribution of values in the obesity group tends to be below that of the normal group. This data strengthens the argument that students with normal BMI have relatively more optimal and more consistent levels of basic movement skills than students with obese BMI in the full-day learning system.

Table 4. Comparison of basic movement skills

Basic Movement Skills	Regular School	Full-Day School
Mean	0,903	0,758
Minimum	0,72	0,51
Maksimum	1.00	0.944
Standar Deviation	0,056	0,094

Based on the **Table 4**, the average value (Mean) of basic movement skills in Regular Schools is 0.903, while in Full Day Schools it is 0.758. This shows that descriptively, Regular School students have higher basic movement

skills than Full Day School students. The standard deviation in Regular Schools is 0.056, while in Full Day Schools is 0.094. This shows that the variation in data in Full Day Schools is greater than in Regular Schools, meaning that Full Day student scores are more spread. The minimum and maximum values also show that Regular Schools have a range of 0.72–1.00, while Full Day Schools have a range of 0.510–0.944.

The development and improvement of basic movement skills is an important aspect at an early age. Basically, every child who develops normally has the potential to learn different types of movements, including more complex movements. Basic movement skills are formed through repetitive activities so that they become habits, as well as influenced by the experience and environment in which the child grows. The basic motion pattern consists of locomotor, non-locomotor, and manipulative motion, which are simple forms of movement (Yudaparmita, 2022).

Basic human movement skills include running, jumping, catching, and throwing. These movement skills are basically already possessed by early childhood, but still need to be fostered and developed in the school environment, in addition to other basic movement skills (Hendra & Putra, 2019). There are many factors that can affect the extent to which a child can master various basic movement skills, one of which is how often they are actively involved in various physical activities. (Oktarifaldi et al., 2024) With a full-day system that has more study time, it can potentially limit or reduce students' time for physical activity outside of class hours (Ningsih & Hidayat, 2022). Based on the results of the study, the involvement of Full Day Elementary School students in extracurricular activities tends to be lower than that of Regular Elementary School students. Students in regular schools are seen to be more and more diverse in participating in extracurricular activities that are physical activities, while in full-day schools most students are not involved in these activities. This condition indicates that the limited free time in the full day system has the potential to reduce students' opportunities to participate in structured physical activities outside of class hours, so that students' movement experience and frequency of movement exercises become more limited. These limitations ultimately have the potential to affect the development of students' basic movement skills.

The balance between physical activity and Body Mass Index (BMI) is essential to support optimal growth. According to research on the re-

lationship between physical activity and BMI in elementary school children, the results show that there is a relationship between physical activity and BMI in elementary school children. The study said that with low physical activity in children, at least 30 minutes every day or at least 3-5 days a week, will increase the potential for children to be obese or overweight (Setyani et al., 2021).

This is in line with the results of the study showing that there is a significant difference between the basic movement skills of Regular Elementary School students and Full Day Elementary School students. This is proven through the Independent Sample t-test with a value of $t = 7.58$ and $p < 0.001$, which means that the null hypothesis is rejected. Statistically, there is a noticeable difference between the two groups. Descriptively, the average value of basic movement skills of regular school students (Mean = 0.903) was higher than that of full-day school students (Mean = 0.758). These findings indicate that the learning system has the potential to influence the development of students' basic movement skills.

These differences can be attributed to the duration and pattern of student activities at school. In a full day system, longer learning time tends to be spent in the classroom, so students opportunities to do physical activities are more limited. In contrast, regular school students have more time outside of school hours which allows them to play and do physical activity freely. This is strengthened by the allocation of PE learning time at Full Day school which is only 3 JP (3×25 minutes) or equivalent to 75 minutes, so that there are relatively fewer opportunities for students to carry out structured movement activities at school. In contrast, in regular schools, the allocation of PE learning time is longer, which is 4 JP (4×25 minutes) or the equivalent of 100 minutes, which provides greater opportunities for students to engage in physical activities and exercise basic movement skills optimally.

In addition, children of elementary school age are included in the vulnerable group to nutritional problems. Nutritional problems that commonly occur in this age group include malnutrition, overnutrition, and obesity (Muchtar et al., 2023). The results of the study also showed that there was a difference in the distribution of Body Mass Index (BMI) between the two groups. In regular schools, the majority of students are in the normal BMI category (79.17%) with a very low percentage of obesity (2.08%). Meanwhile, in full-day school, there is a fairly high percentage of obesity (33.3%). This condition shows that full-day students have a tendency to have greater

weight problems than regular students. The high percentage of obesity in full-day students can be attributed to low physical activity and the possibility of a less active lifestyle.

Based on the results of research from Basic Health Research (Riskesdas) in 2018, the prevalence of obesity in children aged 5-12 years in Indonesia reached 8.8%. Children who are overweight tend to have difficulty moving, which can ultimately hinder their growth and development process (Hartono et al., 2023). The results of the analysis showed that basic movement skills based on BMI categories also showed that students with normal BMI tended to have better movement skills than students with obesity categories. In full-day school, it was seen that the median basic movement skills of students with normal BMI were higher than those of obese students. This shows a relationship between body composition and children's motor skills. Excess weight can affect balance, agility, and coordination of movements, resulting in low basic movement skills.

The results of this study reinforce that the education system and the physical condition of students (BMI) have a relationship with the development of basic movement skills. Schools with a full day system need to pay more attention to the provision of sufficient and structured physical activity so that students' motor development remains optimal. With a balance between academic and physical activities, it is hoped that students' basic movement skills can develop to the maximum without neglecting their health aspects.

CONCLUSION

Based on the results of the study, it can be concluded that there is a difference in basic movement skills between Regular Elementary School and Full Day Elementary School students. Descriptively, Regular School students have a higher average of basic movement skills than Full Day School students. In addition, based on the BMI distribution, Regular Elementary School students vary and the majority are in the normal category, while in Full Day Elementary School, there is a fairly high percentage of obesity, even though the majority are in the normal category. The results of the analysis based on BMI categories also showed that students with normal BMI tended to have better basic movement skills compared to students with obesity. Thus, the education system and BMI categories are related to the basic movement skills of elementary school students.

The suggestions that can be given based on the results of this research for schools, especially

those that implement the Full Day system, need to improve the quality and quantity of students' physical activity so that the development of basic movement skills is more optimal. PE teachers are expected to design more varied learning and adjust to the BMI conditions of students, especially for students in the obesity categories. In addition, parents are also expected to support children to stay active outside of school hours and encourage children to maintain a balanced diet so that BMI remains in the normal category, which can support the development of basic movement skills to the maximum.

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