

Gross Motor Skill Development in Jengka Primary Schools: A Comparative Analysis

Anis Syazatul Najwa Azlan¹, Nurul Diyana Sanuddin^{2*}, Norlaila Azura Kosni³, Mohd Zulkhairi Mohd Azam⁴, Nur Azimah Irdina Aziz⁵

¹²³⁵Faculty of Sports Science and Recreation, Universiti Teknologi MARA Pahang, Jengka Campus, 26400 Bandar Tun Abdul Razak Jengka Pahang MALAYSIA.

⁴Faculty of Sports Science and Recreation, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, MALAYSIA

Corresponding author: diyanasanuddin@uitm.edu.my

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ABSTRACT

Proficiency in gross motor skills holds significant importance for children to achieve a high proficiency in movement that involves the use of major muscle groups in different environment settings. Without suitable progress of fundamental motor skills in the duration of childhood stage, the success of sport-specific at the level of competition is still unreachable in the future. Thus, the objective of the research was to compare the level of gross motor development among school children in Jengka, Pahang. A cross-sectional approach was used to perform this study. This study involved the participation of 110 children from two distinct locations: rural and urban areas, with 50 from rural areas and 60 from urban areas. The tool used to assess the gross motor skill development levels was the Test of Gross Motor Development- Version 2 (TGMD-2). Two subtests in TGMD-2 include 6 skills in each subtest which are locomotor (gallop, leap, horizontal jump, hop, slide, run) and object control (catch, overhand throw, underhand roll, kick, striking a stationary ball, stationary dribble). The gross motor skill development levels were ranked based on both raw and standard scores according to its Gross-Motor Development Quotient (GMDQ). The Independent Samples T-Test was used to analyze the data. The results highlighted that there was a significant difference ($p < 0.05$) between the two groups. Rural children had higher mean and standard deviation (98.44 ± 11.391) compared to urban schools (89.90 ± 10.991) for GMDQ scores. The findings of the present study revealed that children in urban schools exhibited poor motor skill development levels compared with rural schools. The children might be affected by the environmental differences in their respective living areas as children living in rural areas tend to have better gross motor skills than those living in urban areas, which is believed to be due to spending more time outdoors and being more adapted to the demands of playing outside. The findings offer insights that physical education teacher can improve the quality in physical activities that would benefit the development of gross motor skills of children.

Keywords: Gross Motor Skill, Rural, Urban, School Children

INTRODUCTION

Children are at the most important stage of motor development since they are in the globalization era where the prevalence of electronic devices and digital entertainment would be the obstacles that they face to improve motor development. The importance of children's ability to have a good motor skill will enable children to interact with their surroundings actively (Capio et al., 2021). Children's experience and practice in various physical activities are required between the ages of 3 and 8 to achieve a high developmental level of competence in gross motor skills (Sgro' et al., 2017). Children are one of the appropriate age groups for assessing their growth and development using the appropriate tests that measure their degree of gross motor skills (Capio et al., 2021). Children who have an opportunity to engage in daily activities can affect the level of gross motor development and increase confidence to socialize among their groups of similar ages (Suppiah et al., 2019). Therefore, implementing the ability of gross motor skills in children's daily activity which enables the children to master it through practice and experience can encourage them to adopt physically active habits and active lifestyles that may persist into adult life (Hishamuddin Ahmad Aziz, 2015).

The children's ability to move is closely related to gross motor skills (GMS), which are considered as the initial components and crucial aspects of early children's movement capability for practicing beginner, intermediate, or advanced physical activities and sports participation (Sgro' et al., 2017). Gross motor skills involve the large muscle groups from the fine movement patterns involving the activation and production of smaller muscle groups (Webster et al., 2019). Gross and fine motor abilities are essential to a child's capacity to play and connect socially. This interaction can affect their social interaction with classmates in the future.

Children who have mastered gross motor skills will participate in physical activities and other recreational or sports activities (Hishamuddin Ahmad & Aziz, 2015). Adequate levels of gross motor skills encourage children to participate in regular physical activity, prevent diseases linked to weight status, participate in sports, and have a positive attitude toward leading an active lifestyle (Ward et al., 2018). A major or minor shift in motor functions will allow the children's growth to have a positive effect on their cognitive and motor development (Payne & Larry D. Isaacs, 2016)

The environmental factors such as rural and urban area provides children an opportunity to engage with physical activity which influence the motor skills (Syihab et al., 2021). Rural areas allow children to perform physical activity in natural landform whereas, urban areas allow children to perform physical activity using a limited space and fixed accommodation at their respective playground (Suppiah et al., 2019).

Gross Motor Skill of Children

Gross motor skills are the abilities of children to perform movements that require the coordinated engagement of large muscles group in the body (Sutapa & Suharjana, 2019). The gross motor skills are needed for daily and recreational activities where the children might experience an improvement to control the motor skills throughout their early childhood until adulthood (Adriyani, Iskandar & Camelia., 2022). The object control skills and locomotor skills are included in GMS. According to Tomaz, Jones, Bernstein, Twine, Kahn, Norris & Draper (2019), the body projection skills such as jumping and running are categorised as locomotor skills whereas the actions that allow the children to move while interact with any objects for sporting, recreational or physical activity are categorized a subject-control skills such as kicking a ball or batting. Gross-motor skill might show a person's ability to conduct general and specialised movements in order to engage in a physical activity or any activity (Jones et al., 2020). Previous research has shown the need for physical education teachers and parents to focus on the specific area of fundamental movement skills (Suppiah et al., 2019). The gross motor skills important to enable the children to participate fully in sports and physical activities with more efficient body movements (Haibach et al., 2019).

The development of gross motor skills can define as the change in motor behaviour over the lifetime and the processes that motivate the change whether it cause a progression or regression on the performance of gross motor skills (Burns et al., 2019). The gross motor skill development during childhood is referred to the achievement of the children to keep progress in improving the motor skills (Niemistö et al., 2019). Payne & Isaacs (2017) has stated that motor development as a change in movement and behaviour in human life. It is essential to keep up the children's performance to determine their motor development relative to their age. The assessment of fundamental movement skills (FMSs) as the basic elements of movement capability in children are crucial in the establishment of a healthy lifestyle into adulthood (Sgrò et al., 2017).

A sufficient level of competency in gross-motor abilities encourages children to engage in everyday physical activity (Sgro' et al., 2016). This is related with the level of proficiency in children's motor skills can likely to be associated with the participation of daily physical activities, exercise, recreational activities or sport specific activities during their adulthood (Syihab et al., 2021). Developing proficient fundamental movement skills (FMS), the basic building blocks for more complex and specialized movement skills and patterns, is essential for children's physical, cognitive and social development and for establishing a foundation for an active and healthy lifestyle (Hands & McIntyre, 2015).

The development of gross motor skill levels is linked with higher levels of moderate-to-vigorous recreational activity, exercise and physical activity (Silva-Santos et al., 2019). There is a previous study mentioned that the children who actively participate in physical or recreational activities are linked with the improvements in GMS which can lead to maintain an ideal weight and prevent disease that related with physical inactivity (Burns et al., 2022). An achievement of a healthy weight would lead to achieve the higher levels of gross motor skills. Moreover, GMS help the children to perform the simple to complex skills which involved during sport activities, control their bodies to easily execute a specific task, manipulate the skills with the environment accordingly and engaging in other recreational activities (Burns, Byun & Bruddeau 2019).

Environmental factors such as rural and urban with the existence of neighborhoods area, accessibility to public recreation spaces and infrastructure might impact children's gross motor skill development levels (Guseman et al., 2022). Rural population is described as "those who live in places that were not acquainted and undeveloped" which had stated by the Department of Statistics, Census of Population and Housing Malaysia (2010). Due to the environmental factor in the rural area which far from the fully packed building in the town, this area is close to a forest that is suited for cultivation and make the population in this area are more suitable to work as a farmer. According to Jovanović Todorović & Puškarić, (2019), a rural area is an area of land outside the densely populated areas in town or city. Furthermore, past study found that children from rural areas were more physically active than the urban population, which suggests that urban children are more prone to grow obese because they have less time to engage in sport or exercise. Hence, by assessing the gross of motor skill development, it can determine how often that a children participate in sports or physical activity by assessing the overall level of proficiency in gross-motor skills (Hodgkin et al., 2010).

According to the Department of Statistics (2011), individuals living in cities and towns, who generally work in businesses and offices, are classified as the urban population. Urban area is a location characterized by a high population density and an abundance of built environment elements relative to the surrounding countryside (Reatti et al 2019). Moreover, urban areas are characterized by a high popular density, easier access to medical, educational and health services as sports facilities and modern cultural among others (Mcbrien, Stewart & Ezati 2016). The daily activities of these two dwelling groups reveal the disparities between them, with rural residents engaging in greater activity than urban populations (Guseman et al., 2022). In terms of economics, rural populations typically depend more on cyclical agricultural products than urban populations, who have a variety of income sources.

Test of Gross Motor Development-2 (TGMD-2)

The TGMD-2 was introduced by Ulrich (1985) to provide a valid tool for assessing the level of competency in gross motor skills for children ages 3 to 10 in order to determine the potential for a developmental delay. Research has shown that TGMD-2 is valid instrument for worldwide to assess the level of gross motor development in children (Valentini et al., 2012). This test can be administered simultaneously to girls and boys aged 3 to 10 years old which suitable with the participants of this study aged 7 to 9 years old that includes in the age range of TGMD-2. The TGMD-2 is a frequently used and reliable instrument to assess the gross motor skills level in pre-primary and primary school children.

The skills included in TGMD-2 are mostly the most used movement when performing the physical activities. The previous study by Garn & Webster (2021) believed that the skills in Test of Gross Motor Development would enable the children to engage in extracurricular physical activity because the children will be able to apply these movements based on what has been acquired and through physical education. The TGMD-2 concentrates on gross motor skills under the statement that once the child masters these skills, they are prepared to learn how to use them in more sport-related activities that demanding the application of high proficiency of motor skills to be used (Gandotra et al., 2020).

Locomotor skills allow the children to move their body from one place to another while enabling them to navigate through space and it is a foundational skill for them to participate in daily physical activities, games and sports. There are six skills to measure the locomotor for gross motor skills including run, slide, leap, hop, gallop and horizontal jump. Object control skills are the skills that focus on the ability of the children to move while manipulating any objects such as ball, bat, racquet or any equipment that can come together when performing the skills. The skills that come along with object control are throw, catch, dribble, strike a stationary ball, kick and roll.

METHODOLOGY

Research Design

To assess the gross motor development levels among school children in Jengka, Pahang, based on rural and urban areas, a cross-sectional design was employed in this observational study. The two groups which were rural and urban presented as independent variable. The cross-sectional design is a study that is conducted at a single point in time. The data collected from different individuals and observe the variables without influencing it.

Sampling Method

The population in this study are school children aged between 7 to 9 years old from rural and urban schools in Jengka. The fishbowl technique was selected to determine which schools would be chosen from the 22 rural schools and 3 urban schools at Jengka for participant recruitments. In order to detect an effect size of Cohen's $d = 0.8$ with 95% power ($\alpha = 0.05$, two tailed), G*Power suggests that 84 total participants are needed. The largest effect size of interest was set to $d = 0.8$ based on the study from (Sgrò et al., 2017). The consideration of 20% dropout will be taken into account and the total sample size needed is 101 (Rural = 51, Urban = 50).

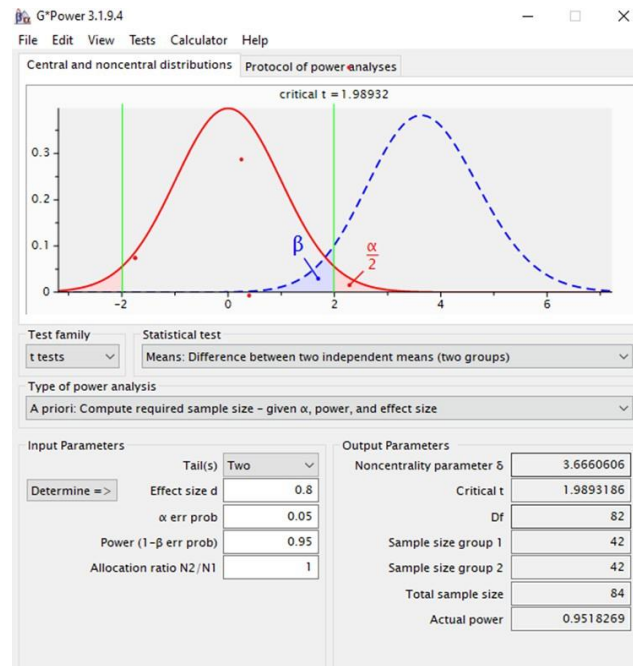


Figure 1: G*power Sampling Result

Testing Design

Instrumentation

Body Mass Index (BMI)

The Body Mass Index (BMI) as Kg/m² was used as an anthropometric measure. The height (kg) and weight (m) of the participants were taken and used for the calculation to estimate the body fat amount.

Test of Gross Motor Development-2

The TGMD-2 has been used to measure gross motor development among school children aged 7 to 10 years old. It was developed by Ulrich (1985) to assess the developmental level of children. The TGMD-2 test will be tested on the subjects starting with locomotor skill subtests and object control subtests. There will be two trials for each subtest and the scores will be measured according to the TGMD-2 manual guide to assess the gross motor skill levels using the GMDQ based on the raw and standard scores.

Data Collection

Once approved by the Research Ethics Committee of the Faculty of Sport Science and Recreation (UiTM Pahang), data collection will commence in May 2023 and continue with statistical analysis by June 2023. A permission letter will be provided to the headmasters of the selected schools in Jengka, and an informed consent form will be distributed to the participants' parents to inform them about the study's purpose and to obtain permission for their children's participation. The TGMD-2 assessment will begin after parental consent is obtained. Results or raw scores will be calculated and converted into the TGMD-2 scoring system, including the standard score and Gross Motor Development Quotient (GMDQ), before the data analysis.

Safety Procedures

The safety procedures in this study are to ensure that the participants will be tested in good condition. The procedure is start with gathering the subjects and briefly clearly about the test. The consent form will be distributed to the participants. All of the subtests in TGMD-2 need to be explained to give a clear vision of the test. In the meantime, if any participant cannot commit to the test, having an illness or disease, they will be excluded from performing the test. Therefore, a clear demonstration should be given so that the participants can get to know about all the skills.

Data Analysis

In this study, the data analyzed by using “Statistical Package for the Social Sciences” (SPSS) version 28.0 (190). If the data is identified to be normal distribution, Independent T-Test will be used to compare the differences of gross motor development level between rural and urban school children. However, if the data is non normal distribution, the Mann-Whitney U Test will be used to determine the differences between both groups. The descriptive statistics for all variables are included frequencies, means $\pm$ standard deviation ($\bar{x} \pm SD$). The variables are analysed within two independent variables, children in rural areas and children in urban areas in the acquisition of gross motor skills. From the SPSS analysis, $p < 0.05$ will be used to determine the significant difference for all the comparisons in this study. This procedure will indicate whether the hypotheses is accepted or rejected.

RESULT AND DISCUSSION

Results

In this section, all the data collected from both rural and urban school by using TGMD-2 will be discussed in detail. The IBM Statistical Package for Social Science (SPSS) software version 28 was used to analyze data that have been collected. The data was presented in mean and standard deviation (Mean $\pm$ SD). The variables that measured in this study was associated with the research objective which is to determine gross motor skill development level of primary school children.

Table 1 shows the demographic data for all related variables in this study. There was no missing data and value identified. The frequency of children in rural schools was 50, which was 45.5%, and for children in urban schools was 60 with 55.4% of overall participants. The male children in rural schools were equal to the female children (N=25) for both genders with 50% each, and for urban schools, it is reported that the frequency of male children was 33 with 55%, and female frequency was 27 with 45% from 60 children. The data in the table statistically reported the age mean and standard deviation for rural (7.90 ± 0.63) and urban (8.66 ± 0.47) schools.

The mean and standard deviation for BMI were shown in the table for rural schools (16.997 ± 4.0718) and urban schools (19.010 ± 4.8218). The highest percentage in rural schools was 62% for the normal category (N=31) followed by 22% for the obese category (N=11), 10% for the overweight category (N=5), and 6% for the underweight category (N=3). The highest percentage of BMI for urban schools is 51.7% for the normal category (N=31), followed by 25% for the overweight category (N=15) and 23.3% for the obese category (N=14). The mean and standard deviation of the Gross Motor Development Quotient (GMDQ) Level for rural school (98.44 ± 11.391) and urban school (89.90 ± 10.991) was shown in the table. It is statistically reported that the highest percentage in rural school was 50% for average category (N=25), followed by 24% for below average category (N=12), 22% for above average category (N=11) and both poor and superior category got 2% and 1 frequency each. Meanwhile, the highest percentage of GMDQ Level for urban school was 48.3% in average category (N=29), followed by 26.7% for poor category (N=16), 21.7% for below average category (N=13) and 2% for above average category (N=2).

Variables (School)	Frequency (n)	Percentage (%)	Mean±SD
School			
Rural	50	45.5	
Urban	60	54.5	
Gender			
(Rural)			
Male	25	50	
Female	25	50	
(Urban)			
Male	33	55	
Female	27	45	
Age			
(Rural)			7.90±0.63
(Urban)			8.66±0.47
BMI			
(Rural)			
Underweight	3	6	
Normal	31	62	16.997±4.0718
Overweight	5	10	
Obese	11	22	
(Urban)			
Normal	31	51.7	
Overweight	15	25	19.010±4.8218
Obese	14	23.3	
GMDQ Level			
(Rural)			
Superior Above	1	2	
Average	11	22	
Average	25	50	98.44±11.391
Below Average	12	24	
Poor	1	2	
(Urban)			
Above Average	2	3.3	
Average	29	48.3	89.90±10.991
Below Average	13	21.7	
Poor	16	26.7	

Table 1. Demographic Data

The independent samples t-test was conducted to determine whether the GMDQ score differ between rural and urban schools. The results in Table 2 reveals that the rural school had higher mean and standard deviation (98.44±11.391) compared to urban school (89.90±10.991). Table 2 shows an Independent Sample t-test that was conducted to compare the mean score between GMDQ of rural and urban school. Based on the Levene's Test for Equity of Variances, the p-value was 0.481 which was not statistically significant ($p > .05$) and bigger than 0.05 that refers to Equal variances assumed. The test statistic in Table 2 shows the Sig. (2-tailed) value was < 0.05 (p-value = 0.001). Hence, rural school ($M = 98.44$, $SD = 11.391$) reported had significantly higher GMDQ than urban school ($M = 89.90$, $SD = 10.991$), $t(108) = 3.991$, $p < .05$.

	School	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2- tailed)
GMDQ	Rural	50	98.44	11.391	1.611	3.99	108	0.001**
	Urban	60	89.90	10.991	1.419			

* $p < 0.05$, ** $p < 0.001$

Table 2. Group Statistics on Rural and Urban

Discussions

The objective of the study was to determine if there were differences for gross motor development level between primary school children in rural and urban areas. The cross-sectional design of this study required the children to perform two types of subtests that included in TGMD-2 with six skills each of the subtests. The used of standard scores are important to compare the differences in gross motor skill development level across age and sex. The gross motor skill development levels were differentiated from GMDQ score that was calculated from the total of standard scores. Within the samples from the current study, the analysis revealed that there were significant differences between the two groups of children in rural and urban area. According to an Independent Samples T-Test results, children in rural school tend to have higher GMDQ that indicates their level of gross motor proficiency is higher than children in urban school. Despite both rural and urban children has the same highest category which is average category, but the difference frequency of poor and superior category between these groups can indicate that children in rural school has better gross motor development level than children in urban school.

The acquisition of gross motor skills is most prominent between ages 5 and 7 (Goodway, Ozmun, & Gallahue, 2019). The previous research stated that the results revealed that the children in urban school showed a lower level of gross motor development compared to children in rural school (Suppiah et al., 2019). Since the aim of the previous and current studies is similar, there are five out of the twelve skills included in the TGMD-2 that showed significant differences between rural and urban schools. The skills included gallop, run and slides for locomotor skills whereas catch and underarm roll for object control skills. In spite of there are no significant differences between the rest of the skills, urban school only obtained one skill that was higher in mean. The frequency of gross motor skill development level from GMDQ in the results of the study showed that only rural schools got two children who achieved very superior category of gross motor skill development level. The frequency of gross motor skill level was similar with current study which is only children in rural schools obtained superior category under GMDQ classification of motor skill development level. However, one of the reasons there is no children who get to achieve very superior category in the current study is because the sample size was smaller than the previous research by (Suppiah et al., 2019).

In addition, the characteristic of the previous study also has difference since that study was comparing the difference between gender among all participants. According to past study posits that children residing in rural area are likely to exhibit an elevated proficiency in Fundamental Movement Skills (FMS) owing to the close proximity of outdoor settings that facilitate a conducive developmental environment for the acquisition and refinement of FMS (Suppiah et al., 2019). Moreover, the accessibility of outdoor play spaces for children in rural area may serve as a causative factor in influencing the results of this current study.

The findings in current study that shows the differences between gross motor skill development level of children in rural and urban areas can be related with the opportunity that the children obtained to perform their daily activities. In rural settings, the inherent natural landform such as unfixed open spaces, flexibility on accessing the natural equipment or tools and less inhabited offers a conducive environment that fosters

opportunities for children to enhance their balance, coordination, and endurance. On the other hand, urban areas typically feature children's playgrounds equipped with fixed equipment situated in confined open spaces, which afford opportunities primarily for the development of strength and coordination (Suppiah et al., 2019).

Children in rural areas are more physically active than those in urban areas, which could affect both their motor skills and physical fitness (Adriyani et al., 2022). Moreover, it was examined the potential implications on the development of motor skills and components of physical fitness such as cardiorespiratory fitness level and agility that effects from the different living area on primary school children (Adriyani et al., 2022). The researchers of the previous study claimed that there were significant differences in cardiorespiratory fitness and motor coordination between rural and urban children but not in agility skills since both areas got almost similar result. The strength of the previous study was conducted with a large sample compare to this current study. During the research timeline, the recruitment of participations faced a situation where the Ministry of Education (MoE) Malaysia suspended all activities outside the classroom and advised schools not to expose students to participate in any activities that require close physical interactions and prolonged gathering in one place. This is because of the hot weather is at warning level 2, where the maximum daily temperature surpasses 37 degrees Celsius for three consecutive days (Ministry of Education Malaysia, 2023).

Although the results were similar between rural and urban areas in both the study by Adriyani et al. (2022) and the current study, the motor concepts used in the two studies differ slightly. Motor coordination and motor skills are related but connected to each other. Motor coordination is the capacity to perform smooth, accurate, and efficient movements involving several body components functioning in unison. It means combining sensory information and muscle motions in order to complete tasks with precision and fluency. The method used was different where the previous study used The Körperkoordinationstest Für Kinder (KTK) test in accessing the motor coordination which consisted of four subtests. Besides, the KTK subtests do not have so much different than TGMD-2 that has been used in the current study. The KTK subtests have hopping height skills that similar with leap and horizontal jump in locomotor skills of TGMD-2 and both of the tests have sideways movement where the participants need to move sideways. The tests also use the motor quotient to classify the level of their motor coordination or gross motor skills. The frequency between both studies showed a worrisome trend of motor development level. None of the participants in this study got highest classification which are 'Very superior' for TGMD-2 and 'High' in KTK test. Recognizing this trend, it becomes crucial for responsible person to acknowledge the research findings and implement the suitable interventions during early age of children or preschool years.

Motor coordination serves as a predictive factor for physical activity levels in children and its proficiency significantly influences the maintenance of an active lifestyle during adulthood (Adriyani et al., 2022). The researchers claim that active travel of rural children who is walking or biking to go school or back from school exerts a greater impact on the physical activity levels. To promote the enhancement of children's motor coordination from the early age, it is essential to implement a structured sports program that emphasizing complex skills. Encouraging their active participation in diverse physical activities and limiting passive pursuits, which collectively serve as effective strategies for fostering motor coordination development and mitigating excess body weight. There is previous study from (Putri et al., 2020) that examined the relationship between the motor development of children using Ages and Stages Questionnaire (ASQ) and BMI in rural area. In current study, BMI of the participants was determined in demographic data. The norm of the BMI for these children was taken from Ministry of Education Malaysia according to the Standard Guidelines for BMI Measurement for Malaysian Schoolchildren Aged Five to Nine Years (BMI 5-9Y). Rural school got a better mean score of BMI compared to children in urban school. Both of the groups got highest percentage in normal category. However, the second highest of BMI was obese category. Several studies have reported evidence indicating that obese children demonstrate lower levels of gross motor skill performance in compared to their peers with normal BMI (Hishamuddin Ahmad & Aziz, 2015). Unfortunately, there are studies that shows contrast results which are there is no significant correlation between BMI and children motor development (Putri et al., 2020)

According to the previous studies the differences of the gross motor skill development level among three groups which are urban, rural and indigenous groups (Zawi et al., 2022). This study accessing the gross motor development levels using similar testing with this current study which is TGMD-2. One of the reasons the researchers from this past study differentiate the fundamental motor skills between these three groups because there are common perceptions that rural and indigenous children lead more active lifestyles in contrast to their urban peers that probably contributing to the increasing level of proficiency in gross motor skills. Nevertheless, the urban group obtained the lowest mean for both object control and locomotor skill. The overall findings of the past study are contrast with the current study where the comparison of gross motor development levels among rural, urban and indigenous groups did not achieve statistically significant difference. The characteristics of participants that were selected in the past study are none of them have ever participated in a formal sports training program and only exposed with physical education sessions in school. The difference in characteristics of participants from both past and current study might be one of the reasons where the results are contrast from each other.

There is previous study claimed the number of studies that examined the gross motor skill proficiency of preschool children from low to middle income country (Tomaz et al., 2019). The researchers come with the study that determined the gross motor skill proficiency on preschool children in urban high-income, urban low-income and rural low-income settings and differ the gross motor proficiency between the three groups. The results of this past studies related with the current study which indicated that children from rural low-income outperformed two other groups. The past study used similar test (TGMD-2) to access the gross motor development levels among the groups. It was stated that rural low-income children obtained the better results in term of gross motor skill proficiency is related with the time spent for the children to engage with moderate to vigorous-intensity physical activity. This shows that the important of the parents in urban and rural area to take up responsibility to ensure that the children take part and participate in physical activities daily since the fundamental of gross motor development need to be obtained by practice and experience.

CONCLUSION

In summary, the study found that primary school children in Jengka, Pahang, exhibited different levels of gross motor development, with rural children showing better results than their urban counterparts. This suggests that environmental factors and school involvement in promoting physical activity play a significant role in motor skill development. The findings highlight the need for targeted interventions for children with lower motor skills or higher BMI, but the study's small sample size and limited area mean the results may not be widely applicable. Future research should use larger samples and explore a broader range of factors affecting gross motor development. Additionally, more studies in Peninsular Malaysia are recommended to better understand these differences across larger populations. Further research should also focus on detailed data about participants' physical activities and characteristics to identify ways to improve motor skill development.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHOR'S CONTRIBUTIONS

All authors contributed equally to this work and approved the final version to be published.

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