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Measuring Gross Motor Development Quotient Scores Among Rural, Urban, and Indigenous Elementary Schools' Students

[*1]Borhannudin Abdullah, [2]Siti Salina Mustakim, [3]Suphasara Supranie a/p Airak, [4]Ang Xiao Wen, [5]Hon Jia Sheng, [6]Arni Nurfatin Arpa

Abstract--- *The purpose of this study was to identify differences in the scores of students' gross motor development from different school locations. This study was an ex post facto study involving 69 respondents. The Test of Gross Motor Development (TGMD-2) instrument was utilized to obtain raw data. 12 skills (locomotor: 6, manipulative: 6) were analyzed based on the performance criterion to obtain the raw scores of the study. The raw scores obtained were transcribed to obtain Locomotor Standard Scores (LSS), Manipulative Standard Scores (MSS), and Gross Motor Development Quotient (GMDQ) scores. The scores were analyzed descriptively to obtain the mean and standard deviation of the variables. ANOVA analysis was performed to compare the mean scores on the development of students' gross motor skills according to different school locations. Descriptive analysis showed that students in rural school (M = 98.4348, SD = 10.268) had the highest mean for GMDQ compared with urban school (M = 76.5217, SD = 11.102) and indigenous school students (M = 85,000, SD = 5.427). Pupils in urban schools get the lowest scores in the developmental stages of motorcycle abuse. There was a significant difference F (18, 50) = 1.790, p = 0.05 for GMDQ scores between urban, rural, and indigenous schools. Post hoc analysis using Games-Howell was performed to see more clearly the differences between groups. The mean difference in mean scores occurred between rural and urban schools with a mean value of 21,913 and a mean difference value of p = .001 was similar to the difference between rural and indigenous schools with a mean of 13.434 and a mean difference value of p = .001. Whereas, the mean difference between urban schools and indigenous schools was low with mean value of 8.478 and significant difference p = .007. Findings indicated that there is a significant increase in motor development for each student according to the location of the school, but their development is not consistent with chronological age. The GMDQ score shows that the gross motor development of all students in different schools is still below average.*

Keywords--- *Gross Motor Skills, Locomotor Skills, Manipulative Skills, Indigenous People.*

I. INTRODUCTION

Physical development during childhood is very important to control. At this time, various motor skills will be learned and improved to lead a better life. Motor learning skills are also considered to be a person's achievements in overall motor development. This achievement is based on the acquisition of motor skills and variables that will enhance or hinder the ability to practice motor skills (Haibach et al., 2011) such as individual skills, training, and experience. According to Sabrie Hussein (2007), motor skills refer to the movements of the muscles or body movements needed to

Faculty of Educational Studies, Universiti Putra Malaysia.
****Corresponding Author Email: borhannudin@upm.edu.my***

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perform a successful exercise. Behavior of human movement is essential, and an environmental requirement. It also includes the input and understanding acquired from learning.

Magill (2010) has built a method for classifying existing motor skills with specific abilities based on the muscle group size needed to perform the ability. There are two categories of motor skills - gross motor skills and fine motor skills. Gross motor skills are movements involving a group of muscles which are large or significant in the development of motion. Fine motor skills are those that include small or small groups of muscles that are hard to see, like finger sewing. Besides, according to Gabbard (2004), motor development in human life is divided into several stages to promote the process of recognizing better and more complete changes, namely pre-birth, newborn, infant (early and late childhood), adolescent and adult. Children aged between two and seven are in the early stages of basic movement (Gallahue & Ozmun, 2002). In these children the basic movement skills are the continuation of skill growth at infant level. Children at this level are very interested in exploring and playing with the potentials and abilities of their bodies.

Specific motor skills are simple motions requiring a mixture of two or more movements of the body and measurable gestures. There are three main types of movement skills according to Gabbard (2008), namely locomotive, non-locomotive, and strategic movement. The body shifts from one stage to another during locomotive movement such as walking, running, skipping, galloping, and sliding. Nonetheless, it is a stabilization movement for non-locomotive movements, in which the axis of the body rotates around a fixed point such as bending, stretching, turning, and lifting. Manipulative motion refers to the power which is transferred to an object or obtained from an entity such as the tossing, catching, running, running, and kicking skills. Indirectly, these basic movement skills improve individual interaction by understanding their capacity, desire and need through motor, cognitive, and social skills. Motor skills also play an important role in the social and emotional functioning of children and can affect the quality of life and well-being (Houwen et al., 2008). If the child's movement is restricted it will not improve the child's social and emotional functioning. Children will become passive which will in turn impact the quality and well-being of their lives. The motor skills are closely related to movement. Normal children undergo very dramatic rates of development of motor skills as they age. Motor development study shows that motor behavior changes are influenced by biological systems and environmental factors (Gabbard, 2008). Changes in this context usually mean observing growth, which is the change in size and the evolution of functional changes over time. The progression of stages of motor growth is an important factor in the actions of children whether they are in urban, rural or indigenous schools.

The metropolitan region is a gazette region and the surrounding area is adjacent to it. These two combined areas have a population of at least 10,000 and 60 per cent of the population in Malaysia. Rural areas are where the bulk of the population engages in farming. Agricultural operations include all operations such as trapping, harvesting, marine animal breeding, forestry, and logging. One example of Malaysia's rural areas is the Sarawak Pakan. While, indigenous people are basically a minority group in Malaysia, recognized as the earliest indigenous people to occupy the Peninsula of Malaysia. The term "Indigenous People" and subsequently "indigenous people were used in the emergency period between 1948 and 1960 by the British for the purpose of persuading indigenous peoples to help the government fight communist threats (Nicholas, 2003). The majority of them live in forests and still practice traditional ways of life that are heavily influenced by the environment and heritage practices of their ancestors. Children are natural persons have a good level of physical fitness, but the level of their gross motor development is still at the level of the ground (Asraff

Faculty of Educational Studies, Universiti Putra Malaysia.
**Corresponding Author Email: borhannudin@upm.edu.my*

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& Halijah, 2019). Motor skills are acquired in early stages of children's development and their development matures with their age. There are several factors that influence children's motor development. These include factors of residence (Aye et al., 2017), physical amenities (Azlan & Arifin, 2015) and fitness level (Syukran et al., 2013).

The factor of residence in the study (Aye et al., 2017) shows that there is a significant difference in the level of development of children's motor skills. Participants in the study were from urban and rural areas. Children from urban areas perform better than rural children in manipulative skills. This is because schools in urban areas are provided with more facilities than rural areas. Several studies have been conducted to examine the relationship between residence (urban or rural) and physical fitness among adolescents and children around the world, including the United States, Turkey, Switzerland, Cyprus, Greece, Mexico, Australia and Oman. The findings from these studies indicated that the results are inconsistent (Syukran et al., 2013).

Furthermore, factors influencing physical health also influence the motor development of children. Study by Azlan and Arifin (2015) found that a shortage of facilities and fields of sport was a major obstacle to the introduction of physical education in indigenous schools. The complete facility would therefore allow the children to engage actively in the teaching of physical education or physical activity. Physical education will help develop the ability of the students through physical, social, emotional and cognitive activities (Kilue & Muhamad, 2017). Children who engage in physical activity display improved results in motor skills (Niemistö et al., 2019). This finding is supported by Haga's research in 2008, which recorded a substantial association between motor ability and physical fitness.

With chronological age, the gross motor skills of children will grow sequentially (Ulrich, 2000). Many researches have administered to assess the disparity in children's gross motor growth in terms of age, school districts and the gap between the Malays, Chinese and Indians (Amri et al., 2012). Additionally, motor activity studies for children in urban and rural areas are regular (Singh & Koh, 2018). Next is the disparity between the pre-school and preschool stages. Fewer studies have been carried out in Malaysia on the disparities between urban, rural, and indigenous schools. The goal of this study was to find out the following: (i) to measure the rate of development of gross motor skills (GMDQ) among urban, rural and indigenous school children and (ii) to measure the difference in gross motor development score (GMDQ) between urban, rural and indigenous school children.

III. METHODOLOGY

The nature of this analysis was ex-post facto, since it did not randomly identify the sample or research group. The research carried out were studies of locomotive abilities and psychological abilities. Researchers may also classify the level of gross motor development in the form of the Gross Motor Development Quotient (GMDQ) score via this process. The respondents for the study comprised of 69 children (urban schools: 23, rural schools: 23, indigenous schools: 23). Girls and boys formed the respondents.

Policy evaluation are most often the assessments of a single instrument in a specific implementation context (Mitchell et al., 2019). In producing this report, Gross Motor Development 2 (TGMD-2) alpha 0.69 test by the Cronbach for 12 ability tests (locomotive skills = 0.46, manipulative skills = 0.64) was used as a test tool for selected sampling subjects. The skill level and performance of the children's motorcycle have been tested on the basis of each subject's chronological age.

Faculty of Educational Studies, Universiti Putra Malaysia.
**Corresponding Author Email: borhannudin@upm.edu.my*

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The TGMD-2 instrument measures 12 basic skills and is divided into six locomotive skills (sprint, throttle, sideways, long jump, one-leg jump, gallop) and six manipulative skills (catching, kicking, throwing balls, rolling balls, rolling ball, hit the ball, bounce the ball). Each locomotive and manipulative skill has its own set of criteria. If the criteria are met, then a single score will be given and a blank score if the criteria cannot be met. Raw data is the sum of the scores obtained from each sub-test performed on the criterion of locomotor skills and manipulative skills. It may indicate the level of gross motor development of each school studied by location, from the total scores resulting from these 12 skills.

The researcher must have adequate resources and correct position on the data collection day in the process of carrying out the study. A brief briefing on the testing process was given to five research assistants at the beginning of the data collection process, so that each instruction and task could be clearly understood and the process of correctly setting up the test station and camera location. Before the test, 69 respondents were required to fill out a personal information form containing the following information: name, date of birth, gender, test date, and guardian consent by signing the name and signature of the guardian. Each respondent shall carry out all tests at each designated testing station.

A demonstration by the teacher should precede the process of performing this rough motor skills test, so that the task that the respondents needs to perform can be achieved with the proper ability. After that, the training session starts applying all the locomotive skills before transitioning to the training of manipulative skills. It records every movement of skills performed by the subject. The researchers will then analyze the video recording after completing all the tests to obtain a raw score. The video footage from the camera was transferred to computer and stored in a folder based on the location of the school. When all the raw scores have been collected for the locomotive and object control exams, they must first be translated to standard scores to determine the achievement of gross motor skills for children. After converting the raw scores for both tests to standard scores, all standard scores must be applied to obtain the quotient value of the Gross Motor Development. Then, they will assess the level of motor skills of students (Table 1) if they are Excellent, Good, Average, Low, Very Low, Weak, or Very Weak.

Table 1. Gross Motor Development Levels

Descriptive Assessment	*Gross Motor Skills Standard Score*	*Score Percentile*
Excellent	>130	99th
Good	121-130	92th — 98th
Average	111-120	76th — 9Ith
Low	90-110	25th — 75th
Very Low	80-89	10th — 24th
Weak	70-79	2th — 8th
Very Weak	<70	<1th

III. RESULTS AND ANALYSIS

The findings of the study are described in accordance with the objectives of the study.

(i) What is the gross motor development score (GMDQ) score of urban, rural, and native-school students?

This analysis aims to determine the level of motorcycle development among students from urban, rural and indigenous schools. Descriptive methods generate mean (M) and standard deviation (SD) values based on the Gross Motor Development Quotient (GMDQ) score. According to Table 2, the overall mean for the GMDQ score was (M = 86.6552, SD = 12.888). Rural schools (M = 98.4348, SD = 10.268) scored the highest on GMDQ scores compared to

Faculty of Educational Studies, Universiti Putra Malaysia.
****Corresponding Author Email: borhannudin@upm.edu.my***

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urban (M = 76.5217, SD = 11.102) and indigenous schools (M = 85,000, SD = 5.427). This shows that urban schools have the lowest GMDQ scores compared to GMDQ scores for rural and indigenous students. This finding also shows that rural school students achieved average levels followed by indigenous schools students that achieving below average, and weak achievement for urban school students based on descriptive ratings for GMDQ. Overall, the achievement of gross motor development (GMDQ) levels between urban, rural, and indigenous schools was below average.

Table 2. Descriptive statistics of overall GMDQ scores for each school

School	*N*	*Mean*	*SD*	*Descriptive Rating*
Urban	23	76.5217	11.102	Weak
Rural	23	98.4348	10.268	Average
Indigenous	23	85.0000	5.427	Below Average
Total	69	86.6552	12.888	Below Average

Notes: N= Respondents, GMDQ= Gross Motor Development Quotient

(ii) Is there a difference in GMDQ students' scores from urban, rural, and native schools?

Based on the descriptive analysis in Table 2, the mean GMDQ score for rural schools was highest compared to the other two schools with values (M = 98.4348). According to Table 3, there was a significant difference F (18, 50) = 1.790, p = 0.05 for GMDQ scores between urban, rural, and indigenous schools. Because there are significant differences, then group comparative analysis should be performed.

Table 3. Inference Analysis for GMDQ scores using the ANOVA

	Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
Between Groups	18.024	18	1.001	1.790	.05
In Group	27.976	50	.560		
Total	46.000	68			

Post hoc analysis using Games-Howell was conducted to see more comparisons between groups. Games-Howell analysis was used for homogeneity test of variance using Levene Statistic to determine significance (p = 0.005).

Table 4. Post hoc analysis of GMDQ scores using Games-Howell

School (I)	*School (J)*	*Mean Difference (I-J)*	*Std. Error*	*Sig.*
Urban	Rural	-21.91304*	3.15333	.000
	Indigenous	-8.47826*	2.57678	.007
Rural	Urban	21.91304*	3.15333	.000
	Indigenous	13.43478*	2.42176	.000
Indigenous	Urban	8.47826*	2.57678	.007
	Rural	-13.43478*	2.42176	.000

Referring to Table 4, the GMDQ scores of the three groups of students in different locations showed significant differences between them. The mean difference in mean scores occurred between rural and urban schools with a mean value of 21.913 and a mean difference value of p = .001 was similar to the difference between rural schools and native schools with a mean of 13.434 and a mean difference value of p = .001. Whereas, the mean difference between urban schools and indigenous schools was low with mean values of 8.478 and significant difference p = .007 at the same time showed that there was a significant difference in GMDQ scores between the three different schools of location.

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****Corresponding Author Email: borhannudin@upm.edu.my***

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IV. DISCUSSION

The acquisition of rough motor skills is a gradual shift in the conduct of movement and occurs during the course of human life (Gallahue & Ozmun, 2006). Rough motor skills are learned early in infancy, and those skills are matured in their lifetime, according to Asraff and Halijah (2019). Mastery of motor skills is highly important in the growth and maintenance of early childhood. Daily work of children depends on the degree to which their motor skills are mastered (Aaron et al., 2015). The findings of this study discussed the problems posed in improving the motor development of 9 to 10 year old urban, rural and indigenous schools, and the disparities in the development of motor skills for children between different schools.

Based on an analysis of the developmental stage of gross motor skills involving 69 children from urban, rural and indigenous schools, the results indicated that the mean value of the production of rural school locomotive skills is higher than that of the indigenous school children. That may be due to living environment factors. Life on the countryside is different from city life. In rural areas the village life pattern is still practiced by children. They always go out to play, no matter the time, and play a variety of games for children. Because of space limitations and dangerous environments this problem is distinct from that of children in urban areas. The area of physical activity also influences the development of children's motor skills, especially locomotive skills, according to Chow and Louie (2013). Native school kids also show low performance in motor skills as opposed to rural schools. This may be due to the unavoidable environmental factors, such as the poorly exposed sample with checked tough motor skills (Singh & Koh, 2018). As a consequence, when children see the example just before the test they may have low scores.

Additionally, it was found that the mean value of the GMDQ score was substantially higher for rural school children than that of urban and indigenous school children. In all three schools of this region, according to Table 3, there was a significant difference in GMDQ scores among children. These findings contradict the results of a study conducted in Kelantan and Johor by Asraff and Halijah (2019), in which there were no substantial differences in scores among children of GMDQ Orang Asli aged 10 years. The GMDQ Standard Score (Ulrich, 2000), referring to Table 2 indicates that rural children are in the normal (normal) group. In line with the research by Singh and Koh (2018), rural school children aged seven have greater motor skills growth than urban schools. Whereas in the lower average group are the native school students. The findings of this research are consistent with the research by Ariff and Ibrahim (2017), which indicates that the motor skills of seven, eight, and nine year olds are poorly developed.

The growth of rural motor skills for rural school children is said to be in normal development, while indigenous and urban school children are experiencing weak motor development. The findings of this study support the findings of previous studies which show that the level of motor skills of children is still low. A research by Singh and Koh (2018) shows that the seven-year-olds also have motor development issues. In the book of Sports Studies in Malaysia (Soh et al., 2014), Borhannudin, Saidon Amri, Kok and Aris Fazil also reported that the level of motor skills for children in Malaysia is growing, but not at a proper chronological age. According to them, the propensity for developmental failure was also affected by the lack of sufficient preparation and education provided in the Physical Education curriculum. It triggers a lack of adequate development of gross motor skills such as running, jumping and others. In fact, according to his chronological age the child cannot master the appropriate motor skills.

V. CONCLUSION

Faculty of Educational Studies, Universiti Putra Malaysia.
**Corresponding Author Email: borhannudin@upm.edu.my*

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Overall, as compared to indigenous and urban schools, rural school children achieved average and better results. Indeed, the findings of this study aid teachers, parents, and institutes involved in the identification of early childhood talent for polishing and relegation to suitable sport fields. The creation of children's motor that are not of chronological age would have **a** detrimental impact on their everyday lives. For example, children who fail to master a motor skill effectively prevent children from engaging in the sports or physical activity they enjoy (Singh & Koh, 2018). While, it is true that the development of rough motor skills is affected by a variety of factors. Previous studies have also shown that the degree of gross motor development can be enhanced by overcoming constraints, if we could apply Dynamic System Theory in formulating the program to develop rough motor skills for them.

Hence, some suggestions are listed to ensure that children master motor skills according to their stage of development. Above all, teachers need to incorporate instructional strategies and activities in order to involve children in activities. To develop the physical abilities of students, teachers need to think creatively and objectively in order to enhance student participation in Physical Education. Teachers will need to improve instruction to include consistency to motivation in accordance with the concepts of children's motor development, from basic to more complex. Repeated training and moving from basic to difficult tasks will help improve motor skills for children. To apply it in teaching and learning or in the classroom, teachers who are responsible for teaching subjects in specific Physical Education need to acquire knowledge and experience relevant to the development of gross motor skills. An instructor could not teach children a step-by-step approach without in-depth expertise based on the right criteria of mastering the motor skills.

Teachers are less likely to get exposure to TGMD exams, especially teachers in elementary school. Where the TGMD test is not applied, the level of motor skills in children could not be assessed and identified at an early stage. This leads students who have trouble with the delay in motor skills to not be able to perform activities to develop their motor skills. Accordingly, in the early stages of education, the appropriate parties will implement the TGMD test to gage the level of motor skills for children while uncovering possible abilities for children in the field of sport. Motor growth and creation is a cycle that is ongoing. The government, teachers, and especially Physical Education teachers and parents should therefore play a role in their respective contexts to ensure that children achieve a level of gross motor development in line with their chronological age and contribute to the success of the country through the active development of sports.

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