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<https://ejournal.upi.edu/index.php/penjas/article/view/21642>DOI: <https://doi.org/10.17509/jpjo.v5i1.21642>**Early Childhood Motor Development and Body Mass Index:
A Demography Study of Children Aged 4-5 Years in Rural Area****Wulandari Putri***, Mesa Rahmi Stephani, Gano Sumarno

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Article Info*Article History :**Received October 2019**Revised October 2019**Accepted Desember 2019**Available online April 2020**Keywords :**Body Mass Index, Fine Motor Skill,
Gross Motor Skill, Motor Development,
Socioeconomic Status***Abstract**

A child motor development and body mass index are determinant aspects yet important predictors for other aspect of development. However, both of them are also influenced by other factors, including the parents' socioeconomic status. Therefore, this study was aimed at finding out the relationship between parents' socioeconomic status with the children' motor development and body mass index, especially for the children living in rural area. The study was an ex-post facto study. The study used Ages and Stages Questionnaire (ASQ) 3rd Edition to measure the children motor development and Instrument (Scale) for Measuring the Socioeconomic Status of a Family Questionnaire to measure the socioeconomic status of the parents. The children body mass index were calculated from the height and weight. The study involved 64 children as the participants. However, only 53 data of the children that were eligible to be analyzed after the data cleaning process was conducted. The data were analyzed by using statistic calculation by the help of SPSS application. The results of the study found that most of the children were coming from upper middle and lower middle status. Their body mass index were mostly in thin category. However, their motor development seems to be on the schedule. Only a small number of the children who need more activities or further professional assessment. Moreover, there was no significant relationship between the parents' socioeconomic status and the children motor development and body mass index was found. The study indicates that the children weight status were alarming and need further attention. However, the data were taken from a small number of participant, thus it cannot be generalized to summarize a general depiction of all children in rural area.

INTRODUCTION

The development of a child is essential for their future life, including their motor development. Early childhood motor development is a determinant factor for their involvement in physical activity in their later life (Laukkanen, Pesola, Havu, Sääkslahti, & Finni, 2013) as well as the predictor for their mental health such as anxiety (Piek, Barrett, Smith, Rigoli, & Gasson, 2010) and other aspects of development such as later math and reading (Grissmer, Grimm, Aiyer, Murrah, & Steele, 2010) and their cognitive and behavioral development (Pagani & Messier, 2012). According to (Laukkanen et al., 2013), it is essential for mastering adequate motor skills for the children to enable them to participate in age-related physical activities, while the gross motor skills may have a vital role for maintaining the level sufficiency of physical activity (PA) during their life course. Related to fine motor skill, (Grissmer et al., 2010) also argue that fine motor skills, attention, and general knowledge are much stronger overall predictors of later math, reading, and science scores. In addition, motor skills also co-occur with cognitive and behavioral development, thus the preventive intervention treatment of children who show less preparedness in motor skills may also require cognitive skills enrichment and vice-versa (Pagani & Messier, 2012). Meanwhile, according to (Piek et al., 2010), it seems that a young child's gross motor development, from 4 months to 4 years, could predicts the level of depressive/anxious symptoms at school age. Therefore, it is seemingly obvious, that motor skills development of early childhood hold an important role for the children other aspects of development.

However, early childhood motor development might also influenced by other factors. Hence, these factors should be taken into account to assure that the children could harvest the optimum motor development. According to (Venetsanou & Kambas, 2010), the process of motor development occurs according to the pattern established by the influence of environmental factors and by the genetic potential. The environmental factors that had gained attention on affecting motor development, in the recent research, including obesity and the socioeconomic factor of the parents. The study of (Morrison, Cairney, Eisenmann, Pfeiffer, & Gould, 2018) found that obese and overweight children display

lower physical activity levels compared to their normal weight peers. Relevant to the study of (Morrison et al., 2018), the study of (Hondt, Deforche, Bourdeaudhuij, & Lenoir, 2009) demonstrates that general motor skill level in obese children is lower than in their overweight peers and normal-weight. Furthermore, (Abdelgawad & Mohamed, 2018) argue that, compared to their normal-weight peers, obese and overweight children are more likely to have motor developmental delays.

In regard to the impact of parents' socioeconomic status on early childhood motor development, some studies had confirm that the parents' socioeconomic status could have relationship with the children motor development. The stimulation provided in the home environment and socioeconomic status (SES) are significant factors of a child well-being including their motor development (Freitas, Gabbard, & Caçola, 2013). The study of (Morley, Till, Ogilvie, & Turner, 2015) found that the children from high socioeconomic status parents significantly outperformed middle and/or low socioeconomic status for total, fine and gross motor proficiency. Moreover, the socioeconomic factor also has impact on the children body mass index itself. According to (Vandendriessche, Vandorpe, Malina, & Lefevre, 2012), low and middle SES was associated with elevated body mass, percentage fat, and BMI with generally poorer motor coordination compared with high SES in girls. It is probably because the students coming from low-SES backgrounds have a higher levels of television viewing that put them at a higher risk for overweight (Morgenstern, Sargent, & Hanewinkel, 2017).

The previous studies show that motor skills has impacts on the children later development as well as the predictor of other aspect of development. However, the children motor development is also influenced by various factors, including the socioeconomic status (Freitas et al., 2013) and their body mass index (Morrison et al., 2018). Regarding to the environment, the children coming from rural area might have a different opportunities to develop their skills. Therefore, this study was aimed at finding out the correlation between the parents' socioeconomic status and the children body mass index and motor development in rural area.

METHODS

The aim of the study was mainly to see the relationship between parents' socioeconomic status and children body mass index and motor development in rural area, especially for the children aged 4-5 year old. The study was an ex-post facto study conducted in a rural area in Indonesia. The study involved 64 children aged 4-5, coming from the rural area, who were taken from the kindergartens and preschools. Before, the study was conducted, the parents of the children signed a consent form as their agreement to allow their children to be involved in the study.

To collect the data, Ages and Stages Questionnaire (ASQ) 3rd Edition was used to measure the children motor development. Meanwhile, the Instrument (Scale) for Measuring the Socioeconomic Status of a Family Questionnaire was used to measure the socioeconomic status of the parents. The children body mass index were calculated from their height and weight. Before taking the data, the data collectors were firstly trained how to collect the data to assure that the obtained data were eligible to be analyzed in the study. After the data were gained, the data cleaning was also conducted to select the data that met the requirement. Only data from 53 children that can be used for further analysis. The obtained data were then analyzed through statistical computation by the help of SPSS software.

RESULT AND DISCUSSION

The data gained were analyzed by statistical analysis. The results of analysis are presented in the following sections. The Table 1 shows the result of descriptive statistics data analysis.

Table 1. Descriptive Analysis

Variable	N	Mean	SD	Variance
Gross Motor	53	46.9	10.7	113.7
Fine Motor	53	47.7	10.3	106.3
Motor Development	53	94.6	15.8	248.9
BMI	53	15.4	1.7	2.9
SES	53	46.6	13.3	177.5

According to the descriptive statistic table above, the average score of gross motor skill variable is 46,9 and deviation standard 10,7. The fine motor skill average score is 47,7 and standard deviation 10,3. The motor skill development average score is 94,6 and standard deviation 15,8. The BMI variable average score is 15,4 and standard deviation 1.7. Meanwhile, for SES variable, the average score is 46,6 and standard deviation 13.3.

The table 2. presents the depiction of the children body mass index, children gross and fine motor development, and the parents' socioeconomic status.

Table 2. Children Body Mass Index, Children Mo-

Variables	Criteria	Percentage (%)
Fine Motor Development	On Schedule	96,36%
	Near the Cut Off	1,82%
	Below the Cut Off	1,82%
Gross Motor Development	On Schedule	76,36%
	Near the Cut Off	12,73%
	Below the Cut Off	10,9%
Body Mass Index	Thin	83,64%
	Normal	16,36%
	Overweight	0%
	Obese	0%
Socioeconomic Status	Upper High	2.4%
	High	19.5%
	Upper Middle	45.1%
	Lower Middle	28.0%
	Poor	4.9%
	Very Poor	0%

The table shows that most of the students had mastered the required fine motor skill development (96,36%) and gross motor skill development (76,36%) according to their stage of age development. The table also shows that most of the students (83,64%) were in thin category. Meanwhile, related to socioeconomic status, most of the children coming from upper middle family (45,1%) followed by lower middle family (28,0%).

The normality test is required to decide the type of correlational study formula to be taken in the later

analysis. The normality test was conducted by using Kolmogrov Smirnov test. The result of analysis proved that each variable gained the Asymp. Sig value between 0.11 to 0.48. Based on the significance level of the fine motor, gross motor, motor development, BMI, and SES variables that gained the value of significance $> 0,05$, the variables were normally distributed.

Table 3. The Result of Correlation Test among Variables

Variabel		r	sig
BMI	Motor Development	-0.06	0.68
SES	Motor Development	-0.12	0.38
SES	BMI	0.02	0.89

The Table 3 shows the result of the correlational test among variable. The test was conducted to find out whether there is any relationship among them or not. The result of the correlation test shows that there is no significant correlation between BMI and motor development; there is no significant correlation between SES with motor development, and there is also no significant correlation between SES and BMI.

The finding of the study describes that most of the children were coming from upper middle socioeconomic status with the majority of the children were in the thin weight category. The finding also explains that the majority of the children had mastered the required fine and gross motor skill development that are required in their age of development period. This milestone might be achieved as they lived in rural area that might still have a sufficient open space for playing and doing physical activity. As stated by (Venetsanou & Kambas, 2010), besides the genetic potential, the process of motor development occurs according to the pattern established by the influence of environmental factors. In addition, the result of the study also found that there is no significant correlation between the parents' socioeconomic status with the children body mass index nor with their motor development. However, this finding does not stand alone. Previous research also discovered the similar findings including the study of (Kakebeeke et al., 2017) who found that there is no also significant correlation between body mass index and children motor development. It is also relevant with the study of (Catenassi et al., 2007) who found that that the performance of four to six year-old children in tasks which

involved gross motor skill did not relate with BMI. This phenomenon might be because daily activities are not influenced by family socioeconomic status (Freitas et al., 2013). Moreover, the motor skill evolution in any specific case depends on the affordances and opportunities of the environment, the physical and psychological properties of the child, and the difficulty of the tasks (Kakebeeke et al., 2017).

CONCLUSION

The results of the study present that the majority of the children were in thin status. Most of them were coming from upper middle and lower middle family. Their motor development were found to be on schedule. Only a very small number of the children who gained an alarming status of motor development. In addition, there was no significant relationship between parents' socioeconomic status and the children motor development and body mass index in rural area. It might indicate that the weight status of the children have to be taken into account. Moreover, the data were taken from a limited number of participant. Therefore, the result of the study cannot be generalized.

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