

## **Gross Motor Levels in Early Childhood After Online Learning in the Highlands Region: Cross Sectional Study**

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### **Abstract**

Gross motor development in children aged 4-5 years is an important aspect to support children's growth and development, in the learning phase after the pandemic and curriculum changes require an evaluation process of gross motor skills using a gross motor ability survey method in children after 4-5 years in Stone City. The subjects in this study totaled 164 students who were taken from 9 kindergartens/PAUD in Batu City. The sampling protocol in this study used the cluster random sampling method. The instruments used in this study used the components in the active motor card, which included: 1) gallop, 2) hop, 3) slide, 4) s-tug, 5) catch, 6) kick, 7) overhand throw, 8) underhand roll. The average result of gross motor skills in boys is 51.98 in the "good" category and in girls it has an average of 52.92 in the "good" category. The gross motor ability test results for children aged 4-5 years in Batu City adjusted to the age and characteristics of children. The gross motor skills of children aged 4-5 years are better in locomotor motion instruments so that in this case the motion of using tools or objects can be implemented more by educators to stimulate children's gross motor motor skills.

**Keywords:** *Gross Motor, Preschooler, Highland*

Received: 25 May 2023

Revised: 5 July 2023

Accepted: 11 August 2023

Published: 30 September 2023

## **INTRODUCTION**

The importance of physical activity as one of the main forms of health for all levels of society has been strengthened by the guidelines set by WHO. Specifically, the benefits of physical activity for children and adolescents as having a significant impact on metabolic systems (cardiovascular fitness, blood pressure, and glucose), cognitive (academic performance, and executive function) and mental health (reduced depressive symptoms) are summarized, and it is recommended that Children need at least 60 minutes per day of moderate to high intensity physical activity throughout the week (World Health Organization, 2020b). Physical inactivity is a global public health problem primarily associated with various chronic disease outcomes (Hall et al., 2020). Thus, the motivations and barriers underlying whether a person engages in physical activity or not are of critical public health interest (Hoare et al., 2016, 2017; Vera et al., 2018). To improve this requires simultaneous cooperation from each country that has been regulated by supporting organizations. The Active Healthy Kids Global Alliance is an organization that focuses on the physical activity of children and adolescents throughout the world. To encourage this level of physical activity there are several indicators of physical activity in children which have been explained and monitored in a document called a "Report card" which was created as a tool for physical activity advocacy (Active Healthy Kids Global Alliance, 2018). Meanwhile, 5-25% of young children experience developmental

disorders, with 8 to 9% of young children experiencing problems with the child's psychomotor development and gross motor skills (World Health Organization, 2020a). The current post-pandemic condition is also a major factor in decreasing motor skills and lack of physical activity for children (Ayubi & Komaini, 2021; Pardilla et al., 2020), identification of children's motor skills is very important to implement. COVID 19 has a significant effect on endurance, motor ability and immunity (Amatriain-Fernández et al., 2020; da Silveira et al., 2021; Dwyer et al., 2020). One of the factors that influences the level of endurance, and the immune system is the composition of the movement behaviour. Children's activities are limited during the pandemic. Children's visits and interactions with playgrounds and schools are limited. Movement activities are limited, stress levels increase and children's boredom increases, making them vulnerable to a decline in the immune system (Jiao et al., 2020; Moore et al., 2020). The 2021 PAUD and PNF Ban policies and mechanisms regarding children's physical and motor development explain that at least every school has a teacher or facilitator who understands children's movement needs.

This requires policies to support physical activity in schools and in the larger community through education, the built environment, and the use of tested and programmed curricula. Healthy physical activity patterns built from childhood can support a healthy lifestyle and must be maintained throughout life (Peyer, 2021). In this context, aspects of social and economic change in countries with a high human development index urge action to increase physical activity among children and adolescents. Supervision and monitoring efforts are needed to identify gaps in the coaching process so that it requires development that focuses on the results of children's physical evaluations (Aubert et al., 2018). These activities need to be supported by government policies as well as the school environment, community, and family environment regarding supporting programs to develop systems to increase physical activity in children, use of active transportation, active play patterns in peer, family and school environments and reduce sedentary time spent every day (Aubert et al., 2018). This can be obtained from school data and the achievement of student movement indicators developed in an area. However, fulfilling physical activity in children requires movement literacy that supports the habituation process. The issue of physical activity and children's motor skills is still something that receives little attention (Liu & Chen, 2021). Movement literacy in children will form awareness regarding the importance of physical activity. which will influence the thinking patterns of the younger generation, become a lifestyle and be able to develop personal potential and healthy living habits. The recommended pedagogical strategies are related to physical literacy in

children according to their age phase to develop children's potential and interests which not only increase competence but also focus on children's movement performance (Lundvall, 2015). So, in this case, to determine the motor skills of young children, a test is needed as an effort to determine gross motor surveillance in children aged 4-5 years in Batu City. The results of evaluating children's motor skills can be developed to provide recommendations for children's physical needs, so that with the evaluation process early childhood development will be well recorded. This research focuses on the gross motor skills of children aged 4-5 years because motor development is an important aspect in developing skill processes and movement patterns that children carry out using the whole body (Sukamti, 2018).

## **METHOD**

The research method used was a survey using a cross-sectional approach by conducting gross motor skills tests with locomotor test instruments and control objects from the active motor card which contains 8 instruments, which include: 1) gallop, 2) hop, 3) slide, 4) s-tug, 5) catch, 6) kick, 7) overhand throw, 8) underhand roll adopted from Test Gross Motor Development-2 (TGMD-2) (Ulrich & Sanford, 2000). The sampling protocol used the cluster random sampling method which was carried out at 9 schools in Batu City with a total of 164 students as subjects. Data were analysed using a quantitative approach by identifying and describing data in the form of statement sentences regarding data on gross motor skills of children aged 4-5 years. This research has passed the ethical feasibility test determined by the Malang POLKESMA ethics commission with certificate number: 620/KEPK-POLKESMA/2022.

## **RESULTS AND DISCUSSION**

The test results in this research can be used as a learning evaluation process to determine the gross motor development of early childhood children on a regional scale. This research was conducted on children aged 4-5 years (kindergarten class A) which was carried out only to determine the children's gross motor skills. The results of the gross motor skills test for children aged 4-5 years using the instruments on the Active Motor Card used in Batu City can be seen in detail in table 1. The average gross motor skills of children aged 5 years are greater than children aged 4 years. At the age of 4 years, boys tend to have better grades than girls and at the age of 5 years, girls have greater grades and tend to be the same as boys. The results of the child's abilities on each instrument are described in figures 1 to 4 which explain according to the child's age and gender. The figure explains that boys aged 4-5 years and girls aged 4 years tend to have better scores on the locomotor test, girls aged 5 years have relatively similar motor

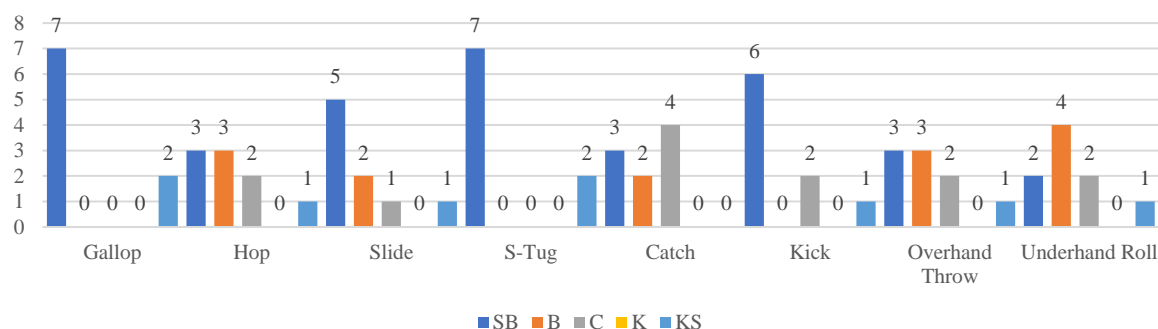
ability results between the locomotor test and the control object. The results of gross motor skills are compared in table 2 and table 3.

The results of gross motor skills in preschool children were obtained through tests of 1) gallop, 2) hop, 3) slide, 4) s-tug, 5) catch, 6) kick, 7) overhand throw, 8) underhand roll which were grouped according to age and gender of the child. Each instrument has a movement category that is intended to assess the child's movement process. From the tests carried out, each instrument is added up and a conclusion is given from all the tests carried out. So, after testing 164 children, the results of the children's gross motor skills included:

**Table 1.** Descriptive data on gross motor skills of children aged 4-5 years

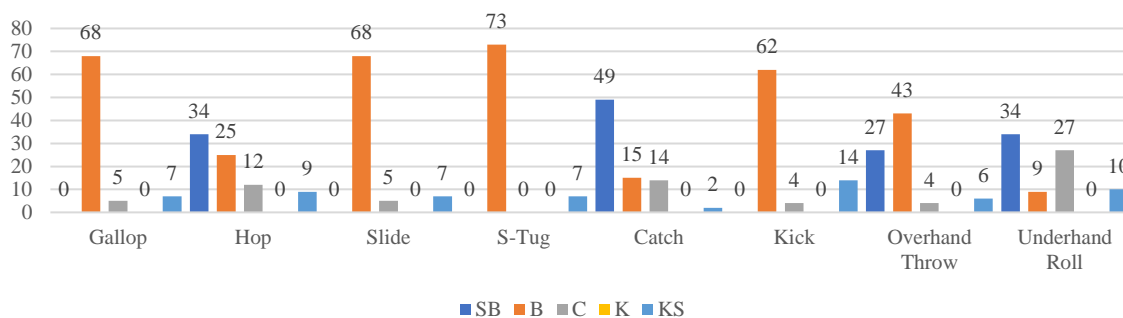
Kelompok	N	Means	Std. Deviation	Minimum	Maximum
4-year-old male	9	52,00	4,90	42	60
5-year-old male	80	53,99	5,55	31	63
4-year-old female	10	51,00	4,71	43	57
5-year-old female	65	54,14	6,78	22	64
Total	164	53,76	6,05	22	64

The results of the motor skills of children aged 4-5 years in 9 kindergartens in Batu City which have been adjusted to the active motor card norms which are adjusted to the child's age and gender, included:



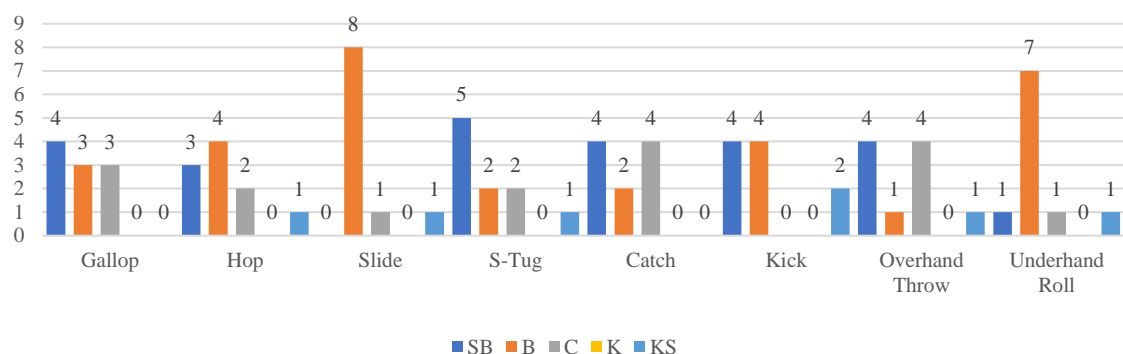
**Figure 1.** Results of Motor Ability for 4-Year-Old Male

The total sample of 4-year-old children with male gender was 9 children, the results of gross motor skills in the very good category were gallop, slide, s-tug and kick movements. In this movement, 7 children had very good motor skills and 2 other children were in the very poor category. Of the 8 existing instruments, the results of children's gross motor skills tend to be in the very good, good, and fair categories, so this instrument tends to be used for boys aged 4 years.



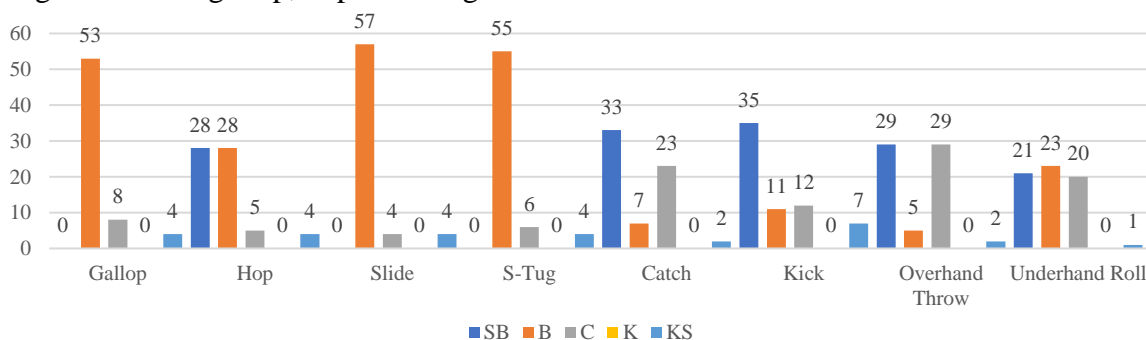
**Figure 2.** Results of Motor Ability for 5-Year-Old Male

The results of the gross motor skills of 5-year-old boys have an average of good categories on the gallop and slide instruments with a percentage of 85% of children getting the good category, s-tug with a good percentage of 91.25%, kick with a good category percentage of 77.5%, and 53.75% in the good category on the overhand throw instrument. The results in the very good category were more numerous for the hop instrument with a percentage of 42.5% and 61.25% for the catch instrument.



**Figure 3.** Results of motor skills of 4-year-old female

For children aged 4 years and female, the results tend to be in an even category between very good, good, and fair, while children who get the category are very poor with 1 child on several instruments. The average results in the good category for slide and underhand roll instruments tend to be higher than for other instruments. The number of good and very good categories on the gallop, hop and s-tug instruments has a total of 7 children.



**Figure 4.** Results of Motor Ability of 5 Year Old Female

The results for girls aged 5 years had an average good category on locomotor instruments, with 53 children on the gallop instrument, 57 children on the slide instrument, 55 children in the s-tug category, and 28 children in the excellent category. with a good category on hop instruments. Basic movements such as gallops, slides, and coordination without objects such as s-tugs will be easier for children to do, because preschool-aged children master more basic locomotor movements than games (Ruiz-Esteban et al., 2020). In preschool children, activities with basic locomotor movements such as coordination and balance carried out twice a week can develop children's gross motor skills, so that the main thing that is done in the introduction of movement in educational institutions is to develop children's locomotor abilities first (Costa et al., 2015; Iivonen & Sääkslahti, 2014).

**Table 2.** Gross Motor Test Results for Children Aged 4-5 Years

<b>Norm Reference</b>	Very Well	Well	Enough	Less	Very Less
4 Years Old Male	2	4	2	0	1
Relative (%)	22.2	44.4	22.2	0	11.1
5 Years Old Male	34	9	27	0	10
Relative (%)	42.5	11.25	33.75	0	12.5
4 Years Old Female	1	7	1	0	1
Relative (%)	10	70	10	0	10
5 Years Old Female	21	23	20	0	1
Relative (%)	32.3	35.8	30.76	0	1.53

The results of the gross motor skills test for boys aged 4-5 years in Batu City with a total of 86 students had an average test result of 51.98 in the good category, 30 students got the very good category, 32 students got the good category, 18 students in the sufficient category and 6 students in the very poor category. The test results for girls aged 4-5 years were 26 students in the very good category, 32 students in the good category, 12 students in the fair category and 5 students in the very poor category. The total number of female students was 75 students with an average result of gross motor skills of 52.92 which was in the good category. These results do not have a significant difference between boys and girls, boys and girls aged 0-6 years do not have significant differences in their motor abilities. In terms of daily outdoor activities carried out by girls, they tend to take longer than boys but still tend to be the same and not significantly different, the activities carried out tend to involve more movement of control objects (Kwon et al., 2022). Locomotor movements which tend to be basic have their own difficulties related to the movement process carried out by children. In the process of developing their movements, the implementation of learning by doing movements which are carried out in a fun way is required (Calero-Morales et al., 2023). Basically, boys and girls at

an early age have different neurobiological mechanisms based on gender, different mental development processes in boys and girls have the same influence on their cognitive processes (Fernández-Sánchez et al., 2022). In this case, early childhood gross motor development is very important as a supporting process for children's development.

The evaluation process in physical education emphasizes the child's gross motor movement process with the aim of knowing the development of the body, and the results of the movement recognition process carried out so that it has benefits on growth and development. With the participation of students in carrying out physical activities, neuromuscular skills will develop and influence the student's motor movement mechanisms. This is very necessary to improve physical activity skills which have an impact on social aspects. There are five basic biomotor skills that are important for children's growth and development, including: strength, endurance, coordination, speed, and flexibility. These five basic movements can be developed into other movement elements, such as explosive power, agility, endurance, beauty of movement and so on (Balyi et al., 2013; Bompa & Buzzichelli, 2019). The instruments developed to determine the gross motor skills of young children use the TGMD-2 (Test Gross Motor Development-2). The TGMD-2 has 12 instruments which are used by dividing the components into two parts which include locomotor and object control (Ulrich & Sanford, 2000). The instruments in TGMD-2 have some movement difficulties when used for children aged 4-5 years, some easy movements are related to kicking, running, jumping and sideways (Kezić et al., 2020) but some other instruments tend to be more difficult, aspects related to the instrument must be adjusted to the child's characteristics, because the child's gender, habits, lifestyle and environment influence their characteristics (Webster et al., 2019). The test results for children in the highlands tend to have lower motor skills than children in coastal areas with results of 54.1% in the very superior category, 37.5% in the superior category, 4.2% in the above average and average categories. , in the highlands it has a value of 9.5% in the average category, 28.6 in the bellows average and poor category and in the very poor category with a percentage of 33.2% (Samodra et al., 2023) because basically the ability of children in each region will differ depending on the habits and culture of the area, so in this case the motor skills test is carried out using instruments that have been adapted to the child's condition. Batu City has a relatively high regional income at number 8 in 2022 in Indonesia, in this case the motor skills of children in areas with low income are less likely to experience iron deficiency, anaemia, risk of gross motor and communicative delays (Celhay et al., 2020). In this case, development progress and the economic level which tends to be high in Batu City have a quite

significant impact on the gross motor skills of children aged 4-5 years which can be seen from the test results which tend to be in the good category and children aged 4-5 years are easier. make locomotor movements rather than penis objects even though basically children prefer to play using tools.

## **CONCLUSION**

The results of the gross motor skills test for children aged 4-5 years in Batu City using the test instrument on the active motor card have an average of good category. The use of evaluation instruments used in early childhood can be done by adjusting the child's condition, region, and child's age. So, this research uses instruments on active motor cards which have been adapted to early childhood in Batu City. Measuring gross motor skills in early childhood can use the test gross motor development-2 (TGMD-2) instrument but using this instrument in several categories tends to be too difficult to carry out in children aged 4-5 years (TK A) and the tools used in These instruments are difficult to find in early childhood school institutions. So, by using a battery test that has been adapted to the child's condition according to the region, it can simplify the process of evaluating a child's gross motor skills. On the gross motor skills test results, boys have a lower average than girls, but these results are still considered good and do not have a significant difference. The use of test instruments to determine children's motor skills is adjusted to the age and socio-demographic characteristics of children in Batu City. The results of tests on gross motor skills in children aged 4-5 years are better on locomotor movement instruments so that in this case movements using tools or objects can be implemented more by educators to stimulate children's gross motor skills. This research was only carried out on children aged 4-5 years (kindergarten class A) at an early childhood institution which will switch to class B. So, in this case future research can be carried out on children aged 5-6 years (kindergarten class B) with aspects of children's gross motor and fine motor skills because currently post-covid learning conditions in early childhood have limited motor ability evaluation instruments which have not been redesigned by early childhood institutions. With this, educators need instruments that can be used to determine children's development and growth so that this research can make it easier for educators to find out the condition of students who will take part in the upcoming learning process.

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