



Lower Elementary School Student Non-Locomotor Movement Profile During COVID-19 Pandemic

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Abstract

This study aimed to construct a profile related to the basic non-locomotor movement skills of elementary school students during the COVID-19 pandemic. The survey was conducted on 53 elementary school students aged 6–8 years of an elementary school in Bandung. The instrument of the study was an instrument for assessing non-locomotor movement skills developed by Gallahue related to stability skills including beamwalk (walking on a beam), one foot balance (standing on a beam with one leg), and dodging. The findings showed that the motor skill stages of lower elementary school students of elementary school in Bandung during the pandemic included three stages, namely the initial stage (6% for the beam walk test, 11% for the one foot balance test, and 15% for the dodging test), the elementary stage (64% for the beam walk test, 70% for one foot balance, and 60% for the dodging test), and the mature stage (30% for the beam walk test, 19% and 25% for the one foot balance and the dodging test, respectively).

INTRODUCTION

Since first appearing in Wuhan, China, in December 2019, the SARS-CoV-2 virus (Covid-19) has caused an unprecedented public health crisis, resulting in the World Health Organization (WHO) officially recognizing this as a global pandemic (Chambonnière et al., 2021). This makes the government have to implement various measures such as lockdowns, closing various institutions, programs, and facilities, and restrictions on the use of open public spaces in an effort to slow down and reduce the rate of transmission (Paterson et al., 2021). As a result, physical education, which had a major impact on planned physical activity in schools, had to disappear due to the closure of schools and kindergartens (Pajek, 2022).

The COVID-19 pandemic greatly disrupted the stability of lifestyle conditions through the parameters measured, namely physical activity conditions, nutritional intake, sleep quality, and stress levels; out of a total of 274 respondents, 38% were in the low category, and there were even 2 respondents in the low category. dangerous zone category, and only 13% are in bad condition. ideal, and 48% are in the sufficient category (Komariyah et al., 2021). Restrictions on outdoor activities carried out during COVID-19 The pandemic also had an impact on reduced participation in physical activity and changes in eating patterns. Quarantine results in a reduced level of physical activity, similar to space exploration. (Pecanha et al., 2020).

Sudden changes in physical activity and fitness in the (young) pediatric population are causes for concern. (Jurak et al., 2021). For several months, children could not be involved in school activities, including sports and physical education, because they had to attend school remotely as a form of prevention against transmission (Dayton et al., 2021). These social restrictions pose a risk to children's health, including physical inactivity, sedentary behavior, and mental health issues. (Yomoda & Kurita, 2021).

Early childhood is an age that has a vul-

nerable time from birth to the age of six, where the process of providing educational stimuli to help the physical and spiritual growth and development of children so that they are ready to enter education (Mutiah, 2015). Early childhood is very vulnerable to viruses because children's immune systems are weak and they often have excessive activities. During a pandemic, the public's health or immune system must be maintained, especially among elementary school students because they are very susceptible to viruses. Parents must pay attention to the physical fitness of students because this can help the body's immune system to stay healthy and strong. (Bluth & Wahler, 2011). Education for elementary school children is very important, because this is when children are more active in socializing within their environment. This period is called the golden age because at this age, physical and psychological development occurs. From a physical perspective, students experience extraordinary development, starting with the growth of brain cells and other organs and the subsequent development of motor skills such as walking, running, jumping, climbing, and so on. So, it is very important to see the development of students' movements after COVID-19 because a healthy body will affect further developments (Ulpí et al., 2021)

Studies on physical fitness activities in children and adolescents before and after the pandemic have become the focus of many researchers at this time. The Healthy Children Global Alliance is actively developing the Global Matrix 4.0 to gain a thorough understanding of the variations in physical activity of children and adolescents around the world and the factors that significantly influence them. (Aubert et al., 2022; Huang et al., 2022). The Global Matrix 4.0 evaluation scale uses a range of values from "F" to A+," taking into account country factors, physical activity indicators, HDI categories, and regional geo-cultural aspects. (Aubert et al., 2022). Indonesia, Vietnam, and the Philippines all scored an "F" in terms of overall physical activity. (Aubert et al., 2022; Cagas et al., 2022; Huang et al., 2022; Lee et

al.,). While other neighboring Asian countries such as Malaysia and Thailand get a "D-" score, Singapore, with a "C-" score, is better than Indonesia. (Widyastari et al., 2022). Therefore, since the extraordinary impact of the COVID-19 pandemic, children's physical health requires more attention (Morrison et al., 2021).

Motor skills are defined as sequences of movements that, when combined, produce smooth and efficient movements that lead to the mastery of a particular task. Basic motor skills include fine motor skills, gross motor skills, locomotor skills, object handling skills, and body coordination. (McDonough et al., 2020). Increasing the capacity of children to master fine motor and gross motor skills is very important for their development, especially their motor skills (Mahfud & Yuliandra, 2020). (Gallahue, 2012) revealed that the term motor comes from the basic or biological principles that produce movement. There are 5 steps in a child's motor development, namely: 1) reflexive movements (4 months before birth–1 year), 2) rhythmic movements (4 months–1 year), 3) immature movements (1-2 years), 4) basic movements, and 5) special movements (Gallahue, 2012; Veiskarami & Roozbahani, 2020)

Children in elementary school feel a desire to leave the house and join their peers, which creates a desire to actively participate in games that require physical activity (Sari et al., 2019). Therefore, it is important for physical education teachers in elementary schools to pay attention to basic movement skills and aspects of movement related to physical education, including manipulative movements, non-locomotor movements, and locomotor movements (Kurniawan et al., 2022). Non-locomotor movement, or what is commonly referred to as stationary movement, is when a person makes a movement without being followed by the movement of moving from its original place, in this case such as stretching, swinging, turning, pushing, lifting, and landing (Anwar et al., 2020). so that the implementation of learning can be optimized in order to increase student movement activity (Mardianah et al., 2018).

During the pandemic, students' movement activities were reduced, and eventually these movement activities could affect the condition of students' bodies (Ma'arif & Prasetyo, 2021). Research on fitness activities for children and adolescents during pre- and post-pandemic times has become the concern of many researchers today (Aubert et al., 2022). This is very important to know how children develop during the COVID-19 pandemic so that the impact can be optimized in the implementation of physical education learning in order to increase students' movement activities (Mardianah et al., 2018). One of them is non-locomotor movement, or what is commonly referred to as stationary movement for elementary school students, when someone makes a movement without being followed by the movement of moving from its original place, in this case stretching, swinging, spinning, pushing, lifting, and landing (Anwar et al., 2020).

METHOD

The method used in this study is the descriptive survey analysis method, a method of collecting data from a small group of samples using a questionnaire or interview to identify the characteristics of the population (Sukmadinata, 2015). In this study, the researchers wanted to reveal the description of the basic non-locomotor movement skills of elementary school students during the COVID-19 pandemic.

Participants

Then I performed a descriptive data analysis, which is the aim of this research method. To find out how the COVID-19 pandemic is impacting non-locomotor movements in children, a survey of elementary school students was conducted.

The survey was conducted on low-grade elementary school students in the city of Bandung, namely the Laboratory School of the Indonesian University of Education. The average sample age is 6-8 years, consisting of 53 male respondents, 25 students (47%), and 28

female students (53%), as shown in Figure 1.

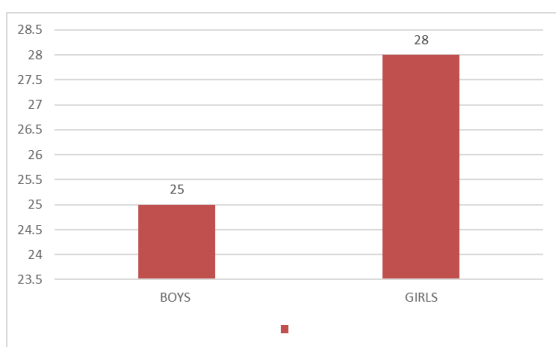


Figure 1. Respondent Demographics

Instrument

The assessment instrument used was the locomotor movement skills test developed by (Gallahue, 2012) and listed in the book *Developmental Physical Education for Today's Children*, which became the main data source in this study. This non-locomotor movement skill test instrument is related to children's stability skills, which include beamwalking (walking on a block), one-foot balance (standing on a block with one foot), and dogging (avoiding). There are three categories of basic movement skills assessment that are applied whether the child is in the initial stage, elementary stage, or mature stage. (Gallahue, 2012; Gallahue & Donnelly, 2007).

RESULT

The following are the results of a survey of non-locomotor basic movement skills, namely beamwalking (walking on a block), one-foot balance (standing on a block with one leg), and dogging (dodging) for low-grade elementary school students at the Indonesian Education University school laboratory, as listed in table 1.

Table 1. Result

	Initial Stage	%	Elementary stage	%	Mature stage	%
Beam walk	3	6	34	64	16	30
One foot Balance	6	11	37	70	10	19
Dogging	8	15	32	60	13	25

Based on the results of the beamwalk test observations as shown in tabel 1, there were 3 students in the initial stage (6%), 34 students in the elementary stage (64%), and as many as 16 students (30%) were in the mature stage. The results of the observation of the one-foot balance test yielded the following data: 6 students were in the initial stage (11%), 37 students were in the elementary stage (70%), and as many as 10 students (19%) were in the mature stage. The results of the dodging test were that 8 students (15%) were in the initial stage, 32 students were in the elementary stage (60%), and 13 students (25%) were in the mature stage. In addition to the demography of the results of the movement skills test for each test item that has been carried out, the writer also analyzes the coefficient of determination R square to see which movement skill variables among beamwalk, one-foot balance, and dodging have the greatest influence on non-locomotor skills in elementary schools with low-grade laboratories. Indonesian Education University School. Table 2 shows that the correlation coefficient of each variable on no-locomotor movement skills, namely beamwalking, is 0.705, one-foot balance is 0.580, and dodging is 0.732.

Table 2. Non-locomotor skill correlation

	Beam walk	One foot Balance	Doging	Non locomotor
Beam walk	1.000			
One foot Balance	0.128	1.000		
Doging	0.320	0.090	1.000	
Non locomotor	0.705	0.580	0.732	1.000

Then the value of the coefficient of determination, or R squared (see Table 2), is calculated to see the carrying capacity of each variable on the non-locomotor skills of low-grade elementary school students in the laboratory. The results show the following score: Dodging is the highest variable with a carrying capacity of 54%, followed by a beamwalk of 50%, and the lowest is a one-foot balance of 34% (see

table 3).

Table 3. Non-Locomotor R Square

Coefficient of Determination R Square		
Beamwalk	One foot balance	Dodgning
50%	34%	54%

The pandemic does not stop development as long as children have the desire to learn and parents and teachers guide them to fulfill all their needs (Wahyuni & Kurniati, 2021). Activities provided by the teacher serve as examples to be repeated at home (Li et al., 2015). Activities can be modified by parents into various interesting activities, such as passing obstacles that are made to reach a predetermined final goal (Tapia et al., 2020). Because the physical activity that is carried out educates students to align their behavior with prevention and control measures at home, school, and in the community (West et al., 2020). In the long term, this awareness empowers children and families to voice their involvement in handling the pandemic, especially regarding physical activity (Tapia et al., 2020).

DISCUSSION

The results of the analysis show that in the non-locomotor movement skills of low-grade elementary school students during the COVID-19 pandemic, there were still students who had movement skills in the initial stage, namely 6% for the beamwalk test, 11% for one-foot balance, and 15% for the dodging test. For the elementary stage, it is 64% for the beamwalk test, 70% for one-foot balance, and 60% for the dodging test, and students who are already in the mature stage are at 30% for the beamwalk test, 19%, and 25% for the dodging test.

Looking at the above data, the authors draw the conclusion that non-locomotor movement skills are related to the stability of low-grade elementary school students in elementary school laboratory schools in general. They are

still in the elementary stage, and there are still students who are still in the initial stage. Of course, this should be a concern for sports practitioners, especially physical education teachers, to provide treatment for these students, given the importance of basic movement skills for children. Other research proves that learning physical education has an impact not only on motor skills but also on cognitive abilities. In line with growing research, interventions based on structured ludic-motor activities ensure health benefits for children. (Battaglia et al., 2019). Another thing disclosed by (Derri et al., 2001) that music and movement activities can improve the quality of children's motor skills, which are more complex and significant.

Common childhood sports such as soccer and unstructured play activities involving rapid movement in direction, interceptions, and resistance all require spatiotemporal adjustments in movement coordination (Patla et al., 1999; Strike & Taylor, 2009). In general, children aged 5 who are still developing tend to reduce their stride length when approaching obstacles; this indicates that they are able to change their body movement patterns (Vallis & McFadyen, 2005). This is in line with the results of this study, where children maintain balance when doing the beamwalk test. It should be noted that there is a critical period in the development of rapid learning in the early years of a child's life. The development of temporal and spatial motor adaptations has different periods of maturity; spatial adaptation occurs in childhood up to 12 years of age, while temporal adaptation matures at 3 years of age (Vasudevan et al., 2011). Another finding in this study is that this non-locomotor skill has a carrying capacity of 54% for the dodging variable, followed by 50% for the beamwalk, and 34% for one-foot balance.

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Activities can be modified by parents into various interesting activities, such as passing obstacles that are made to reach a predetermined final goal (Tapia et al., 2020). Because the physical activity that is carried out educates students to align their behavior with prevention and control measures at home, school, and in the community (West et al., 2020). In the long term, this awareness empowers children and families to voice their involvement in handling the pandemic, especially regarding physical activity (Tapia et al., 2020).

CONCLUSION

Based on the results of the analysis and data and the discussion, the researcher concluded that the motor skill stage of low-grade elementary school students at the laboratory elementary school during the pandemic showed students who had movement skills in the initial stage, namely 6% for the beamwalk test, 11% for one foot balance, and 15% for dodging test; for the elementary stage, 64% for the beamwalk test, 70% for one foot balance, and 60% for dodging test, as well as students who were already in the mature stage, which is 30% for the beamwalk test, 19%, and 15% for the dodging test. With the average student still in elementary school, hopefully the results of this research can be of concern to sports practitioners who want to be able to improve students' motor skills through physical education and sports.

REFERENCE

- Anwar, Woro, O., Handayani, K., Rumini, & History, A., Korespondensi, A., Pendiikan, J., Siswa, T., & Tenggara, N. (2020). The movement form of traditional game (buja kadanda) "dou mbojo" related to physical education values article info. *Journal of Physical Education and Sports*, 9(1), 57–62.
- Aubert, S., Barnes, J. D., Demchenko, I., Hawthorne, M., Abdeta, C., Nader, P. A., Salla, J. C. A., Aguilar-Farias, N., Aznar, S., Bakalár, P., Bhawra, J., Brazo-Sayavera, J., Bringas, M., Cagas, J. Y., Carlin, A., Chang, C. K., Chen, B., Christiansen, L. B., Christie, C. J. A. Tremblay, M. S. (2022). Global matrix 4.0 physical activity report card grades for children and adolescents: Results and analyses from 57 countries. *Journal of Physical Activity and Health*, 19(11), 700–728.
- Battaglia, G., Alesi, M., Tabacchi, G., Palma, A., & Bellafiore, M. (2019). The development of motor and pre-literacy skills by a physical education program in preschool children: a non-randomized pilot trial. *Frontiers in Psychology*, 9(1), 2694.
- Bluth, K., & Wahler, R. G. (2011). Parenting preschoolers: Can mindfulness help?. *Mindfulness*, 2(4), 282–285.
- Cagas, J. Y., Mallari, M. F. T., Torre, B. A., Kang, M.-G. D. P., Palad, Y. Y., Guisihan, R. M., Aurellado, M. I., Sanchez-Pituk, C., Realin, J. G. P., Sabado, M. L. C., Ulanday, M. E. D., Baltasar, J. F., Maghanoy, M. L. A., Ramos, R. A. A., Santos, R. A. B., & Capio, C. M. (2022). Results from the Philippines' 2022 report card on physical activity for children and adolescents. *Journal of Exercise Science & Fitness*, 20(4), 382–390.
- Chambonnière, C., Fearnbach, N., Pelissier, L., Genin, P., Fillon, A., Boscaro, A., Bonjean, L., Bailly, M., Siroux, J., Guirado, T., Pereira, B., Thivel, D., & Duclos, M. (2021). Adverse collateral effects of covid-19 public health restrictions on physical fitness and cognitive performance in primary school children. *International Journal of Environmental Research and Public Health*, 18(21), 11009.
- Dayton, J. D., Ford, K., Carroll, S. J., Flynn, P. A., Kourtidou, S., & Holzer, R. J. (2021). The deconditioning effect of the covid-19 pandemic on unaffected healthy children. *Pediatric Cardiology*, 42(3), 554–559.
- Derri, V., Tsapakidou, A., Zachopoulou, E., & Kioumourtzoglou, E. (2001). Effect of a music and movement programme on development of locomotor skills by children 4 to 6 years of age. *European Journal of Physical Education*, 6(1), 16–25.
- Gallahue, D. L. (2012). Developmental Physical Education for Today's School Children. *Brown & Benchmark Pub* (1995).
- Gallahue, D. L., & Donnelly, F. C. (2007). Developmental physical education for all children. *Human Kinetics*.
- Huang, W. Y., Aubert, S., Tremblay, M. S., & Wong, S. H. (2022). Global Matrix 4.0 physical activity report cards grades for children and adolescents: A comparison among 15 Asian countries and regions. *Journal of Exercise Science and Fitness*, 20(4), 372–381.

- Jurak, G., Morrison, S. A., Kovač, M., Leskošek, B., Sember, V., Strel, J., & Starc, G. (2021). A covid-19 crisis in child physical fitness: Creating a barometric tool of public health engagement for the Republic of Slovenia. *Frontiers in Public Health*, 9(1), 1-7
- Komariyah, L., Roring, L. A., Gumilar, A., Hambali, B., Martini, T., & Rahma, T. A. (2021). Lifestyle of Indonesian Education University students during the covid-19 pandemic. *Kinestetik: Jurnal Ilmiah Pendidikan Jasmani*, 5(4), 782-787.
- Kurniawan, R., Pradana, I. A., & Heynoek, F. P. (2022). Pengembangan modul guru materi variasi dan kombinasi gerak lokomotor non-lokomotor manipulatif untuk siswa autisme. *Multilateral : Jurnal Pendidikan Jasmani Dan Olahraga*, 21(2), 98-114.
- Li, K., Su, W., Fu, H., & Pickett, K. A. (2015). Kinesthetic deficit in children with developmental coordination disorder. *Research in Developmental Disabilities*, 38(3), 125-133.
- Ma'arif, I., & Prasetyo, R. (2021). Tingkat kebugaran jasmani siswa sekolah dasar saat pandemi covid-19. *Jurnal Pendidikan Tambusai*, 5(2), 3451-3456.
- Mahfud, I., & Yulindra, R. (2020). Pengembangan model gerak dasar keterampilan motorik untuk kelompok usia 6-8 tahun. *PORT-Mu: Jurnal Pendidikan Olahraga*, 1(1), 54-66.
- Mardianah, R., Vindyastuti, A., & Aprianti, E. (2018). Meningkatkan aktivitas fisik anak-anak autisme melalui pembelajaran olahraga di taman kanak-kanak. *CERIA (Cerdas Energik Responsif Inovatif Adaptif)*, 1(3), 30-36.
- McDonough, D. J., Liu, W., & Gao, Z. (2020). Effects of physical activity on children's motor skill development: a systematic review of randomized controlled trials. In *BioMed Research International*, (1), 1-14.
- Morrison, S. A., Meh, K., Sember, V., Starc, G., & Jurak, G. (2021). The effect of pandemic movement restriction policies on children's physical fitness, activity, screen time, and sleep. *Frontiers in Public Health*, 9(1), 1-12
- Mutiiah, D. (2015). Psikologi bermain anak usia dini. *Kencana*.
- Pajek, S. V. (2022). Impact of the covid-19 pandemic on the motor development of schoolchildren in rural and urban environments. *BioMed Research International*, (1), 1-7
- Paterson, D. C., Ramage, K., Moore, S. A., Riazi, N., Tremblay, M. S., & Faulkner, G. (2021). Exploring the impact of covid-19 on the movement behaviors of children and youth: A scoping review of evidence after the first year. *Journal of Sport and Health Science*, 10(6), 675-689.
- Patla, A. E., Prentice, S. D., Rietdyk, S., Allard, F., & Martin, C. (1999). What guides the selection of alternate foot placement during locomotion in humans. *Experimental Brain Research*, 128, 441-450.
- Pecanha, T., Goessler, K. F., Roschel, H., & Gualano, B. (2020). Social isolation during the covid-19 pandemic can increase physical inactivity and the global burden of cardiovascular disease. *American Journal of Physiology - Heart and Circulatory Physiology*, 318(6), H1441-H1446.
- Sari, E. F. N., Sujarwo, & Sukiri, S. (2019). Basic locomotor movement of first grade students of elementary school. *Proceedings of the 5th International Conference on Physical Education, Sport, and Health (ACPES 2019)*, 362, 187-191.
- Strike, S. C., & Taylor, M. J. D. (2009). The temporal-spatial and ground reaction impulses of turning gait: is turning symmetrical?. *Gait & Posture*, 29(4), 597-602.
- Sukmadinata, N. S. (2015). Metode Penelitian Pendidikan. *Remaja Rosdakarya*.
- Tapia, M. I., de Alda, J. A. G. O., Jeong, J. S., & Gómez, D. G. (2020). Teaching and classroom communication with children in the covid-19 pandemic. *European Commission*. 1-28
- Ulpi, W., Hakim, N., Kadir, A., Pajarianto, H., & Rahmatia, R. (2021). Gambaran Kebugaran Jasmani Anak Usia Dini pada Masa Pandemi Covid-19. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 6(1), 30-39.
- Vallis, L. A., & McFadyen, B. J. (2005). Children use different anticipatory control strategies than adults to circumvent an obstacle in the travel path. *Experimental Brain Research*, 167, 119-127.
- Vasudevan, E. V. L., Torres-Oviedo, G., Morton, S. M., Yang, J. F., & Bastian, A. J. (2011). Younger is not always better: Development of locomotor adaptation from childhood to adulthood. *Journal of Neuroscience*, 31(8), 3055-3065.
- Veiskarami, P., & Roozbahani, M. (2020). Motor development in deaf children based on Gallahue's model: A review study. *Auditory and Vestibular Research*, 29(1), 10-25.

- Wahyuni, I., & Kurniati, E. (2021). Body-kinaesthetic program for toddlers during the covid-19 pandemic. *Proceedings of the 5th International Conference on Early Childhood Education (ICECE 2020)*, 538, 41–46.
- West, R., Michie, S., Rubin, G. J., & Amlôt, R. (2020). Applying principles of behaviour change to reduce sars-cov-2 transmission. *Nature Human Behaviour*, 4(5), 451–459.
- Widyastari, D. A., Saonuam, P., Pongpradit, K., Wongsingha, N., Choolers, P., Kesaro, S., Thangchan, W., Pongpaopattanakul, P., Phankasem, K., Musor, M. E., Autchaworaphong, P., Muensakda, P., Chaiprasit, K., Yousomboon, C., Mansing, W., Aunampai, A., Nilwatta, N., Iamyam, W., Rasri, N., & Katewongsa, P. (2022). Results from the Thailand 2022 report card on physical activity for children and youth. *Journal of Exercise Science and Fitness*, 20(4), 276–282.
- Yomoda, K., & Kurita, S. (2021). Influence of social distancing during the COVID-19 pandemic on physical activity in children: A scoping review of the literature. *Journal of Exercise Science & Fitness*, 19(3), 195-203.