

Observational Study of Animal-Based Physical Exercise Programs for Improving Fundamental Movement Skills in Toddlers

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ABSTRACT

Early childhood is a critical period for the development of fundamental movement skills (FMS). However, Indonesia continues to face challenges related to motor development, with motor delays affecting approximately 29.9% of children. This study aimed to develop an Animal-Based Physical Exercise program designed to support FMS development in toddlers through a simple, contextual, and enjoyable approach. This study employed a descriptive observational design with a limited pilot implementation. The study involved seven toddlers aged 2-5 years and two instructors at a fitness studio in Surabaya. Data were collected through direct observation of physical exercise activities and brief interviews with the instructors. The observation findings were used to develop the Animal-Based Physical Exercise program, which was subsequently implemented on a limited basis with two toddlers aged 1.5 and 4 years. The collected data were analyzed descriptively by organizing and interpreting the observation and implementation findings. The observations showed that younger children required more guidance and participated less consistently during the activities, whereas the older child was able to follow the movement sequence more independently and participated actively throughout the session. These observations suggest that children's responses to physical exercise may vary according to their developmental stage. The developed Animal-Based Physical Exercise program integrates animal imitation movements into structured play activities to encourage locomotor skills, balance, coordination, and active participation. This study provides a practical and contextually appropriate physical exercise program that can be implemented in fitness studios, early childhood education settings, and at home to support toddlers' motor development. The findings also provide preliminary information for developing age-appropriate physical activity programs and may serve as a reference for future studies involving larger samples and longer implementation periods.

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1. INTRODUCTION

Children aged 1-4 years are in the golden period of growth and development, during which fundamental movement skills (FMS) begin to develop rapidly (Supriady et al., 2023). Appropriate stimulation during this stage is essential to support optimal motor development. However, developmental disorders remain a major public health concern worldwide. According to the World Health Organization (WHO), 28.7% of toddlers experienced growth and developmental disorders in 2018. Developmental delays affect approximately 12-16% of children in the United States, 22% in Argentina, and 24% in Thailand. In Southeast Asia, Indonesia ranks third among countries with the highest prevalence of growth and developmental disorders. National data indicate that approximately 29.9% of Indonesian children experience motor developmental delays. Furthermore, developmental disorders affect 33.5% of Indonesian children, with 22.1% classified as having developmental disorders and 11.4% categorized as having questionable development. Speech disorders account for the highest proportion (46.8%), followed by motor delays (30.9%) (Maheswari et al., 2025). A regional study conducted in Sidoarjo also reported that 15.4% of children had questionable development, while 1.3% showed abnormal developmental outcomes (Mudlikah et al., 2021).

Developmental disorders during early childhood may have both short-term and long-term consequences. In the short term, motor delays can limit children's ability to perform age-appropriate movements, participate in play activities, and interact confidently with their peers. If left unaddressed, these delays may persist into later childhood, reducing participation in physical activity and potentially affecting children's overall growth and development. Therefore, early stimulation is essential to support optimal motor development and prevent further developmental difficulties.

Fundamental movement skills are the basic movement patterns that form the foundation for more complex motor abilities and lifelong participation in physical activity. These skills include locomotor, non-locomotor, and manipulative movements, all of which play an important role in supporting children's physical development (Feldasha Atha Cahya Dewi et al., 2025). In addition to motor competence, FMS contribute to cognitive, social, and emotional development. Children with well-developed FMS are generally more confident in participating in physical activities, whereas poor FMS are associated with lower physical activity levels and an increased risk of developmental delays (Kusnandar et al., 2021).

Physical exercise is an effective strategy for stimulating the development of FMS during early childhood. One approach involves incorporating animal imitation movements into play-based activities (Heru saputra, 2025). Previous studies have demonstrated that animal-based movement programs, such as Animal Fun, improve children's motor skills and can be easily integrated into daily activities (PolICASTRO et al., 2022). Animal-based movements have also been reported to improve coordination, balance, and muscle strength (Sidik et al., 2025). In addition, structured physical exercise programs consistently have been shown to enhance children's fundamental movement skills and physical fitness (Wang et al., 2022). However, the implementation of animal-based physical exercise programs remains limited in Indonesia, highlighting the need for programs tailored to the characteristics of Indonesian toddlers.

Therefore, this observational study aimed to develop an animal-based physical exercise program based on observational findings and tailored to the developmental characteristics of Indonesian toddlers. The proposed program consists of simple, enjoyable movements that can be performed using readily available equipment at home or in early childhood education settings. The novelty of this study lies in the development of a practical, contextually relevant exercise program designed for Indonesian toddlers. In addition, this study supports Sustainable Development Goal (SDG) 3 by promoting healthy growth and development through age-appropriate physical activity in early childhood.

2. METHOD

This study employed a descriptive observational design, aiming to describe the implementation of physical exercise among toddlers and develop an Animal-Based Physical Exercise program based on field observations. Following the observation stage, the developed program was implemented on a limited basis to observe children's responses to the activities. This implementation served as an initial application of the program and was not intended to evaluate the program's effectiveness.

The study was conducted at a fitness studio in Surabaya. The participants consisted of seven toddlers aged 2-5 years as the primary subjects and two instructors as supporting subjects. The toddlers included in this study

were children who regularly participated in physical exercise activities at the study site, were able to follow simple movement instructions, and obtained parental consent. The instructors were actively involved in conducting the exercise sessions. Because the participants represented different developmental stages, the observations focused on each child's participation and responses based on their individual developmental characteristics rather than making direct comparisons between age groups. After the program was developed, a limited implementation was conducted with two toddlers aged 1.5 and 4 years to observe their responses to the developing activities.

Data collection was conducted after obtaining permission from the partner institution. Primary data were collected through direct observation of physical exercise activities using a non-participatory approach to obtain an objective description of the existing exercise sessions. Brief interviews were also conducted with the instructors to obtain additional information regarding the implementation of the activities. The observations focused on the type of physical activity, session structure, exercise intensity, duration, and children's participation and responses. The observation was conducted once for approximately one hour according to the study schedule. To minimize potential bias, observations were conducted systematically using the same observation focus for all participants, findings were compared with information obtained from instructor interviews through simple triangulation, and all field data were documented consistently throughout the study.

Based on the observation findings, an Animal-Based Physical Exercise program was developed by maintaining the existing session structure while adapting the movements into simple animal imitation activities appropriate for toddlers. The program consisted of four sessions, namely warm-up, main activity, fun games, and cool-down, with a total duration of approximately 30-45 minutes. The activities emphasized locomotor movements, balance, coordination, agility, and body control through play-based exercises.

Table 1. Summary of Observed Physical Activities

Session	Type of Activity	Intensity Level	Duration
Warm Up	Stretching and light body movements	Low - Moderate	±7 min 30 sec
Main Activity	Running, jumping, obstacle activities	Moderate High	±18 minutes
Fun Games	Object transfer, zig zag running	Moderate	±7 minutes
Cool Down	Relaxation and stretching	Low	±7 minutes

The developed Animal-Based Physical Exercise program integrated animal-imitation movements into each exercise session while maintaining the original activity sequence, ensuring the movements remained familiar and easy for toddlers to follow.

Table 2. Animal Based Physical Activity Program Design

Session	Activity Example	Animal Imitation	Purpose
Warm Up	Walking, clapping, arm rotation	Penguin, bird, octopus	Flexibility & mobility
	Balance and light jumping	Flamingo, rabbit	Balance & coordination
Main Activity	Running and object carrying	Ant, cheetah	Locomotor skills
	Jumping and obstacle movement	Frog, goat	Agility & balance
	Bouncing	Bunny	Coordination
Fun Games	Object transfer and zig-zag running	Ant, snake	Coordination & agility
	Stop and go movement	Various animals	Control & reaction
Cool Down	Stretching and relaxation movements	Turtle, Panda	Body control & flexibility
	Neck and body stretching	Owl, butterfly	Flexibility

The developed program was subsequently implemented on a limited basis under the researcher's guidance with two toddlers aged 1.5 and 4 years to observe their responses to the activities. The collected data were analyzed descriptively by systematically organizing, grouping, and interpreting the observation and implementation findings to provide a comprehensive description of the physical exercise activities and the developed program. The findings are presented as narrative descriptions supported by field observations.

3. RESULTS AND DISCUSSION

Based on observations and interviews at the partner site regarding physical exercise activities for toddlers, the researchers found that 7 children participated. The participants' characteristics are shown in Table 3.

Table 3. Characteristics of Participants

Variable	Category	Frequency (n)	Percentage
Gender	Female	2	28,6%
	Male	5	71,4%
Total		7	100%
Age	2 years	2	28,6%
	4 years	1	14,3%
	5 years	4	57,1%
Total		7	100%

The participants represented different stages of early childhood development, ranging from 2 to 5 years of age. To minimize potential bias associated with developmental differences, the observations focused on each child's participation, response, and ability to follow the activities according to their developmental stage rather than making direct comparisons between age groups.

During the observation, variations in children's responses were identified. Among the two-year-old participants, one child actively participated, demonstrated enthusiasm, and followed most of the movements. The other child required additional guidance and participated less consistently, although several movements were completed successfully. In contrast, children aged 4-5 years generally appeared more active, followed the instructor's directions throughout the session, and completed the movement sequence more consistently. These observations describe children's participation during the exercise sessions and should not be interpreted as evidence of developmental differences between age groups.

Based on these observations, an Animal-Based Physical Exercise program was developed using simple animal-imitation movements while maintaining the original session structure. The program was then implemented on a limited basis with two toddlers aged 1.5 and 4 years. During the implementation, the younger child was able to perform several movements gradually but required more guidance and participated less consistently throughout the activities. In comparison, the four-year-old child actively participated from the early and late parts and completed most activities enthusiastically. These findings provide an initial description of children's responses to the developed program rather than evidence of its effectiveness.

3.1. Age and Gender Differences in Children's Physical Exercise Response

Variations in children's responses to physical exercise activities were observed across different age groups. Based on the observations, children aged 4-5 years appeared to be more active, followed instructions more consistently, and completed all activities in a structured manner. In contrast, children aged 2 years showed more varied responses, ranging from very active participation to needing additional guidance during several activities. These observations may reflect differences in motor development that naturally occur with increasing age. Previous studies have reported that children with more developed motor competence tend to participate more actively in physical activities (den Uil et al., 2023).

Motor competence is an important component of fundamental movement skills (FMS), which provide the foundation for children's participation in physical activities. The development of these skills is influenced by several factors, including maturation of the central nervous system, neuroplasticity, genetic factors, environmental conditions, and cognitive processes involved in motor learning. Previous research has also shown that children with better motor competence generally demonstrate greater participation in physical activities (Piotrowski et al., 2025). Therefore, the age-related differences observed in this study may reflect differences in developmental stage rather than individual characteristics alone.

Gender has also been discussed in previous studies as a factor that may be associated with differences in children's physical activity. However, based on the observations in this study, boys and girls showed comparable participation and responses during the physical exercise sessions. The observed differences appeared to be more

closely related to individual developmental characteristics than to gender. This observation is consistent with previous findings suggesting that differences in physical activity between boys and girls are relatively small during early childhood (Kretschmer et al., 2023). Other studies have reported that girls may demonstrate better locomotor skills, whereas boys tend to spend more time engaging in moderate-to-vigorous physical activity (MVPA) (Ma & Luo, 2023).

Overall, the observations suggest that age may be associated with differences in children's responses to physical activity, while no clear differences between genders were observed in this study. Older children appeared to demonstrate greater physical readiness, coordination, and consistency in participating in the activities. However, these findings are based on descriptive observations and should be interpreted with caution, considering the limited number of participants and the absence of statistical analysis.

3.2. Characteristics of Physical Activity in Early Childhood

The observation results showed that the physical exercise program consisted of four main sessions: warm-up, physical activity, fun games, and cool-down, with a total duration of approximately 30-45 minutes. The activities included locomotor movements, coordination exercises, and simple play-based tasks. According to the 2021 World Health Organization (WHO) recommendations, children aged 1-2 years should engage in at least 180 minutes of physical activity each day involving a variety of movement types. Children aged 3-4 years are also recommended to accumulate at least 180 minutes of daily physical activity, including at least 60 minutes of moderate-to-vigorous physical activity (MVPA) (*Physical Activity*, n.d.). These recommendations emphasize active play involving locomotor, balance, and coordination movements (McGowan et al., 2023).

Based on the observations, the activities implemented in this study included walking, running, jumping, navigating obstacles, and carrying objects, which represent basic locomotor and coordination movements. These activities are consistent with movement components that support gross motor development in early childhood (Salsabila & Pratama, 2025). Previous studies have also reported that running, jumping, and game-based activities increased participation in moderate-to-vigorous physical activity (MVPA), whereas more passive activities are generally associated with lower activity intensity (Kyhälä et al., 2021). Therefore, the observed exercise program reflects movement characteristics that are considered beneficial for supporting children's motor development.

Based on field observations, the core activity and fun game sessions involved continuous movements such as running, jumping, and active play, indicating a moderate-to-high level of physical activity, whereas the warm-up and cool-down sessions involved lighter movements. This classification was derived from the observed characteristics of the activities rather than from objective measurements of exercise intensity. Although each session lasted approximately 30-45 minutes and did not meet the WHO recommendation of at least 180 minutes of daily physical activity, the program can be considered a structured physical activity that contributes to children's daily movement opportunities. Therefore, the developed program aligns with the recommended types of physical activity but should be complemented with additional daily activities to achieve the recommended duration.

3.3. Animal Based Physical Exercise Program in Early Childhood (FMS Oriented Approach)

Animal Based Physical Exercise is a program designed to increase children's engagement and participation in physical activities. Observations indicate that while children can participate in physical exercise, their responses vary, particularly among younger children. The animal-imitation approach was chosen because it incorporates imaginative and playful elements that align with the developmental stage of young children, who tend to learn through play and exploration. Additionally, the integration of animal imitation movements in this program aims to develop several fundamental movement skills (FMS), such as locomotor ability, balance, coordination, and body control. Movements such as hopping (imitating a rabbit), crawling (imitating a bear), or walking with balance (imitating a flamingo) provide diverse stimulation to children's motor systems. Studies indicate that developing FMS through structured and varied physical activities can enhance motor skills and support children's long-term engagement in physical activity (Policastro et al., 2022).

A play-based activity approach was used in this study because it aligns with the characteristics of young children, who learn through play. This approach is child-centered and enhances children's engagement, because the activities are designed to be enjoyable (Taylor & Boyer, 2020). In the context of physical activity, play-based activities such as running, jumping, and interactive games can enhance children's motivation, participation duration, and motor skills, including coordination and balance. Therefore, this approach is integrated into animal-

based physical activity programs to encourage children's active participation while optimally developing fundamental movement skills (Sulyman et al., 2024). In addition to increasing engagement, this approach offers flexibility in implementation activities. Animal-based movements can be adapted according to children's ages and abilities, allowing them to be used across various age groups and difficulty levels. This is important given the variation in abilities among young children, as found in the observational results of this study.

3.4. Limitations and Strengths

This study has several limitations. The small number of participants, particularly during the program implementation phase, which involved only two children, limits the generalizability of the findings. In addition, the relatively short duration of the study and observation periods restricted the ability to assess long-term changes and conduct more comprehensive evaluations. To minimize potential bias, observations were conducted systematically using a non-participatory approach during the initial stage, findings were compared with information obtained from instructor interviews through simple triangulation, and all data were documented consistently throughout the study. Despite these limitations, this study has the advantage of integrating field observation findings with the development of an applicable program and provides preliminary insights into children's responses to the Animal-Based Physical Exercise approach.

3.5. Recommendation

Based on the research findings, it is recommended that the Animal-Based Physical Exercise program be further developed by recruiting more participants and extending the intervention duration. Additionally, this program can be implemented to stimulate children's growth and development, particularly by enhancing physical activity and gross motor skills. Healthcare professionals, especially midwives, can also use this play-based approach as an educational tool to support parents in their children's development.

4. CONCLUSION

Structured physical exercise activities, organized into warm-up, main activity, fun games, and cool-down sessions, play a crucial role in stimulating fundamental movement skills (FMS) in young children, including locomotor skills, balance, coordination, and body control. Differences in children's responses were clearly evident across age groups. Children aged 4-5 years demonstrated more active participation, followed instructions more consistently, and completed activities in a more structured manner than younger children. This reflects the influence of motor development maturity on children's engagement in physical activities.

The development of an Animal-Based Physical Exercise program that integrates animal imitation movements with a play-based approach positively impacts children's interest and engagement. This approach makes the activities more engaging, enjoyable, and aligned with the learning characteristics of young children. Overall, the developed program has advantages because it is simple, flexible, and easy to implement. Therefore, this program has the potential to be used as an alternative for stimulating physical activity in both home and early childhood education settings to support children's optimal motor development.

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