



Exploring the Role of Outdoor and Structured Physical Activities in Enhancing Motor Competence in Preschool Children: A Systematic Literature Review

Review Article

Zainal Widyanto

Cenderawasih University,
INDONESIA

Julian Dewantara

Yogyakarta State University,
INDONESIA

Yusril*

Yogyakarta State University,
INDONESIA

Abstract.

Background

Early childhood is a crucial period for the development of motor, cognitive, and social skills. Among these, motor competence plays a key role as it forms the foundation for future physical activity and overall well-being. The aim of this systematic literature review is to explore the role of structured and unstructured outdoor physical activities in enhancing motor competence in preschool children, focusing on how these activities influence the development of motor skills and physical fitness.

Objectives

The aim of this systematic literature review is to explore the role of structured and unstructured outdoor physical activities in enhancing motor competence in preschool children, focusing on how these activities influence the development of motor skills and physical fitness.

Methods

A systematic search of relevant literature was conducted in three databases: Google Scholar, ScienceDirect, and PubMed. Keywords related to ("exercise OR physical activity OR sports activity" AND preschoolers OR early childhood") are used to identify studies published between 2020 and 2025. After applying the exclusion criteria, 8 articles were included in the analysis. Studies were reviewed to assess the effectiveness of structured and unstructured outdoor activities in improving motor skills.

Results

Both structured and unstructured physical activities were found to positively impact motor skills, with unstructured activities, particularly outdoor play, showing more significant benefits in improving locomotion and object control skills. Additionally, outdoor play was associated with higher levels of moderate-to-vigorous physical activity (MVPA), which is crucial for overall motor competence.

Conclusion

This review highlights the importance of integrating both structured and unstructured outdoor physical activities into preschool programs. Outdoor play, in particular, offers unique benefits by promoting diverse physical movements that enhance motor competence. Future educational and policy frameworks should emphasize creating safe, accessible outdoor play spaces to foster these benefits in early childhood.

Keywords: physical, motor, child, preschool

Received: January 27, 2025. Accepted: March 23, 2025

*Correspondence: yusril.2023@student.uny.ac.id

Yusril

Yogyakarta State University, Indonesia



Copyright: © 2025 by the authors. Published by KHATEC, Pontianak, Indonesia. This is an Open Access article distributed under the terms of the Creative Commons Attribution License ([Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/)), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Early childhood is an important period for the development of cognitive, cognitive, and social skills. Among them, the development of motor competence plays an important role as it becomes the basis for future physical activity and overall well-being [1]. Motor competence, which includes various aspects of skills such as locomotor control, object control, and balance, is essential not only for participation in physical activity but also for promoting cognitive development, confidence, and social interaction in young children [2]. Research [3] has consistently shown that proficiency in basic motor skills (FMS) is a predictor of sustained engagement in physical activity throughout life. Therefore, understanding the factors that influence the development of motor competence in preschool-aged children is essential to form effective interventions and promote lifelong physical activity.

Physical activity is recognized as one of the most influential factors in improving motor competence in early childhood [4]. The importance of physical activity, especially during the preschool years, cannot be overstated as it directly impacts children's physical health, cognitive function, and emotional well-being [5]. However, despite the recognized benefits, many preschool-age children fail to meet recommended levels of physical activity [6]. This gap is certainly concerning, as it could contribute to the increasing global epidemic of physical inactivity and childhood obesity, which has long-term implications for public health [7].

Dalam mengatasi masalah ini, aktivitas fisik sering dikategorikan ke dalam bentuk terstruktur dan unstructured, each with different characteristics and potential benefits. Structured physical activity typically involves an organized program led by an instructor or caregiver, in which specific motor skills are targeted, such as running, jumping, or catching [8]. These activities often follow a set routine and are designed to develop specific aspects of motor competence. On the other hand, unstructured physical activity, such as free play or outdoor exploration, gives children the freedom to move spontaneously, fostering creativity and self-regulation in Movement [9]. Both forms of activities have been shown to support motor development, but their comparative effectiveness and role in fostering motor competence in preschoolers remain the subject of debate and research.

Outdoor physical activity, which includes both structured and unstructured activities, is significant. Studies have shown that spending time outdoors not only increases physical activity levels but also promotes better motor development compared to indoor activities [10]. Outdoor environments encourage children to engage in a wider range of movements, including climbing, running, and balancing, which are essential for developing motor skills [11]. Additionally, outdoor play is associated with greater involvement in moderate to strenuous physical activity (MVPA), which is critical for overall motor health and competence [12].

Despite the growing body of evidence on the benefits of physical activity for preschoolers, there is still a need for comprehensive studies that synthesize the existing literature on the specific role of structured and unstructured physical activity, especially outdoors, in improving motor competence. In addition, while some studies have explored this relationship independently, systematic reviews comparing and contrasting the impact of the two types of activity on early childhood are lacking. This systematic literature review aims to fill this gap by exploring the role of outdoor and structured physical activity in improving motor competence in preschoolers. By synthesizing existing research, this review will provide insights into how different types of physical activity contribute to the development of basic motor skills and physical fitness, and how outdoor play can offer additional benefits in this regard. Next, it will examine the effectiveness of structured interventions compared to naturalistic and unstructured play, offering a comprehensive understanding of how best to support the development of motor skills in early childhood. The findings of this review have the potential to inform early childhood education practices, public health interventions, and policymaking, with the ultimate goal of promoting physical activity and motor competence from an early age.

METHOD

Search Strategy

The literature search for this study was conducted using three main databases: Google Scholar, ScienceDirect and PubMed. ScienceDirect was chosen because of its broad coverage of scientific literature, especially in the fields of science, engineering, and health. PubMed was chosen because it is a widely recognized indexing system that is often used by researchers around the world to access biomedical and health science literature [13].

The search strategy involves using a combination of the following keywords: ("sports OR physical activity OR sports activities" AND preschoolers OR early childhood"). These keywords were chosen to capture relevant publications that discuss the influence of physical activity in the aging process in older adults. The search follows the guidelines of Preferred Reporting Items for Systematic Review and MetaAnalysis (PRISMA) [14], which prioritize transparency and comprehensiveness in systematic reviews [15].

Exclusion Criteria

The following exclusion criteria apply: (1) Articles not published in Scopus or Web of Science indexed journals, (2) Articles in languages other than English, (3) Articles published before 2020 or after 2025, and (4) Articles that do not explicitly affect physical activity in improving motor competence in preschoolers.

Procedure

Initial searches yielded 1,335 publications: 1,121 from Google Search, 85 from ScienceDirect and 129 from PubMed. After applying the exclusion criteria, the final number of relevant articles was reduced to 8, with many being excluded due to a lack of a specific focus on outdoor physical activity in improving preschoolers' motor competence. The remaining articles are extracted and analyzed using Mendeley's software to remove duplicates. A detailed overview of the article selection and screening process is presented in Figure 1.

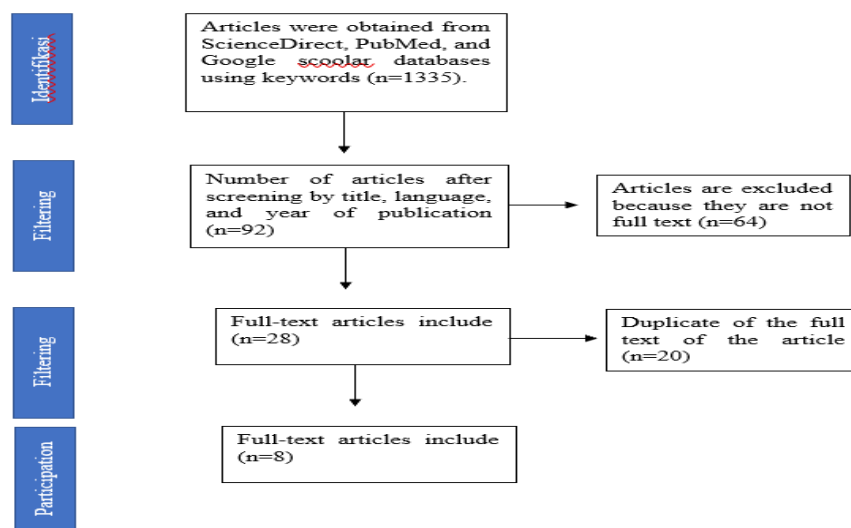


Figure 1. PRISMA research flow diagram

Results

This study reviewed studies related to outdoor and structured physical activity in improving motor competence in preschoolers. Therefore, only research articles examining outdoor and structured physical activity in preschoolers were reviewed. Based on the review, articles are divided into four categories, namely (i) Author and Year, (ii) Journal Name, (iii) Research Objectives, and (iv) Research Results. This study aims to make a meaningful contribution to the existing literature on the importance of outdoor and structured physical activity in improving motor competence in preschoolers. These findings are based on a review of 14 articles, which are summarized in Table 1 **Table 1**.

Results of the review of articles that match the research theme

Author and year	Jurnal name	Research objectives	research result
[16]	Sports	To compare the effectiveness of conductivist and constructivist teaching methods on gross motor development in preschoolers.	Both groups showed improvement in motor skills, but the conductivist model (Group 1) was more effective in improving walking and running abilities, especially in the "Acquired" and "In Process" skill levels.
[17]	Sustainability	To assess the effects of structured vs unstructured physical activity on preschoolers' motor skills.	Both structured and unstructured physical activities showed positive effects on motor skills, but unstructured activities were more effective in improving locomotion and object control skills.
[10]	BMC Public Health	To explore the association between outdoor time and physical activity levels in preschoolers.	Increased daily outdoor time was positively associated with physical activity, especially in girls. No significant link was found between outdoor time and locomotor skills.
[11]	BMC Public Health	To explore how diversified physical activity at age 6 impacts later motor competence and physical activity levels at ages 9 and 13.	Diversified physical activity at age 6 positively influenced motor competence and physical activity at ages 9 and 13, with motor competence acting as a mediator.
[18]	Journal of Sports Sciences	To investigate the association between physical activity intensity and fundamental motor	Moderate and vigorous physical activities showed a strong positive association with fundamental motor skills like locomotion, object control, and balance.

		skills in preschool children.	
[19]	Frontiers in Public Health	To explore the relationship between physical activity, fundamental motor skills, and body mass index in preschool children.	Physical activity was positively correlated with motor skills. However, there was no significant correlation between BMI and motor skills or physical activity levels.
[20]	International Journal of Behavioral Nutrition and Physical Activity	To evaluate the bidirectional relationship between physical activity and motor skills in preschool children.	Moderate-to-vigorous physical activity (MVPA) was positively associated with improvements in fundamental motor skills. However, motor skills were not linked to future increases in physical activity.
[21]	Journal of Sports Science and Medicine	To investigate the effects of guided active play vs active play on physical activity levels and fundamental motor skills in school-aged children.	Guided active play showed significant improvements in physical activity and motor skills, especially for locomotor skills, compared to free play.

RESULTS AND DISCUSSION

Discussion

The role of outdoor and structured physical activity in improving motor competence in preschoolers is a multifaceted problem that intersects with many developmental domains. This systematic literature review underscores the importance of physical activity during childhood, with particular attention to its impact on motor skills, physical health, cognitive development, and emotional well-being.

Motor Competence Development: Structured vs. Unstructured Activities

Literatur secara konsisten menyoroiti bahwa aktivitas fisik terstruktur dan tidak terstruktur memiliki dampak positif pada pengembangan keterampilan motorik. Kegiatan terstruktur, seperti program fisik terorganisir yang dipimpin oleh instruktur, sangat efektif dalam menargetkan keterampilan motorik tertentu seperti berlari, melompat, dan manipulasi objek. Kegiatan ini mengikuti rutinitas yang memungkinkan pengembangan keterampilan yang ditargetkan dan berurutan [17]. Di sisi lain, aktivitas tidak terstruktur, seperti bermain bebas di lingkungan luar ruangan, mendorong kreativitas, pengaturan diri, dan gerakan spontan, yang penting untuk perkembangan motorik holistik. Menariknya, penelitian menunjukkan bahwa permainan tidak terstruktur, terutama di luar ruangan, cenderung memiliki efek yang lebih signifikan dalam pengembangan keterampilan penggerak dan kontrol objek, karena memungkinkan anak-anak untuk terlibat dalam beragam gerakan yang meniru tantangan fisik kehidupan nyata [17].

The Importance of Outdoor Play

Outdoor play, in particular, has emerged as an important factor in improving motor competence. The benefits of outdoor physical activity are numerous. First, the outdoor environment naturally provides opportunities for more diverse and intense physical activities, such as climbing, balancing, and running, which are integral to the development of motor skills [10]. These activities engage children in moderate to strenuous physical activity (MVPA), which has been strongly correlated with the development of better motor skills. Additionally, outdoor settings foster a stronger relationship between physical activity and social engagement, as children often play in groups, promoting physical and social development [22].

Physical Activity and Long-Term Benefits

The relationship between early motor competence and physical activity participation is then well established. Research has consistently shown that the development of basic motor skills during the preschool years is a strong predictor of future levels of physical activity [23]. These basic skills, such as balance and coordination, not only improve immediate physical abilities but also serve as a gateway to lifelong physical engagement. For example, children who develop better motor skills at an early age are more likely to participate in physical activity as they age, leading to long-term health benefits [24].

Comparing Structured and Unstructured Approaches

While structured activities are essential for skill-focused development, the combination of structured and unstructured play seems to offer the most all-encompassing benefits. Structured activities provide a framework for mastering specific skills, while unstructured play fosters creativity and adaptability, which are equally important for a child's development [22]. The synergy between these two forms of activity can provide a balanced approach, allowing children to develop technical motor skills and exploration.

Based on the findings from this review, it is recommended that early childhood education programs and policy frameworks place a greater emphasis on outdoor play and incorporate both structured and unstructured physical activities into daily routines. Programs that blend both approaches may maximize the development of motor skills while also promoting social and cognitive growth. Additionally, there is a need for policies that support the creation and maintenance of safe and accessible outdoor play spaces for young children. Municipal and educational leaders should work collaboratively to ensure that children have access to environments that encourage active play and physical exploration.

CONCLUSION

This systematic review highlights the important role of structured and unstructured physical activity in improving motor competence in preschoolers. Outdoor play, in particular, emerged as an important factor in promoting the development of motor skills due to its natural boost from various physical movements such as running, climbing, and balancing. Both types of activities contribute uniquely to motor skill acquisition, with structured activities focusing on the development of targeted skills, and unstructured activities that foster creativity and spontaneous movement. These findings underscore the

need for early childhood education programs to integrate structured and unstructured activities into daily routines to maximize developmental outcomes. Ensuring access to safe outdoor play spaces is essential to cultivating these benefits, thereby promoting physical, cognitive, and social development among preschool-age children.

ACKNOWLEDGMENT

Thank you to those who helped in completing this research.

AUTHOR CONTRIBUTION STATEMENT

ZW is responsible for conceptualizing and designing studies, collecting data, and drafting manuscripts. JD. contributes to the analysis, interpretation of results, and critical revision of manuscripts. Y acts as a correspondence writer, handling all correspondence and revisions related to publications.

CONFLICT OF INTEREST AND FUNDING

There is no conflict of interest

REFERENCES

- [1] F. Bardid, T. Utesch, D. F. Stodden, and M. Lenoir, "Developmental perspectives on motor competence and physical fitness in youth," *Scand. J. Med. Sci. Sports*, vol. 31, no. S1, pp. 5–7, Apr. 2021, doi: 10.1111/sms.13946.
- [2] D. Niemistö, L. M. Barnett, M. Cantell, T. Finni, E. Korhonen, and A. Sääkslahti, "Socioecological correlates of perceived motor competence in 5- to 7-year-old Finnish children," *Scand. J. Med. Sci. Sports*, vol. 29, no. 5, pp. 753–765, May 2019, doi: 10.1111/sms.13389.
- [3] K. Wick *et al.*, "Interventions to Promote Fundamental Movement Skills in Childcare and Kindergarten: A Systematic Review and Meta-Analysis," *Sport. Med.*, vol. 47, no. 10, pp. 2045–2068, Oct. 2017, doi: 10.1007/s40279-017-0723-1.
- [4] E. A. Schmutz *et al.*, "Motor Competence and Physical Activity in Early Childhood: Stability and Relationship," *Front. Public Heal.*, vol. 8, Feb. 2020, doi: 10.3389/fpubh.2020.00039.
- [5] J. Gil-Moreno and M. Rico-González, "The Effects of Physical Education on Preschoolers' Emotional Intelligence: A Systematic Review," *Sustainability*, vol. 15, no. 13, p. 10632, Jul. 2023, doi: 10.3390/su151310632.
- [6] M. Bourke, A. Haddara, A. Loh, V. Carson, B. Breau, and P. Tucker, "Adherence to the World Health Organization's physical activity recommendation in preschool-aged children: a systematic review and meta-analysis of accelerometer studies," *Int. J. Behav. Nutr. Phys. Act.*, vol. 20, no. 1, p. 52, Apr. 2023, doi: 10.1186/s12966-023-01450-0.
- [7] N. Stratakis and M. Vrijheid, "Invited Perspective: PFAS and the Childhood Obesity Phenotype—Challenges and Opportunities," *Environ. Health Perspect.*, vol. 131, no. 6, Jun. 2023, doi: 10.1289/EHP12713.
- [8] N. J. Rinehart, S. Jeste, and R. B. Wilson, "Organized physical activity programs: improving motor and non-motor symptoms in neurodevelopmental disorders," *Dev. Med. Child Neurol.*, vol. 60, no. 9, pp. 856–857, Sep. 2018, doi: 10.1111/dmcn.13962.
- [9] K. A. Dankiw, M. D. Tsiros, K. L. Baldock, and S. Kumar, "The impacts of unstructured nature play on health in early childhood development: A systematic review," *PLoS One*, vol. 15, no. 2, p. e0229006, Feb. 2020, doi: 10.1371/journal.pone.0229006.
- [10] S. Kwon, P. S. Tandon, M. E. O. Neill, and A. B. Becker, "Cross - sectional association of light sensor - measured time outdoors with physical activity and gross motor competency among U . S . preschool - aged children : the 2012 NHANES National Youth Fitness Survey," *BMC Public Health*, pp. 1–9, 2022, doi: 10.1186/s12889-022-13239-0.
- [11] P. S. Melby, P. Elsborg, G. Nielsen, R. A. Lima, P. Bentsen, and L. B. Andersen, "Exploring the importance of diversified physical activities in early childhood for later motor competence and physical activity level: a seven-year longitudinal study," *BMC Public Health*, vol. 21, pp. 1–15, 2021.
- [12] J. Gustat, C. E. Anderson, and S. J. Slater, "Association of Playground 'Playability' With Physical Activity and Energy Expenditure," *Prev. Chronic Dis.*, vol. 20, p. 220247, Apr. 2023, doi: 10.5888/pcd20.220247.

- [13] P. Ossom Williamson and C. I. J. Minter, "Exploring PubMed as a reliable resource for scholarly communications services," *J. Med. Libr. Assoc.*, vol. 107, no. 1, Jan. 2019, doi: 10.5195/jmla.2019.433.
- [14] L. Basenach, B. Renneberg, H. Salbach, M. Dreier, and K. Wölfling, "Systematic reviews and meta-analyses of treatment interventions for Internet use disorders: Critical analysis of the methodical quality according to the PRISMA guidelines," *J. Behav. Addict.*, vol. 12, no. 1, pp. 9–25, Mar. 2023, doi: 10.1556/2006.2022.00087.
- [15] R. van de Schoot *et al.*, "An open source machine learning framework for efficient and transparent systematic reviews," *Nat. Mach. Intell.*, vol. 3, no. 2, pp. 125–133, Feb. 2021, doi: 10.1038/s42256-020-00287-7.
- [16] S. Calero-Morales, G. del C. Vinueza-Burgos, C. L. Yance-Carvajal, and W. J. Paguay-Balladares, "Gross motor development in preschoolers through conductivist and constructivist physical recreational activities: comparative research," *Sports*, vol. 11, no. 3, p. 61, 2023.
- [17] R. Abusleme-Allimant *et al.*, "Effects of structured and unstructured physical activity on gross motor skills in preschool students to promote sustainability in the physical education classroom," *Sustainability*, vol. 15, no. 13, p. 10167, 2023.
- [18] E. S. Haugland *et al.*, "Multivariate physical activity association patterns for fundamental motor skills and physical fitness in preschool children aged 3 – 5 years physical fitness in preschool children aged 3 – 5 years," *J. Sports Sci.*, vol. 41, no. 7, pp. 654–667, 2023, doi: 10.1080/02640414.2023.2232219.
- [19] F.-F. Ma and D.-M. Luo, "Relationships between physical activity, fundamental motor skills, and body mass index in preschool children," *Front. Public Heal.*, vol. 11, p. 1094168, 2023.
- [20] A. K. O. Nilsen *et al.*, "Bi-directional prospective associations between objectively measured physical activity and fundamental motor skills in children: A two-year follow-up," *Int. J. Behav. Nutr. Phys. Act.*, vol. 17, pp. 1–11, 2020.
- [21] A. Moghaddaszadeh and A. N. Belcastro, "Guided active play promotes physical activity and improves fundamental motor skills for school-aged children," *J. Sports Sci. Med.*, vol. 20, no. 1, p. 86, 2021.
- [22] P. S. Melby, P. Elsborg, G. Nielsen, R. A. Lima, P. Bentsen, and L. B. Andersen, "Exploring the importance of diversified physical activities in early childhood for later motor competence and physical activity level: a seven-year longitudinal study," *BMC Public Health*, vol. 21, no. 1, p. 1492, Dec. 2021, doi: 10.1186/s12889-021-11343-1.
- [23] M. J. Duncan, C. Hall, E. Eyre, L. M. Barnett, and R. S. James, "Pre-schoolers fundamental movement skills predict BMI, physical activity, and sedentary behavior: A longitudinal study," *Scand. J. Med. Sci. Sports*, vol. 31, no. S1, pp. 8–14, Apr. 2021, doi: 10.1111/sms.13746.
- [24] E. A. Schmutz *et al.*, "Physical activity and sedentary behavior in preschoolers: a longitudinal assessment of trajectories and determinants," *Int. J. Behav. Nutr. Phys. Act.*, vol. 15, no. 1, p. 35, Dec. 2018, doi: 10.1186/s12966-018-0670-8.