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A bibliometric analysis of research on physical activity and fitness among preschool children in Asia (2020-2024)

[1abcde]Sujarwo*, [2bcde]Sandey Tantra Paramitha, [1abcd]Andi Hasriadi Hasyim, [1abde]M. Gilang Ramadhan, & [1abd]Iwan Setiawan

[1]Department of Physical Education, Faculty of Sports Sience, Universitas Negeri Jakarta, Jakarta, Indonesia[1]
[1]Department of Sports Scince Programme, Faculty of Sport and Health Education, Universitas Pendidikan Indonesia, Bandung, Indonesia[2]

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ABSTRACT

Background: Physical activity (PA) and physical fitness (PF) are essential for preschool children's development. However, rising childhood obesity and sedentary lifestyles are concerning. A comprehensive analysis of the research landscape is necessary to inform better interventions and policies. **Research Objectives:** This study aims to conduct a bibliometric analysis of research on physical activity and physical fitness among preschool children in Asia from 2020 to 2024. **Methods:** The analysis was based on publications from Scopus and Web of Science, focussing on keyword co-occurrence, citation analysis, and co-authorship networks. We used tools like ScientoPy and VOSviewer to assess key metrics such as the number of publications, citations, and influential contributors. **Findings and Results:** The study reveals significant trends, with a peak in research productivity in 2022, reflecting heightened global attention on early physical health. China, Japan, and Iran led contributions, with China dominating in publication volume. Notable researchers included Saeed Ghorbani and emerging contributors Ahmad Chaeroni and Amir Dana. Leading journals, such as the International Journal of Environmental Research and Public Health and Frontiers in Public Health, were prominent sources. **Conclusion:** Despite a decline in productivity post-2022, PA and PF research for preschoolers remains important. These shifting trends provide opportunities for researchers to explore new areas or innovate approaches. Significant contributions from Asian researchers also indicate a geographic shift in the global research focus. This study also highlights the importance of physical activity in preschoolers and how trends in scientific publications can help policymakers formulate more effective interventions to improve children's fitness.

Keywords: Physical activity; physical fitness; preschool children; asia

***Corresponding Author**
sujarwo@unj.ac.id

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INTRODUCTION

Physical activity (PA) and fitness (PF) are essential for the development of preschool-aged children, as this stage represents a critical period for establishing healthy behavior patterns that can last a lifetime. Engaging in physical activity during early childhood contributes to motor skills development, cognitive growth, and overall well-being (Jing et al., 2024). The rise in childhood obesity and the increase in sedentary lifestyles highlight

the urgent need to understand trends in PA and PF among preschool-aged children (Grevnerts et al., 2024). Research shows that early interventions targeting PA can significantly reduce obesity rates and prevent long-term health issues (Han & Vitiello, 2023). These findings underscore the importance of focusing on this developmental phase because the effects of PA and PF interventions can extend into adulthood.

Significant global and regional changes, particularly in Asia, have impacted PA trends from 2020 to 2024. The onset of the COVID-19 pandemic in early 2020 resulted in lockdowns, school closures, and restrictions on outdoor activities (Johnson et al., 2024), leading to a significant reduction in PA levels among preschoolers (Filho et al., 2024). In many Asian countries, where urbanization and limited access to outdoor spaces already pose challenges to early childhood education and physical activity, the pandemic exacerbates these issues (Cheng et al., 2023; Liu et al., 2023). This period has seen an increase in research focused on how these disruptions have affected PA and PF among preschool-aged children in the region, as well as the exploration of digital and home-based interventions to support physical fitness (Li et al., 2024). Therefore, the years 2020 to 2024 offer a unique context to assess the shifts in research priorities and strategies related to PA and PF in Asian preschoolers.

Despite a growing body of global research on PA in children, significant gaps remain in understanding how PA relates to PF in preschool-aged children, particularly in Asia. While research in Western countries has extensively explored the relationship between PA and PF, studies in Asia often focus more broadly on health and education outcomes, neglecting the specific relationship between PA and PF during early childhood (Sun et al., 2018; Tsai et al., 2017). Given the unique sociocultural and economic conditions in Asia, region-specific research is necessary to develop interventions that are both effective and culturally relevant (Chandrasenage et al., 2024). Rapid economic growth and lifestyle changes in Asia are driving the growing prevalence of childhood obesity, underscoring the importance of understanding this relationship (Uijtdewilligen et al., 2016).

Recent research has increasingly aimed to identify the factors that both promote and hinder PA and PF in children, including environmental, familial, and institutional influences (Huang et al., 2022; Sell et al., 2024; Wang et al., 2024). Many studies have found that preschool children often lack adequate opportunities for physical activity, both at home and in educational settings (Al-Walah et al., 2024). Limited facilities and a lack of parental awareness regarding the importance of PA are additional challenges (Moreira et al., 2023). These circumstances underscore the need for structured, evidence-based interventions to ensure that children not only reap the immediate benefits of PA but also build a foundation for long-term health.

Children's early development is particularly important because by the age of three, they have already acquired 75% of their adult knowledge capacity, and this figure reaches 90% by the age of six (Barnett et al., 2016). Between the ages of six and seven, children reach a mature stage in fundamental motor skills, allowing them to perform movements in an efficient, coordinated, and controlled manner (Pagani & Messier, 2012). Physical education for preschool children provides excellent opportunities for developing these skills, but the lack of teacher training in effective PA delivery remains a significant barrier (Hadi et al., 2017). Therefore, it is crucial to expose children to movement skills from an early age—not just for athletes, but for all children to develop sufficient physical abilities to support a healthy future.

A bibliometric analysis is a powerful tool for evaluating the research landscape on PA and PF. It allows researchers to track publication trends, measure the influence of key contributors, and identify emerging themes in the literature. Researchers have used bibliometric analysis to look into many aspects of PA, such as its link with better sleep (Memon et al., 2020), changes in PA for kids with autism (Feng et al., 2022), how PA can slow down the ageing process (Möller et al., 2015) and the psychology of exercise in early childhood (Sheikhhoseini, 2024). Additionally, the use of virtual and augmented reality technologies in physical activity rehabilitation (Denche-Zamorano et al., 2023), as well as the impact of PA on children's quality of life (Završnik et al., 2019), are gaining attention. Furthermore, Sabe et al. (2022) have discussed trends in the interplay between PA, mental health, and well-being.

Although several studies on PA in preschool children exist (e.g., Jiménez-Jiménez et al. 2023), there remains a notable gap in research specifically linking PA to PF in this age group. This highlights the need for further analysis to better understand this relationship, which is vital for supporting their future physical development and overall well-being. The current study aims to fill this gap by using a bibliometric approach to map publication trends, researcher collaborations, and identify key themes and subthemes emerging from the relevant literature. This analysis will also evaluate how research on this topic has evolved and pinpoint areas that require further investigation.

The significance of this study is all the more apparent given the increasing prevalence of sedentary lifestyles in preschool-aged children, which has the potential to adversely affect their physical fitness and health in the future. Given that the preschool period is a critical stage in children's physical development, a deeper understanding of the relationship between physical activity and physical fitness is becoming increasingly important to support effective policies and interventions to improve early childhood wellbeing. This study aimed to identify publication trends, influential researchers, and key themes in the literature related to physical activity and physical fitness in preschool children. Therefore, the study poses the following research questions: **RQ1**. In recent years, how have publication trends related to physical activity and physical fitness in preschool children evolved? **RQ2**. Who are the influential researchers or institutions in this field? **RQ3**. What are the main themes and subthemes emerging in research on physical activity and physical fitness among preschool-aged children? **RQ4**. What areas of research remain underexplored and require further attention?

METHOD

This study employed a bibliometric analysis to systematically explore the research landscape surrounding physical activity (PA) and physical fitness (PF) among preschool-aged children. The bibliometric method is an effective tool for quantitatively evaluating trends in scientific literature by analysing patterns of publication, co-authorship, citation networks, and research collaborations (Kandeel et al., 2023). This approach allowed us to map the development of knowledge, identify key contributors and emerging themes, and pinpoint gaps in the literature that require further investigation.

Data Source and Search Strategy

Bibliometric data were extracted from reputable academic databases, namely Web of Science (WoS) and Scopus, which are widely used for bibliometric studies due to their extensive coverage of peer-reviewed publications (Endriani et al., 2024; Saharullah et al., 2023). The search included all relevant documents published until the present date. We used the boolean expression form (AND, OR) to search for the following keywords. The keywords to search for articles reporting on physical activity and physical fitness among

students are ("physical activity" OR "physical* activ*" OR "physical fitness" OR "motor activity" OR "motor activit*") AND ("preschool children" OR "children" OR "young child*" OR "child (MESH)" OR "child preschool (MESH)" OR "preschool*" OR "pre-school*"). A descriptive method was used to analyse the data obtained, and all titles and abstracts were reviewed for possible study inclusion. At the same time, the identification strategy was modified and adapted to the particular database to increase the sensitivity. After a detailed identification process, studies were considered to be relevant if they met the inclusion criteria.

Inclusion and Exclusion Criteria

This study included articles that examined the relationship between physical activity (PA) and physical fitness (PF) in preschool-aged children, typically aged between 3 and 6 years. Studies that explored the relationship between PA and PF, either directly or through indirect measures such as motor skills, health outcomes, or interventions aimed at improving physical activity and fitness were also considered. To maintain data quality, we included only peer-reviewed journal articles published in English. Additionally, the focus was on research conducted in the Asian region, taking into account the unique sociocultural and environmental factors that affect preschool-aged children in these countries. On the other hand, we excluded articles that focussed on older children, adolescents, or adults, or those that addressed unrelated topics like cognitive or academic development without explicitly linking them to PA or PF. We also excluded non-peer reviewed publications like book chapters, opinion pieces, and editorials. Furthermore, the analysis deemed irrelevant studies that focussed on health outcomes without considering PA or PF as factors.

Data Analysis Tools

We used VOSviewer and ScientoPy as the two main tools in this analysis. VOSviewer is highly effective software for visualising and mapping research networks, including co-authorship, co-citation, and keyword co-occurrence. VOSviewer generates visual maps that showcase the relationships between researchers, institutional collaborations, and emerging research themes in the field of physical activity and physical fitness in preschool children. On the other hand, researchers use ScientoPy to conduct in-depth analyses of research trends and quantitative metrics, including the development of publication counts and citation indices, and to identify new emerging topics. By combining these two tools, the study provided a comprehensive picture of publication trends, researcher engagement, and the evolution of research themes within the topic.

Selection and Characteristics of Studies

The selection process began with a title-based search in the Scopus and Web of Science (WoS) databases. The initial search in Scopus yielded 8.972 articles, which we then filtered by publication year (2020-2024), publication type (articles and conference papers), language (English), and geographic region (Asia), leaving 577 articles. We carried out a similar process in WoS, reducing the initial 12.812 articles to 593 relevant ones. Table 1 displays the final result, which found a total of 699 relevant unique articles after combining both databases and removing duplicates (458 articles).

Table 1. Summary of Study Selection Process

Selection Stage	Scopus	Web of Science (WoS)
Initial Search	8.972	12.812
Year of Publication (2020-2024)	3.218	3.768
Conference papers and articles	2.701	2.881
English	2.507	2.696
Asia Focus	577	593
Article Duplication	453	5
Final Results	**699**	

RESULTS AND DISCUSSION

Trends related to physical activity and physical fitness in preschool children

The bibliometric analysis of publication trends on physical activity (PA) and physical fitness (PF) in preschool children (2020-2024) shows distinct patterns in the Web of Science (WoS) and Scopus databases. In WoS, the number of articles steadily increased from 86 in 2020, peaking at 158 in 2022, before declining to 132 in 2023 and 107 in 2024. This drop after 2022 could be linked to external factors like the COVID-19 pandemic, which initially boosted research interest due to its impact on education and health systems. As lockdowns eased and priorities shifted, the urgency to address pandemic-related issues in children's physical health may have decreased. Meanwhile, Scopus recorded lower but more stable publication numbers, with 26 articles in 2020, dipping slightly to 25 in 2021 and 20 in 2022, then rebounding to 30 in 2023 before falling to 23 in 2024. The difference between WoS and Scopus may reflect the latter's narrower coverage of specialized journals in early childhood physical activity.

Fluctuations in research productivity likely stem from several external factors. Health policies in Asia, such as efforts to combat childhood obesity and support early childhood development, may have influenced peaks in research activity. Additionally, while the pandemic initially spurred studies on adapting physical activity interventions during lockdowns, challenges in conducting in-person research likely contributed to the subsequent decline. Technological trends, such as digital and virtual fitness interventions, also played a role, gaining relevance during the pandemic and potentially inspiring new research directions. Both WoS and Scopus reflect stable but fluctuating interest in PA and PF research, shaped by public health policies, educational reforms, and technological advancements.

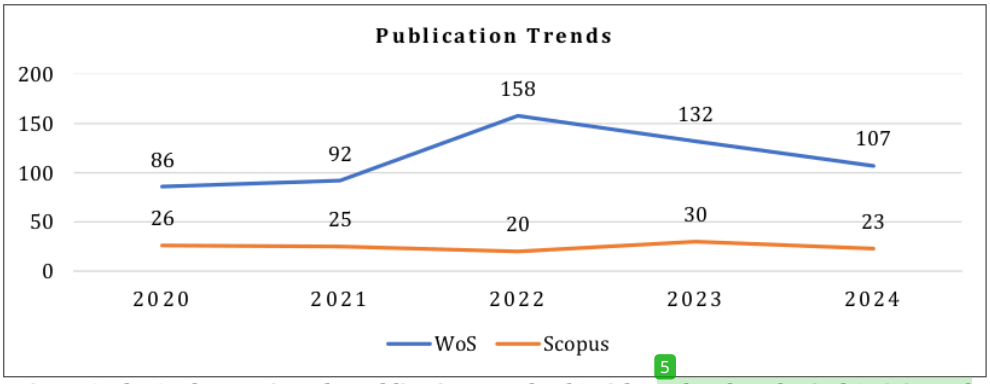

Figure 1. The Study Examines the Publication Trends of Articles Related to Physical Activity and Physical Fitness in Preschool Children in the Web of Science (WoS) and Scopus Databases from 2020 to 2024

Based on further analysis (see **Figure 2**), the overall trend shows an increase in the productivity of articles related to physical activity and physical fitness of preschool children at the beginning of the period. The number of articles increased from 112 in 2020 to 117 in 2021. A surge in productivity occurred in 2022, with a total of 178 articles published, marking the peak of research contributions in this area. However, after reaching the peak in 2022, the number of published articles began to decline in 2023 with 162 articles, and this downward trend continued until 2024 with 130 articles. This decline may be due to a decrease in research funding, a change in research focus, or other factors such as global health policy shifting to other issues.

Overall, the period 2020-2022 was a time of significant growth in research related to preschoolers' physical activity and fitness. Although the trend declines after 2022, the high number of publications suggests that global interest in this topic is still present and relevant among researchers. The results of this analysis not only provide deep insights into the patterns of research productivity but also show that research in this area still has room to grow despite the decline in productivity in recent years.

Figure 2. Trends in Total Publication of Articles Related to Physical Activity and Physical Fitness in Preschool Children Across Multiple Databases (2020-2024)

The most contributing and influential authors, sources, and countries in this field

Authors

According to the bibliometric analysis of the most contributing and influential authors in the field of physical activity and physical fitness in preschool children, Saeed Ghorbani from Iran stands out as the author with the highest total number of publications, namely 4 articles and 75% published in the last two years (2023-2024). Although his article growth rate has not increased significantly (AGR 0.0), Ghorbani has an average document per year (ADY) of 1.5, which shows the consistency of his annual contributions, with the percentage of documents published in the last five years (PDLY) reaching 75%. This positions him as an influential author with an h-index of 2, reflecting the quality and impact of his research in this field.

In second place, Ahmad Chaeroni and Amir Dana each have 3 articles, with 67% published in the last two years (2023-2024) and an AGR of 0.5, indicating steady growth year on year. Their PDLY of 66.7% and ADY of 1.0 indicate a consistent annual contribution. Others also have an h-index of 2, indicating significant research influence,

despite having fewer publications than Saeed Ghorbani. However, Roya Kelishadi has the same number of publications as Chaeroni and Dana (3 articles), all of which were published after 2023 and exhibit a decline in publication growth rate (AGR -0.5). This could be due to a decrease in activity or a shift in research focus. Kelishadi has an h-index of 1, indicating lower impact than other authors.

Other authors, such as Cindy H. P. Sit, Catherine M. Capio, and Xiaoqi Feng, have 2-3 articles each, with more varied annual contributions. Cindy H.P. Sit shows an ADY of 0.5 with a PDLY of 33.3%, while Xiaoqi Feng and Catherine M. Capio show a greater impact in recent years, with a PDLY of 50.0% each. Meanwhile, Yang Liu is the standout author with an ADY of 1.0 and a PDLY of 100.0%, signalling that all of his publications occurred in the last five years, with an AGR of 0.5, indicating positive growth and potential for increased contributions in the future. Yang Liu has an h-index of 1, indicating that Yang's contributions are still relatively new but have the potential to grow further. Overall, these data suggest that although there is variation in the number and growth of publications, some key authors, such as Ghorbani S., Chaeroni A., and Dana A., show consistency and significant impact in research related to physical activity and physical fitness in preschool children.

Table 2. The Top 10 Authors with the Most Publications

Author and Country	Total	AGR	ADY	PDLY	hIndex
Saeed Ghorbani, Iran	4	0.0	1.5	75.0	2
Ahmad Chaeroni, Indonesia	3	0.5	1.0	66.7	2
Amir Dana, Iran	3	0.5	1.0	66.7	2
Roya Kelishadi, Iran	3	-0.5	0.0	0.0	1
Cindy H P Sit, Hongkong	3	0.0	0.5	33.3	1
Catherine M. Capio, Hongkong	2	0.0	0.5	50.0	0
Xiaoqi Feng, China	2	0.0	0.5	50.0	2
Hye-Jin Kim, South Korea	2	0.5	0.5	50.0	1
Norlaila Azura Kosni, Malaysia	2	-0.5	0.5	50.0	1
Yang Liu, China	2	0.5	1.0	100.0	1

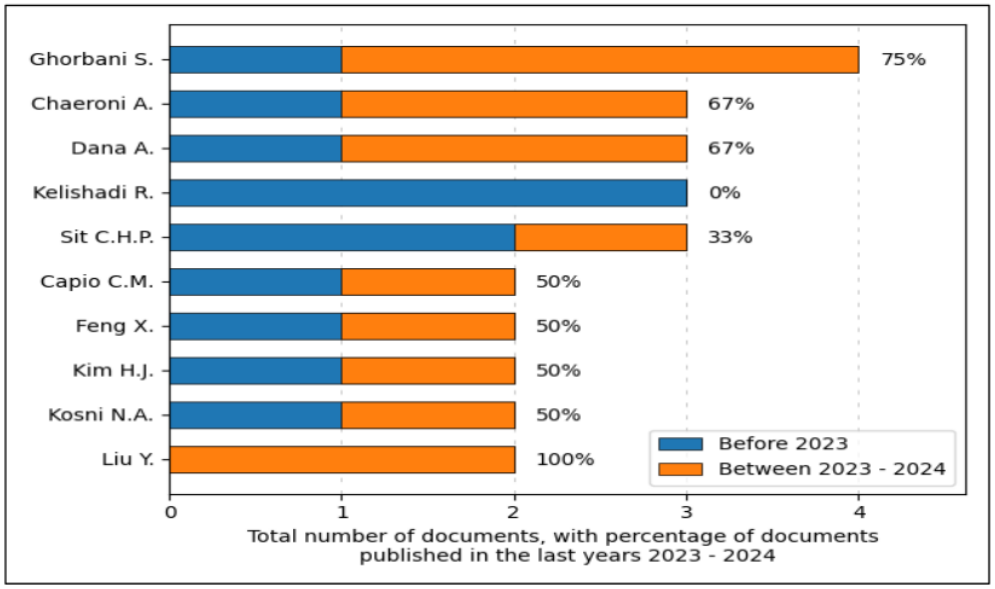

Figure 3. Ten Authors and Percentage of Publications in the Last Two Years

Sources

According to a bibliometric analysis of the most contributing and influential journals in the field of physical activity and physical fitness in preschool children, the International Journal of Environmental Research and Public Health ranked first with a total of 58. The journal experienced a decline in productivity, as evidenced by its AGR of -9.5, average annual contribution (ADY) of 3.5, and percentage of documents published in the last five years (PDLY) of 12.1%. vity. However, the journal remains highly influential, with a top h-index of 13, reflecting the significant impact of the articles it publishes.

Frontiers in Public Health ranked second with a total of 30 articles. The journal shows a steady growth trend with an AGR of 0.5 and ADY of 9.0, as well as a PDLY of 60.0%, indicating that most of its contributions occurred in the last five years. This journal has a h-index of 7, indicating significant quality and impact in this field. In third place, BMC Public Health has 26 articles, with a positive AGR of 2.0 and ADY of 7.0, reflecting fairly steady and continuous growth. The journal's PDLY of 53.8% signifies that more than half of its contributions are from the last five years. The journal has an h-index of 8, indicating a strong impact in the scientific community.

Journal of Exercise Science & Fitness has the same number of publications as BMC Public Health (26 articles) but experienced negative growth (AGR -0.5). Its ADY of 8.0 and PDLY of 61.5% show that despite its declining growth, the journal has remained relevant in the last five years, with an h-index of 7 signalling good publication quality. In the next rank, Children-Basel has 16 articles with an AGR of -2.0 and ADY of 3.0. With a PDLY of 37.5% and an h-index of 5, this journal has remained an influential source in recent years despite its declining productivity.

Other journals, such as Frontiers in Paediatrics, PLOS ONE, and Nutrients, have smaller contributions in terms of total publications but show differences in productivity growth. Frontiers in Paediatrics and International Journal of Paediatrics-Mashhad recorded significant negative growth, while PLOS ONE showed a positive trend with an AGR of 1.5 and PDLY of 41.7%. Overall, although some sources experienced a decline in productivity, they still maintained a significant impact, with the International Journal of Environmental Research and Public Health, Frontiers in Public Health, and BMC Public Health dominating the contributions in this area of research.

Table 3. The Top Ten Sources that Contribute the Most

Source Title	Total	AGR	ADY	PDLY	hIndex
International Journal of Environmental Research and Public Health	58	-9.5	3.5	12.1	13
Frontiers in Public Health	30	0.5	9.0	60.0	7
BMC Public Health	26	2.0	7.0	53.8	8
Journal of Exercise Science & Fitness	26	-0.5	8.0	61.5	7
Children-Basel	16	-2.0	3.0	37.5	5
Frontiers in Pediatrics	12	-3.5	1.5	25.0	5
PLOS ONE	12	1.5	2.5	41.7	6
International Journal of Pediatrics-Mashhad	11	-5.0	0.0	0.0	3
Nutrients	11	-1.5	1.0	18.2	4
BMC Pediatrics	10	-1.0	2.0	40.0	4

Countries

With a total of 290 articles from 2020 to 2024, China ranked first as the country that contributed the most research on physical activity and physical fitness in preschool children, according to bibliometric analyses. China's contribution increased significantly from 43 articles in 2020 and 2021, peaking in 2022 with 81 articles, before decreasing to

59 articles in 2023 and slightly increasing to 64 in 2024. Over the period, Japan ranked second, with a total of 50 articles. Japan's productivity was relatively stable, with increases in 2021 (14 articles) and 2023 (13 articles), although it saw a decline in 2024 with only 5 articles. Iran followed with a total of 40 articles, showing rapid growth in 2022 with 19 articles, although its contribution declined after that. The country made smaller contributions in 2020 and 2021, with only 2 and 5 articles, respectively. Malaysia also showed a significant upward trend, especially in 2023 with 13 articles, after contributing only 4 articles in 2022. While there were no publications in 2021, its productivity surged in 2020 and 2024, with 8 articles each.

Other countries, such as South Korea (29 articles) and Saudi Arabia (26 articles), showed more stable trends. South Korea experienced a gradual increase from 2020 to 2024, with the highest contribution in 2023 (8 articles). Meanwhile, Saudi Arabia also showed a significant spike in 2023 and 2024, with 8 and 7 articles, respectively. India, Indonesia, Thailand, and Taiwan ranked next with smaller contributions. India and Indonesia have a total of 22 and 21 articles respectively, with a fluctuating pattern. Thailand and Taiwan contributed 16 and 15 articles, respectively, with Thailand showing a consistent increase in 2024 (6 articles), while Taiwan has been relatively stable for five years. Overall, these data show that China dominates the contributions in research related to physical activity and physical fitness in preschool children, followed by other Asian countries such as Japan, Iran, and Malaysia. The rapid growth in publications from some of these countries reflects the increasing global attention to the importance of physical activity and physical fitness among preschoolers, with variations in contributions between countries influenced by factors such as health policies, research funding, and technological infrastructure.

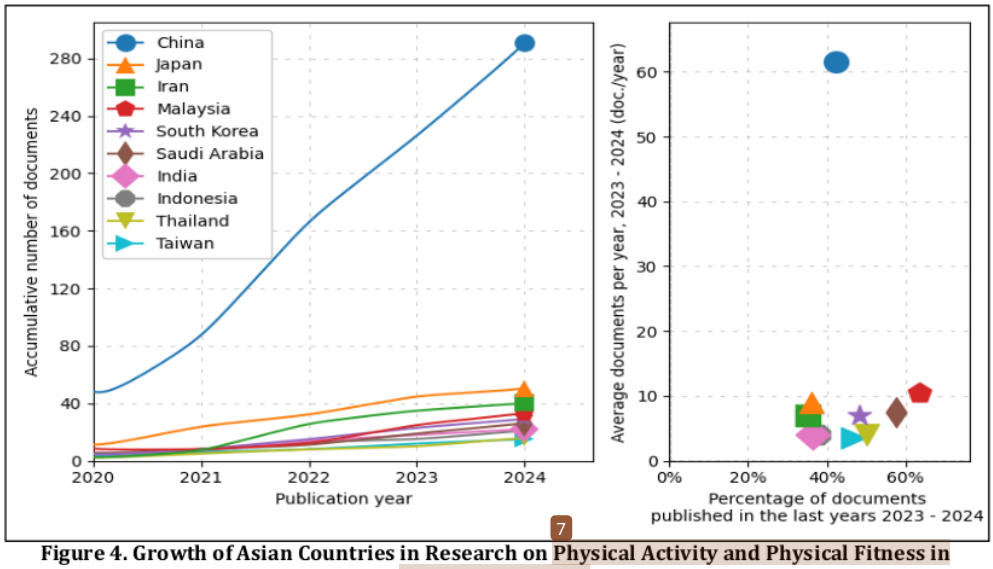

Figure 4. Growth of Asian Countries in Research on Physical Activity and Physical Fitness in Preschool Children

The main themes and subthemes emerging in research on physical activity and physical fitness among preschool-aged children

Research on physical activity and physical fitness among preschool-aged children reveals several main themes and subthemes, as revealed by the bibliometric analysis. The most frequently occurring keyword is "physical activity," which appeared 399 times,

indicating its central role in the literature. Other prominent keywords include “children,” “physical fitness,” “body mass index,” “COVID-19,” “mental health,” and “obesity.” These terms frequently co-occur, suggesting strong associations between physical activity and health outcomes in early childhood. Themes related to body mass index and obesity highlight concerns about childhood obesity and its long-term health implications. The impact of COVID-19 has also emerged as a significant subtheme focusing on the effects of lockdowns and reduced physical activity opportunities on children's health. Research on mental health emphasises the relationship between physical fitness and psychological well-being, particularly when combating anxiety and stress induced by the pandemic. These findings suggest a continued interest in exploring how physical activity interventions can improve both physical and mental health outcomes in preschoolers while addressing growing concerns around obesity and pandemic-related disruptions.

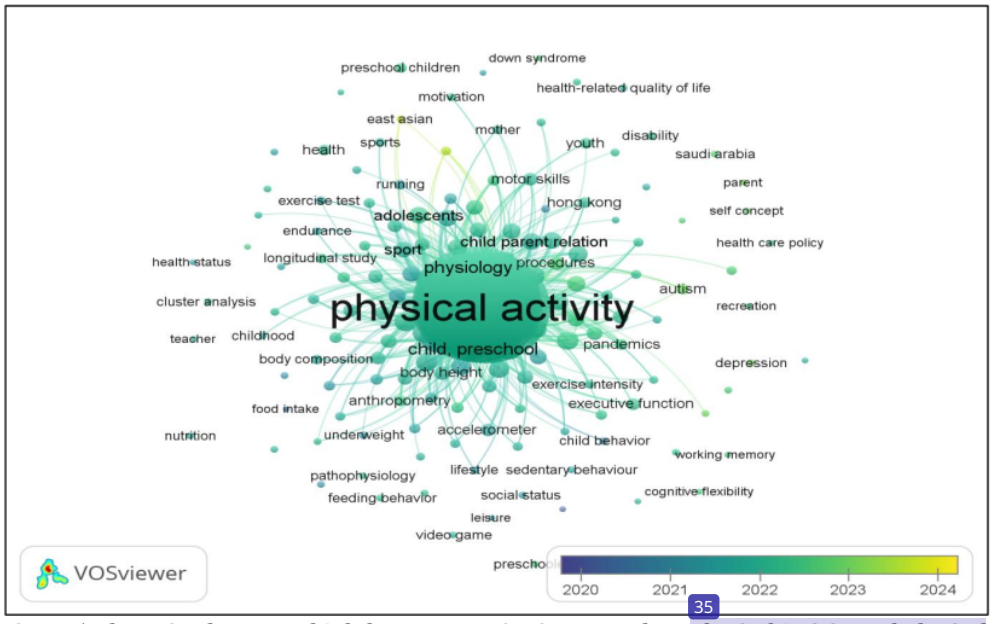

Figure 5. The Main Themes and Subthemes Emerging in Research on Physical Activity and Physical Fitness among Preschool-aged Children

DISCUSSION

Between 2020 and 2024, research on physical activity (PA) and physical fitness (PF) in preschool children in Asia fluctuated. Web of Science (WoS) saw an increase in publications, peaking in 2022, followed by a decline in 2023-2024, likely due to shifts in global health and education policies (Yelamos et al., 2019). Park et al. (2020) highlighted the role of early physical activity policies in countries like China and Japan in boosting research. COVID-19 caused a surge in studies on home-based physical activity during lockdowns Wang et al. (2021), but interest decreased post-pandemic, explaining the drop after 2022. Scopus showed more stable trends despite fewer publications.

Limited research infrastructure and funding constraints further contribute to the disparity in research productivity between countries. Capio et al. (2021) pointed out that countries with limited access to research funds, such as the Philippines and Vietnam,

often lag behind in research output compared to countries like China and Japan. Furthermore, the lack of international collaboration hinders productivity in these countries, which exacerbates the problem of limited research resources and infrastructure. The study by Ghorbani et al. (2022) also highlighted China's significant contribution to PA and PF research, especially during the peak of 2022, which was fueled by government policies to address childhood obesity.

Strengthening international collaborations and increasing government support could encourage research in less productive countries. Kim and Park (2023) added that technological advances, such as the use of digital apps and fitness monitoring devices, have become a new research focus in developed countries such as South Korea and Japan, especially during the pandemic. The application of technology to promote physical activity in children could be a growing research trend in the future, especially in countries with high technology access. However, there are limitations in the existing literature, as developing Asian countries such as Myanmar, Bangladesh, and Nepal are under-represented in this global study. Therefore, we need to strengthen research infrastructure and improve access to international databases to expand research in these countries. Collaboration between developed and developing countries in Asia can be an effective strategy to increase research productivity in the field of preschool PA and PF.

In addition, the bibliometric analysis revealed several major themes that dominate research on PA and PF in preschool children. The keyword "physical activity" appeared most frequently, indicating its central role in the literature. Other keywords such as "children," "body mass index," "mental health," and "obesity" co-occurred frequently, suggesting a close relationship between physical activity and various health outcomes, such as obesity and mental health. The impact of the COVID-19 pandemic was also an important theme, particularly in relation to the decline in physical activity due to lockdowns. This research highlights the importance of physical activity interventions not only to improve physical health but also to support mental health, especially in coping with anxiety and stress triggered by the pandemic (Ciuldim et al., 2022; Zhang et al., 2022a; Zhang et al., 2022b).

CONCLUSION

A bibliometric analysis of trends in the productivity of articles addressing physical activity and physical fitness in preschool children over the period 2020-2024 revealed significant variation across two major databases, Web of Science (WoS) and Scopus. Web of Science recorded an increase in the number of publications until it peaked in 2022 with 158 articles, before declining in the following years. On the other hand, Scopus shows a more stable trend, although the number of publications is lower than WoS. This difference reflects the two databases' different research foci on this topic. External factors, such as global health policies or technological developments, may influence the decline in publications in both databases after the peak productivity in 2022. The overall trend shows that despite fluctuations in the number of publications, interest in this research is still quite strong.

The most influential authors in this field include Saeed Ghorbani, Ahmad Chaeroni, and Amir Dana, who have consistently contributed to research over the past five years. In terms of influential journals, the International Journal of Environmental Research and Public Health, Frontiers in Public Health, and BMC Public Health stand out as the main sources of publications related to physical activity in preschool children, although some of them have seen a decline in productivity in recent years. From a country perspective, China emerged as the largest contributor to the study, followed by Japan and Iran, which also showed significant growth. Overall, these findings reflect the importance of the topic

of physical activity and physical fitness in preschool children among global researchers. Despite a decline in productivity after the peak in 2022, these results still indicate the relevance and room for further research development in this area.

Limitations of this study include limited data coverage on two major databases and potential bias in keyword searches. Additionally, the study may not have fully represented other factors like, regional roles in health policy. Future research recommendations suggest conducting a more comprehensive analysis across multiple databases to obtain a more comprehensive picture. In addition, focusing on the impact of health policy and technology on children's physical activity may provide further insights. This study contributes to highlighting the importance of physical activity in preschool children and how trends in scientific publications can help policymakers formulate more effective interventions to improve children's fitness.

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