Pubsains

OPEN ACCESS

Journal of Pubnursing Sciences, 2025, 03 (01): 30-41
eISSN 2988-4330; pISSN 3025-3330; DOI: 10.69606/jps.v3i01.218

[Review Article]

Journal of Pubnursing Sciences

A Systematic Review of Physical Activity, Sedentary Behavior, and Screen Time in Youth Aged 7–18

La Saudi [1*], **Vernando Yanry Lameky**[2]

[1]Department of Nursing, Faculty of Medicine, Saudi University, Indonesia 42156
[2] Department of Nursing, Universitas Kristen Indonesia Maluku, Indonesia
[*]**Corresponding author:** lasaudi@unesa.ac.id

Article Info:

Received:
(2025-02-29)

Revised:
(2025-02-30)

Approved:
(2025-03-31)

Published:
(2025-03-31)

Abstract

Background: The lack of physical activity, sedentary behavior, and screen time among children and adolescents has become a significant global health issue, contributing to an increased risk of non-communicable diseases, mental health disorders, and a decline in quality of life. **Aims:** To systematically review the existing literature on the trends of physical activity and sedentary behavior in children and adolescents, and their impact on non-communicable diseases. **Methods:** This research utilized a systematic review method following the PRISMA guidelines to compile and evaluate 15 out of 2550 studies related to the relationship between physical activity, sedentary behavior, and screen time in children and adolescents. Literature searches were conducted in the PubMed, Scopus, and Google Scholar databases with specific inclusion criteria, and data analysis was performed comparatively to assess the quality and findings of the selected studies. **Results:** Increased sedentary time and decreased physical activity among children and adolescents may contribute to a higher risk of non-communicable diseases and mental health issues in the future. Therefore, interventions involving education, policies that support physical activity, and reduction of screen time are crucial to modify sedentary behavior and improve the quality of life for children and adolescents. **Conclusion:** Increasing physical activity and reducing sedentary time among children and adolescents are essential to prevent the risk of non-communicable diseases and support their future physical and mental health.

Keywords: Physical Activity, Sedentary Behavior, Screen Time, Youth

Introduction

The lack of physical activity (PA), sedentary behavior (SB), and screen time (ST) has become a significant global health issue, particularly among children and adolescents. According to recent reports, approximately 81% of children and adolescents worldwide do not meet the recommended guidelines for sufficient daily physical activity (WHO, 2020). Low physical activity levels and excessive sedentary time have a major negative impact on the health of children and adolescents. Lack of physical activity can contribute to an increased risk of obesity, metabolic disorders, heart disease, and several types of cancer, such as colorectal and breast cancer (Ekelund et al., 2019). These impacts also have the potential to reduce the life expectancy of children and adolescents in the long term.

In addition to the physical impacts, the imbalance between low physical activity and high sedentary behavior can affect mental and emotional health. Recent studies have shown a link between low physical activity and sedentary behavior with other health problems, including overweight and obesity, cardiovascular fitness disorders, mental health issues, increased blood cholesterol levels, and other non-communicable diseases (Wang et al., 2022; Mo et al., 2022). Additionally, children

experience functional constipation (FC), a common digestive disorder in children. The global prevalence of FC in children is estimated to be around 9.5% (Rosenbaum et al., 2021). This condition not only affects the quality of life of children but is often accompanied by psychological issues such as anxiety, depression, and adjustment disorders (Levine et al., 2020).

Excessive sedentary behavior has also been identified as a risk factor for the development of various non-communicable diseases (NCDs), which are currently the leading causes of morbidity and mortality worldwide (Guariguata et al., 2019). Furthermore, health issues related to sedentary behavior and lack of physical activity place a significant burden on public health systems, with healthcare expenditures for both inpatient and outpatient care continuing to rise. This situation highlights the need for more effective interventions to reduce sedentary time and increase physical activity among children and adolescents (Marques et al., 2020; WHO, 2018; Gába et al., 2020).

Reducing sedentary time and increasing physical activity levels are crucial for the long-term health of children (Guthold et al., 2020). Therefore, this study aims to systematically review the existing literature on the changing trends in physical activity and sedentary behavior among children and adolescents, as well as their impact on non-communicable diseases. The study also explores the effectiveness of interventions that have been implemented to increase physical activity and reduce sedentary time in the age group of 7 to 18 years.

Methods

This systematic review was designed and implemented according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). The aim of the process was to provide a clear and comprehensive overview of the relationship between physical inactivity, sedentary time, and the health impacts on youth aged 7 to 18.

The literature search was conducted in several key databases, including PubMed, Scopus, and Google Scholar, covering the period from the beginning to the end of March 2025. The articles selected for inclusion followed the criteria outlined below: (1) published between 2020 and 2025, (2) written in English, (3) available in full-text, and (4) focused on subjects aged 7 to 18 years. Systematic reviews and research protocols were excluded from the study. The selection process followed the four stages outlined in the PRISMA guidelines: (1) keyword search, (2) initial screening based on titles, (3) evaluation of abstracts or full texts, and (4) quality assessment of studies. Each stage of the selection process was meticulously documented to ensure transparency and reproducibility of the review process.

The keywords used for the search included relevant combinations of terms related to the research topic, such as: “Physical activity” OR “physical activity levels” OR “physical inactivity” AND “sedentary time” OR “sedentary behavior” OR “sedentary lifestyle” OR “health outcomes” OR “screen time” AND “children” AND “adolescents.” The search in PubMed resulted in 1501 articles, while Scopus found 1023 articles, and Google Scholar returned 26 articles. After removing duplicates, the researcher proceeded with screening based on titles and abstracts, followed by applying the inclusion criteria. As a result, 159 articles met the initial criteria. The next step involved evaluating the full texts of 21 articles, which ultimately led to the selection of 15 studies for further analysis.

Data extraction was performed by classifying the findings from the selected studies based on key themes, such as physical activity levels, sedentary duration, and health impacts. Comparative analysis was carried out to evaluate differences and similarities across studies regarding the results found and to assess the methodological quality of the research conducted. The quality assessment of the studies was performed using an appropriate evaluation tool for quantitative studies to ensure that only those with high methodological quality were included in the analysis. All stages of the search, selection, and data analysis were conducted carefully to minimize bias and ensure the validity of the results obtained (see Figure 1).

Results

The studies included in this review came from a variety of countries, with a significant number

conducted in China (3 studies), the United States (2 studies), and others in Brazil, New Zealand, West Africa, Iran, Finland, Japan, Spain, Northern Ireland, Portugal, and Canada.

The trends observed across these countries regarding sedentary time and physical activity levels were consistent. 15 studies reported that school-aged children were less involved in physical activity and spent considerable time engaged in sedentary behaviors. These behaviors were most commonly associated with increased screen time, including television watching, computer use, and video gaming.

The lack of physical activity and high levels of sedentary behavior were found to have significant negative effects on children's health. The main consequences reported included: 1) Overweight and obesity: A number of studies highlighted that children who spent more time in sedentary activities had higher rates of overweight and obesity; 2) Cardiovascular fitness disorders: Physical inactivity and prolonged sedentary behavior were also linked to cardiovascular fitness issues, including increased risks of hypertension and poor cardiovascular health; 3) Mental health problems: Increased sedentary behavior was associated with higher levels of anxiety, depression, and other mental health challenges; 4) Elevated cholesterol levels: Sedentary behavior was often linked to increased cholesterol levels in children, which is a risk factor for heart disease and other chronic health conditions.

Te findings emphasize the global nature of the issue, with countries across different regions showing similar trends regarding children's physical activity and sedentary behavior, and the associated health consequences.

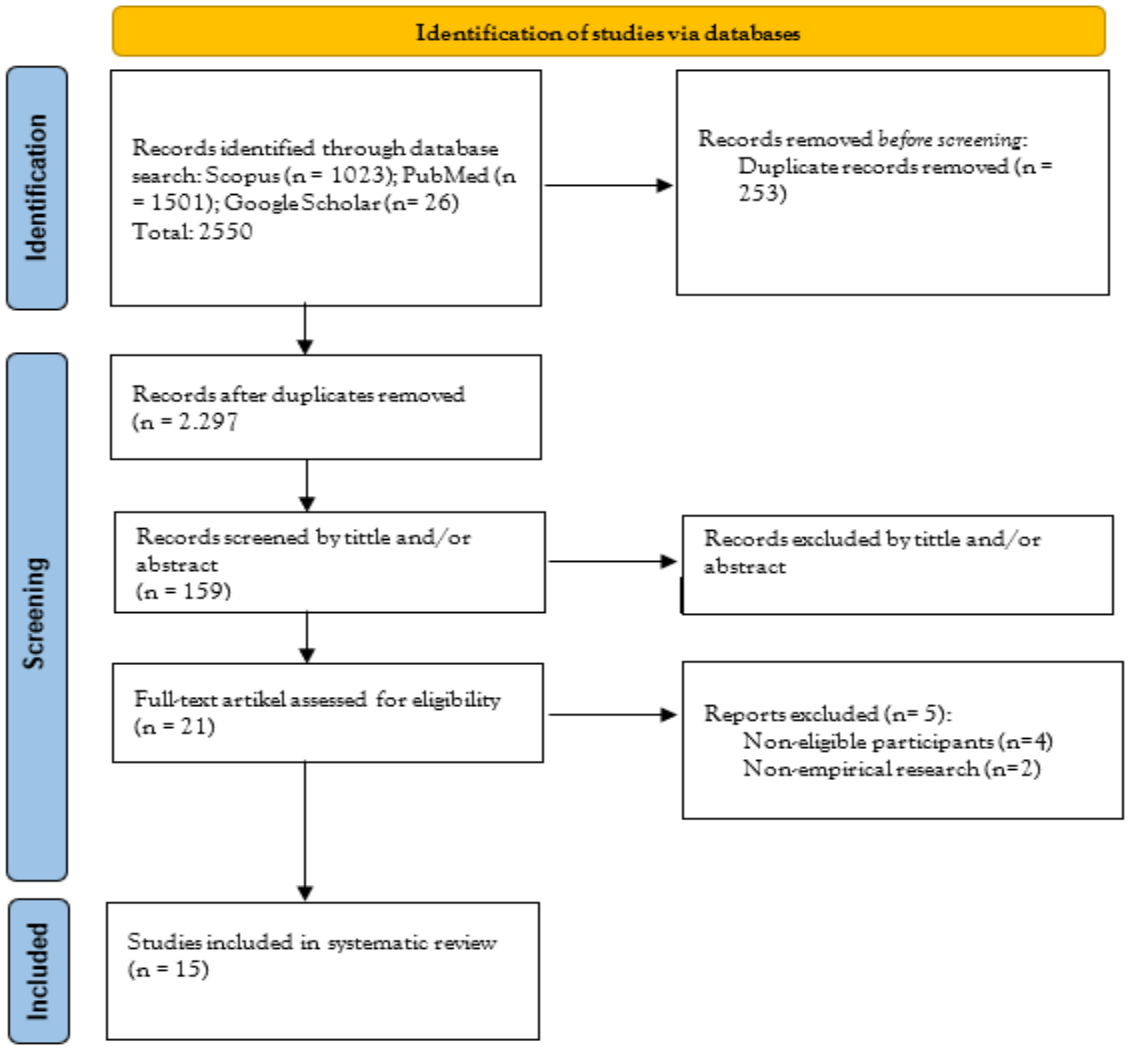

Figure 1. Study selection process with PRISMA diagram

Table 1. Summary of Key Findings from Selected Studies

Authors	Countries	Objective of the Study	Study Design	Results
Wang. Et al., 2022	China	To test whether the effects of physical activity and sedentary behavior on overweight and obesity differ between males and females	Open-cohort study, sample of 4,520 children and adolescents aged 6–18 years.	The effects of sedentary behavior and intense physical activity were only significant among females. Intense physical activity reduced the risk of overweight and obesity by 63% (OR: 0.37; 95% CI: 0.20, 0.67) among females aged 6–11 years and by 54% (OR: 0.46; 95% CI: 0.25, 0.85) among females aged 12–18 years. High sedentary hours increased the risk by 96% (OR: 1.96; 95% CI: 1.09, 3.54) among females aged 12–18 years. No significant effects were observed among males.
Mo, et al., 2022	New Zealand	To examine compliance with the 24-Hour Movement Guidelines (24-HMG) among adolescents, with a focus on moderate-to-vigorous physical activity (MVPA), light physical activity (LPA), screen time, sleep duration, and sleep time consistency.	Longitudinal study, sample of 216 adolescents aged 12–17 years.	Compliance rates for various activities were as follows: 3.7% for moderate-to-vigorous physical activity, 13.0% for screen time, 14.4% for light physical activity, and 36.1% for vigorous physical activity. Less than 1% of participants met all seven recommendations. Compliance tended to be lower among older adolescents, particularly for light physical activity and screen time. Over the course of one year, there was a decline in compliance for light physical activity (from 15.0% to 7.2%) and screen time (from 15.6% to 6.0%).
Sun & Yuan, 2024	United States	Analyzing Trends in Sedentary Behavior and Physical Activity Among Overweight Adolescents in the United States	Cross-sectional study, sample of 11,865, aged 6-17 years	From 2018 to 2022, the average screen time (ST) duration among overweight adolescents increased from 3.7 hours to 4.1 hours per day, which represents a statistically significant increase ($p = 0.07$). The prevalence of overweight adolescents meeting the screen time guideline of ≤2 hours/day decreased from 44.6% to 30.0% ($p = 0.007$). Furthermore, the prevalence of adolescents meeting the physical activity guideline of ≥1 hour/day remained low and stable, ranging from 8.4% to 12.3% during the analysis period ($p = 0.6$)
Starks, et al., 2023	West Africa	To assess physical activity and sedentary behavior among secondary school students in Sierra Leone	Cross-sectional study, sample of 2,798 participants aged 13-17 years.	82% of participants did not engage in moderate or vigorous physical activity for at least one hour per day, 25% sat for 3 hours or more each day outside of school and homework time, and 87% were physically inactive and/or sedentary based on these thresholds. Females who rarely or never exercised tended to engage in light physical activity outside of school rather than sitting, while males who exercised daily tended to spend more time sedentary when not exercising.
Ziaei, et al., 2022	Iran	To report the prevalence of physical activity and sedentary behavior among high school adolescents in Iran	Cross-sectional study, 1,517 high school students, grades 9 to 11.	Physical inactivity was found in **72.2**% of participants, and sedentary behavior in **71.4**%. Factors positively associated with physical inactivity included: being female, overweight or obese, walking/cycling to or from school 1–4 days per week, sitting for 3 or more hours per day (sedentary behavior), inadequate vegetable intake, being bullied, and lack of support from parents, peer support, and parental connectivity (protective factors).
Jesus, et al.,	Brazil	To analyze the relationship	Cross-sectional study, sample	Attendance in Physical Education (PE) ≥2/week is associated with a higher frequency

2022		between weekly attendance in physical education (PE) classes and various forms of physical activity among schoolchildren	of 2,477 schoolchildren aged 7-12 years.	of active play (females: PR=1.40, 95% CI=1.11–1.78; males: PR=1.49, 95% CI=1.15–1.94) and structured physical activity (females: PR=2.11, 95% CI=1.31–3.40; males: PR=4.33, 95% CI=1.63–11.52). Higher attendance in PE (≥2/week) is associated with higher overall physical activity (females: PR=1.31, 95% CI=1.06–1.62; males: PR=1.42, 95% CI=1.14–1.77) and lower sedentary behavior (females: PR=0.80, 95% CI=0.71–0.90; males: PR=0.81, 95% CI=0.68–0.97). Attendance in PE 1/week is also associated with a lower frequency of daily sedentary behavior among females (PR=0.73, 95% CI=0.64–0.84).
Nagata, et al., 2024	United States	To identify the joint association of screen time and physical activity with cardiovascular disease risk factors in adolescents	Cross-sectional study, sample of 4,718 adolescents aged 11–12 years	The analytical sample spent an average of 6.6 hours of screen time per day and took 9,722 steps per day. In a model that included both screen time and steps, the high screen time category was associated with a 4.27 higher percentile in diastolic blood pressure (95% CI 1.83–6.73) and lower HDL cholesterol levels (B = -2.85, 95% CI -4.77 to -0.94 mg/dL) compared to the low screen time category. The moderate step category (B = 3.68, 95% CI 1.24–6.11) and low step category (B = 7.64, 95% CI 4.07–11.20) were associated with higher diastolic blood pressure percentiles compared to the high step category. The moderate step category was also associated with lower HDL cholesterol levels (B = -1.99, 95% CI -3.80 to -0.19 mg/dL) compared to the high step category. Similar findings were observed when screen time and step count were analyzed as continuous variables; higher continuous step counts were also associated with lower total cholesterol levels (mg/dL).
Guo, et al., 2024	China	To examine trends in Physical Activity (PA) and Recreational Screen Time (RST) among children and adolescents in China	Cross-sectional survey, Sample of 52,503 children and adolescents from grades 4 to 12 (aged 12.72±2.12).	There was an annual decline in physical activity (PA) compliance by approximately 3.43% (95% CI: 0.79–6.08%) for elementary school students, particularly among boys living in rural areas and in the northern region. High school students experienced an annual decline of about 5.23% (95% CI: 2.55–7.92%) in PA compliance across genders, regions, and urban areas. Similarly, the compliance rate for recommended sedentary time (RST) for elementary school students decreased by approximately 3.18% (95% CI: 1.57–4.78%) annually for all genders and regions, but only in the northern region.
Husu, et al., 2024	Finland	Investigating trends in physical activity (PA) and sedentary behavior (SB) among Finnish children and adolescents.	Cross-sectional, Sample of 7,080 participants aged 7-15 years.	In 2016, participants averaged 10,305 steps per day, spending 0:15 (hours: minutes) in very high-intensity physical activity (VPA), 1:37 in moderate physical activity (MPA), 1:52 in moderate to very high-intensity physical activity (MVPA), 3:48 in low-intensity physical activity (LPA), 0:55 in a standing position, and 7:52 in sedentary behavior (SB). From 2016 to 2018, daily steps, MPA, LPA, and standing time increased [229 steps (95% Confidence Interval, CI 70–387), 0:03 (CI 0:01–0:04), 0:11 (CI 0:09–0:14), and 0:07 (CI 0:05–0:08), respectively], while VPA and SB decreased [0:01 (CI 0:00–0:02) and 0:20 (CI 0:16–0:24), respectively]. From 2018 to 2022, daily physical activity and standing time decreased [751 steps (CI 562–939), VPA 0:02 (CI 0:01–0:03), MPA 0:09 (CI 0:07–0:11), MVPA 0:11 (CI 0:09–0:14), LPA 0:08 (CI 0:05–0:11), and standing 0:01 (CI 0:01–0:03)], while sedentary behavior (SB)

				increased by 0:21 (CI 0:16–0:25), suggesting a potential impact of the pandemic.
Mori, et at, 2024	Jepang	To clarify the relative age effects on physical activity and sedentary behavior at different school stages among children and adolescents in Japan.	Cross-sectional questionnaire survey, 21,491 children and adolescents (elementary, middle, and high school students aged 10–18 years).	Relatively younger individuals tend to be less engaged in physical activity (especially high-intensity physical activity/VPA); this association was observed in both middle and high school students. In contrast, relatively younger boys spent more time on weekends engaging in sedentary behavior and internet use. Based on school stage, the relative age effects on VPA time were seen in boys in middle school (average marginal effect (AME) = -0.74, $p < 0.01$) and high school (boys: AME = -0.69, $p < 0.01$; girls: AME = -0.53, $p < 0.05$). The relative age effects on sedentary behavior were observed on weekends, with sedentary behavior (AME = 3.55, $p < 0.01$), video game play (AME = 0.72, $p < 0.05$), and internet use (AME = 2.46, $p < 0.01$) in high school boys, and TV watching (AME = 1.12, $p < 0.05$) in middle school girls.
Tapia-Serrano, et al., 2022	Spanish	To test the likelihood of having high/very high physical fitness levels across various physical fitness components based on meeting the 24-hour movement guidelines.	Cross-sectional study, 1276 Spanish youths (13.07±0.86; 55.88% boys), aged 11–16 years.	Participants who met all three of the 24-Hour Movement Guidelines were more likely to have high/very high cardiovascular fitness (OR = 3.31; 95% CI: 1.79, 6.14; $p < 0.001$), standing long jump (OR = 1.91; 95% CI: 1.06, 3.45; $p = 0.031$), muscle fitness (OR = 2.05; 95% CI: 1.09, 3.86; $p = 0.048$), and physical fitness (OR = 1.99; 95% CI: 1.08, 3.66; $p = 0.012$), but not for handgrip strength (OR = 1.15; 95% CI: 0.64, 2.01; $p = 0.636$) and speed/agility (OR = 1.65; 95% CI: 0.92, 2.96; $p = 0.093$), compared to those who did not meet all three recommendations.
Sun, et al., 2020	China	To determine the relationship between reallocating 20 minutes of sedentary behavior (SB) to light physical activity (LPA), moderate-to-vigorous physical activity (MVPA), and a combination of LPA and MVPA with cardiorespiratory fitness (CRF).	Cross-sectional design, sample of 536 individuals aged 7 to 18 years.	Shifting sedentary behavior (SB) to moderate to vigorous physical activity (MVPA) is associated with improved cardiovascular fitness (CRF) in boys ($P < 0.01$), girls ($P < 0.01$), and adolescent girls ($P < 0.05$).
O'Kane, et al., 2020	Northern Ireland	To evaluate the effectiveness of a low-cost, new peer-led school-based walking intervention implemented throughout the school year to increase physical activity levels in adolescent girls.	c-RCT, sample of 80 girls, aged 12–14 years.	The WISH study will examine the effectiveness of a low-cost, peer-led, school-based walking intervention in increasing physical activity among adolescent girls when implemented throughout the school year.
Judice, et al., 2021	Portugal	To identify correlations predicting sensor-based physical activity, sedentary time, and self-reported screen time in youth.	Cross-sectional survey, sample size of 2,179 youth aged 10-18 years.	Among adolescents aged 10–14 years, factors associated with physical inactivity include being a girl, lacking sports facilities in the surrounding environment, and not perceiving the environment as a safe place. Meanwhile, for adolescents aged 15–18 years, factors associated with inactivity include not exercising (9.7% chance of being active). Factors predicting high sedentary time (ST) in the younger group include not exercising (55.8% chance of high ST), and for the older group, these factors include not having a pet, perceiving the environment as a safe place, and having inactive

				parents (63.7% chance of high ST). In the younger group, the highest likelihood of having high CST is among those in their last year of elementary school, who are girls, and who do not have friends in their surroundings (73.1% chance of high CST), while in the older group, the highest likelihood of high CST is among those who are girls and have a TV in their bedroom (74.3% chance of high CST).
Goon, et al., 2020	Canada	To assess the impact of perceived and researcher-assessed built environment on children's physical activity and sedentary behavior outcomes.	Longitudinal cohort study, a total of 816 children aged 9–14 years.	The multilevel modeling approach was used to understand the influence of the built environment (BE) on children's physical activity outcomes. Children's perceptions of the availability of parks and sidewalks predicted higher accumulated moderate-to-vigorous physical activity (MVPA) and lower sedentary time (ST). Children's reports of the absence of social disturbances in the environment (e.g., threats from dogs or scary people) predicted higher light physical activity (LPA), while reports of concerns about crime predicted lower MVPA. Researchers' assessments of environmental activity friendliness predicted lower ST, while their assessments of safety from crime predicted higher ST. Characteristics of the BE perceived by children were stronger predictors of children's physical activity outcomes compared to the BE factors rated by researchers.

Discussion

Consistent physical activity (PA) is widely regarded as one of the key pillars of overall child health. Various health guidelines, including those issued by the World Health Organization (WHO), recommend that children engage in sufficient physical activity every day. These recommendations aim to support healthy physical and mental growth and reduce the risk of long-term diseases. Children who participate in regular physical activity tend to have better fitness levels and a lower risk of obesity, cardiovascular disorders, mental health issues, and other non-communicable diseases (Sigmundová, et al., 2013).

However, a rising phenomenon is the increasing number of children adopting a sedentary lifestyle, marked by a lack of engagement in physical activity and more time spent in front of screens (screen time). This sedentary lifestyle, coupled with excessive screen exposure, has been linked to an increased risk of serious health issues such as obesity, cardiovascular fitness problems, and mental health disorders in children and adolescents. Children who spend more time in sedentary activities and screen time are more vulnerable to obesity, elevated blood cholesterol levels, and other health problems (Reilly et al., 2023). Therefore, participating in adequate physical activity is highly recommended to reduce the risk of non-communicable diseases associated with a sedentary lifestyle and lack of physical activity.

According to WHO guidelines, children and adolescents are advised to engage in at least 60 minutes of moderate-to-vigorous physical activity (MVPA) every day (WHO, 2020). However, despite these guidelines, data from various studies indicate that only a small proportion of children meet these recommendations. A global study by Starks et al. (2023) found that only 82% of children across different countries performed the recommended physical activity. This indicates that a significant number of children remain physically inactive, which could potentially increase the burden of non-communicable diseases in the future.

Trends in Sedentary Time and Physical Activity Levels in Children and Adolescents

Global trends concerning sedentary time and physical activity levels in children and adolescents show significant changes. According to 15 studies from various countries, the majority of school-aged children show a decline in physical activity participation and an increase in time spent on sedentary activities (Biddle et al., 2021). This decline is particularly noticeable among children and adolescents who spend more time in front of screens for both entertainment and educational purposes.

This systematic review also identified several studies discussing trends in physical activity (PA) and sedentary behavior (SB), as well as the achievement of guidelines set for these behaviors. Some studies with random samples show consistent negative trends in many countries, such as increased sedentary time, a decrease in the percentage of children meeting PA guidelines, and an increase in screen time. These trends reflect a significant impact on the physical and mental well-being of children and adolescents (Janssen & LeBlanc, 2020).

Additionally, various tools are used to assess physical activity levels and sedentary behavior in children, such as accelerometers and questionnaires, each with strengths and limitations regarding accuracy and consistency. Different data processing methods in each study may also affect the results, particularly in the assessment of sedentary time and sufficient physical activity. Furthermore, differences in definitions of sedentary behavior and sufficient physical activity between these studies contribute to inconsistent findings, especially regarding gender differences or the prevalence of sufficient physical activity (Basterfield et al., 2021).

The Impact of Sedentary Time and Physical Activity on Non-communicable Diseases

Increased sedentary time and reduced physical activity in children and adolescents have long-term

effects on their physical and mental health. Excessive sedentary time, particularly screen time, has been linked to an increased risk of obesity, metabolic disorders, and declining cardiovascular health. Additionally, a lack of physical activity can lead to a decrease in muscle mass and heart fitness, directly affecting the quality of life and life expectancy of children and adolescents (Ekelund et al., 2019). In addition to physical effects, research also shows a connection between increased screen time and mental health issues such as anxiety, depression, and sleep disorders in children and adolescents (Ferguson et al., 2020).

Interventions to Reduce Sedentary Time and Increase Physical Activity

To address the negative impact of excessive sedentary time and insufficient physical activity, various interventions have been implemented at individual, family, and community levels. Intervention programs that raise awareness about the importance of physical activity, reducing sedentary time, and promoting healthier technology usage can help children and adolescents modify their behavior (Frömel, et al., 2018 & Trost et al., 2021). School-based interventions have also proven effective in increasing physical activity levels by providing time and space for structured and enjoyable physical activities for children and adolescents.

At the policy level, it is important for governments to design programs that support accessible and affordable physical activity for all children, including school sports programs, the development of safe play facilities, and campaigns to reduce screen time. Furthermore, clear and evidence-based guidelines regarding screen time and physical activity duration for children and adolescents are essential to guide parents, educators, and communities in supporting child health (Jesus, et al., 2022 & Pate et al., 2020)

Conclusion

Overall, a better understanding of the relationship between physical activity, sedentary behavior, and screen time in children and adolescents is crucial in developing policies and programs to promote healthy lifestyles. While there are significant challenges in increasing children's engagement in physical activity and reducing sedentary behavior, a holistic and evidence-based approach can help create sustainable changes to improve the long-term health of children worldwide.

Declaration of Conflicting Interest
No conflict of interest to declare.

Funding
No funded

Author's Contribution
LS contributed to data analysis and manuscript preparation, wrote the first draft of the manuscript, revised the final draft, and gave final approval of the version to be published. VYL contributed to literature search and data extraction

Author's ORCID
Ns. La Saudi, M.Kep., Sp.Kep.An, is a Nursing lecturer at the Faculty of Medicine, State University of Surabaya, Indonesia. ORCiD iD: https://orcid.org/0009-0008-5075-6224
Ns. Vernando Yanry Lameky, M.Kep is a Nursing lecturer at the Faculty of Nursing Universitas Kristen Indonesia Maluku, Indonesia. ORCiD iD: https://orcid.org/0000-0001-8415-8099

Data Availability Statement
The dataset generated during and analyzed during the current study is available from the corresponding author upon reasonable request.

Declaration of Use of AI in Academic Writing
The author used ChatGPT in the writing process to improve readability and remove grammatical errors. However, he took full responsibility for the content.

References

Basterfield, L., Adamson, A. J., & Parkinson, K. N. (2021). Physical activity and sedentary behavior in children and adolescents: a systematic review of intervention studies. *International Journal of Behavioral Nutrition and Physical Activity*, 18(1), 10.

Biddle, S. J., & Asare, M. (2021). Physical activity and mental health in children and adolescents: a review of reviews. *British Journal of Sports Medicine*, 55(6), 315-324.

Ekelund, U., Luan, J., Sherar, L. B., et al. (2019). Physical activity and sedentary behavior in

children and adolescents. *The Lancet*, 382(9882), 1835-1843.

Ferguson, C. J., & Beresin, E. V. (2020). Screen time and children: What the research tells us. *American Journal of Psychiatry*, 177(1), 5-7.

Frömel K, Grofk D, Chmelík F, Cocca A, Skalik K. (2018). Physical activity of 15–17 years old adolescents in diferent educational settings: A Polish Czech study. Cent Eur J Public Health, 26(2):137–43

Goon, S., Kontulainen, S., & Muhajarine, N. (2020). Neighborhood Built Environment Measures and Association with Physical Activity and Sedentary Time in 9–14-Year-Old Children in Saskatoon, Canada. Int. J. Environ. Res. Public Health, 17, 3837; doi:10.3390/ijerph17113837

Guariguata L, Jeyaseelan S. (2019). Children and non-communicable disease: Global Burden Report 2019. NCD Child. Retrieved from: www.ncdchild.org

Guthold R, Stevens GA, Riley LM, Bull FC. (2020). Global trends in insufcient physical activity among adolescents: A pooled analysis of 298 population-based surveys with 1·6 million participants. Lancet Child Adolesc Heal, 4(1):23–35.

Gába A, Pedišić Ž, Štefelová N, Dygrýn J, Hron K, (2020). Dumuid D, et al. Sedentary behavior patterns and adiposity in children: A study based on compositional data analysis. BMC Pediatr, 20(147):1–11.

Guo, M. M., Koh. K. T., & Wang, X. Z. (2024). Trends of physical activity and recreational screen time among Chinese children and adolescents: a national study from 2017 to 2019. BMC Public Health (2024) 24:1305. https://doi.org/10.1186/s12889-024-18822-1

Husu, P., Tokola, K., Vähä-Ypyä, H.,.. & Vasankari, T. (2024). Physical activity has decreased in Finnish children and adolescents from 2016 to 2022. BMC Public Health, 24:1343. https://doi.org/10.1186/s12889-024-18854-7

Janssen, I., & LeBlanc, A. G. (2020). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, 17(1), 1-20.

Jesus, G. M., Araujo, R. H. D. O., Dias, L. A...& Assis, M. A. D. (2024). Attendance in physical education classes, sedentary behavior, and diferent forms of physical activity among school children: a cross-sectional study. BMC Public Health, 22:1461. https://doi.org/10.1186/s12889-022-13864-9.

Judice, P. B., Magalhaes, J. P., Rosa, G. B., ... & Sardinha, L. B. (2020). Sensor-based physical activity, sedentary time, and reported cell phone screen time: A hierarchy of correlates in youth. Journal of Sport and Health Science 10 (2021) 55-64. https://doi.org/10.1016/j.jshs.2020.03.003

Marques A, Henriques-Neto D, Peralta M, Martins J, Demetriou Y, Schönbach DMI, et al. (2020). Prevalence of physical activity among adolescents from 105 low, middle, and high-income countries. Int J Environ Res Public Health, 17(3145):1–11

Mo Z, Wang H, Zhang, et al., (2022). Boys may Differ from those among Girls in China: An Open Cohort Study. The Journal of Nutritional Epidemiology, 152:1274–1282. doi: https://doi.org/10.1093/jn/nxab446.

Mori, T., Aoki, T., Oishi, K...& Ishii, K. (2024). Relative age efect on the physical activity and sedentary behavior in children and adolescents aged 10 to 18 years old: a cross-sectional study in Japan. BMC Public Health, 24:3273. https://doi.org/10.1186/s12889-024-20659-7

Moher D, Liberati A, Tetzlaff J, et al. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. J Clin Epidemiol, 62:1006–12.

Nagata, J. M., Weinstein, S., Alsamman, S.,.. & Gabriel, K. P. (2024). Association of physical activity and screen time with cardiovascular disease risk in the Adolescent Brain Cognitive Development Study. BMC Public Health, 24:1346.

O'Kane, S. M., Carlin, A., Gallagher, A. M., ... & Murphy, M. H. (2020). A study protocol for a clustered randomised controlled trial to evaluate the effectiveness of a peer-led school-based walking intervention on adolescent girls' physical activity: the Walking In ScHools (WISH) study. BMC Public Health, 20:541. https://doi.org/10.1186/s12889-

020-08600-0

Pate, R. R., O'Neill, J. R., & McIver, K. L. (2020). Physical activity and sedentary behavior in youth: implications for public health. *Journal of Physical Activity and Health*, 17(1), 3-7.

Sigmundová D, Sigmund E, Hamrik Z, Kalman M. (2013). Trends of overweight and obesity, physical activity and sedentary behaviour in Czech schoolchildren: HBSC study. Eur J Public Health, 24(2):210–5.

Sun, Y., & Yuan., D. (2024). Recent trends and disparities in screen-based sedentary behavior and physical activity among U.S. overweight youth, 2018–2022. Complementary Therapies in Clinical Practice 57 (2024) 101910. https://doi.org/10.1016/j.ctcp.2024.101910

Sun, Y., Yin, X, Li, Y.,.... & Song, S. (2020). Isotemporal substitution of sedentary behavior for physical activity on cardiorespiratory fitness in children and adolescents. Medicine, 99:30(e21367). http://dx.doi.org/10.1097/MD.0000000000021367

Starks, K. S., Kamara, D., & Jacobsen, K. H. (2024). Sedentary Behavior and Physical Inactivity Among Secondary School Students in the 2017 Sierra Leone Global School-Based Student Health Survey. Journal of School Health, 94 (5), 433-442. DOI: 10.1111/josh.13402

Tapia-Serrano, M. A., López-Gil, J. F., Sevil-Serrano, J.,.. & Sánchez-Miguel, P. A. (2022). What is the role of adherence to 24-hour movement guidelines in relation to physical fitness components among adolescents? Scand J Med Sci Sports., 33:1373–1383. DOI: 10.1111/sms.14357

Telford, D. M., Meiring, R.M., Gusso, S. (2025). Moving beyond moderate-to-vigorous physical activity: A longitudinal study on adherence to 24-hour Movement Guidelines in adolescents. Journal of Science and Medicine in Sport 28 (2025) 147–153. https://doi.org/10.1016/j.jsams.2024.10.002

Trost, S. G., Fees, B., & Dzewaltowski, D. A. (2021). A framework for physical activity interventions. *American Journal of Preventive Medicine*, 41(2), 159-167.

Ziaei, R., Mohammadi, R., Dastgiri, S.,... & Viitasara, E. (2022). The prevalence and correlates of physical activity/inactivity and sedentary behaviour among high-school adolescents in Iran: a cross-sectional study. Journal of Public Health: From Theory to Practice, 30:1121–1131. https://doi.org/10.1007/s10389-020-01392-y

WHO (2020). Guidelines on physical activity and sedentary behavior. World Health Organization.

World Health Organization. (2018). Global action plan on physical activity 2018-2030: More active people for a healthier world. Geneva: World Health Organization.

Rahmawati, S., Nurmumpuni, D., & Rasyid, M. F. A. (2022). in House Training Pelaporan Insiden Keselamatan Pasien Sebagai Upaya Meningkatkan Mutu Pelayanan dan Keselamatan Pasien di Rumah Sakit. *JCOMENT (Journal of Community Empowerment)*, 3(3), 194–204. https://doi.org/10.55314/jcoment.v3i3.327

Rosen, A. K., & Rivard, P. E. (2025). Moving the Needle on Measurement of Patient Safety: The Evolving Role of the Agency for Healthcare Research and Quality (AHRQ) Patient Safety Indicators. *Joint Commission Journal on Quality and Patient Safety*, *51*(3), 229–231. https://doi.org/10.1016/j.jcjq.2024.11.004

Schenzel, H. A., Palmer, A. K., Shah, N. B., Lawson, D. K., Fischer, K. M., Lapid, M. I., & DeFoster, R. E. (2025). Weighted Blankets for Agitation in Hospitalized Patients with Dementia: Protocol for a Randomized Controlled Trial. *JMIR Research Protocols*, *14*, e57264. https://doi.org/10.2196/57264

Simpson, E., Rodger, R., & Qadri, H. (2025). P11 A quality improvement baseline evaluation of IV gentamicin management in the acute hospital setting following introduction of an electronic prescribing system (HEPMA). *JAC-*

Antimicrobial Resistance, 7(Supplement_1). https://doi.org/10.1093/jacamr/dlae217.015

Zakiyyah, N., Handiyani, H., Hariyati, R. T. S., & Novieastari, E. (2024). Efikasi Diri dan Sikap Perawat dalam Melaporkan Insiden Keselamatan Pasien di Rumah Sakit. *MAHESA : Malahayati Health Student Journal*, 4(6), 2460–2471. https://doi.org/10.33024/mahesa.v4i6.14210