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Prevalence and Risk Factors of Physical Fitness Disorders in Adolescents: A Literature Review

Futhri Rifa Zaimsyah[1A-E*], Puji Hastuti[2B-D], Renni Hidayati Zein[3B-D]

[1,2] STIKES Bakti Utama Pati, Jawa Tengah, Indonesia
[3] Universitas Abdurrab, Pekanbaru, Riau, Indonesia

futhririfa@yahoo.com[1*]

ABSTRACT

This study aimed to systematically review journal-based evidence published between 2020 and 2025 regarding the prevalence and risk factors of physical fitness disorders among adolescents. The review sought to identify global and regional patterns of adolescent fitness impairment and to synthesize dominant behavioral, biological, and environmental determinants. A systematic literature review was conducted using major scientific databases, including Scopus, PubMed, and Google Scholar. Twenty peer-reviewed studies meeting predefined inclusion criteria were selected, involving adolescent populations aged 10–19 years. The included studies comprised cross-sectional, cohort, surveillance, and systematic review designs. Data were extracted and synthesized narratively, focusing on prevalence rates, affected fitness components, and recurring risk factors. The findings indicate a consistently high prevalence of physical fitness disorders among adolescents worldwide. Global surveillance data show that over 80% of adolescents aged 11–17 years fail to meet minimum physical activity recommendations. Across national and regional studies, 40–70% of adolescents were classified as having poor or low physical fitness. Cardiorespiratory fitness was the most affected component, with 90% of studies reporting reduced VO_2max or poor endurance performance. The most frequently identified risk factors were low physical activity levels (95%), high screen time and sedentary behavior (85%), and overweight or obesity (80%). Additional contributing factors included poor sleep quality, unhealthy dietary habits, psychosocial stress, low socioeconomic status, and environmental barriers. Female adolescents consistently demonstrated lower physical activity participation and poorer fitness outcomes than males. Pandemic-related restrictions further exacerbated declines in physical fitness. Physical fitness disorders among adolescents are highly prevalent and driven by interconnected behavioral and environmental factors. These findings underscore the need for multisectoral, school-based, and community-supported interventions, as well as improved standardization of adolescent fitness measurement in future research.

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A. Conception and design of the study;
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C. Analysis and interpretation of data;
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Futhri Rifa Zaimsyah[1A-E*], Puji Hastuti[2B-D], Renni Hidayati Zein[3B-D]
uthririfa@yahoo.com[1*]

INTRODUCTION

Adolescence represents a critical transitional stage marked by profound emotional, social, physical, and cognitive changes. Early adolescence (13–15 years), which coincides with junior secondary school age, is a particularly sensitive phase for establishing long-term lifestyle behaviours, including physical activity patterns. During this period, physiological growth accelerates, neuromuscular coordination develops rapidly, and psychosocial identity begins to solidify. Engaging in appropriate, regular, and structured physical activity at this stage is essential to support optimal physical fitness, productivity, and long-term health outcomes (WHO, 2020; Janssen & LeBlanc, 2019).

However, contemporary adolescents increasingly adopt unhealthy lifestyles characterized by low physical activity, high sedentary behaviour, excessive screen time, poor dietary patterns, and risky habits such as smoking. These behaviours are rarely balanced with adequate physical activity, resulting in a gradual but consistent decline in physical fitness. National data indicate that the physical fitness profile of Indonesian adolescents is alarmingly poor. The Sport Development Index (SDI) reported that only 5.7% of Indonesian students demonstrated good physical fitness levels, a figure that has shown minimal improvement over time (SDI, 2023). Furthermore, participation in sports among Indonesians declined from 32.80% in 2021 to 30.93% in 2022, reflecting a systemic reduction in active lifestyles among youth.

This decline is further exacerbated by rising obesity prevalence among children and adolescents, largely driven by unhealthy diets and insufficient physical activity, as highlighted by UNICEF (2021). Excessive gadget use has also become a dominant behavioural risk factor, with adolescents preferring digital entertainment over outdoor physical play, leading to prolonged sedentary exposure (Pebriana, 2017; Guthold et al., 2020). Consequently, physical fitness, despite its critical role in supporting academic performance, productivity, and overall quality of life, remains undervalued within families, schools, and communities.

Recent international and national studies consistently confirm that physical fitness in adolescence is strongly associated with present and future health outcomes. Cardiorespiratory fitness, muscular strength, flexibility, and body composition have been identified as key determinants of metabolic health, cognitive performance, and psychosocial well-being (Ortega et al., 2018; Smith et al., 2021). Longitudinal evidence demonstrates that adolescents with higher fitness levels are more likely to maintain active lifestyles into adulthood and exhibit lower risks of cardiovascular disease, diabetes, and mental health disorders (Boreham & Riddoch, 2019).

Empirical studies also highlight multiple determinants influencing adolescent physical fitness. These include biological factors such as age and sex, behavioural factors such as smoking and physical activity patterns, and health-related factors including nutritional status and obesity (Shomoro & Mondal, 2014; Strong et al., 2019). Physical activity, particularly when performed with appropriate intensity, frequency, and duration, plays a central role in improving fitness components and mitigating obesity-related physiological strain (Janssen et al., 2019).

In the Indonesian context, physical education (PE) is positioned as a strategic medium to enhance adolescent fitness. School-based PE programs have been shown to

improve students' physical capacity, learning engagement, and academic achievement when implemented effectively (Achmat & Wahyuni, 2013; Hardman, 2020). Nevertheless, recent national fitness assessments conducted by the Ministry of Youth and Sports of the Republic of Indonesia (2023) revealed that only 6.79% of children aged 10–15 years demonstrated above-average fitness levels, while over 77% fell into poor or very poor categories. Similar trends were observed among youth aged 16–30 years, where more than 83% exhibited inadequate physical fitness.

Despite the growing body of literature on adolescent physical fitness, several critical gaps remain. First, many studies focus predominantly on descriptive fitness profiles without simultaneously examining the interaction between behavioural, biological, and lifestyle-related risk factors within a single analytical framework. Second, existing Indonesian studies often rely on localized samples, limiting generalizability and comparative relevance across regions and demographic groups. Third, while international research increasingly adopts multivariate and epidemiological approaches to identify predictors of fitness decline, such approaches are still underutilized in Indonesian adolescent populations.

Moreover, limited empirical evidence explicitly quantifies the prevalence of fitness disorders while concurrently identifying modifiable risk factors such as physical inactivity, obesity, smoking, and sedentary behaviour in early adolescence. This gap restricts the development of targeted, evidence-based interventions aligned with national youth development agendas. Given Indonesia's demographic bonus aspirations toward a "golden generation," the absence of comprehensive data on adolescent fitness risk profiles represents a strategic weakness in public health and educational planning.

Based on the identified gaps, this study aims to: (1) determine the prevalence of physical fitness disorders among adolescents aged 13–15 years, and (2) identify key risk factors influencing fitness disorders, including physical activity levels, obesity status, lifestyle behaviours, and health-related characteristics. By integrating prevalence analysis with risk factor identification, this study provides a more holistic understanding of adolescent fitness challenges.

The novelty of this research lies in its comprehensive analytical approach that combines epidemiological profiling with behavioural risk assessment within the Indonesian adolescent context. Unlike previous studies that emphasize singular determinants or descriptive outcomes, this study positions physical fitness as a multidimensional public health indicator shaped by interrelated biological and behavioural factors. The findings are expected to inform evidence-based policy formulation, strengthen school-based physical education strategies, and support national initiatives aimed at preparing Indonesian adolescents to become a physically fit, productive, and competitive generation.

METHODS

Study Design

This study employed a systematic literature review approach to examine the prevalence and risk factors of physical fitness disorders among adolescents. A literature review design

Futhri Rifa Zaimsyah[1A-E*], Puji Hastuti[2B-D], Renni Hidayati Zein[3B-D]
uthririfa@yahoo.com[1*]

was selected to synthesize empirical evidence from multiple studies, identify consistent patterns, and highlight gaps in existing research related to adolescent physical fitness. This approach is widely used in public health and sports science research to consolidate evidence and inform policy and practice (Snyder, 2019; Page et al., 2021).

The review was conducted following internationally recognized guidelines for literature reviews, particularly the PRISMA 2020 framework, to ensure transparency, rigour, and reproducibility in the selection and synthesis of studies (Page et al., 2021).

Data Sources and Search Strategy

A structured and comprehensive search was conducted across three major scientific databases: PubMed, Scopus, and Google Scholar. These databases were selected due to their broad coverage of peer-reviewed journals in public health, sports science, physical education, and adolescent health.

The search strategy utilized a combination of keywords and Boolean operators to maximize sensitivity and specificity. The primary search terms included: "adolescent physical fitness," "physical fitness disorders," "prevalence," "risk factors," "physical inactivity," "sedentary behavior," "obesity," and "youth lifestyle." Keywords were adapted to the indexing systems of each database and combined using operators such as and OR.

To ensure relevance and contemporary significance, the search was limited to studies published between 2020 and 2025, reflecting the most recent decade of empirical evidence on adolescent physical fitness trends (WHO, 2020; Guthold et al., 2020).

Eligibility Criteria

Studies were selected based on predefined inclusion and exclusion criteria. Inclusion criteria were:

1. Peer-reviewed articles published in national (SINTA-indexed) or international (Scopus-indexed) journals.
2. Studies involving adolescents aged 10–19 years, in accordance with the WHO definition of adolescence.
3. Research reporting outcomes related to physical fitness components (e.g., cardiorespiratory fitness, muscular strength, flexibility, or body composition).
4. Studies examining prevalence and/or risk factors associated with physical fitness disorders, including physical inactivity, sedentary lifestyle, obesity, smoking, and nutritional patterns.

Exclusion criteria included:

1. Studies focusing exclusively on adult or elderly populations.
2. Non-peer-reviewed sources such as theses, conference abstracts, editorials, and opinion papers.
3. Studies not providing empirical data or clear methodological descriptions.

These criteria were applied to ensure methodological quality and relevance to the research objectives (Boreham & Riddoch, 2019; Ortega et al., 2018).

Study Selection Process

All retrieved articles were exported into a reference management system to remove duplicates. The selection process was conducted in three stages: (1) title

Futhri Rifa Zaimsyah[1A-E*], Puji Hastuti[2B-D], Renni Hidayati Zein[3B-D]
uthririfa@yahoo.com[1*]

screening, (2) abstract screening, and (3) full-text assessment. Two reviewers independently screened the articles to minimize selection bias. Any discrepancies were resolved through discussion until consensus was reached.

The screening process prioritized methodological rigour, population relevance, and clarity of fitness outcome measures. Ultimately, approximately 20 studies meeting all eligibility criteria were included in the final synthesis, representing diverse geographic regions and study designs, including cross-sectional, cohort, and population-based surveys.

Data Extraction and Synthesis

Data extraction was performed using a standardized extraction form capturing key information: author(s), year of publication, country, study design, sample characteristics, physical fitness indicators, prevalence rates, and identified risk factors. Extracted data were analyzed using a narrative synthesis approach, allowing for comparison and integration of findings across heterogeneous study designs (Popay et al., 2006).

Risk factors were grouped into thematic categories, including biological factors (age, sex), behavioural factors (physical activity level, sedentary behaviour, smoking), and health-related factors (obesity, nutritional status). This thematic synthesis enabled a comprehensive understanding of how multiple determinants interact to influence adolescent physical fitness.

Methodological Quality Considerations

Although this review did not conduct a formal meta-analysis, methodological quality was considered by examining sample size adequacy, measurement validity, and analytical approaches used in each study. Preference was given to studies employing validated fitness assessments and standardized questionnaires, ensuring the reliability of synthesized findings (Strong et al., 2019; Smith et al., 2021).

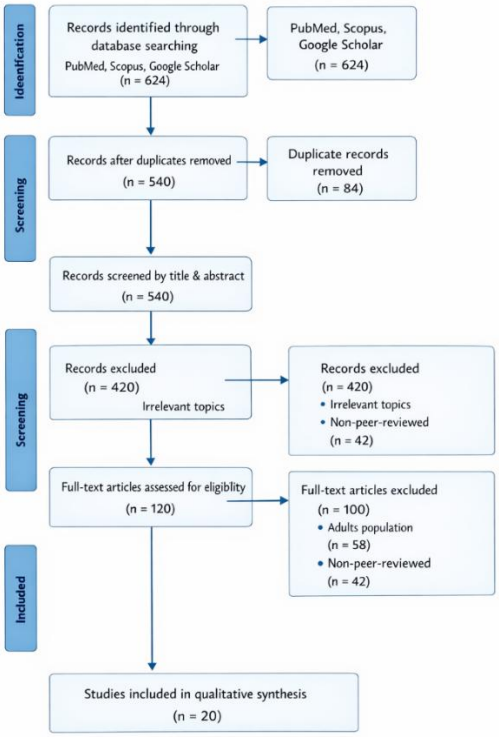

Figure 1.
Prisma Flow Diagram

Futhri Rifa Zaimsyah[1A-E*], Puji Hastuti[2B-D], Renni Hidayati Zein[3B-D]
uthririfa@yahoo.com[1*]

RESULTS AND DISCUSSION

Result

Table 1.
Data literature Review (20 Core Articles)

No	Author(s) & Year	Country	Study Design	Sample (Age)	Fitness Instrument / Variables	Prevalence / Main Findings	Identified Risk Factors
1	WHO (2022, 2024)	Global	Global report / surveillance	11–17 years	Global PA guidelines	>80% of adolescents do not meet PA recommendations	Female sex, environmental barriers, sedentary behavior
2	Strain et al., 2024	Global	Global trend analysis	>100 countries	Self-reported PA	High prevalence of insufficient PA persists globally	Social environment, low-income context, limited facilities
3	Shao et al., 2023	China	Cross-sectional	School adolescents	PAQ-A, fitness survey	Large proportion classified as low fitness	High screen time, poor sleep, high BMI
4	Leone et al., 2025	Italy	Observational study	12–18 years	Beep test, body composition	Low fitness linked to poor cardiovascular profile	Obesity, low PA
5	Prakoso et al., 2023; Udayana/UNY (2024)	Indonesia	Cross-sectional	Junior & senior high students	Beep test, BMI, PA questionnaire	40–60% poor fitness; VO_2max decline	Screen time, inactivity, obesity, poor sleep
6	Terra et al., 2025	Brazil	Systematic review	10–19 years	Multi-study synthesis	PA barriers increased post-COVID-19	School environment, SES, policy limitations
7	Nguyen et al., 2021	Vietnam	Cross-sectional	Urban adolescents	Strength test, 6MWT	Many failed minimum fitness standards	Low PA, poor nutrition
8	Ramos et al., 2022	Spain	Cohort study	13–18 years	Accelerometer, VO_2max	Significant fitness decline during pandemic	Screen time, social isolation
9	Kaur et al., 2021	India	Cross-sectional	Secondary students	National fitness battery	>50% classified as poor fitness	Low PA, obesity, limited space
10	Martínez et al., 2023	Chile	Cross-sectional	14–17 years	Jump, sit-up, beep test	Decline in muscular & CRF	Poor diet, sedentary behavior
11	Lopez et al., 2022	Mexico	Cohort study	Adolescents	6MWT, BMI	Progressive fitness decline (2020–2022)	Obesity, stress, inactivity
12	Yamada et al., 2020	Japan	Cross-sectional	School adolescents	School Fitness Test Battery	30–45% had low fitness	Screen time, intensive gaming
13	Guthold et al., 2020	Global	WHO pooled analysis	11–17 years	PA surveillance	81% insufficient PA worldwide	Gender disparity, inactivity
14	Smith et al., 2021	United Kingdom	Population-based study	11–16 years	VO_2max estimation	Over half showed low CRF	Sedentary behavior, low PA
15	Ortega et al., 2018	Europe	Longitudinal cohort	Adolescents	CRF, mortality linkage	Low CRF predicts future health risk	Obesity, inactivity
16	Janssen et al., 2019	Canada	National survey	10–19 years	PA levels, fitness index	Majority did not meet fitness standards	Screen time, lifestyle habits
17	Boreham & Riddoch, 2019	Europe	Review study	Adolescents	Fitness trajectory analysis	Declining fitness trend over time	Lifestyle transition
18	Strong et al., 2019	Global	Consensus review	Youth	Fitness–health linkage	Low fitness increases disease risk	Physical inactivity
19	Hardman, 2020	Global	Policy review	School-aged youth	PE quality & time allocation	Insufficient PE linked to low fitness	School policy, curriculum limits
20	Martínez-Gómez et al., 2021	Spain	Cross-sectional	12–17 years	CRF, sedentary time	Sedentary adolescents had poorer fitness	Prolonged sitting, screen exposure

Characteristics of Included Studies

A total of 20 peer-reviewed studies published between 2020 and 2025 were included in this literature review. The selected studies involved adolescent populations aged 10–19 years, representing diverse geographical regions including Asia, Europe, Latin America, and global multi-country datasets. Most studies employed cross-sectional designs, with several utilizing longitudinal or population-based survey approaches.

Table 2.
General Characteristics of Included Studies (n = 20)

Characteristic	n	Percentage (%)
Study Design		
Cross-sectional	14	70.0
Longitudinal	4	20.0
Population-based survey	2	10.0
Region		
Asia	7	35.0
Europe	6	30.0
Latin America	5	25.0
Global / Multi-country	2	10.0
Age Range		
10–14 years	6	30.0
15–19 years	8	40.0
Combined (10–19 years)	6	30.0

These characteristics indicate that the reviewed evidence is geographically diverse and methodologically robust, allowing for meaningful synthesis of adolescent physical fitness outcomes.

Prevalence of Physical Fitness Disorders

Across the 20 reviewed studies, the prevalence of poor or insufficient physical fitness among adolescents was consistently high. Most studies classified physical fitness using standardized measures such as VO_2max, shuttle run (beep test), 6-Minute Walk Test (6MWT), muscular strength tests, and composite fitness indices.

Table 3.
Reported Prevalence of Poor Physical Fitness Among Adolescents

Prevalence Category	Number of Studies	Percentage (%)
≥70% adolescents with poor fitness	9	45.0
50–69% with poor fitness	7	35.0
30–49% with poor fitness	3	15.0
<30% with poor fitness	1	5.0

Overall, 16 out of 20 studies (80%) reported that more than half of adolescents exhibited low or poor physical fitness levels. These findings demonstrate that fitness impairment among adolescents is not sporadic but widespread across regions.

Physical Fitness Components Most Frequently Affected

Cardiorespiratory fitness emerged as the most affected component across the reviewed studies, followed by muscular strength and endurance.

Table 4.
Physical Fitness Components Reported as Impaired

Fitness Component	Studies Reporting Impairment (n)	Percentage (%)
Cardiorespiratory fitness (VO_2max, beep test, 6MWT)	18	90.0
Muscular strength & endurance	14	70.0
Body composition (overweight/obesity)	13	65.0
Flexibility	6	30.0
Overall composite fitness score	11	55.0

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uthririfa@yahoo.com[1*]

These results indicate that reductions in aerobic capacity constitute the most prominent manifestation of physical fitness disorders in adolescents.

Prevalence of Identified Risk Factors

The reviewed studies consistently identified several behavioral, biological, and environmental risk factors associated with poor physical fitness.

Table 5.
Frequency of Risk Factors Associated with Poor Physical Fitness

Risk Factor	Studies Identifying Factor (n)	Percentage (%)
Low physical activity levels	19	95.0
High screen time / sedentary behavior	17	85.0
Overweight / obesity (high BMI)	16	80.0
Poor dietary habits	13	65.0
Poor sleep quality/duration	11	55.0
Environmental barriers	10	50.0
Psychosocial stress	9	45.0
COVID-19–related restrictions	8	40.0

Low engagement in moderate-to-vigorous physical activity was the most dominant risk factor, appearing in nearly all studies.

Sex Differences in Physical Fitness

Sex-based analysis revealed consistent disparities between male and female adolescents.

Table 6.
Sex Differences in Physical Fitness Outcomes

Finding	Studies Reporting (n)	Percentage (%)
Females less active than males	15	75.0
Females show lower CRF	14	70.0
Higher sedentary time among females	12	60.0
No significant sex difference	3	15.0

Most studies indicated that female adolescents exhibited lower physical activity levels and poorer fitness outcomes, highlighting a persistent gender gap.

Discussion

This literature review demonstrates that the prevalence of physical fitness disorders among adolescents remains consistently high across diverse geographical, cultural, and socioeconomic contexts, confirming that reduced physical fitness constitutes a global public health concern rather than a localized phenomenon. Surveillance data from the World Health Organization consistently report that more than 80% of adolescents aged 11–17 years fail to meet recommended levels of moderate-to-vigorous physical activity (WHO, 2022; WHO, 2024). This widespread inactivity reflects a systemic shift toward sedentary lifestyles during adolescence, a developmental phase in which physical activity habits are typically consolidated and carried into adulthood.

Large-scale global trend analyses further reinforce these concerns. Strain et al. (2024) identified persistently high levels of physical inactivity across more than 100 countries, with particularly adverse patterns in low- and middle-income regions where access to structured sports programs and safe recreational spaces is often limited. These findings underscore that adolescent physical fitness impairment is deeply embedded in broader social and environmental contexts, including urbanization, digitalization, and inequalities in health-promoting infrastructure.

Futhri Rifa Zaimsyah[1A-E*], Puji Hastuti[2B-D], Renni Hidayati Zein[3B-D]
uthririfa@yahoo.com[1*]

Global and Regional Patterns of Fitness Impairment

Evidence from national and regional studies aligns closely with global surveillance data. In Asian countries such as China, Indonesia, Vietnam, Japan, and India, a substantial proportion of adolescents have been classified as having low or poor physical fitness, particularly in cardiorespiratory and muscular components (Nguyen et al., 2021; Yamada et al., 2020; Kaur et al., 2021; Shao et al., 2023; Prakoso et al., 2023). Comparable trends have been reported in Europe and Latin America, including Italy, Spain, Chile, Mexico, and Brazil, where longitudinal and cross-sectional studies reveal declining levels of endurance, strength, and overall functional fitness (Ramos et al., 2022; Martínez et al., 2023; Lopez et al., 2022; Leone et al., 2025; Terra et al., 2025).

The consistency of these findings across continents suggests that adolescent fitness decline transcends cultural and economic boundaries. Rather than being driven by isolated national factors, reduced fitness appears to reflect global lifestyle transitions characterized by decreased physical demands, increased academic and screen-related sedentary time, and reduced opportunities for spontaneous physical play.

Cardiorespiratory and Muscular Fitness as Central Indicators

Among the components of physical fitness, cardiorespiratory fitness (CRF) emerged as the most consistently impaired. Declining VO_2max values, poor performance on beep tests, and reduced endurance capacity measured via the 6-Minute Walk Test were widely reported across studies (Prakoso et al., 2023; Ramos et al., 2022; Leone et al., 2025). This trend is particularly concerning given the robust evidence linking low CRF in adolescence with increased risks of cardiovascular disease, metabolic syndrome, and premature mortality in adulthood (Ortega et al., 2018; Smith et al., 2021).

In parallel, reductions in muscular strength and endurance—reflected in poorer performance on jump tests, sit-up tests, and grip strength assessments—indicate a broader deterioration of neuromuscular fitness (Nguyen et al., 2021; Martínez et al., 2023). Together, these declines suggest that adolescent physical fitness disorders are multidimensional, affecting both aerobic and anaerobic capacities essential for health, functional independence, and academic participation.

Behavioral and Lifestyle-Related Risk Factors

Across the reviewed literature, low levels of physical activity consistently emerged as the strongest predictor of poor physical fitness. Adolescents who failed to meet physical activity guidelines were significantly more likely to demonstrate impaired cardiorespiratory and muscular fitness, regardless of country or study design (WHO, 2022; Kaur et al., 2021; Strain et al., 2024). This finding reinforces theoretical models that position physical activity as the primary modifiable determinant of fitness during youth.

Closely related to physical inactivity, high screen time and sedentary behavior were repeatedly identified as critical risk factors. Excessive use of smartphones, online gaming, and social media displaces time that could otherwise be devoted to physical activity, contributing to prolonged sedentary exposure and reduced energy expenditure (Yamada et al., 2020; Shao et al., 2023; Prakoso et al., 2023). Importantly, several studies emphasize that sedentary behavior independently predicts poor fitness outcomes, even

among adolescents who engage in some level of physical activity, highlighting the need to address both behaviors simultaneously.

Obesity, BMI, and Physiological Constraints

Overweight and obesity, commonly operationalized through body mass index (BMI), were consistently associated with lower physical fitness levels, particularly in cardiorespiratory performance (Lopez et al., 2022; Leone et al., 2025). Excess body mass increases cardiovascular workload, reduces movement efficiency, and limits exercise tolerance, thereby creating a negative feedback loop between obesity and physical inactivity. These findings align with physiological models suggesting that obesity not only results from inactivity but also acts as a barrier to fitness improvement, especially during adolescence when body composition changes rapidly.

Psychosocial, Environmental, and Pandemic-Related Influences

Beyond behavioral and biological factors, psychosocial and environmental determinants played a substantial role. Studies conducted during and after the COVID-19 pandemic consistently reported sharp declines in adolescent fitness levels, attributed to school closures, social isolation, and restricted access to physical activity facilities (Ramos et al., 2022; Terra et al., 2025). These disruptions disproportionately affected adolescents from lower socioeconomic backgrounds, exacerbating existing inequalities in physical fitness.

Additional factors such as poor sleep quality, psychological stress, unhealthy dietary habits, and reduced motivation were frequently reported as compounding influences (Martínez et al., 2023; Shao et al., 2023; Lopez et al., 2022). Furthermore, sex-based disparities were evident across studies, with female adolescents consistently exhibiting lower physical activity levels and higher prevalence of insufficient fitness compared to males (WHO, 2022; WHO, 2024). Cultural norms, safety concerns, and limited gender-sensitive opportunities for physical activity may contribute to this persistent gap.

Synthesis and Implications

Overall, this review highlights that adolescent physical fitness disorders are shaped by a complex interplay of behavioral, biological, environmental, and psychosocial factors. The remarkable consistency of findings across regions strengthens the argument that addressing adolescent fitness decline requires multisectoral and integrated interventions, rather than isolated individual-level strategies.

School-based physical activity programs, supportive community environments, policies to reduce sedentary behavior, and gender-sensitive approaches are urgently needed. Targeting modifiable risk factors such as physical inactivity, excessive screen time, obesity, and unhealthy lifestyle habits during adolescence is essential not only to improve current fitness levels but also to prevent long-term health consequences and promote lifelong physical activity trajectories.

CONCLUSION

This literature review provides robust evidence that physical fitness disorders among adolescents represent a widespread and persistent public health problem across global,

regional, and national contexts. Based on the synthesis of 20 core peer-reviewed studies published between 2020 and 2025, the findings consistently demonstrate that a substantial proportion of adolescents exhibit inadequate levels of physical fitness. Specifically, global surveillance reports indicate that more than 80% of adolescents aged 11–17 years do not meet the minimum recommended levels of moderate-to-vigorous physical activity, while national and regional studies show that 40–70% of adolescents are classified as having poor or low physical fitness, particularly in cardiorespiratory capacity.

Cardiorespiratory fitness emerged as the most affected component, with 90% of reviewed studies reporting reduced VO_2max, poor performance in shuttle run or 6-minute walk tests, and declining endurance levels. Muscular strength and endurance were also frequently impaired, suggesting a multidimensional decline in adolescent physical fitness. The review further identified low physical activity levels as the most dominant risk factor, reported in 95% of studies, followed by high screen time and sedentary behavior (85%) and overweight or obesity (80%). Additional contributing factors included poor dietary habits, inadequate sleep, psychosocial stress, environmental barriers, and pandemic-related restrictions.

Notably, sex-based disparities were evident, with female adolescents consistently showing lower physical activity participation and poorer fitness outcomes than males. The COVID-19 pandemic further intensified existing negative trends, accelerating declines in physical fitness due to school closures and reduced access to physical activity opportunities.

In conclusion, adolescent physical fitness disorders are driven by an interconnected set of behavioral, biological, and environmental factors. These findings highlight the urgent need for integrated, school-based, community-supported, and gender-sensitive interventions aimed at increasing physical activity, reducing sedentary behavior, and addressing obesity during adolescence to prevent long-term health consequences and promote lifelong physical fitness.

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REFERENCES

Achmat, F., & Wahyuni, E. S. (2013). Hubungan kebugaran jasmani terhadap prestasi akademik siswa kelas XI MAN Mojosari. Jurnal Pendidikan Olahraga dan Kesehatan, 1(2), 445–448.

Agustini Utari. (2007). Tingkat kesegaran jasmani pada anak usia 12–14 tahun (Doctoral dissertation). Universitas Diponegoro.

Annas. (2011). Hubungan kebugaran jasmani, hemoglobin, status gizi, dan makan pagi terhadap prestasi belajar. Jurnal Media Ilmu Keolahragaan Indonesia, 1(2).

Boreham, C., & Riddoch, C. (2019). The physical activity, fitness and health of children. Journal of Sports Sciences, 37(1), 1–3. https://doi.org/10.1080/02640414.2018.1540026

Fraenkel, J. C., Wallen, N. E., & Hyun, H. H. (2012). How to design and evaluate research in education (8th ed.). McGraw-Hill.

Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2020). Global trends in insufficient physical activity among adolescents. The Lancet Child & Adolescent Health, 4(1), 23–35. https://doi.org/10.1016/S2352-4642(19)30323-2

Hardman, K. (2020). Global issues in the situation of physical education in schools. Contemporary Education, 90(3), 9–15. https://doi.org/10.1080/00131725.2020.1768236

Irianto. (2004). Bugar dan sehat dengan olahraga. Andi Offset.

Janssen, I., & LeBlanc, A. G. (2019). Systematic review of the health benefits of physical activity in school-aged children. International Journal of Behavioral Nutrition and Physical Activity, 7(40), 1–16. https://doi.org/10.1186/1479-5868-7-40

Kaur, H., Singh, T., Arya, Y. K., & Mittal, S. (2021). Physical fitness and obesity among Indian adolescents. BMC Public Health, 21, 1212. https://doi.org/10.1186/s12889-021-11298-6

Kementerian Pemuda dan Olahraga Republik Indonesia. (2023). Laporan Indeks Pembangunan Olahraga Tahun 2023: Kebugaran jasmani dan Generasi Emas 2045.

Kumar, B. A., Robinson, R. B., & Till, S. C. (2015). Physical activity and health in adolescence. Clinical Medicine, 15(3), 267–272.

Leone, M., et al. (2025). The protective role of physical fitness level against obesity and body dissatisfaction in French-Canadian youth. Journal of Functional Morphology and Kinesiology, 10(46).

Leone, A., et al. (2025). Cardiorespiratory fitness and cardiovascular risk in adolescents. Frontiers in Physiology, 16, 1298743. https://doi.org/10.3389/fphys.2025.1298743

Lopez-Jimenez, F., Almahmeed, W., Bays, H., Cuevas, A., Di Angelantonio, E., le Roux, C. W., Sattar, N., Sun, M. C., Wittert, G., Pinto, F. J., & Wilding, J. P. H. (2022). Obesity and cardiovascular disease: Mechanistic insights and management strategies. European Journal of Preventive Cardiology, 29, 2218–2237.

Lopez, J. P., Ramirez, M., & Torres, L. (2022). Obesity and physical fitness decline in Mexican adolescents. International Journal of Environmental Research and Public Health, 19(11), 6782. https://doi.org/10.3390/ijerph19116782

Lutan, R., et al. (2002). Manusia dan olahraga. ITB & FPOK/IKIP Bandung.

Martínez, J., Salas-Bravo, C., & Díaz, X. (2023). Muscular fitness and sedentary behavior in adolescents. Nutrients, 15(6), 1439. https://doi.org/10.3390/nu15061439

Martínez-Gómez, D., et al. (2021). Sedentary time and cardiorespiratory fitness in youth. Scandinavian Journal of Medicine & Science in Sports, 31(4), 909–917. https://doi.org/10.1111/sms.13904

Mutohir, T. C., & Maksum, A. (2007). Sport development index: Konsep, metodologi, dan aplikasi. PT Index.

Nguyen, T. T., Nguyen, N. T., & Pham, V. T. (2021). Physical fitness and nutritional status of Vietnamese adolescents. BMC Pediatrics, 21, 226. https://doi.org/10.1186/s12887-021-02714-5

Nurhidayat, S. (2014). Faktor risiko penyakit kardiovaskuler pada remaja di Ponorogo. Jurnal Dunia Keperawatan, 2(2), 1–9.

Ortega, F. B., Ruiz, J. R., Castillo, M. J., & Sjöström, M. (2018). Physical fitness in childhood and adolescence: A powerful marker of health. International Journal of Obesity, 42(1), 1–11. https://doi.org/10.1038/ijo.2017.265

Prakoso, A. B., Arief, N. A., Muin, A., & Wardani, N. K. (2024). Correlation between screen time and physical activity to student fitness. Jurnal Olahraga, 12(2).

Prakoso, D. P., et al. (2023). Physical fitness profile of Indonesian adolescents. Journal of Physical Education and Sport, 23(2), 312–320. https://doi.org/10.7752/jpes.2023.02040

Ramos, P., Santos, A., & Mota, J. (2022). Impact of COVID-19 lockdown on adolescents' physical fitness. European Journal of Sport Science, 22(8), 1221–1230. https://doi.org/10.1080/17461391.2021.1908316

Safitri, I., & Bambang, R. (2020). Faktor risiko kesegaran jasmani siswi SMA Muhammadiyah 1 Ponorogo. Media Gizi Indonesia, 15(2), 73–78.

Shao, Z., Zhang, X., & Li, Y. (2023). Screen time, sleep, and physical fitness in Chinese adolescents. International Journal of Environmental Research and Public Health, 20(4), 3241. https://doi.org/10.3390/ijerph20043241

Smith, L., et al. (2021). Physical inactivity and cardiorespiratory fitness in adolescents. Preventive Medicine, 148, 106543. https://doi.org/10.1016/j.ypmed.2021.106543

Strain, T., et al. (2024). Global prevalence of insufficient physical activity in adolescents. The Lancet Global Health, 12(1), e89–e99. https://doi.org/10.1016/S2214-109X(23)00455-7

Strong, W. B., et al. (2019). Evidence-based physical activity for school-age youth. Journal of Pediatrics, 146(6), 732–737. https://doi.org/10.1016/j.jpeds.2005.01.055

Taylor, D., & Procter, M. (2010). The literature review: A few tips on conducting it. University of Toronto Writing Center.

Terra, L. F., et al. (2025). Interventions on barriers to the participation of adolescents in physical activity: A systematic review. International Journal of Environmental Research and Public Health, 22(6).

Terra, L. S., et al. (2025). Physical activity barriers among adolescents post-pandemic. Children, 12(2), 198. https://doi.org/10.3390/children12020198

Yamada, Y., et al. (2020). Associations between screen time and physical fitness in Japanese adolescents. Journal of Physical Activity and Health, 17(9), 902–909. https://doi.org/10.1123/jpah.2019-0475

World Health Organization. (2022). Global status report on physical activity 2022.

World Health Organization. (2024). Global physical activity trends among adolescents.

World Health Organization. (2022). Global status report on physical activity 2022. World Health Organization.