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THE ROLE OF PHYSICAL EDUCATION IN COMBATING CHILDHOOD OBESITY AND PROMOTING HEALTHY LIFESTYLES: A SYSTEMATIC REVIEW OF CURRENT EVIDENCE AND FUTURE DIRECTIONS

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RESEARCH ARTICLE

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Abstract

The rise in childhood obesity worldwide is a serious health concern that calls for a variety of preventative measures. This systematic review examines the role of physical education (PE) in schools in reducing childhood obesity and promoting healthy lifestyles. Using keywords such as "obesity prevention", "physical education", and "health promotion", a thorough search was conducted across PubMed, Google Scholar, and Scopus, following the PRISMA 2020 guidelines. Peer-reviewed journal articles published in English between 2016 and 2024 were the main focus of the inclusion criteria; case studies, editorials, and non-English article publications were not included. 12 High-quality studies were ultimately included after duplicates and irrelevant items were removed from the original pool of 1,158 records. The results show that structured physical education programs lower BMIs, promote lifelong active behaviours, and greatly improve children's physical fitness. Additionally, physical education has a significant impact on mental health and cognitive development, especially when combined with parental participation and nutritional information. Disparities in program access and the requirement for contemporary, technologically advanced methods, however, continue to be obstacles. To effectively reduce childhood obesity and support holistic child development, this review emphasizes the need for inclusive, long-term, and multidisciplinary physical education initiatives.

Keywords: *Obesity Prevention, Physical Education, School Programs, Childhood Health, Health Education, Exercise Interventions*

Introduction

The worldwide growth in childhood obesity has become a serious health issue, attributed to unhealthy eating practices, reduced physical exercise, and inactive lifestyles. This condition carries considerable long-term health-related consequences, including heart-related diseases, adult-onset diabetes, and health-related psychological problems. Educational institutions have a significant role in combating obesity via programs that integrate health education, physical training, and structured exercise activities (Yuksel et al., 2020). School-based programs enhance physical fitness and active living, encourage active learning, and build healthy habits in youthful individuals. By prioritizing the integration of regular exercise and proper nutritional guidance into their curricula, schools can address obesity at an early stage, promoting lifelong well-being and reducing the global consequences of obesity-related chronic illnesses.

Physical education is a crucial, structured intervention within schools that reduces childhood obesity and contributes to overall wellness. Through the incorporation of structured exercise programs and proper health instruction, Physical Education curricula encourage physical fitness, refine motor abilities, and inculcate persistent active lifestyle habits (Sarma et al., 2017). These strategies are influential in obesity prevention, helping children with vitally important knowledge about healthful practices and the importance of prolonged physical activity. Embedded in school programs, Physical Education offers an organized setting for implementing specific strategies aimed at enhancing children's health. Furthermore, it contributes to emotional and social growth, helping to act against sedentary behaviors while reducing the occurrences of chronic health-related illnesses through early intervention and ongoing participation. Physical education plays an important role in developing leadership skills, self-confidence, and teamwork among students Role & Education, (2007). By engaging in different types of group activities and sports, children learn to, communicate effectively, communicate and support one another, fostering important social skills that extend beyond the gymnasium. Additionally, participating in regular physical activity has been shown to increase cognitive function, enhancing children's ability to learn, concentrate, and retain information across all academic subjects.

Purpose of the Review

This study explores the strategic role of physical education (PE) in preventing childhood obesity-promoting healthy lifestyle choices and further assessing how PE programs enhance fitness, physical activity, and health-conscious habits Bailey et al., (2013). Additionally, it evaluates Physical education's contribution to emotional, social, and physical well-being while advocating for curricula that integrate behavior modification, exercise interventions, and health education (Lead, 2021).

There are several unanswered questions, notwithstanding a wealth of studies investigating how PE might help prevent childhood obesity and promote healthy lives. Prior research studies have frequently overlooked sustained health and behavioral effects in Favor of short-term effects, such as unexpected increases in Body Mass Index (BMI) or physical fitness levels (Konermann, 2016). Emerging areas like technology-supported interventions remain underexplored, and disparities in PE access among underprivileged communities need further investigation suggested by Singh & Parmar, (2023). Socioeconomic disparities in assessing quality Physical Education programs in underprivileged areas require further research. Addressing these gaps is important for developing inclusive, comprehensive, and sustainable Physical Education strategies that effectively and efficiently promote long-term health and prevent childhood obesity.

Significance of the Study

This review emphasizes the influence of school-based physical activity interventions and physical education programs on obesity-related parameters like fitness level, body mass index (BMI), and general health. Reviewing the topic "The Role of Physical Education in Combating Childhood Obesity and Promoting Healthy Lifestyles" is important. These strategies are essential for enhancing physical fitness, promoting physical activity, and keeping children from leading inactive lives. The study focuses on the significance of incorporating physical education (PE) with larger programs for weight management, health promotion, and long-term obesity prevention in schools, exposes implementation gaps, and provides insights into successful solutions by bringing together the results of previous research studies

Methodology

The PRISMA 2020 standards were followed for conducting this review.

Search Strategy

A methodical internet search technique using Google Scholar, PubMed, and Scopus was used to gather data on relevant keywords, and the state of knowledge about the topic was carefully taken into account while creating the review paper for publication. The keywords mentioned are "Obesity Prevention, Exercise Prevention, Physical education, Health Science," and other related terms. The searches were limited to articles published in English between 2016 and 2024. However, case studies, editorials, and qualitative research are not included in the list.

The study's quality was evaluated by closely analysing the whole text, abstracts, and titles of the publication. Studies that didn't fit the predetermined inclusion criteria were disqualified.

	Google Scholar	Scopus	PubMed
Keywords	Physical Education, Exercise Intervention, School Programmes, Health Promotion, Body Mass Index (BMI).	Obesity, Physical training, Education Curricula,	School Health Problem, Childhood Health, Physical Training, Physical Fitness,

Table 1. Keyword Search

Inclusion criteria and Exclusion criteria

Using the given criteria, a thorough literature review was carried out to identify relevant publications.

Inclusion Criteria	Exclusion Criteria
The review literature and Journals published from 2016 onwards are studied	Journals that contain literature published before 2016 were excluded.
English-language journals and papers are included	Journals and articles published in a language other than English are excluded
For academic research, credible online sources and peer-reviewed publications both regarded as trustworthy	The study does not include journals that are not peer-reviewed.
Journal-published articles are guaranteed to be included	Book chapters, book reviews, editorials, case studies, and conference proceedings are among the several kinds of written materials.

Table 2. Inclusion and Exclusion Criteria

An Explanation of Studies and It's Findings

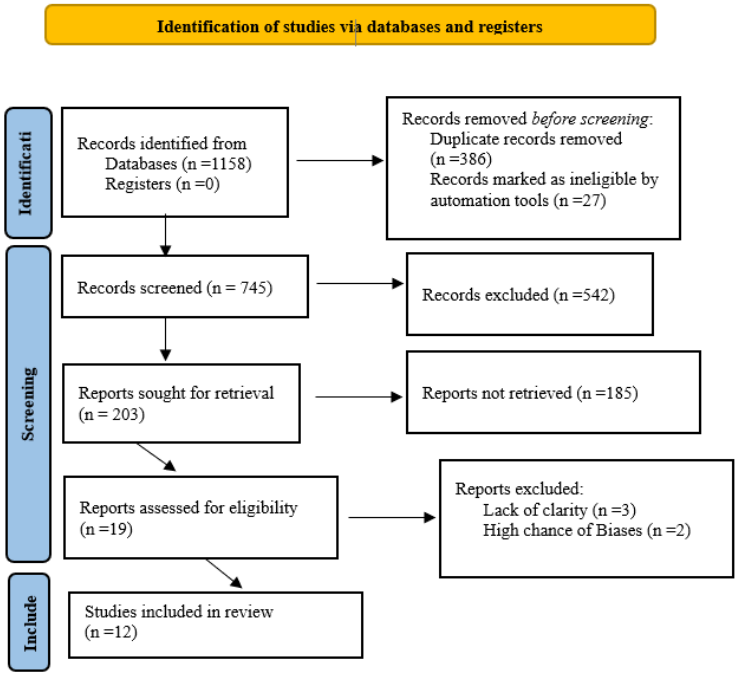


Figure 1. Prisma Flow Chart 2020 (Moher et al., 2009).

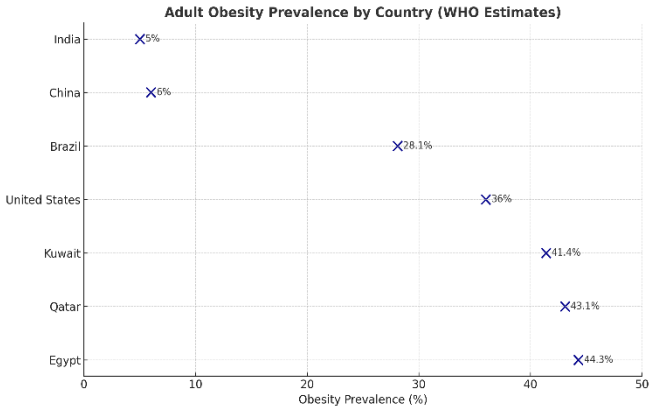
The chosen publication examining the role of physical education in preventing childhood obesity and encouraging healthy lifestyles is examined in this review. A total of 1158 articles were found to be potentially relevant following a thorough search across three databases (PubMed, Google Scholar, and Scopus). Nevertheless, there were 745 articles left after integrating the database and removing the duplicate articles. Because they didn't fit the predetermined inclusion criteria, 727 peer-reviewed papers in all were removed from the study. 13 papers met the requirements for inclusion after a careful review of the other 18 publications' whole content.

Results and Discussion

Current Trends in Childhood Obesity

The study conducted by Magaly Aceves-Martins, Elisabet Llaurado, and others found that approximately 34% of Mexican children and adolescents (5-19 years) are overweight or obese, with school-aged and adolescent boys showing the highest prevalence. Contributing factors include the dietary shift to high-fat, low-fibre foods, a 226% rise in sugary beverage consumption, poor school meals, and sociocultural beliefs favouring overfeeding. Sedentary behaviour, limited physical education (PE), unsafe neighbourhoods, and high poverty rates exacerbate the issue. Parental Obesity and low breastfeeding rates also play a significant role in increasing obesity (Martins et al., 2016).

The global prevalence of childhood obesity has tripled since the 1980s, with rapid increases in developing countries now matching or exceeding developed nations. The study conducted by Gonzalez-alvarez et al., (2020) revealed Oceania leads in obesity rates, with Asia and Africa showing accelerating trends. Boys in developing regions have higher obesity rates, whereas girls in developing areas exhibit overweight prevalence. This study concludes that obesity rises with GDP but plateaus in high-income countries. Overweight prevalence converges globally, but BMI and Obesity diverge significantly. One could say that developed countries show a slowdown in obesity growth while developing nations face a growing public health burden.



Childhood obesity affects over 42 million children globally, information demonstrated by Rankin et al., (2016) with numbers projected to reach 70 million by 2025, particularly rising in developing nations. Obese children face higher rates of depression, anxiety, low self-esteem, and behavioral issues, worsened by stigma and bullying. Poor health-related quality of life (QoL) is reported among overweight and obese (OW/OB) children compared to their peers.

While the relationship between obesity and psychiatric conditions remains unclear, early intervention, promoting a healthy lifestyle, reducing stigma, and integrating mental health support is vital. A multidisciplinary approach can improve both physical and mental health outcomes for affected children.

Role of Physical Education in Obesity Prevention

Carbone et al., (2019) explored the relation between obesity and type 2 diabetes mellitus (T2DM), highlighting physical activity (PA), exercise training (ET), and cardio-respiratory fitness (CRF) in prevention and management. Obesity contributes to T2DM through adipose tissue remodelling, insulin resistance, and inflammation. PA (150+ minutes/week) lowers T2DM risk by 44%, while combined aerobic and resistance, ET significantly enhances CRF, insulin sensitivity, and glucose control. A 1 MET increase in CRF reduces T2DM risk by 8% and mortality by 12%. We need to modify our lifestyle, including dietary changes and comprehensive interventions, improving weight, and metabolic health, and reducing diabetes and cardiovascular risks which can be achieved through regular physical activity.

Stuart J.H. Biddle studied the relationship between physical activity (PA) and mental health outcomes (depression, anxiety, self-esteem, cognition functioning) in children and adolescents. PA interventions showed moderate effects on reducing depression, especially in clinically depressed youth. Anxiety outcomes had limited support, while mixed evidence for self-esteem lacked strong causality. Cognitive functioning demonstrated a strong causal link, with Physical Activity improving cognition, academic performance, and brain structure (Biddle et al., 2019). Research has expanded significantly since 2011 for depression and cognition, while anxiety studies are stagnant. Modern Physical Activity promising mental health strategy, requiring tailored intervention and further research.

Promoting Healthy Lifestyles Through Physical Education

A recent study conducted in 2024 evaluated a 21-week school-based physical education intervention (PROFIT) targeting children aged 6-11 with 50 participants. It significantly improved physical fitness components, including agility (-0.67 seconds), cardiorespiratory fitness (+89.27 meters), and speed (-1.06 seconds). This study gives evidence of a marginal reduction in sedentary behaviour (+68.13 min/day/week). The intervention included high-intensity circuit training, gymnastics, pre-sports games, and monthly nutritional education for students and parents (Reis et al., 2024). This study underscores the importance of structured, high-quality physical education programs in improving children's fitness but emphasizes the need for broader lifestyle changes to impact physical activity levels.

Petri Wiklund addresses the alarming increase in Obesity over the last thirty years, primarily due to a persistent positive energy balance where caloric intake surpasses expenditure. This study underscores the importance of a healthy lifestyle that includes regular physical activity, which can help create the energy deficit necessary for effective weight management. The rise in sedentary behaviours has intensified this challenge, especially in wealthy societies. Long-term success in weight loss is closely tied to adherence to both diet and exercise. Therefore, public health initiatives should promote a balanced approach that encourages both physical activity and healthier eating habits to combat obesity (Wiklund, 2016).

The article of Guerra et al., (2016) reviews 33 systematic studies on school-based interventions for childhood obesity, finding that effective programs last over 6 months and parental involvement is necessary for enhancing a healthy lifestyle for their children. Gender-specific responses show boys benefit more from structural interventions and girls from behavioural ones. The study highlights a lack of theoretical models in intervention design and recommends long-term, family-focused strategies to improve outcomes and a better understanding of obesity prevention frameworks.

Comparison of Traditional vs. Modern PE Approaches

A comparative study was conducted between traditional and modern physical education approaches, where the researcher found that traditional physical education (PE), which emphasizes sports-focused training through structured drills, while modern approaches prioritize lifestyle-focused methods incorporating technology and gamification. The findings of the study indicate that traditional PE effectively develops specific physical skills and discipline, while modern approaches enhance student engagement and promote long-term health habits (Faruk & Rashid, 2024). The research suggests that integrating both methodologies of traditional and modern methodologies can optimize physical education curricula, catering to diverse student needs and fostering a holistic approach to health and fitness. This blended strategy aims to create a more dynamic and inclusive educational environment for students.

Nikola, (2021) revealed that by facilitating individualized learning and increased engagement, smart technologies – such as activity trackers, smartwatches, and educational applications have completely transformed physical education. By tracking physical parameters like heart rate and activity levels, these devices offer insightful data on fitness and health. New technologies that improve sports training with accuracy and feedback include augmented reality glasses and smart apparel. These technological advancements in distance education provide worldwide access to customized curricula, facilitating self-directed and flexible learning. This study gave importance to the integration of smart tools into physical education curricula has enormous potential to improve education, promote lifelong fitness, and advance performance analysis, despite obstacles like cost and technology literacy. The study also emphasizes technological transforms in physical education, and personal programmed learning helping in performance assessment, and global accessibility while addressing challenges like affordability and integration.

Challenges in Implementing Effective PE Programs

The study of Veloo & Md-Ali, (2016) explores the challenges faced by Malaysian PE teachers in implementing school-based assessments (SBA) within health and physical education programs. Key issues include inadequate SBA training, ineffective dissemination of guidelines, limited resources, space constraints in urban schools, and difficulties in managing large, diverse classes. The teachers expressed willingness to adapt effective school-based Physical Education programs but highlighted the need for improved training, facilities, smaller class sizes, and collaboration among stakeholders to streamline SBA implementation effectively.

Louisa R. Peralta and his fellow members looked at 7,555 Australian children aged from 5 to 17 years, and how their school-level socio-economic status (SES) affected their physical activity (PA), fitness, and fundamental movement skills (FMS). In terms of cardiovascular fitness and FMS mastery, high SES schools outperformed low SES schools, with just 21.8% of primary and 11.7% of secondary children meeting PA standards. While high SES schools benefited from greater facilitators such as PA encouragement and community connections, low SES schools faced obstacles like a lack of teacher competency, resources, and equipment Peralta et al., (2019). This can be concluded that all SES groups can benefit from improved PA and fitness if these disparities are addressed through focused interventions.

Future Research Directions

Upcoming studies could explore the integration of advanced technologies like wearable fitness trackers and AI-driven health monitoring tools in physical education programs. Longitudinal studies examining the sustained impact of school-based physical activity interventions on obesity prevention and lifestyle habits are also essential. Additionally, investigating the role of family and community engagement alongside physical education in shaping children's health behaviors could provide valuable insights for holistic strategies.

Conclusion

This study underscores the vital role of physical education in combating childhood obesity and promoting a healthy lifestyle. Physical education programs not only enhance fitness and motor skills but also foster lifelong health habits, cognitive development, and social skills. The study highlights the need for comprehensive, technology-integrated, and inclusive approaches tailored to diverse educational contexts. Challenges such as socioeconomic disparities, resource limitations, and inadequate teacher training require targeted solutions. By addressing these barriers and prioritizing family and community involvement, physical education can become a cornerstone in preventing obesity and developing overall childhood health outcomes.

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