PHYSICAL EDUCATION AND ITS ROLE IN PREVENTING CHILDHOOD OBESITY

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Abstract

Childhood obesity has become a significant global health issue, contributing to both physical and psychological complications that persist into adulthood. This study examines the role of physical education (PE) programs in preventing childhood obesity in Jizzakh, Uzbekistan, focusing on children aged 6-12 years. Over the course of 12 months, 500 children participated in regular PE sessions that included aerobic exercises, strength training, and recreational sports. The study assessed physical activity levels and Body Mass Index (BMI) at three key time points: baseline, six months, and twelve months. The results demonstrated a significant increase in physical activity, with children engaging in 50% more exercise by the end of the study. Additionally, the average BMI of participants decreased by 7.3%, from 20.5 to 19.0, indicating a positive impact on weight management. Children aged 6-8 years showed a greater reduction in BMI (2.0 points) compared to older children (9-12 years), who experienced a 1.0-point decrease. Beyond physical changes, the study also revealed substantial improvements in children's health knowledge, with 80% reporting an enhanced understanding of nutrition and the benefits of regular exercise, up from 40% at the start. Furthermore, 85% of children expressed enjoyment in PE classes, and 70% reported making healthier food choices post-intervention. These findings highlight the effectiveness of PE programs in reducing obesity and promoting healthier lifestyles, emphasizing the importance of implementing such programs on a wider scale to combat childhood obesity.

Keywords: physical education, childhood obesity, obesity prevention, physical activity.

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Background

Childhood obesity has reached alarming levels globally, with serious consequences for children's physical and mental health. Overweight and obese children are at increased risk of developing chronic conditions such as diabetes, heart disease, and psychological issues like depression and low self-esteem. Physical activity, including physical education programs in schools, is considered one of the most effective preventive measures.

Objective

This study aims to analyze the role of physical education programs in preventing childhood obesity by evaluating the impact of such programs on children's physical activity levels, body mass index (BMI), and overall health.

Introduction

Child obesity is one of the most serious public health challenges of the 21st century (2018). Childhood obesity has emerged as a significant global public health challenge, with rates steadily rising across many regions. This alarming increase in childhood obesity presents serious health risks, underscoring the urgent need for effective interventions. The "EpPOI: Education to Prevent Childhood Obesity" project adopts a multidisciplinary approach to raise awareness about the importance of addressing childhood obesity, focusing on educational initiatives that encourage healthy lifestyle changes (Porri et al., 2024). A task force from the European Childhood Obesity Group and the European Academy of Pediatrics reviewed English-language meta-analyses, systematic reviews, randomized clinical trials, and observational studies from various databases, including PubMed/MEDLINE, Cochrane Library, Science Direct, MEDLINE, and EBSCO. This review, which examined literature published between 2018 and August 2020, culminated in the development of a consensus statement. The statement highlights the critical role of physical activity (PA) in preventing excessive body weight and provides age-appropriate PA recommendations, as well as guidance for school-based interventions, parents, and guardians (Wyszyńska et al., 2020). In southern Europe, over 40% of children under the age of 10 have been diagnosed with overweight or obesity, compared to fewer than 10% in northern Europe. Additionally, the prevalence of overweight is notably higher among girls (21.1%) than boys (18.6%) (Ahrens et al., 2014). Obesity is a complex and multifactorial condition that primarily results from an imbalance between calorie intake and expenditure. Physical activity (PA) plays a crucial role in managing energy balance, contributing approximately 25% to total energy expenditure (Westerterp, 2017). Therefore, PA is an effective tool in promoting weight management and combating obesity (Swift et al., 2014).

Literature Review

The increasing prevalence of childhood obesity and its associated health risks underscore the need for widespread prevention efforts. Various public health interventions aimed at increasing physical activity among children have been implemented in schools, families, and communities. These efforts show promising strategies for addressing childhood obesity (Goran et al., 1999). The primary modifiable risk factors for childhood obesity are unhealthy eating habits and low levels of physical activity, both of which are influenced by aspects of the built environment (Henry et al., 2024). Engaging children in regular physical activity is essential, as a lack of it increases the risk of obesity, cardiovascular diseases, diabetes, and other chronic conditions, all of which have long-term consequences (Pradeep Singh Chahar, 2014). In particular, excessive screen time and sedentary behaviour contribute significantly to obesity and associated health risks such as cardiovascular and metabolic diseases, while also impeding skeletal muscle development, cognitive function, and mental health (Wang et al., 2024).Research has shown that children with obesity are less physically active than their non-obese counterparts (Trost et al., 2001), and this is compounded by the fact that parents of obese children are also typically less active, influencing their children's activity levels (Chan et al., 2024). Tackling childhood obesity in regions like China requires a multifaceted approach that integrates social, economic, cultural, and environmental strategies. These should combine school-based, family-based, and individual-based interventions, with collaborative efforts from various sectors (Yuan et al., 2024). The COVID-19 pandemic has exacerbated childhood obesity rates, leading to an increase in sedentary behaviour and unhealthy eating patterns among children. Beyond the immediate physical health risks, such as type 2 diabetes and cardiovascular diseases, childhood obesity is also linked to psychological issues like depression, anxiety, and low self-esteem, which can persist into adulthood (Goel et al., 2024). Obesity in childhood is associated with chronic health conditions like hypertension, dyslipidemia, and metabolic syndrome, all of which set the stage for long-term health issues. Moreover, obese children are more likely to become obese adults, perpetuating a cycle of health problems (Freedman et al., 1999; Pulgarón, 2013). Addressing childhood obesity requires early intervention to prevent its long-term physical and psychological consequences. Public health efforts must focus on promoting healthy eating and physical activity at an early age, particularly in the context of the built environment, to break the cycle of obesity-related health issues.

Methodology

This study was conducted in Jizzakh, Uzbekistan, to evaluate the role of physical education (PE) in preventing childhood obesity. It utilized a quantitative research design, combining both experimental and observational approaches. Data were collected through various methods, including BMI measurements, physical activity logs, and surveys. The participants included children aged 6 to 12 years enrolled in schools in Jizzakh that had regular physical education programs. A total of 500 children from 10 different schools were selected to ensure diversity in terms of school type, location, and socio-economic background. Children with medical conditions or disabilities that would

prevent participation in physical activities were excluded from the study. The children's Body Mass Index (BMI) was measured at three key time points: at the start of the study (baseline), after six months (mid-study), and at the end of the study (12 months). The BMI was calculated using the standard formula.

$$BMI = \frac{weight(kg)}{height(m)^2}$$

The measurements were taken by trained health professionals to ensure accuracy and consistency. Each child was asked to keep a physical activity log, documenting their daily physical activities, including both the duration and intensity of each activity. These logs were collected weekly throughout the 12-month study period. The logs helped track the frequency of physical activity, providing insights into the overall impact of physical education programs on activity levels. Pre- and post-intervention surveys were conducted to assess changes in children's attitudes toward physical activity, their knowledge of healthy eating habits, and their perceived improvements in physical fitness. The surveys were designed to gather self-reported data on children's perceptions of physical activity and the educational components of the physical education programs.

PE Program Intervention

Children participated in regular physical education classes, which were held three times a week for 45 minutes per session. The program consisted of a variety of activities, including aerobic exercises, strength training, and recreational sports, all designed to engage the children in fun and meaningful ways. The PE classes aimed to enhance cardiovascular fitness, flexibility, and strength, while promoting the importance of an active lifestyle.

Data Analysis

The collected data were analyzed using the following methods

Descriptive Statistics: To summarize the baseline characteristics and changes observed in BMI, physical activity levels, and survey responses.

Paired t-tests: Used to compare the BMI measurements at the baseline and post-study to determine if there were statistically significant changes in BMI as a result of participation in the physical education program.

Regression Analysis: Applied to assess the relationship between physical activity levels (as recorded in the activity logs) and changes in BMI. This analysis helped understand the extent to which increased physical activity contributed to improvements in obesity-related outcomes. Prior to the study, informed consent was obtained from the parents or guardians of all participants, ensuring their understanding of the study's purpose and the procedures involved. The confidentiality of the participants' personal information and health data was maintained throughout the study. The research was approved by the institutional review board (IRB) to ensure that ethical standards were met.

Results

The results of the study conducted in Jizzakh reveal significant findings regarding the impact of physical education (PE) on childhood obesity prevention. The analysis of physical activity levels, Body Mass Index (BMI) measurements, and survey results provides a clear picture of the role that regular PE programs play in promoting health and reducing obesity among children. The study observed a substantial increase in the physical activity levels of children participating in regular PE classes. At baseline, the average weekly physical activity duration was 120 minutes. However, by the end of the 12-month study, this increased to 180 minutes per week, reflecting a 50% increase in the time children spent engaging in physical activities.

Baseline: 120 minutes per week

Post-study: 180 minutes per week

This increase in physical activity is statistically significant ($p < 0.05$), as analyzed through paired t-tests, confirming the positive effect of PE programs on overall activity levels.

BMI Changes

The Body Mass Index (BMI) of children who participated in the physical education program showed notable improvement and we can see it in 1st table. On average, children reduced their BMI by 1.5 points over the course of the 12 months. The baseline average BMI was 20.5 (considered within the normal weight range), and at the end of the study, the average BMI was 19.0, representing a reduction of 7.3% (Table 1).

The reduction in BMI was found to be statistically significant with a paired t-test ($p < 0.05$). The findings indicate that the regular participation in physical education contributed to a decrease in obesity-related indicators such as BMI.

Table 1. The Body Mass Index (BMI) physical education program.

Time point	Average BMI	Change in BMI
Baseline	20.5	-
Mid-study (6 months)	20.0	-0.5
Post-study (12 months)	19.0	-1.5

Table 2. The results also revealed differences in BMI reductions based on age and gender.

Age Group	Average BMI at Baseline	Average BMI Post-study	Change in BMI
6-8 years	21.0	19.0	-2.0
9-12 years	20.0	19.0	-1.0
Post-study (12 months)	19.0	-1.5	

Table 3. Study Indicates 80% of children had increased their knowledge of nutrition and the benefits.

Time point	Percentage of Children with Increased Health Knowledge
Pre-study (Baseline)	40%
Post-study (12 months)	80%
Post-study (12 months)	19.0

The results also revealed differences in BMI reductions based on age and gender in 2nd table.

Age Group 6-8 years: 2nd table illustrates the youngest age group experienced the most significant reduction in BMI, with an average decrease of 2.0 points (from 21.0 to 19.0).

Age Group 9-12 years: 2nd table illustrates older children showed a more modest reduction in BMI, averaging 1.0 point (from 20.0 to 19.0) (Table 2).

The reduction in BMI was slightly more pronounced in younger children, suggesting that early engagement in physical education may have more significant impacts on preventing obesity.

The pre- and post-study surveys indicated a positive shift in children's attitudes toward physical activity and healthy eating habits.

Health Knowledge Improvement

3rd table indicates before the intervention, 40% of children reported understanding the importance of exercise and healthy eating. By the end of the study, 3rd table indicates 80% of children had increased their knowledge of nutrition and the benefits of regular physical activity (Table 3).

Positive Attitudes Towards PE

85% of children reported enjoying PE classes and felt more motivated to engage in physical activity outside of school.

70% of children stated they were more conscious of making healthier food choices after participating in the PE program.

The regression analysis confirmed a strong relationship between increased physical activity and BMI reduction. For every additional 30 minutes of physical activity per week, there was a corresponding reduction of 0.5 BMI points, further supporting the effectiveness of PE in combating childhood obesity.

1. Physical Activity: Children increased their physical activity by 50%, from 120 to 180 minutes per week.
2. BMI Reduction: The average BMI decreased by 1.5 points, from 20.5 to 19.0.
3. Age-related Differences: Younger children (6-8 years) experienced a greater reduction in BMI (2.0 points) compared to older children (9-12 years), who showed a reduction of 1.0 point.
4. Health Knowledge: There was a significant increase in children's knowledge of healthy eating and physical activity, rising from 40% to 80%.
5. Positive Feedback: 85% of children enjoyed PE classes, and 70% were more conscious of healthy eating habits post-study.

These findings indicate that physical education is a powerful tool in promoting physical activity, reducing obesity, and fostering healthier lifestyles among children.

Conclusion

This study in Jizzakh, Uzbekistan, shows that physical education (PE) significantly helps prevent childhood obesity. Over 12 months, children increased physical activity by 50%, leading to an average BMI reduction of 1.5 points. Younger children saw the greatest improvement. Health knowledge and positive attitudes toward exercise and healthy eating also increased significantly. These results emphasize the effectiveness of PE in promoting healthier lifestyles and combating childhood obesity, highlighting the need for more school-based PE programs to address this growing public health issue.

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