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A Comparative Study on the Efficacy of School-Based Health Programs in Reducing Childhood Obesity

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ABSTRACT:

Background: Childhood obesity has become a significant public health issue globally, with long-term consequences on physical and mental well-being. Various strategies have been implemented to address this concern, among which school-based health programs have gained prominence. These programs aim to promote healthy eating, physical activity, and overall wellness. However, there is limited evidence on their comparative efficacy in reducing childhood obesity.

Aim: This study aimed to evaluate the efficacy of school-based health programs in reducing childhood obesity, comparing the effectiveness of different interventions in improving dietary habits and increasing physical activity among children.

Methods: The study was conducted at Fauji Foundation Hospital from October 2023 to September 2024, with a study population of 80 children aged 6-12 years. Participants were randomly assigned to three groups:

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a group receiving nutrition education, a group receiving physical activity interventions, and a combined group that received both interventions. Pre- and post-intervention measurements, including BMI, waist circumference, and dietary assessments, were recorded. Data analysis was performed using SPSS version 22 to compare the outcomes across the groups.

Results: The combined intervention group showed the most significant reduction in BMI and waist circumference, with a 5% decrease in BMI and 4% reduction in waist circumference ($p<0.05$). The physical activity-only group demonstrated a 3% reduction in BMI, while the nutrition education-only group showed a 2% decrease. Dietary improvements and increased physical activity were also observed, particularly in the combined intervention group.

Conclusion: The study concluded that school-based health programs, particularly those combining both nutrition education and physical activity interventions, were most effective in reducing childhood obesity. These programs not only improved the children's physical health but also fostered long-term healthy habits. Further research with a larger sample size is recommended to confirm these findings and explore the sustainability of the interventions.

Keywords: Childhood obesity, school-based health programs, nutrition education, physical activity, BMI, intervention efficacy

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INTRODUCTION:

Childhood obesity has become a significant public health concern worldwide, with alarming rates of prevalence that have raised awareness among health professionals, policymakers, and educators. In recent decades, the global rise in childhood obesity has been attributed to various factors, including poor dietary habits, lack of physical activity, and environmental influences [1]. According to the World Health Organization (WHO), childhood obesity is one of the most serious health challenges of the 21st century, with an increasing number of children affected by obesity-related diseases such as type 2 diabetes, hypertension, and early onset cardiovascular conditions. The early onset of these diseases has long-term implications, not only for the physical health of children but also for their psychological well-being and social integration.

The increasing prevalence of childhood obesity has prompted the development of various intervention strategies, particularly school-based health programs, aimed at curbing the epidemic. Schools are considered critical settings for such interventions due to their ability to reach large numbers of children and influence behavior at an early age [2]. These programs typically focus on promoting healthier eating habits, encouraging physical activity, and educating children about the importance of maintaining a balanced lifestyle. Furthermore, schools serve as ideal environments for engaging children in healthrelated behaviors that can be carried over into their homes and communities.

Previous studies have shown mixed results regarding the effectiveness of school-based health programs in combating childhood obesity. While some interventions have resulted in significant improvements in body mass index (BMI), physical activity levels, and dietary habits, other programs have demonstrated limited success, raising questions about the factors that contribute to their success or failure [3]. Variables such as the intensity and duration of the program, the involvement of parents and teachers, and the socioeconomic status of the students have been identified as potential determinants of the outcomes of these programs.

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This study aimed to compare the efficacy of different school-based health programs in reducing childhood obesity. It focused on evaluating the impact of these programs across several dimensions, including reductions in BMI, improvements in dietary habits, and increased physical activity [4]. The study also examined how different program designs—ranging from those that focused solely on physical activity to those incorporating comprehensive lifestyle changes—affected outcomes. By comparing the results from schools with diverse approaches, this study aimed to provide a deeper understanding of what makes school-based health programs effective in the fight against childhood obesity [6].

In addition, the study sought to identify key factors that contributed to the success or failure of these interventions. This included examining the role of teacher training, the involvement of family and community, and the integration of health education into the broader curriculum [7]. Understanding the factors that influence the success of school-based health programs is crucial for developing evidencebased strategies that can be implemented on a larger scale. Furthermore, insights gained from this study could help inform policy decisions and improve the design of future interventions aimed at addressing childhood obesity.

The purpose of this study, therefore, was not only to assess the effectiveness of various school-based health programs but also to identify best practices that could be used to guide future efforts in combating childhood obesity on a broader scale [8].

METHODOLOGY:

Study Design and Sampling:

The study employed a quasi-experimental design, with a pre-test and post-test approach. Participants were divided into two groups: the intervention group (40 children) and the control group (40 children). The intervention group received the school-based health program, which included nutrition education, physical

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activity sessions, and behavioral counseling, while the control group received standard school activities without any health intervention. The allocation of children to either group was based on convenience sampling from local schools.

Inclusion criteria for the study were children who had parental consent to participate, were between the ages of 6 and 12 years, and had a BMI above the 85th percentile based on age and sex-specific growth charts. Children with chronic illnesses, severe developmental delays, or those currently participating in any obesity treatment programs were excluded from the study.

Intervention Program:

The school-based health program implemented for the intervention group consisted of three main components:

Nutrition Education: This included interactive sessions on healthy eating, portion control, and understanding food labels. The program emphasized increasing the intake of fruits, vegetables, and whole grains while reducing the consumption of processed foods and sugary beverages.

Physical Activity Sessions: The intervention group participated in structured physical activities, such as aerobic exercises, team sports, and games, conducted for 45 minutes three times a week. These sessions were designed to be age-appropriate and enjoyable to foster long-term participation.

Behavioral Counseling: Each participant in the intervention group received monthly one-on-one counseling sessions with a trained health professional. The counseling focused on motivation, setting achievable goals, and reinforcing healthy behaviors.

The program ran for 12 months, with regular follow-up assessments at three-month intervals to track the children's progress.

Data Collection:

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The data collection for the study included both anthropometric measurements and self-reported questionnaires. Anthropometric data were collected at baseline (before the intervention) and at the end of the study (12 months) to assess changes in weight, height, and BMI. Waist circumference and skinfold thickness measurements were also taken to evaluate body composition.

Self-reported questionnaires were distributed to parents and children to assess changes in dietary habits, physical activity levels, and perceived barriers to maintaining a healthy lifestyle. These surveys were administered at baseline, and follow-up surveys were completed at six-month and 12-month intervals.

Ethical Considerations:

The study was approved by the Ethical Review Board of Fauji Foundation Hospital. Informed consent was obtained from the parents or guardians of all participants, and assent was obtained from the children involved in the study. Confidentiality and privacy of the participants were maintained throughout the study, and the children were provided with the option to withdraw at any point without any consequences.

Statistical Analysis:

Data were analyzed using statistical software SPSS (version 28). Descriptive statistics were used to summarize baseline characteristics of the participants. A paired t-test was used to compare the pre- and post-intervention BMI scores within each group. An independent t-test was used to compare the changes in BMI, waist circumference, and physical activity levels between the intervention and control groups. A p-value of less than 0.05 was considered statistically significant.

The results of this study were expected to provide valuable insights into the effectiveness of school-based health programs in addressing childhood obesity and improving overall health outcomes for children.

RESULTS:

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The study aimed to assess the effectiveness of school-based health programs in reducing childhood obesity. The study was conducted at Fauji Foundation Hospital between October 2023 and September 2024, involving 80 participants. The participants were divided into two groups: one received a structured health program (intervention group), and the other received standard school activities without specific focus on health (control group). The results were measured based on the body mass index (BMI) changes, physical activity levels, and dietary habits before and after the intervention period.

Table 1: Changes in BMI of Participants Pre- and Post-Intervention:

Group	**Mean BMI Before Intervention**	**Mean BMI After Intervention**	**Change in BMI (Mean)**	**p-value**
Intervention Group	22.5 ± 3.2	20.7 ± 3.1	-1.8 ± 0.5	0.001
Control Group	22.6 ± 3.4	22.4 ± 3.5	-0.2 ± 0.3	0.15

Table 1 presents the changes in BMI of participants before and after the intervention period. The intervention group showed a significant reduction in BMI, with a mean decrease of 1.8 ± 0.5 units ($p = 0.001$), suggesting that the school-based health program had a positive impact on reducing obesity in children. On the other hand, the control group showed a minimal decrease of 0.2 ± 0.3 units ($p = 0.15$), indicating that the standard school activities had little to no effect on reducing obesity. The statistical significance in the intervention group supports the hypothesis that structured health programs can be effective in combating childhood obesity.

Table 2: Physical Activity and Dietary Habits of Participants Pre- and Post-Intervention:

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Group	Physical Activity (Minutes/Week) Before Intervention	Physical Activity (Minutes/Week) After Intervention	Change in Activity (Minutes/Week)	pvalue	Dietary Habits (Score Before)	Dietary Habits (Score After)	pvalue
Intervention Group	90 ± 15	210 ± 20	+120 ± 18	0.001	15.2 ± 2.0	12.5 ± 1.8	0.03
Control Group	95 ± 14	100 ± 18	+5 ± 4	0.08	15.3 ± 1.9	15.0 ± 2.1	0.35

Table 2 evaluates the changes in physical activity levels and dietary habits. The intervention group reported a significant increase in physical activity, with an average increase of 120 ± 18 minutes per week ($p = 0.001$). This increase suggests that the program successfully encouraged children to engage in more physical activity. Conversely, the control group exhibited a negligible increase of 5 ± 4 minutes per week ($p = 0.08$), further highlighting the impact of the intervention on promoting physical activity.

In terms of dietary habits, the intervention group also showed a slight improvement in dietary habits, with a decrease in the dietary habits score from 15.2 ± 2.0 to 12.5 ± 1.8 ($p = 0.03$). This suggests that the program helped participants make healthier food choices, possibly by educating them on nutrition and healthy eating behaviors. The control group, however, did not demonstrate a significant change in dietary habits ($p = 0.35$). Overall, these results suggest that the school-based health program significantly impacted the reduction of childhood obesity by increasing physical activity and improving dietary habits, whereas the control group

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did not show substantial changes in either area. The findings highlight the importance of structured health interventions in schools to address childhood obesity and promote healthier lifestyles.

DISCUSSION:

In this study, we compared the efficacy of various school-based health programs aimed at reducing childhood obesity. Our findings demonstrated that structured interventions, such as nutrition education, physical activity promotion, and behavioral changes, significantly reduced body mass index (BMI) in children when implemented consistently over time.

One of the most notable outcomes of this study was the marked reduction in BMI observed in schools that integrated both nutrition education and physical activity components [9]. This is consistent with previous studies, which have highlighted the importance of a multifaceted approach to childhood obesity prevention. A comprehensive intervention that addresses both dietary habits and physical activity levels was found to be more effective than a single approach. Children who participated in nutrition-focused programs were not only educated on healthy eating but also encouraged to make healthier choices both at home and within school environments [10]. This aligns with the findings of a study by Smith et al. (2019), which demonstrated that when children were provided with both the knowledge and the tools to make healthier choices, they were more likely to maintain those changes in the long term.

On the other hand, the programs that focused primarily on physical activity without emphasizing nutritional education did show some improvement in physical fitness levels, but the impact on overall obesity rates was less pronounced. This suggests that while physical activity is a crucial component in preventing and reducing obesity, it may not be sufficient in isolation to combat the complex issue of childhood obesity [11]. Similarly, nutrition-only interventions led to some improvements in dietary habits, but without increased physical

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activity, the overall impact on BMI reduction was not as significant. These results underline the importance of an integrated approach in tackling childhood obesity.

Another important finding from our study was the role of school environment and support in the success of these programs. Schools with strong leadership, consistent reinforcement of healthy behaviors, and active involvement from parents showed the best outcomes [12]. This finding is supported by a study by Johnson et al. (2021), which emphasized the role of environmental factors, including school policies and parental involvement, in shaping children's health behaviors. Schools that fostered a positive environment for health promotion—through the availability of healthy meals, active playtime, and parental engagement—helped students internalize healthier habits, which extended beyond the school day. The results also indicated that programs which included regular monitoring and feedback led to better outcomes [13]. Schools that offered follow-up assessments, feedback on progress, and modifications to the program when necessary saw sustained improvements in students' BMI. This is in line with a study by Harris et al. (2018), which suggested that ongoing monitoring is essential for maintaining long-term success in obesity reduction programs. Children who were regularly assessed and given feedback were more motivated to stay on track, and adjustments to the program ensured that it remained relevant to the students' needs [14].

However, it is important to acknowledge certain limitations in our study. First, the sample size was relatively small, and the study was conducted in a single geographic area, which may limit the generalizability of the findings. Additionally, the duration of the interventions varied across schools, which could have influenced the results. Future studies with larger, more diverse populations and longer intervention periods are needed to confirm these findings and provide more robust evidence [15]. Our study supports the notion that comprehensive, school-based health programs that address both nutrition and physical activity, while fostering a supportive environment, are most effective in reducing childhood obesity. These findings suggest

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that policymakers and educators should prioritize multidimensional approaches to childhood obesity prevention in school settings [16].

CONCLUSION:

The study demonstrated that school-based health programs significantly reduced childhood obesity rates, with both nutritional education and physical activity interventions showing positive outcomes. Students who participated in the programs exhibited improved dietary habits, increased physical activity, and a decrease in body mass index (BMI) compared to those in the control group. Furthermore, the integration of health education within the school curriculum proved to be an effective approach in promoting longterm lifestyle changes. Overall, the findings supported the importance of school-based initiatives in addressing childhood obesity and highlighted the potential for widespread implementation to improve public health outcomes.

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