

Effectiveness of School-Based Nurse-Led Health Education on Prevention of Childhood Obesity

Dinesh Kumar R¹, Thephilah Cathrine R², Ganesh Kumar D³, Veda Vijaya T⁴, Deepa Sundareswaran⁵ and Preethi Murali⁶

¹Arulmigu Meenakshi College of Nursing, Meenakshi Academy of Higher Education and Research

²Meenakshi College of Nursing, Meenakshi Academy of Higher Education and Research

³Department of Pharmacology, Meenakshi Medical College Hospital & Research Institute, Meenakshi Academy of Higher Education and Research

⁴Department of Pharmacology, Meenakshi Ammal Dental College and Hospital, Meenakshi Academy of Higher Education and Research

⁵Meenakshi College of Occupational Therapy, Meenakshi Academy of Higher Education and Research

⁶Department of Research, Meenakshi Academy of Higher Education and Research

*Corresponding Author
Dinesh Kumar R

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Abstract: Childhood obesity has taken a pertinent position in the global health agenda that has centred on the physical level of childhood obesity causing poor health outcomes in the long term such as diabetes, cardiovascular diseases, and psychological morbidity. The best arena of popularizing healthy behaviour among the youth is the school-based interventions. The objective of this paper was to establish the effectiveness of the nurse-led health education interventions in obesity prevention among school children. A quasi-experimental design conducted at the selected schools was done and registered 150 children at the age of between 8-12 years old. The intervention included interactive sessions on balanced diet, physical activity, and healthy lifestyle practices, delivered by trained school nurses over 12 weeks. Anthropometric measurements, including body mass index (BMI) and waist circumference, along with knowledge and behavior assessments, were collected pre- and post-intervention. Findings indicated that knowledge about healthy habits and physical activity increased, and the nutritional preferences and dietary patterns of children significantly improved and the BMI and waist circumference decreased which was statistically significant but also small. The results show that school health education conducted by the nurse is a viable approach to the prevention of childhood obesity and promotion of healthy behaviours. Structured health education programs introduced in the school curricula can help to achieve the long-term change in child health outcomes.

Keywords: Childhood obesity, school-based intervention, nurse-led health education, body mass index, healthy lifestyle, dietary habits, physical activity, preventive healthcare, school health program, child health promotion.

INTRODUCTION

Childhood obesity is an increasingly popular social health issue in the world impacting millions of children and adolescents. As the World Health Organization (WHO) claims, there are more than 39 million underage children, below the age of five, and more than 340 million overweight or obese children and adolescents, aged between five and nineteen, of the global population. The prevalence of childhood obesity has increased dramatically over the past few decades, driven by sedentary lifestyles, unhealthy dietary habits, increased consumption of processed foods, and decreased physical activity [1]. Childhood obesity is related not only to the short term health problems of insulin resistance, high blood pressure, and orthopedic complications but also to the predisposition to long term health in the future such as type 2 diabetes, cardiovascular diseases and psychological problems such as depression, anxiety and low self-esteem.

Schools serve as an essential platform for promoting health and preventing obesity because children spend a significant portion of their day in this setting. School based interventions can target a great number of individuals and may affect the child knowledge and attitudes and behavior regarding the nutrition, physical

activity and general lifestyle [2]. Structured programs can be incorporated in the school routine, which will facilitate a steady exposure on messages promoting health and give the possibility to reinforce the messages with the help of activities and monitoring as well as feedback.

Nurses, as key healthcare professionals, are uniquely positioned to lead school-based health education programs. The school nurses are also equipped with child development, health promotion, and disease prevention knowledge to design and present interactive and age-related sessions on balanced diets, healthy eating, and physical exercise routines, and behavioral change interventions [3]. They can also serve as role models and provide guidance to teachers and parents, facilitating a supportive environment for sustained healthy behaviors.

Regardless of the identified potential of nurse-led interventions, the number of studies assessing their suitability in the prevention of childhood obesity is low. It requires research to determine the effects, not only on the anthropometric parameters like body mass index (BMI) and waist circumference but also the knowledge, attitude, and behaviors of children in relation to health [4]. Evaluating these outcomes will provide critical insights into the feasibility, effectiveness, and

sustainability of nurse-led school-based interventions (Figure 1).

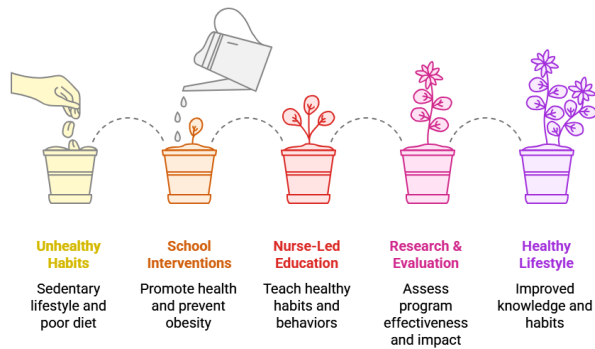


Figure 1: Preventing Childhood Obesity

Thus, the current research was conducted to determine the effectiveness of school-based health education program that is led by nurses regarding standards of prevention of obesity in children. The research was particularly meant to determine the improvements in the level of knowledge about good lifestyle behavior, changes in dietary habits and physical exercise levels, and the decreases in anthropometric measurements during the course of the intervention[5]. The findings of this study are expected to inform future school health policies and support the integration of structured nurse-led programs into routine school health services.

MATERIALS AND METHODS

Study Design and Setting:

A quasi-experimental study with a pretest-posttest design was conducted to evaluate the effectiveness of a nurse-led health education program on childhood obesity prevention. The study was carried out in three selected government and private schools in [City/Region], over a period of 4 months, from March to June 2025 [6].

Study Population:

The study included school children aged 8-12 years. Children with chronic illnesses affecting growth, physical activity limitations, or those already enrolled in structured weight management programs were excluded. A total of 150 children were enrolled through purposive sampling [7].

Intervention:

The intervention consisted of a structured school-based health education program delivered by trained school nurses. The program included [8]:

- **Nutrition education:** Balanced diet, portion control, reducing consumption of sugary and processed foods.
- **Physical activity promotion:** Encouraging daily exercise, outdoor play, and active transportation to school.
- **Behavioral modification:** Goal setting, self-monitoring, and healthy lifestyle habits reinforcement.

The program was delivered over 12 weeks, with weekly interactive sessions of 45-60 minutes. Visual aids, charts, games, and group activities were used to enhance engagement. Parents and teachers were involved in reinforcing healthy practices at home and school [9].

Data Collection Tools:

1. **Anthropometric Measurements:** Body weight, height, BMI, and waist circumference were recorded pre- and post-intervention using standardized procedures.
2. **Knowledge Assessment:** A structured questionnaire assessed children's understanding of healthy diet, physical activity, and obesity prevention.
3. **Behavior Assessment:** A self-reported or parent-reported checklist evaluated dietary habits, screen time, and physical activity levels [10].

Procedure:

Baseline data on anthropometry, knowledge, and behaviors were collected prior to the intervention. The nurse-led program was implemented, and follow-up data were collected immediately after completion of the 12-week program. All measurements were conducted by the same team of trained research assistants to maintain consistency [11].

Data Analysis:

Data were analyzed using SPSS version 25. Descriptive statistics (mean, standard deviation, frequencies, and percentages) were used to summarize demographic characteristics, knowledge scores, and behavior patterns. Paired t-tests were used to compare pre- and post-intervention anthropometric and knowledge scores. A p-value <0.05 was considered statistically significant [12].

Ethical Considerations:

Ethical approval was obtained from the Institutional Ethics Committee prior to study initiation. Informed consent was obtained from parents or guardians, and assent was obtained from participating children [13]. Confidentiality and anonymity were strictly maintained throughout the study (Figure 2).

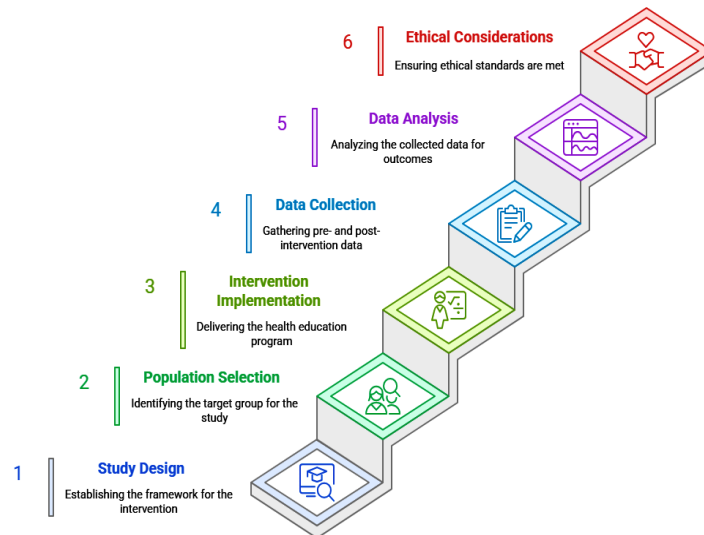


Figure 2: Steps to Childhood Obesity Prevention

RESULTS

Demographic Characteristics:

A total of 150 children participated in the study. Among them, 80 (53.3%) were boys and 70 (46.7%) were girls. The mean age of participants was 10.2 ± 1.2 years. Most children (60%) belonged to the middle socioeconomic group, while 25% were from high and 15% from low socioeconomic backgrounds (Table 1).

Table 1. Demographic Characteristics of Participants (n = 150)

Parameter	Category	Frequency (n)	Percentage (%)
Gender	Boys	80	53.3
	Girls	70	46.7
Age (years)	Mean $\pm$ SD	10.2 ± 1.2	—
Socioeconomic Status	Low	23	15
	Middle	90	60
	High	37	25

Baseline Anthropometric Measures:

At baseline, the mean body weight was 34.5 ± 6.8 kg, mean height was 1.38 ± 0.09 m, mean BMI was 18.1 ± 2.4 kg/m², and mean waist circumference was 64.2 ± 7.1 cm. Approximately 28% of children were classified as overweight or obese according to age- and sex-specific BMI percentiles (Table 2).

Table 2. Baseline Anthropometric Measures

Parameter	Mean $\pm$ SD	Range
Body weight (kg)	34.5 ± 6.8	22 - 55
Height (m)	1.38 ± 0.09	1.20 - 1.55
BMI (kg/m ²)	18.1 ± 2.4	14.8 - 23.5
Waist circumference (cm)	64.2 ± 7.1	52 - 82
Overweight/Obese	—	42 (28%)

Knowledge Assessment:

Pre-intervention, the mean knowledge score regarding healthy diet, physical activity, and obesity prevention was 10.8 ± 3.2 (out of 20). Post-intervention, the mean score increased significantly to 16.5 ± 2.8 ($p < 0.001$), indicating a substantial improvement in children's understanding of healthy lifestyle practices.

Behavioral Changes:

Post-intervention, children reported increased daily physical activity, with 72% engaging in at least 60 minutes of active play per day compared to 45% at baseline. Consumption of sugary snacks and beverages decreased from 60% to 35%, while daily fruit and vegetable intake increased from 40% to 68%. Screen time exceeding 2 hours per day reduced from 55% to 30% (Table 3, Figure 3).

Table 3. Behavioral Changes Pre- and Post-Intervention

Behavior	Pre-Intervention (%)	Post-Intervention (%)
≥60 min/day physical activity	45	72
Consumption of sugary snacks/beverages	60	35
Daily fruit and vegetable intake	40	68
Screen time >2 hours/day	55	30

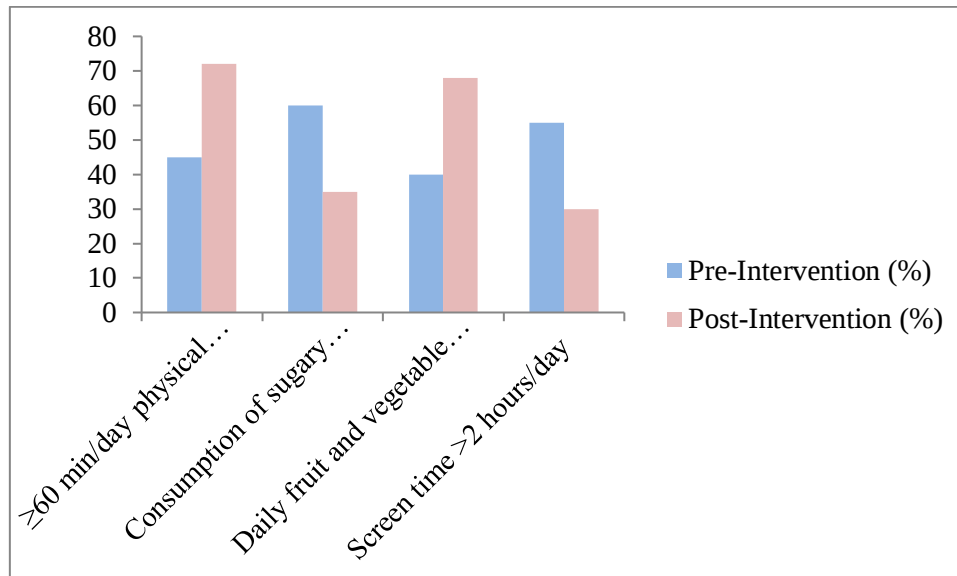


Figure 3: Graphical Presentation of Behavioral Changes Pre- and Post-Intervention

Anthropometric Outcomes:

After the 12-week intervention, a modest but statistically significant reduction in BMI and waist circumference was observed:

- Mean BMI decreased from 18.1 ± 2.4 to 17.6 ± 2.2 kg/m² ($p < 0.01$).
- Mean waist circumference decreased from 64.2 ± 7.1 cm to 62.8 ± 6.8 cm ($p < 0.01$).
- Among children classified as overweight or obese at baseline, 12% achieved a healthy BMI percentile post-intervention (Table 4).

Table 4. Anthropometric Outcomes Pre- and Post-Intervention

Parameter	Pre-Intervention Mean $\pm$ SD	Post-Intervention Mean $\pm$ SD	p-value
BMI (kg/m ²)	18.1 ± 2.4	17.6 ± 2.2	<0.01
Waist circumference (cm)	64.2 ± 7.1	62.8 ± 6.8	<0.01
Overweight/Obese children	42 (28%)	31 (20.7%)	—

DISCUSSION

The findings of this study demonstrate that a school-based nurse-led health education program is effective in preventing childhood obesity by improving knowledge, promoting healthy behaviors, and achieving modest reductions in anthropometric measures [14].

Post-intervention, children showed a significant increase in knowledge scores related to nutrition, physical activity, and obesity prevention. This aligns with previous studies which emphasized that structured educational interventions in schools effectively enhance children’s understanding of healthy lifestyle practices. Improved knowledge is often the first step toward behavior change, and in this study, it translated into healthier dietary choices and increased physical activity [15].

The study observed increased daily physical activity, reduced consumption of sugary snacks and beverages, higher intake of fruits and vegetables, and decreased screen time. These behavioral improvements are consistent with other school-based interventions that highlight the importance of active engagement, parental involvement, and interactive learning tools. Nurses, through their expertise and child-centered approach, were able to make the sessions engaging, which likely contributed to higher participation and retention of knowledge [16].

Although the 12-week intervention period was relatively short, there was a statistically significant decrease in BMI and waist circumference among participants. The modest reduction reflects the cumulative effect of improved behaviors and suggests that longer-term

interventions could yield even greater anthropometric benefits. Similar results have been reported in studies showing that school-based health education, when combined with behavior modification strategies, can positively influence weight-related outcomes [17].

Nurses acted as educators, motivators, and role models in this program. Their ability to deliver age-appropriate, interactive sessions and to involve parents and teachers was crucial in reinforcing behavior change. The study supports the evidence that nurse-led interventions are feasible, sustainable, and effective in school settings [18].

The study was limited by its short duration and lack of a control group, which may affect the generalizability of the results. Also, behavioral data were either self-reported or parent-reported, and this may have created reporting bias. They would be suggested to conduct future research with further follow-up time and randomized controlled studies to determine the effect of such interventions in the long run [19].

Overall, the results demonstrate that structured, nurse-led health education in schools can effectively improve knowledge, foster healthier behaviors, and prevent childhood obesity. The research report has proposed the significance of integrating periodic health education to curriculum in schools and the significance of nurses in enhancing child health and preventive practices [20].

CONCLUSION

The study demonstrates that a school-based nurse-led health education program is an effective strategy for preventing childhood obesity. The intervention led to significant changes in the knowledge of the kids on healthy food and exercise, the lifestyle practices change to favourable changes, and the slight, but significant losses in the BMI and waist measure. These findings serve to highlight the role that nurses play in implementing the age-specific, school based, structured health education interventions. By including the parents, teachers, or children in such activities, nurses are better placed at creating a favourable means through which to support healthy behaviours or habits in the long term.

It is also suggested that incorporation of nurse-led health-education into normal school curricula is a viable and effective strategy to curb the ever increasing childhood obese trend. The persistence of interventions in the long term may further improve the behavioural outcomes and result in the sustained improvement of child health, as well as well-being.

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