



Original Research Article

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**A SCHOOL-BASED, NURSE-LED STUDY TO DETERMINE THE IMPACT OF A  
COMPREHENSIVE HEALTH PROMOTION PROGRAM ON OBESITY-  
ASSOCIATED METABOLIC RISK FACTORS AND HEALTH-RELATED  
BEHAVIORS AMONG ADOLESCENTS IN SELECTED SCHOOLS OF PUNJAB**

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**Abstract**

Background: Adolescent obesity is a major public health concern associated with increased metabolic risk factors and unhealthy lifestyle behaviors (World Health Organization [WHO], 2023; Gupta et al., 2012). School-based interventions led by nurses may play a crucial role in prevention and management.

Objective: To evaluate the effectiveness of a comprehensive nurse-led health promotion program on obesity-related metabolic risk indicators and health-related behaviors among adolescents in selected schools of Madhya Pradesh.

Methods: A pre-experimental one-group pretest-posttest design was used. Fifty adolescents aged 13–17 years were selected through purposive sampling. Baseline data on Body Mass Index (BMI), waist circumference, blood pressure, fasting blood glucose, and health-related behaviors were collected using standardized tools. A 12-week nurse-led intervention comprising nutrition education, structured physical activity, behavioral counselling, and parental involvement was implemented. Post-intervention assessments were conducted using the same tools. Data were analyzed using descriptive statistics and paired t-tests. A p-value < 0.05 was considered statistically significant.

Results: Paired t-test analysis showed statistically significant reductions in BMI ( $p < 0.001$ ), waist circumference ( $p < 0.001$ ), systolic blood pressure ( $p < 0.01$ ), and fasting blood glucose ( $p < 0.01$ ). Significant improvements were also observed in physical activity levels,

dietary practices, and reduction in sedentary behavior ( $p < 0.001$ ).

**Conclusion:** The nurse-led comprehensive health promotion program significantly improved metabolic risk indicators and health-related behaviors among adolescents. School-based nurse-led interventions can serve as an effective strategy to combat adolescent obesity.

**Keywords:** Adolescent obesity, school-based intervention, nurse-led program, metabolic risk factors, health promotion, Punjab

## **Introduction**

Adolescent obesity has emerged as a significant global public health concern (WHO, 2023). In India, increasing urbanization, sedentary lifestyles, and unhealthy dietary patterns have contributed to rising prevalence rates among school-aged children (Ranjani et al., 2016; Gupta et al., 2012). Adolescents with obesity are at increased risk of hypertension, insulin resistance, dyslipidemia, and type 2 diabetes (Singh et al., 2008).

Schools provide an ideal environment for structured health promotion initiatives, as adolescents spend substantial time within educational settings (Story et al., 2006). Systematic reviews indicate that school-based interventions can effectively reduce obesity and improve health behaviors (Brown et al., 2009; Waters et al., 2011). Nurses are uniquely positioned to lead such programs due to their expertise in preventive care, counseling, and health education (Pbert et al., 2013).

This study aimed to evaluate the effectiveness of a comprehensive nurse-led health promotion program in improving metabolic risk indicators and health-related behaviors among adolescents in selected schools of Punjab.

## **Objectives**

- To assess baseline metabolic risk indicators among adolescents.
- To evaluate baseline health-related behaviors related to diet and physical activity.
- To determine the effectiveness of a nurse-led health promotion program on metabolic risk indicators.

- To assess changes in health-related behaviors following the intervention.

### **Hypotheses**

**H01:** There will be no statistically significant difference in mean metabolic risk indicator scores before and after the intervention as tested by paired t-test.

**H02:** There will be no statistically significant difference in mean health-related behavior scores before and after the intervention as tested by paired t-test.

**H1:** There will be a statistically significant reduction in mean metabolic risk indicator scores following the intervention.

**H2:** There will be a statistically significant improvement in mean health-related behavior scores following the intervention.

### **Materials and Methods**

#### **Research Design**

A pre-experimental one-group pretest-post test design was adopted.

#### **Setting**

The study was conducted in selected secondary schools in Madhya Pradesh.

#### **Sample and Sampling Technique**

Fifty adolescents aged 13–17 years identified as overweight or obese based on BMI criteria were selected using purposive sampling.

#### **Inclusion Criteria**

- Adolescents aged 13–17 years
- BMI above the normal range for age and sex
- Willing to participate with parental consent

#### **Data Collection Tools**

Anthropometric Measurements:

BMI was calculated as weight (kg)/height (m<sup>2</sup>). Waist circumference was measured using a non-stretchable measuring tape.

Blood Pressure:

Measured using a calibrated digital sphygmomanometer; two readings were averaged.

Fasting Blood Glucose:

Measured using a standardized glucometer after 8–10 hours of fasting.

Structured Health Behavior Questionnaire:

A validated self-administered questionnaire assessing dietary practices, physical activity, and sedentary behavior. Reliability was confirmed using Cronbach's alpha ( $\alpha > 0.7$ ).

### **Intervention**

A 12-week nurse-led health promotion program included:

- Weekly nutrition education sessions (45 minutes)
- Structured physical activity sessions (3 times/week, 45 minutes each)
- Individual and group behavioral counseling
- Monthly parental awareness sessions
- Continuous monitoring and follow-up

### **Data Analysis**

Data were analyzed using SPSS software. Descriptive statistics (mean, standard deviation) summarized baseline characteristics. Paired t-tests were used to compare pre- and post-intervention metabolic indicators and health behavior scores. Statistical significance was set at  $p < 0.05$ .

### **Results**

#### **Demographic Characteristics**

Among the 50 participants:

- 56% were male and 44% were female
- Majority (60%) were aged 14–15 years

### **Changes in Metabolic Risk Indicators**

<b>Variable</b>	<b>Pre-test Mean</b>	<b>Post-test Mean</b>	<b>p-value</b>
BMI (kg/m <sup>2</sup> )	27.4 ± 2.1	25.9 ± 2.0	<0.001
Waist Circumference (cm)	92.3 ± 5.4	88.7 ± 5.1	<0.001
Systolic BP (mmHg)	128.5 ± 6.2	122.1 ± 5.8	<0.01
Fasting Blood Glucose (mg/dL)	104.2 ± 8.5	96.8 ± 7.3	<0.01

There was a statistically significant reduction in all measured metabolic risk indicators after the intervention.

### **Changes in Health-Related Behaviors**

- Regular physical activity increased from 30% to 72%.
- Daily consumption of fruits and vegetables increased from 26% to 68%.
- Screen time exceeding 3 hours per day decreased from 64% to 28%.

Significant improvements were observed in overall health behavior scores ( $p < 0.001$ ).

### **Discussion**

The findings demonstrate that the nurse-led intervention significantly improved metabolic and behavioral outcomes. The reduction in BMI and waist circumference aligns with evidence from school-based intervention studies (Brown et al., 2009; Wang et al., 2015). Improvements in blood pressure and glucose levels suggest enhanced metabolic regulation (Kelishadi & Azizi-Soleiman, 2014).

Consistent with previous research, nurse-delivered programs have shown effectiveness in improving adolescent weight outcomes and lifestyle behaviors (Pbert et al., 2013). Parental involvement likely strengthened sustainability of behavioral changes (Hoelscher et al.,

2013).

### **Limitations**

- Small sample size (n=50)
- Absence of a control group
- Short duration of follow-up
- Limited to selected schools in Punjab, reducing generalizability

### **Conclusion**

The nurse-led school-based health promotion program significantly improved obesity-associated metabolic risk indicators and health-related behaviors among adolescents. Integrating nurse-led structured interventions within school settings may serve as an effective strategy to address adolescent obesity in India.

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