

UNDERSTANDING THE RELATIONSHIP BETWEEN DIET, PHYSICAL ACTIVITY, AND WEIGHT STATUS IN URBAN ADOLESCENT GIRLS

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**Abstract**

Background: The prevalence of overweight and obesity among urban adolescent girls has become a major public health concern worldwide. Diet and physical activity are key factors influencing weight status during adolescence. However, the complex relationship between diet, physical activity, and weight status in this population remains poorly understood. This study aimed to investigate and better comprehend the interplay between these variables in urban adolescent girls. **Materials and Methods:** A cross-sectional study was conducted among a representative sample of urban adolescent girls of Maheshbathna, under MGM Medical College & Hospital, Bihar aged 13 to 18 years. Data on diet, physical activity, and weight status were collected using validated questionnaires and anthropometric measurements. The associations between dietary patterns, physical activity levels, and weight status were analyzed using statistical techniques such as logistic regression and correlation analysis. **Result:** The study included a total of 210 urban adolescent girls with a mean age of 15.4 years (± 1.7). The prevalence of overweight and obesity in the sample was found to be 18.1% and 9.5%, respectively. The analysis of dietary patterns revealed that 47.6% of the girls had a higher consumption of unhealthy foods, including sugary drinks and fast food. On the other hand, 34.3% of the girls had a healthier dietary pattern characterized by a higher intake of fruits, vegetables, and whole grains. **Conclusion:** This study provides valuable insights into the relationship between diet, physical activity, and weight status in urban adolescent girls. Unhealthy dietary patterns and low physical activity levels were associated with an increased risk of overweight and obesity, highlighting the importance of promoting healthy eating habits and regular physical activity among this population. Future interventions and public health strategies should focus on empowering urban adolescent girls with the knowledge and resources to make healthier choices and engage in more active lifestyles, thereby reducing the burden of obesity-related health problems in this vulnerable group.

INTRODUCTION

The prevalence of overweight and obesity among urban adolescent girls has become a major public health concern worldwide. In recent years, the rapid urbanization and lifestyle changes have led to shifts in dietary habits and physical activity levels, contributing to the rising rates of obesity in this population.^[1,2] Understanding the complex relationship between diet, physical activity, and weight status is crucial for developing effective strategies to address this growing public health issue.

Diet plays a significant role in shaping weight status during adolescence. Urban environments often offer easy access to unhealthy food options, including

sugary drinks and fast food, which are high in calories and low in nutritional value.^[3] Consumption of these unhealthy foods has been associated with weight gain and an increased risk of overweight and obesity in adolescents.^[4] Conversely, a diet rich in fruits, vegetables, and whole grains provides essential nutrients and is associated with a lower risk of overweight and obesity.^[5] However, the specific relationship between dietary patterns and weight status in urban adolescent girls remains poorly understood.

Physical activity is another critical factor influencing weight status in this population. Urbanization has led to changes in transportation patterns, reducing opportunities for physical activity and increasing sedentary behaviors.^[6] Sedentary

lifestyles, characterized by excessive screen time and limited engagement in physical activity, have been linked to higher rates of overweight and obesity in adolescents.^[7] Conversely, regular physical activity has numerous health benefits, including weight management, improved cardiovascular fitness, and reduced risk of chronic diseases.^[8] However, the relationship between physical activity levels and weight status in urban adolescent girls requires further investigation.

To address the existing knowledge gap, this study aimed to investigate the relationship between diet, physical activity, and weight status in urban adolescent girls. By analyzing dietary patterns, physical activity levels, and weight status data, we aimed to gain a comprehensive understanding of how these factors interact and contribute to overweight and obesity in this vulnerable population.

MATERIALS AND METHODS

Study Design and Participants: A cross-sectional study was conducted among a representative sample of urban adolescent girls aged 13 to 18 years in Maheshbathna, under MGM Medical College & Hospital, Bihar. The study aimed to include a diverse range of participants to ensure the generalizability of the findings. Ethical approval was obtained from the institutional review board before data collection.

Data Collection: Data on diet, physical activity, and weight status were collected using validated questionnaires and anthropometric measurements. The questionnaires were administered by trained interviewers who explained the purpose of the study and obtained informed consent from the participants and their parents or legal guardians.

Dietary Assessment: A validated food frequency questionnaire (FFQ) was used to assess the participants' dietary patterns. The FFQ included a list of food items commonly consumed by adolescents in the urban setting. Participants were asked to indicate the frequency of consumption for each food item over a specified period (e.g., daily, weekly, monthly). Nutrient intake and dietary patterns were derived from the FFQ data using standard procedures.

Physical Activity Assessment: Physical activity levels were assessed using a validated physical activity questionnaire. The questionnaire included items on different types of physical activities, including structured exercise, sports participation, active commuting, and leisure-time activities. Participants were asked to report the frequency and

duration of each activity. Total physical activity levels were calculated based on metabolic equivalents (METs) and categorized into sedentary, light, moderate, and vigorous activity levels.

Anthropometric Measurements: Anthropometric measurements were taken by trained personnel following standardized procedures. Height was measured to the nearest 0.1 centimeter using a stadiometer, and weight was measured to the nearest 0.1 kilogram using a calibrated digital scale. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared. Weight status was classified according to age- and sex-specific BMI percentiles based on the World Health Organization (WHO) growth reference standards.

Statistical Analysis: The associations between dietary patterns, physical activity levels, and weight status were analyzed using appropriate statistical techniques. Logistic regression analysis was performed to assess the relationship between dietary patterns and weight status, controlling for potential confounders. Correlation analysis was used to examine the associations between physical activity levels and weight status. All statistical analyses were conducted using statistical software (e.g., SPSS, ver-26) with a significance level set at $p < 0.05$.

RESULTS

A total of 210 urban adolescent girls from Maheshbathna, under MGM Medical College & Hospital, Bihar, participated in the study. The mean age of the participants was 15.4 years (standard deviation = 1.7).

Weight Status: The prevalence of overweight among the participants was 18.1% ($n = 38$), while the prevalence of obesity was 9.5% ($n = 20$).

Dietary Patterns: Based on the responses from the food frequency questionnaire, 47.6% ($n = 100$) of the girls had an unhealthy dietary pattern, characterized by a higher consumption of sugary drinks and fast food. In contrast, 34.3% ($n = 72$) of the girls had a healthier dietary pattern, characterized by a higher intake of fruits, vegetables, and whole grains.

Physical Activity Levels: The assessment of physical activity levels revealed that 62.9% ($n = 132$) of the girls had a sedentary lifestyle, with limited engagement in physical activity. Only 37.1% ($n = 78$) of the girls reported engaging in regular physical activity.

Association between Diet, Physical Activity, and Weight Status:

Table 1: Association between Diet and Weight Status

Dietary Patterns	Overweight (n = 38)	Obesity (n = 20)
Unhealthy	28 (73.7%)	18 (90.0%)
Healthy	10 (26.3%)	2 (10.0%)

The table above shows the association between dietary patterns and weight status. Among girls with an unhealthy dietary pattern, 73.7% (n = 28) were overweight, and 90.0% (n = 18) were obese. In contrast, among girls with a healthy dietary pattern, 26.3% (n = 10) were overweight, and 10.0% (n = 2) were obese.

Table 2: Association between Physical Activity and Weight Status

Physical Activity Levels	Overweight (n = 38)	Obesity (n = 20)
Sedentary Lifestyle	33 (86.8%)	19 (95.0%)
Regular Physical Activity	5 (13.2%)	1 (5.0%)

Table 3: Logistic Regression Analysis of the Association between Dietary Patterns and Weight Status

Variables	Overweight	Obesity
Unhealthy Dietary Pattern	OR = 2.83, p < 0.001	OR = 3.12, p < 0.001

The [Table 2] presents the association between physical activity levels and weight status. Among girls with a sedentary lifestyle, 86.8% (n = 33) were overweight, and 95.0% (n = 19) were obese. In contrast, among girls engaging in regular physical activity, 13.2% (n = 5) were overweight, and 5.0% (n = 1) were obese.

The results demonstrate a significant association between dietary patterns, physical activity levels, and weight status among urban adolescent girls. Girls with an unhealthy dietary pattern had a higher prevalence of overweight and obesity compared to those with a healthy dietary pattern. Similarly, girls with a sedentary lifestyle had a higher prevalence of overweight and obesity compared to those engaging in regular physical activity.

These findings underscore the importance of promoting healthy dietary habits and regular physical activity among urban adolescent girls to prevent and manage weight-related issues. Strategies targeting the reduction of sugary drink and fast food consumption, as well as promoting a diet rich in fruits, vegetables, and whole grains, should be emphasized. Additionally, interventions focusing on reducing sedentary behaviors and increasing physical activity levels are crucial in mitigating the risk of overweight and obesity in this population.

[Table 3] The logistic regression analysis was conducted to assess the relationship between dietary patterns and weight status while controlling for potential confounding factors. The unhealthy dietary pattern was treated as the reference group, and the odds ratios (OR) were calculated for overweight and obesity compared to the healthy dietary pattern.

For overweight, the analysis revealed that participants with an unhealthy dietary pattern had significantly higher odds of being overweight compared to those with a healthy dietary pattern (OR = 2.83, p < 0.001). This indicates that the odds of being overweight were 2.83 times higher among girls with an unhealthy dietary pattern.

Similarly, for obesity, the analysis showed a significant association between the unhealthy dietary pattern and obesity (OR = 3.12, p < 0.001). Girls with an unhealthy dietary pattern had 3.12 times higher odds of being obese compared to those with a healthy dietary pattern.

Overall, the results indicate that the unhealthy dietary pattern was significantly associated with an increased risk of both overweight and obesity among urban adolescent girls, even after controlling for potential confounding factors. These findings highlight the importance of promoting healthier dietary choices to prevent and manage weight-related issues in this population.

DISCUSSION

The present study aimed to investigate the relationship between diet, physical activity, and weight status in urban adolescent girls. The findings revealed significant associations between dietary patterns, physical activity levels, and weight status in this population.

Consistent with previous research, the study demonstrated that an unhealthy dietary pattern, characterized by a higher consumption of sugary drinks and fast food, was strongly associated with an increased risk of overweight and obesity among urban adolescent girls (Ambrosini et al., 2014; Wang et al., 2016).^[5,4] These findings highlight the need for interventions targeting the reduction of unhealthy food consumption and the promotion of healthier dietary choices, including increased intake of fruits, vegetables, and whole grains. Such interventions can play a crucial role in preventing weight-related problems and promoting better overall health among adolescent girls.

Additionally, the study revealed that a sedentary lifestyle and low levels of physical activity were significantly associated with a higher likelihood of overweight and obesity in urban adolescent girls. These findings align with previous research showing the detrimental effects of sedentary behaviors and inadequate physical activity on weight status during adolescence (Biddle et al., 2010; Ng et al., 2014).^[6,7] Encouraging regular physical activity and reducing sedentary behaviors among adolescent girls should be a priority in public health strategies to address the growing problem of obesity.

The results of this study contribute to the existing body of literature on the relationship between diet, physical activity, and weight status in urban adolescent girls. By focusing on a specific urban setting, the study provides valuable insights into the context-specific factors influencing weight-related

issues in this population. However, there are some limitations that should be considered. First, the cross-sectional design of the study prevents establishing causality between variables. Longitudinal studies are needed to examine the temporal relationship between diet, physical activity, and weight status. Second, the reliance on self-reported data for diet and physical activity introduces the possibility of recall bias. Future research could benefit from incorporating objective measures of dietary intake and physical activity. Lastly, the study was conducted in a specific geographical area and may not be fully generalizable to other urban adolescent girl populations.^[8]

The findings of this study emphasize the importance of promoting healthy dietary patterns and regular physical activity among urban adolescent girls to prevent and manage overweight and obesity. Interventions targeting this population should aim to reduce the consumption of unhealthy foods and promote healthier dietary choices, while also encouraging increased physical activity and reduced sedentary behaviors. By addressing these factors, we can contribute to the reduction of overweight and obesity rates and improve the overall health and well-being of urban adolescent girls.

CONCLUSION

This study provides valuable insights into the relationship between diet, physical activity, and weight status in urban adolescent girls. Unhealthy dietary patterns and low physical activity levels were associated with an increased risk of overweight and obesity, highlighting the importance of promoting healthy eating habits and regular physical

activity among this population. Future interventions and public health strategies should focus on empowering urban adolescent girls with the knowledge and resources to make healthier choices and engage in more active lifestyles, thereby reducing the burden of obesity-related health problems in this vulnerable group.

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