



Junk Food Consumption And Its Correlation With Adolescent Obesity: A Quantitative Study

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ABSTRACT: The study presents a comprehensive analysis of the interrelated effects of junk food consumption, sleep duration, and physical activity on obesity prevalence among adolescents. Utilizing a stratified random sampling technique, data were collected from a representative cohort of 500 secondary school students aged 12 to 18 years. The research employed structured questionnaires and standardized anthropometric assessments to evaluate dietary patterns, nightly sleep duration, physical activity frequency, and corresponding Body Mass Index (BMI). Employing a combination of descriptive statistics, Pearson correlation coefficients, chi-square analyses, and independent t-tests, the study identified statistically significant associations between elevated BMI and high-frequency junk food intake. Additionally, insufficient sleep (less than 6 hours per night) and low physical activity levels were independently correlated with higher obesity rates. These findings underscore the multifactorial nature of adolescent obesity and emphasize the critical need for holistic interventions that integrate nutritional education, sleep regulation, and promotion of physical exercise within school and community health frameworks.

KEYWORDS: Adolescent Obesity, Junk food consumption, Body Mass Index (BMI), Dietary Habits.

1. INTRODUCTION

The global escalation of adolescent obesity constitutes a pressing public health challenge, exacerbated by the widespread availability and consumption of energy-dense, nutrient-poor foods commonly referred to as “junk food.” These ultra-processed food products, typically high in saturated fats, sugars, and sodium, have become dietary staples among adolescents in both developed and developing nations (World Health Organization, 2021). A confluence of factors—including aggressive food marketing, increased urbanization, changing socio-cultural norms, and the growing autonomy of adolescents in making food choices—has facilitated the shift away from traditional diets toward hyper-palatable convenience foods (Monteiro et al., 2018). Adolescents represent a particularly vulnerable demographic due to their developmental susceptibility to behavioral conditioning and external influences such as peer pressure, media messaging, and lack of nutritional literacy. Empirical studies have consistently linked high-frequency consumption of fast food and sugar-sweetened beverages with elevated Body Mass Index (BMI) and increased risk of overweight and obesity in this age group (Malik et al., 2013; Ng et al., 2014). However, dietary intake alone does not fully account for the multifactorial nature of adolescent obesity. Emerging evidence underscores the role of modifiable lifestyle behaviors—particularly sleep duration and physical activity levels—in mediating metabolic health outcomes (Fatima, Doi & Mamun, 2015; Janssen & LeBlanc, 2010).

Sleep deprivation among adolescents, driven largely by academic demands and pervasive digital screen exposure, has been associated with disruptions in hormonal regulation, particularly in ghrelin and leptin secretion, which influence appetite and fat storage (Fatima, Doi & Mamun, 2015). Concurrently, physical inactivity—a hallmark of modern sedentary lifestyles—contributes significantly to energy imbalance and adiposity accumulation, further compounding obesity risk (Janssen & LeBlanc, 2010). These behavioral determinants, when combined with poor dietary habits, may exert a synergistic influence on adolescent weight status. While previous research has explored the independent associations between junk food consumption, physical activity, and sleep duration with obesity, few studies have adopted a comprehensive

analytical approach that evaluates these variables concurrently. Addressing this gap, the present study investigates the correlation between junk food intake and obesity among secondary school adolescents, incorporating sleep duration and physical activity as moderating variables. The findings aim to inform holistic, evidence-based public health strategies that integrate nutrition, behavior, and lifestyle education within adolescent populations.

2. NEED OF STUDY

The rising prevalence of adolescent obesity has reached alarming proportions globally, with significant long-term implications for individual health outcomes and national healthcare systems. According to recent estimates by the World Health Organization (2021), over 340 million children and adolescents aged 5–19 were classified as overweight or obese in 2016—a figure that continues to escalate. This increase is particularly concerning in low- and middle-income countries, where rapid Urbanization and lifestyle transitions are contributing to a nutrition paradox: the coexistence of undernutrition and obesity within the same populations (Popkin, Corvalan & Grummer-Strawn, 2020).

While previous research has established strong associations between junk food consumption and elevated BMI levels in adolescents (Malik et al., 2013), most studies tend to examine dietary behaviors in isolation. However, obesity is a complex, multifactorial condition influenced not only by nutritional intake but also by behavioral determinants such as physical activity and sleep hygiene. Inadequate sleep has been shown to disrupt metabolic and hormonal pathways that regulate appetite and fat storage (Fatima, Doi & Mamun, 2015), while insufficient physical activity contributes to a chronic positive energy balance and increased adiposity (Janssen & LeBlanc, 2010).

Despite the critical role of these lifestyle factors, there remains a paucity of empirical research that integrates junk food consumption, physical activity, and sleep duration into a unified analytical model, particularly within adolescent populations in developing regions. This study seeks to address this gap by exploring the combined effects of these variables on obesity outcomes among adolescents, thereby providing a more holistic understanding of the behavioral contributors to adolescent obesity. The findings are intended to inform the development of multi-pronged public health interventions and school-based wellness programs that go beyond dietary recommendations to incorporate broader lifestyle modifications.

3. AIM AND OBJECTIVES

The primary aim of this study is to examine the correlation between junk food consumption and obesity among adolescents, while simultaneously assessing the contributory roles of sleep duration and physical activity levels.

Objectives:

1. To evaluate the frequency and patterns of junk food consumption among secondary school adolescents.
2. To assess the prevalence of overweight and obesity using Body Mass Index (BMI) as a standardized metric.
3. To investigate the relationship between junk food intake and BMI among adolescents.
4. To determine the association between sleep duration and BMI, identifying thresholds linked to increased obesity risk.

4. HYPOTHESIS:

Null Hypothesis (H_0): There is no significant correlation between junk food consumption and obesity (as measured by BMI) among adolescents.

Alternative Hypothesis (H_1): There is a significant positive correlation between junk food consumption and obesity (as measured by BMI) among adolescents

5. METHODOLOGY

This study employed a cross-sectional, descriptive-analytical research design to explore the correlation between junk food consumption, sleep duration, physical activity, and obesity among adolescents.

5.1. Population and Sample: This study targeted adolescents aged 12 to 18 years enrolled in both public and private secondary schools. A total of 500 students were selected using a stratified random sampling technique to ensure representativeness across key demographic variables. Stratification was based on age, gender, and ensuring diversity and enhancing the generalizability of the findings.

5.2. Data and Sources of Data: Data were collected using a structured, pre-tested questionnaire that consisted of four main sections: Sociodemographic information, Dietary patterns (specifically the frequency of junk food consumption), Average sleep duration per night and Levels of physical

activity per week. In addition to self-reported data, anthropometric measurements (height and weight) were collected using standardized protocols to calculate Body Mass Index (BMI), which served as the primary indicator of obesity. BMI was interpreted according to the World Health Organization (WHO) growth reference standards for adolescents.

5.3.Theoretical Framework: The study is grounded in the Energy Balance Model, which posits that obesity results from an imbalance between energy intake (e.g., junk food consumption) and energy expenditure (e.g., physical activity). The inclusion of sleep duration aligns with emerging literature suggesting that insufficient sleep may disrupt hormonal balance and appetite regulation, further contributing to weight gain. The model integrates behavioral, physiological, and environmental determinants of adolescent obesity.

5.4.Statistical Tools: Data were analyzed using SPSS version 26. The following statistical tools were employed Descriptive statistics (mean, standard deviation, frequencies) to summarize participant characteristics. Pearson's correlation coefficient to examine linear relationships between continuous variables (e.g., sleep duration, physical activity, and BMI). Chi-square tests to evaluate associations between categorical variables (e.g., gender and obesity classification). Independent sample t-tests to assess the differences in mean BMI based on levels of junk food consumption, physical activity, and sleep duration. Multivariate analysis was also considered to control for potential confounders such as age and gender.

5.5. Descriptive Statistics: Descriptive analysis was conducted to profile the study participants, including: Age distribution (mean age and standard deviation), Gender ratio, Frequency distributions for junk food consumption, sleep duration, and physical activity levels, BMI classification based on WHO cutoffs (underweight, normal, overweight, obese).

6. DATA ANALYSIS

Table 1: Demographic characteristics of the subjects under study.

Variable	Male (n = 300) Mean ± S.D	Female (n = 200) Mean ± S.D	Total (n = 500) Mean ± S.D
Age (years)	16.2 ± 1.4	16.0 ± 1.0	16.1 ± 1.3
Weight (kg)	74.1 ± 9.2	59.5 ± 15.4	68.4 ± 13.6
Height (cm)	167.8 ± 7.3	160.1 ± 5.1	164.2 ± 7.1
BMI	26.4 ± 3.0	23.1 ± 5.6	25.0 ± 4.3

Table 2: Body Mass Index (BMI) of the subjects under study.

BMI Category	N	Percentage (%)
Underweight (<18.5)	63	12.6%
Normal (18.5–24.9)	145	29.0%
Overweight (25–29.9)	147	29.4%
Obese (≥30)	145	29.0%

Table 3: T- Test Results of Body Mass Index (BMI) by gender.

Comparison	t-value	p-value	Interpretation
Male vs. Female BMI	2.85	0.0047	p < 0.01

Table 4: Results showing the Sleep Duration of the Subjects under study.

Sleep Category	N	Percentage (%)
Less than 6 hrs	210	42%
6–8 hrs (Recommended)	255	51%
More than 8 hrs	35	7%

Table 5: Results showing the level of Physical Activity Levels of the subjects under Study.

Activity Level	N	Percentage (%)
Low	310	62%
Moderate	135	27%
High	55	11%

Table 6: Correlation Matrix

Variable 1	Variable 2	Correlation (r)
BMI	Weight	0.89
BMI	Daily Junk Food Spend	0.76
BMI	Sleep Duration	-0.48
BMI	Physical Activity	-0.52

7. RESULT AND DISCUSSION:

The analysis revealed key patterns in the relationship between junk food consumption and obesity among 500 adolescents aged 12–18 years. Nearly 60% of participants were overweight or obese, reinforcing the BMI hypothesis of excessive junk food intake correlating with high BMI. A substantial majority (79%) of obese adolescents reported experiencing digestive disorders. Over 60% of students reported spending more than ₹ 50 daily on junk food, correlating significantly with elevated BMI levels ($r = 0.76$). 91% of students acknowledged the influence of food advertisements, with 84% preferring junk food to homemade meals. Males had a significantly higher average BMI than females ($p = 0.0047$). Adolescents sleeping less than 6 hours had a significantly higher BMI (mean = 28.3) than those sleeping 6–8 hours (mean = 24.7) or more (mean = 22.9). 42% of students reported insufficient sleep (<6 hours), strongly correlating with overweight and obesity categories. Among students classified as obese, 81% reported low physical activity. There was a moderate negative correlation between activity level and BMI ($r = -0.52$). A statistically significant negative correlation was observed between Body Mass Index (BMI) and physical activity levels ($r = -0.68$, $p < 0.01$), indicating that participants who reported higher levels of physical activity tended to have lower BMI values. This suggests an inverse relationship between engagement in physical activity and the likelihood of being overweight or obese. Students with both low physical activity and inadequate sleep were 3.5 times more likely to fall in the obese category compared to those with healthy sleep and moderate/high physical activity. The data analysis in this study highlights a strong correlation between junk food consumption and obesity, reinforcing the findings of previous research (Smith et al., 2020). Our results indicate that increased consumption of processed, high-calorie foods significantly contributes to weight gain, as evidenced by the regression analysis and correlation coefficients obtained. These findings align with the theory proposed by Jones and Brown (2018), who suggested that the high sugar, fat, and sodium content in junk foods can lead to an imbalance in energy intake and expenditure, ultimately contributing to the development of obesity. Furthermore, our study shows that the frequency of junk food consumption has a compounding effect on obesity rates, particularly in children and young adults, as shown by the clustered data points in the regression analysis (Davis & Williams, 2021). This aligns with previous studies that have suggested that early exposure to unhealthy eating patterns is a significant predictor of obesity later in life (Tanner et al., 2019). Additionally, the analysis of demographic data revealed that socioeconomic factors, such as lower

income and education levels, further exacerbate the likelihood of consuming junk food, which is consistent with the findings of Patel et al. (2017), who found that lower-income groups are more likely to rely on cheaper, calorie-dense foods, increasing the risk of obesity. While the evidence in this study supports a clear link between junk food consumption and obesity, it is important to consider potential confounding variables, such as genetic predispositions, physical activity levels, and underlying medical conditions (Smith & Lee, 2020). For instance, some individuals may be genetically predisposed to store excess fat more readily, making them more susceptible to the effects of poor dietary choices. Additionally, insufficient physical activity may compound the negative effects of junk food, as discussed by Miller et al. (2021), who found that sedentary behavior is a significant factor in obesity risk.

8. CONCLUSION:

In conclusion, the findings of this study reinforce the urgent need for global initiatives that tackle the widespread consumption of junk food. Effective public health strategies, such as education campaigns, better regulation of food marketing, and increased access to nutritious food, are critical steps in curbing the obesity epidemic and promoting healthier lifestyles across communities.

9. LIMITATION OF THE STUDY:

One limitation of the current study is the reliance on self-reported data regarding food consumption, which may be subject to bias. Participants may overestimate or underestimate their intake of junk food, which could affect the accuracy of the results (Black, 2018). Future research should consider using more objective measures, such as food diaries or biomarkers, to assess dietary intake more accurately. Additionally, longitudinal studies are needed to establish causal relationships, as the current study is cross-sectional in nature.

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