

Assessment of Dietary Behaviors and Obesity Status in School-Aged Children

Sandeep Kumar¹, Kumar Pravin², Gaurav Varma³

¹Assistant Professor, Department of Community Medicine, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India

²Associate Professor, Department of Community Medicine, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India

³Professor, Department of Community Medicine, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India

Received: 08-04-2026 / Revised: 19-05-2026 / Accepted: 25-06-2026

Corresponding Author: Dr. Sandeep Kumar

Conflict of interest: Nil

Abstract:

Background: Childhood obesity is a growing public health concern, particularly in developing countries undergoing rapid transition into nutrition. Unhealthy dietary patterns established during school years contribute significantly to excess weight gain and long-term health risks.

Aim: To assess dietary patterns among school-aged children and examine their association with obesity.

Methodology: A cross-sectional observational study carried out with 70 students ages 6 to 15 years from selected government and private schools in the rural and peri-urban regions of Bihta, Patna, Bihar. Dietary habits were assessed using a pre-tested questionnaire, and anthropometric measurements were taken to calculate BMI-for-age. Data were analyzed using descriptive statistics and Chi-square test.

Results: Suboptimal intake of fruits and vegetables and a high prevalence of fast-food consumption, sugar-sweetened beverages, and snacking were observed. Frequent fast-food intake (≥ 3 times/week) was significantly associated with overweight/obesity ($p = 0.03$).

Conclusion: Unhealthy dietary practices are common among school-aged children and are significantly associated with obesity. Targeted school- and family-based nutritional interventions are urgently needed.

Keywords: Childhood Obesity, Dietary Patterns, Fast Food, School-Aged Children, BMI.

DOI: 10.25258/ijpqqa.17.6.80

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Childhood obesity is a major public health challenge of the twenty-first century, affecting both developed and developing countries. The World Health Organization identifies it as a global epidemic due to its rapidly rising prevalence and long-term health consequences across the life course [1]. Childhood obesity is particularly alarming, as this stage is crucial for physical growth, cognitive development, and the establishment of enduring dietary and lifestyle habits. Childhood obesity frequently continues into adulthood, elevating the risk of non-communicable diseases, including type 2 diabetes mellitus, cardiovascular disorders, hypertension, and certain malignancies [2]. Furthermore, childhood obesity is associated with psychosocial challenges, such as diminished self-esteem, social stigma, anxiety, and subpar academic achievement.

Children's nutrition patterns have an important impact on childhood obesity developing. Examining food consumption patterns rather than examining

individual nutrients or foods gives a broader view of habitual eating habits and how different foods interact with each other to create health conditions [3]. With the modern-day diet of school-aged children consisting mostly of energy-dense, nutrient-deficient foods – that is, foods containing large amounts of highly-refined carbohydrates, saturated fat, sugar added to them, and ultra-processed foods – and very little fruit, vegetables, whole grains, and foods rich in vitamins and minerals, the nutritional profile has changed substantially from home-cooked meals to convenience foods and the consumption of fast food and sugar sweetened beverages [4]. The increased number of meals eaten out and less regular/irregular meal habits and breakfast skipping is also contributing to unhealthy eating patterns in this age group.

Children's dietary preferences and eating habits are heavily affected by their home and school environments. For instance, the school buildings are where children typically get at least half of what they eat

throughout the day. Therefore, school meal programs, canteens, and food policies have a major effect on the health/nutrition status of children. At home, factors such as parents food preferences, income level, education level, and culture may determine what types of healthy food items children can eat or will be willing to eat [5]. Changes in urban development, increased income levels among families, and changes in family size and structure are also related to the fact that children are consuming more processed and fast foods, or "ready to eat" foods, rather than traditional, more balanced meals. Additionally, aggressive marketing tactics for unhealthy foods directed toward children via television and digital platforms, and through marketing packages or containers, reinforce poor eating patterns in children [6].

A combination of sedentary lifestyle along with poor eating habits has increased the prevalence of obesity among children [7]. With the increase in time spent in front of screens, less time spent playing outside, more study/academic pressure and fewer opportunities to engage in physical activities, this results in a decreased level of energy burned which increases the impact of excess calories consumed by an individual. Nevertheless, nutrition is a major factor that can be changed to help prevent and manage obesity [8]. Knowing the type of food that contributes to obesity within a child's nutrition helps provide focused nutrition interventions and evidence based public health solutions to the problem.

In developing nations including India, how to deal with childhood obesity is complicated because malnutrition can also be found in many children. Both undernutrition and obesity can be found simultaneously in the same population, community, home or even region [9]. The shift away from traditional and healthy diets toward westernized ones that support unhealthy eating has caused an increase in the rate of overweight and obese school-aged children in developing nations, particularly in urban and semi-urban locations [10]. Even though childhood obesity continues to remain an important area of concern, little is known about the dietary patterns related to obesity among children in specific regions of the world--therefore systematic studies of dietary behavior and obesity among children need to be carried out.

To that end, this research project will investigate eating habits of children, as well as their contribution to excess weight (obesity). In determining the dominant types of diets consumed by school-age children; understanding how those types of diets relate to nutritional status; and generating useful information to assist developing effective school nutrition programs, educating parents about their children's diets, and creating related regulations/policies, this research will provide insight into how dietary habits contribute to obesity during the formative

years of childhood, leading to the ability to create successful long-term prevention strategies.

Methodology

Study Design: The present study was a cross-sectional observational study designed to assess dietary patterns and their association with obesity among school-aged children. This design was chosen to evaluate the prevalence of obesity and related dietary habits at a single point in time.

Study Area: The research was carried out inside the Department of Community Medicine at Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India. The field activities were conducted at designated schools within the rural and peri-urban practice areas affiliated with the department.

Study Duration: The study was conducted over a period for one year.

Study Participants

Inclusion Criteria

- School-aged children aged 6–15 years
- Children enrolled in selected government and private schools
- Children whose parents/guardians provided written informed consent
- Children present on the day of data collection

Exclusion Criteria

- Children with known chronic illnesses or endocrine disorders affecting growth or weight
- Children on long-term medication influencing nutritional status
- Children unwilling to participate or without parental consent

Sample Size: A total of 70 school-aged children were included in the study.

Procedure: The study participants were selected using a convenient sampling method. Written informed consent was obtained from parents or guardians prior to data collection. A pre-tested, semi-structured questionnaire was used to collect information on socio-demographic characteristics and dietary patterns, including meal frequency, consumption of fruits and vegetables, intake of fast foods, sugar-sweetened beverages, and snacking habits. Anthropometric measurements such as height and weight were recorded using standard procedures, and Body Mass Index (BMI) was calculated. Nutritional status was assessed using age- and sex-specific BMI-for-age reference standards.

Statistical Analysis: The collected data was input into Microsoft Excel and analyzed with SPSS software version 27. Descriptive statistics, including mean, standard deviation, frequencies, and percentages, were employed to summarize the data. The correlation between food patterns and obesity was

examined utilizing suitable statistical methods, including the Chi-square test, with a p-value of <0.05 being statistically significant.

Result

Table 1 shows the socio-demographic characteristics of participants in the study. The largest age range of participants was 10-12 years (40%), followed by 6-9 years (31.4%), and finally, 13-15 years (28.6%). Each age group had an almost equal number of children, and more children were in the early

adolescent age groups than other age groups. The sex ratio was relatively even; 51.4% of the participants were boys, while 48.6% were girls. More than half of the children in the study (54.3%) attended public schools compared to 45.7% who were in private schools. Most of the participants lived in rural areas (58.6%) as opposed to peri-urban areas (41.4%), indicating that a significant portion of children surveyed resided in a rural area.

Table 1: Socio-Demographic Characteristics of Study Participants (n = 70)			
Variable	Category	Frequency (n)	Percentage (%)
Age Group (years)	6-9	22	31.4
	10-12	28	40
	13-15	20	28.6
Gender	Male	36	51.4
	Female	34	48.6
Type of School	Government	38	54.3
	Private	32	45.7
Area of Residence	Rural	41	58.6
	Peri-urban	29	41.4

Table 2 illustrates the dietary patterns and characteristics of 70 participants in the study. Of the participants, nearly half of the participants (48.6%) reported they consumed three meals a day. Equal proportions (25.7% each) reported they consumed two meals or less than four meals a day, suggesting meal frequency was variable among participants' diets. One-third (34.3% of participants) consumed fruit at least once per day. The largest proportion of participants (37.1%) reported eating fruit 3-4 days/week, and slightly less than one-third (28.6%) of participants ate fruit 2 days or less/week. A small

proportion of participants appear to consume fruit regularly. Vegetable consumption patterns were like that found for fruits: 42.9% consumed vegetables daily, while the remaining majority (57.1%) infrequently consumed vegetables (i.e. occasionally). Thus, it appears from Table 2 that most participants consume regular meals; however, daily fruit and vegetable consumption is inadequate among a large proportion of the study population. Consequently, this could be related to diets being inadequate for supporting nutrition and increasing a participant's risk of obesity.

Table 2: Dietary Pattern Characteristics of Study Participants (n = 70)			
Dietary Variable	Category	Frequency (n)	Percentage (%)
Meal Frequency per Day	≤2 meals	18	25.7
	3 meals	34	48.6
	≥4 meals	18	25.7
Fruit Intake	Daily	24	34.3
	3-4 days/week	26	37.1
	≤2 days/week	20	28.6
Vegetable Intake	Daily	30	42.9
	Occasionally	40	57.1

Table 3 indicates how frequently 70 respondents ate food considered unhealthy. There was a high percentage of respondents eating fast food frequently. For example, 41.4% ate fast food three or more days per week, while 37.1% ate fast food one to two days per week, meaning that almost four out of every five respondents in the study were regular eaters of fast food. Another very common unhealthy food item was the sugar-sweetened beverage. Of the respondents, 30% reported consuming sugar-sweetened

beverages daily, and 47.1% reported that they occasionally consumed these beverages, while only 22.9% reported that they never consume sugar-sweetened beverages or consume them infrequently. Snacking between meals was also common, as evidenced by 62.9% of respondents saying that they participated in this behavior frequently. Based on the findings of this study, the behaviors shown are associated with an increased risk of both becoming overweight and becoming obese.

Table 3: Consumption of Unhealthy Foods Among Participants (n = 70)

Dietary Habit	Category	Frequency (n)	Percentage (%)
Fast Food Intake	≥3 times/week	29	41.4
	1–2 times/week	26	37.1
	Rare/Never	15	21.5
Sugar-Sweetened Beverages	Daily	21	30
	Occasionally	33	47.1
	Rare/Never	16	22.9
Snacking Between Meals	Yes	44	62.9
	No	26	37.1

Table 4 presents that there is an association between high levels of fast-food consumption and increased rates of obesity among the participants. Statistically significant results (p-value of 0.03) reveal that within the group of children who consumed fast food three times or more per week, there was a greater percentage of them who were considered overweight or obese (17 out of 29) when compared to those who had a normal BMI (12 out of 29). Conversely, within the group of children who had

consumed less than three times a week, a larger percentage of children had a 'normal' BMI (24 out of 41), whereas fewer children were considered overweight or obese (17 out of 41). Therefore, the overall results of the current study indicate that frequent consumption of fast food is positively correlated with higher levels of both overweight and obese children within the school-age group being examined.

Table 4: Association Between Fast Food Consumption and Obesity (n = 70)

Fast Food Intake	Normal BMI (n)	Overweight/Obese (n)	Total	p-value
≥3 times/week	12	17	29	0.03
<3 times/week	24	17	41	
Total	36	34	70	

Discussion

In this study, we will further examine the socio-demographic characteristics, dietary habits, and consumption patterns of unhealthy foods among children aged 6 to 12 years. Our findings show that children between 10-12 years old are slightly more prevalent than children aged 6-9 years old, which suggests that this age group is critical for the development of lasting dietary habits. With the gender distribution approximately equal, our findings are representative of dietary patterns among both boys and girls without gender bias. In addition, the large proportion of children in government schools and living in rural areas reflects the need for such information to be disseminated to people in public-sector institutions (e.g., government) and in rural communities where these types of dietary transitions are continuing. Correa et al., 2017 [11] reported similar findings and the results from this study support the body of literature that associates the consumption of energy-dense dietary patterns and being overweight/obese in children.

The analysis of dietary patterns indicated a large amount of variability in meal frequency among children. In general, about 50% of the children studied said they ate at least three times per day, which is consistent with dietary recommendations. However, significant numbers of children also reported they skipped at least two meals each day (i.e., ≤2 meals/day) and/or frequently (≥4 meals/day). A high

proportion of children appear to be exhibiting irregular meal patterns, which have been associated with difficulties in appetite regulation, as well as an increased likelihood of being overweight and obese when those patterns are combined with poor food choices. Other investigators have shown that the relationship between food consumption and sleep patterns exists as well; Hart et al., (2013) [12] demonstrated an association between less food intake and increased sleep duration for children.

Intake of fruits and vegetables by participants was clearly inadequate; only ~33% of children consumed fruit daily and almost 50% reported eating vegetables daily, which is like the observations made in other Indian and global literature regarding poor micronutrient intake from raw foods among the school-aged population in these areas. Inadequate fruit and vegetable consumption could lead to lower amounts of dietary fiber, lower levels of satiety, and higher levels of consumption of calorie dense foods, which in turn could contribute to a higher risk for developing obesity through indirect means. Olafsdottir et al., (2014) [13] suggested that TV total hours also correspond to a greater chance of consuming sweetened drinks, especially when exposed to commercials.

High rates of unhealthy eating habits were also reported: a high percentage of people eat fast food regularly (nearly four out of five people) and almost half (45%) of the participants reported eating fast food daily (or at least three times weekly). This data

suggests that the nutrition transition in terms of variety and access to calorie-dense foods continues to increase. Frequent snacking is another contributor to excess caloric intake, particularly when the snacks are high in calories. Kaluski et al., (2009) [14] reported that the amount of time spent sitting in front of a computer, watching TV or videos, or listening to music is not associated with physical inactivity or obesity.

A primary conclusion from the research indicates that there is a significant statistical link between consuming large amounts of fast food regularly (at least three times each week) and being overweight or obese. When compared to those who did not eat fast food as often, children eating at least three times per week were found to be more likely to be overweight/obese. This finding provides additional support for prior research which viewed regular consumption of fast-food products (typically containing high amounts of fat and sugar and salt) to create a state of positive energy balance in children and thus contribute to weight gain among children. Thus, the correlation between the consumption of large amounts of fast food and obesity in children defines fast food as a modifiable risk factor for obesity in childhood.

It has been determined that there is an increasing need for more effective targeted nutrition-based intervention programs that assist with both improving the dietary quality and reducing the number of unhealthy foods consumed by school-age children. An example would include school-based nutrition education classes, parent classes focusing on educating their parents about nutrition, and policy initiatives that help provide children (specifically those living in rural and government schools) access to healthy food options would greatly enhance the prevention of childhood obesity. Early childhood intervention (during a child's school years) is critical, as studies have shown that most dietary habits that are created when children begin school will continue into adulthood, thereby affecting the long-term health of the child.

Conclusion

To conclude, this study has shown that there is a high prevalence of unhealthy eating patterns among children, which is defined by the low amounts of fruit/vegetable consumption, high levels of fast-food intake, sugar-sweetened beverage use, and snack food consumption. About half of the respondents had consistent mealtime practices, but the remaining respondents demonstrated erratic eating patterns. The finding of a statistically significant relationship between frequent fast-food consumption and increased weight/obesity suggests that energy-dense diets are associated with childhood obesity. Additionally, these findings are particularly important in rural and peri-urban areas currently experiencing

rapid nutritional transitions. Many of the findings supporting this conclusion will help to identify appropriate early intervention programs (e.g., through school nutrition programs), increasing parent awareness of the eating patterns of their children, and creating/enacting supportive food policy. All these strategies will contribute to establishing healthy eating patterns in children and reducing the increasing prevalence of childhood obesity.

References

1. Malecka-Tendera E, Mazur A. Childhood obesity: a pandemic of the twenty-first century. *International journal of obesity*. 2006 Jun; 30(2): S1-3.
2. Lehmann F, Varnaccia G, Zeiher J, Lange C, Jordan S. Influencing factors of obesity in school-age children and adolescents—a systematic review of the literature in the context of obesity monitoring. *Journal of health monitoring*. 2020 May 7;5(Suppl 2):2.
3. Agostoni C, Braegger C, Decsi T, Kolacek S, Koletzko B, Mihatsch W, Moreno LA, Puntis J, Shamir R, Szajewska H, Turck D. Role of dietary factors and food habits in the development of childhood obesity: a commentary by the ESPGHAN Committee on Nutrition. *Journal of pediatric gastroenterology and nutrition*. 2011 Jun;52(6):662-9.
4. Kumar GS, Kulkarni M, Rath N. Evolving food choices among the urban Indian middle-class: a qualitative study. *Frontiers in nutrition*. 2022 Mar 29; 9:844413.
5. Kral TV, Rauh EM. Eating behaviors of children in the context of their family environment. *Physiology & behavior*. 2010 Jul 14;100(5):567-73.
6. Fanzo J, Davis C. Transformations across diets and food systems. In *Global food systems, diets, and nutrition: Linking science, economics, and policy* 2021 Jun 6 (pp. 71-84). Cham: Springer International Publishing.
7. Dumuid D, Olds T, Lewis LK, Martin-Fernández JA, Katzmarzyk PT, Barreira T, Broyles ST, Chaput JP, Fogelholm M, Hu G, Kuriyan R. Health-related quality of life and lifestyle behavior clusters in school-aged children from 12 countries. *The Journal of pediatrics*. 2017 Apr 1; 183:178-83.
8. Sallis JF, Glanz K. The role of built environments in physical activity, eating, and obesity in childhood. *The future of children*. 2006 Apr 1:89-108.
9. World Health Organization. The double burden of malnutrition: priority actions on ending childhood obesity. World Health Organization. Regional Office for South-East Asia; 2020.
10. Adetunji AE, Adeniran KA, Olomu SC, Odike AI, Ewah-Odiase RO, Omoike IU, Akpede GO. Socio-demographic factors associated with

- overweight and obesity among primary school children in semi-urban areas of mid-western Nigeria. *PloS one*. 2019 Apr 3;14(4):e0214570.
11. Corrêa RD, Vencato PH, Rockett FC, Bosa VL. Dietary patterns: are there differences between children and adolescents?. *Ciência & Saúde Coletiva*. 2017;22:553-62.
 12. Hart CN, Carskadon MA, Considine RV, Fava JL, Lawton J, Raynor HA, Jelalian E, Owens J, Wing R. Changes in children's sleep duration on food intake, weight, and leptin. *Pediatrics*. 2013 Dec 1;132(6):e1473-80.
 13. Olafsdottir S, Eiben G, Prell H, Hense S, Lissner L, Mårild S, Reisch L, Berg C. Young children's screen habits are associated with consumption of sweetened beverages independently of parental norms. *International journal of public health*. 2014 Feb;59(1):67-75.
 14. Kaluski DN, Mazengia GD, Shimony T, Goldsmith R, Berry EM. Prevalence and determinants of physical activity and lifestyle in relation to obesity among schoolchildren in Israel. *Public health nutrition*. 2009 Jun;12(6):774-82.