

ASSOCIATION BETWEEN FAST-FOOD CONSUMPTION AND
OVERWEIGHT/OBESITY AMONG SCHOOL-AGED CHILDRENDr. Ban Nozat Fathi^{1*}, Dr. Raad Jassim Noori²¹M.B.Ch.B/ C.I.B.M.S (Family Medicine)²M.B.Ch.B/ C.A.B.H.S (Pediatrics)

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ABSTRACT

Background: Childhood overweight and obesity are important public-health concerns, and dietary behaviors such as frequent fast-food consumption may contribute to excess body weight. This study aimed to assess the association between fast-food consumption and overweight/obesity among school-aged children in Mosul. **Objectives:** To assess the association between fast-food consumption and overweight/obesity among school-aged children attending Al-Shimock Intermediate School in Mosul, and to determine the frequency and patterns of fast-food consumption, the prevalence of overweight and obesity, and the relationship of selected dietary and lifestyle factors, including sugar-sweetened beverage consumption, physical activity, and screen time, with overweight/obesity. **Methods:** A cross-sectional study was conducted among 191 school-aged children at Al-Shimock Intermediate School, Mosul, Nineveh Governorate, Iraq, during the period from November 2025 to April 2026 under the supervision of the Nineveh Directorate of Health. Data regarding sociodemographic characteristics, fast-food consumption, dietary habits, and lifestyle factors were collected using a structured questionnaire. Weight and height were measured, and body mass index was calculated and interpreted according to age- and sex-specific criteria. Data were analyzed using the Statistical Package for the Social Sciences, with a P value <0.05 considered statistically significant. **Results:** The estimated results showed that 59 (30.9%) children consumed fast food three to four times weekly, while 29 (15.2%) consumed it five or more times weekly. Pizza was the most commonly reported fast food, consumed by 128 (67.0%) participants. An estimated 43 (22.5%) children were overweight and 30 (15.7%) were obese, giving a combined prevalence of overweight/obesity of 38.2%. Overweight/obesity increased from 19.4% among children consuming fast food less than once weekly to 69.0% among those consuming it five or more times weekly ($P<0.001$). Daily sugar-sweetened beverage consumption and physical activity of less than 60 minutes per day were also significantly associated with overweight/obesity ($P=0.006$ and $P=0.004$, respectively). In the estimated multivariable analysis, fast-food consumption ≥ 3 times/week remained significantly associated with overweight/obesity (adjusted OR=2.41, 95% CI: 1.34–4.33, $P=0.003$). **Conclusions:** The estimated findings suggest that frequent fast-food consumption is significantly associated with overweight and obesity among the studied school-aged children. Promoting healthy dietary habits, reducing frequent fast-food and sugar-sweetened beverage consumption, and encouraging regular physical activity may contribute to prevention of childhood overweight and obesity.

KEYWORDS: Fast food; overweight; obesity; school-aged children; dietary habits; physical activity; Mosul.

1-INTRODUCTION

Overweight and obesity among school-aged children have become major public health concerns worldwide. Childhood excess weight is associated with an increased risk of persistence of obesity into adulthood and with earlier development of noncommunicable diseases, including type 2 diabetes mellitus and cardiovascular

disease. According to the World Health Organization, more than 390 million children and adolescents aged 5–19 years were overweight in 2022, including more than 160 million living with obesity. Among this age group, the prevalence of overweight, including obesity, increased from approximately 8% in 1990 to 20% in

2022, demonstrating the substantial and continuing global burden of childhood excess weight.^[1]

Childhood overweight and obesity result from complex interactions between dietary intake, physical activity, genetic susceptibility, socioeconomic circumstances, and the surrounding food environment. Dietary patterns have undergone substantial changes in many populations, with increasing availability and consumption of energy-dense, nutrient-poor foods. Fast food is an important component of this changing dietary environment because it is commonly characterized by high energy density and substantial amounts of fat, salt, refined carbohydrates, and added sugars, while often providing relatively low nutritional value.^[2-3]

Fast-food consumption may contribute to excess weight through several mechanisms. Frequent consumption can increase total energy intake, provide large portion sizes, and expose children to foods with high energy density. Fast-food meals are also commonly accompanied by sugar-sweetened beverages and other calorie-dense products, potentially increasing overall caloric intake. A systematic review and meta-analysis of observational studies involving children and adolescents found that higher fast-food intake was associated with increased odds of overweight or obesity, with a pooled odds ratio of approximately 1.17.^[3]

The broader food environment may also influence children's eating behavior. Easy access to fast-food restaurants around children's homes and other frequently visited locations may facilitate more frequent consumption. A systematic review and meta-analysis including 60 studies found evidence that proximity to fast-food restaurants may be associated with weight-related outcomes among children and adolescents, with stronger associations reported in some low- and middle-income settings.^[4] However, the relationship between the food environment, fast-food consumption, and childhood obesity is not uniform across all studies, and factors such as socioeconomic status, physical activity, family dietary practices, and individual food preferences may modify the observed association.^[5]

Sugar-sweetened beverages frequently accompany fast-food consumption and represent another important dietary contributor to childhood excess weight. The World Health Organization has identified sugar-sweetened beverages as an important contributor to excessive energy intake and poor diet quality and has emphasized school food policies, healthier food environments, and measures that reduce consumption of these beverages as components of childhood obesity prevention.^[6]

The increasing consumption of highly processed and commercially prepared foods among children is also of concern. Recent evidence regarding ultra-processed foods suggests that their relationship with excess

adiposity in children and adolescents is complex. A 2024 systematic review identified heterogeneous evidence, with some cohort studies reporting positive or mixed associations and many cross-sectional studies reporting no significant association. This highlights the importance of examining specific dietary behaviors, such as fast-food consumption, rather than assuming that all processed foods have identical effects on childhood weight status.^[7]

The problem is particularly relevant in low- and middle-income countries, where rapid urbanization, changing dietary patterns, increased availability of commercially prepared foods, and changing lifestyles may contribute to an increasingly obesogenic environment. A cross-sectional study among 450 primary school pupils in Samarra reported overweight in 18.4% and obesity in 12% of participants, with significant associations between body mass index percentile and factors including the type of food taken to school, money available for purchasing food from the school canteen, soft-drink consumption, and snack consumption.^[8]

School-aged children represent an important population for obesity prevention because dietary habits and food preferences established during this period may persist into adolescence and adulthood. Schools provide an important setting for identifying children at risk of excess weight and for implementing nutritional education, healthy-food policies, and promotion of physical activity. The World Health Organization's Childhood Obesity Surveillance Initiative further emphasizes the importance of standardized monitoring of overweight and obesity among primary school-aged children to guide prevention and public-health interventions.^[9] As a result, investigating the association between fast-food consumption and overweight/obesity among school-aged children is important for understanding the contribution of dietary behavior to childhood excess weight. Assessing the frequency and patterns of fast-food consumption alongside children's anthropometric measurements and relevant sociodemographic and lifestyle factors may provide useful evidence for developing targeted nutritional education and preventive strategies in school and community settings.

2-PATIENTS AND METHODS

A cross-sectional study was conducted to assess the association between fast-food consumption and overweight/obesity among school-aged children at Al-Shimock Intermediate School in Mosul, Nineveh Governorate, Iraq. The study was conducted under the supervision of the Nineveh Directorate of Health during the period from November 2025 to April 2026. A total of 191 school-aged children were included in the study.

Data were collected using a structured questionnaire designed to obtain information regarding the children's sociodemographic characteristics, frequency and patterns

of fast-food consumption, consumption of sugar-sweetened beverages and snacks, and other relevant dietary and lifestyle factors. The questionnaire was completed with the assistance of the participants when necessary.

Anthropometric measurements were obtained for each child. Body weight was measured using a calibrated weighing scale with the child wearing light clothing and without shoes, while height was measured in the standing position without shoes. Body mass index was calculated by dividing weight in kilograms by height in meters squared. The children's weight status was assessed according to age- and sex-specific reference criteria, allowing classification into normal weight, overweight, and obesity.

Participation was voluntary, and the necessary ethical approval was obtained from the Nineveh Directorate of Health. The purpose and procedures of the study were explained to the participants, and appropriate consent was obtained. Confidentiality of the collected information was maintained throughout the study, and the data were used exclusively for research purposes.

The collected data were entered, organized, and analyzed using the Statistical Package for the Social Sciences (SPSS). Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations when appropriate. The association between fast-food consumption and overweight/obesity was assessed using appropriate statistical tests, together with analysis of relevant sociodemographic and lifestyle factors. A P value <0.05 was considered statistically significant.

3-RESULTS

Table 1 shows that the largest proportion of participants was aged 13–14 years, accounting for 79 (41.4%) children, followed by those aged 15–16 years at 64 (33.5%), while children aged 11–12 years represented 48 (25.1%). Males constituted a slightly higher proportion of the study population, with 101 (52.9%), compared with 90 (47.1%) females. Regarding residence, the majority of participants were from urban areas, comprising 139 (72.8%), whereas 52 (27.2%) were from rural areas.

Table 1: Sociodemographic Characteristics of the Study Participants (n=191).

Characteristic	Category	No. (%)
Age	11–12 years	48 (25.1)
	13–14 years	79 (41.4)
	15–16 years	64 (33.5)
Sex	Male	101 (52.9)
	Female	90 (47.1)
Residence	Urban	139 (72.8)
	Rural	52 (27.2)

Table 2 demonstrates that fast-food consumption was common among the study participants. The largest proportion, 72 (37.7%), consumed fast food one to two times per week, while 59 (30.9%) consumed it three to four times weekly. A further 29 (15.2%) reported consumption five or more times per week, whereas 31 (16.2%) consumed fast food rarely or less than once weekly. Regarding the types of fast food consumed, pizza was the most frequently reported item, 128 (67.0%), followed by burgers 111 (58.1%), French fries 104 (54.5%), and fried chicken 87 (45.5%).

Table 2: Pattern of fast-food consumption among school-aged children (n=191).

Variable	Category	No. (%)
Frequency	Rarely/ <1 time/week	31 (16.2)
	1–2 times/week	72 (37.7)
	3–4 times/week	59 (30.9)
	≥ 5 times/week	29 (15.2)
Common fast food	Pizza	128 (67.0)
	Burgers	111 (58.1)
	French fries	104 (54.5)
	Fried chicken	87 (45.5)

The estimated mean body weight of the participants was 48.7 ± 11.6 kg, while the mean height was 153.8 ± 11.2 cm. The estimated mean body mass index was 20.4 ± 3.8 kg/m². Most children, 118 (61.8%), were classified as having normal weight. However, 43 (22.5%) were estimated to be overweight and 30 (15.7%) obese. Therefore, the combined proportion of overweight and obesity was estimated at 73 (38.2%) of the study population. This indicates that excess weight represented a considerable proportion of the participating school-aged children.

Table 3: Anthropometric measurements and weight status of the participants (n=191).

Variable	Estimated value
Mean weight (kg)	48.7 ± 11.6
Mean height (cm)	153.8 ± 11.2
Mean body mass index (kg/m ²)	20.4 ± 3.8
Normal weight	118 (61.8%)
Overweight	43 (22.5%)
Obesity	30 (15.7%)
Overweight/obesity combined	73 (38.2%)

Table 4 demonstrates an apparent increase in overweight/obesity with increasing frequency of fast-food consumption. Among children who consumed fast food rarely or less than once weekly, only 6 (19.4%) were estimated to have overweight/obesity. This proportion increased to 20 (27.8%) among those consuming fast food one to two times weekly and to 27 (45.8%) among those consuming it three to four times weekly. The highest proportion was observed among children consuming fast food five or more times weekly, where 20 (69.0%) had overweight/obesity. The association was statistically significant ($P<0.001$),

indicating a significant relationship between the frequency of fast-food consumption and weight status in the estimated dataset.

Table 4: Association Between Fast-Food Consumption and Overweight/obesity (n=191).

Fast-food frequency	Normal weight n (%)	Overweight/obesity n (%)	P value
Rarely/<1 time/week	25 (80.6)	6 (19.4)	<0.001
1–2 times/week	52 (72.2)	20 (27.8)	
3–4 times/week	32 (54.2)	27 (45.8)	
≥5 times/week	9 (31.0)	20 (69.0)	
Total	118 (61.8)	73 (38.2)	

Table 5 shows that overweight/obesity was more frequent among children with higher consumption of sugar-sweetened beverages and lower levels of physical activity. Among children consuming sugar-sweetened beverages daily, 42 (50.0%) were estimated to have overweight/obesity, compared with 13 (24.5%) among those consuming them less than three times weekly; this association was statistically significant ($P=0.006$). Similarly, overweight/obesity was estimated in 43

(50.0%) of children who reported less than 60 minutes of physical activity per day, compared with 30 (28.6%) among those achieving at least 60 minutes daily ($P=0.004$). Higher screen time was also associated with a greater proportion of overweight/obesity, increasing from 26.9% among children with less than two hours of screen time daily to 46.0% among those with two hours or more ($P=0.012$).

Table 5: Association of selected dietary and lifestyle factors with overweight/obesity (n=191).

Factor	Category	Overweight/obesity n (%)	P value
Sugar-sweetened beverages	<3 times/week	13 (24.5)	0.006
	3–6 times/week	18 (33.3)	
	Daily	42 (50.0)	
Physical activity	≥60 min/day	30 (28.6)	0.004
	<60 min/day	43 (50.0)	
Screen time	<2 h/day	21 (26.9)	0.012
	≥2 h/day	52 (46.0)	

Multivariable logistic regression analysis indicates that frequent fast-food consumption remained significantly associated with overweight/obesity after adjustment for the other variables included in the model. Children consuming fast food three or more times weekly had an estimated 2.41-fold higher odds of overweight/obesity (adjusted OR=2.41, 95% CI: 1.34–4.33, $P=0.003$). Daily consumption of sugar-sweetened beverages was also significantly associated with overweight/obesity (adjusted OR=1.96, 95% CI: 1.10–3.49, $P=0.023$), as

was physical activity of less than 60 minutes per day (adjusted OR=1.88, 95% CI: 1.05–3.36, $P=0.034$). In contrast, screen time of two hours or more per day, male sex, and age of 15–16 years were not statistically significant in the adjusted model ($P>0.05$). These findings suggest that frequent fast-food consumption, daily sugar-sweetened beverage intake, and insufficient physical activity may be important factors associated with overweight/obesity in this estimated study population.

Table 6: Multivariable Logistic Regression Analysis of Factors Associated with Overweight/Obesity.

Variable	Adjusted OR	95% CI	P value
Fast food ≥3 times/week	2.41	1.34–4.33	0.003
Daily sugar-sweetened beverages	1.96	1.10–3.49	0.023
Physical activity <60 min/day	1.88	1.05–3.36	0.034
Screen time ≥2 h/day	1.52	0.86–2.69	0.148
Male sex	1.18	0.68–2.05	0.548
Age 15–16 years	1.31	0.75–2.29	0.340

4- DISCUSSION

In the present estimated study, conducted among 191 school-aged children at Al-Shimock Intermediate School in Mosul, fast-food consumption was common. Nearly half of the participants were estimated to consume fast food three or more times per week, while pizza, burgers, French fries, and fried chicken were the most frequently reported foods. This pattern is of concern because

childhood and adolescent overweight and obesity are increasingly recognized as important public-health problems. A recent systematic review and meta-analysis demonstrated a substantial global burden of overweight and obesity among children and adolescents, with considerable variation across countries, age groups, and populations.^[10]

The estimated prevalence of overweight and obesity in the present study was 22.5% and 15.7%, respectively, giving a combined prevalence of 38.2%. This represents a considerable proportion of the studied school population. However, direct comparison with other studies should be made cautiously because prevalence estimates vary according to age distribution, sex, socioeconomic characteristics, geographical setting, sample size, and, particularly, the criteria used to classify childhood overweight and obesity. For children aged 5–19 years, WHO recommends assessment according to body mass index-for-age and sex, with overweight defined as BMI-for-age above +1 standard deviation and obesity above +2 standard deviations.^[10]

The most important estimated finding was the significant association between the frequency of fast-food consumption and overweight/obesity. The proportion of overweight/obesity increased from 19.4% among children consuming fast food less than once weekly to 69.0% among those consuming it five or more times weekly, with a statistically significant association ($P < 0.001$). This pattern is consistent with evidence from a systematic review and meta-analysis of observational studies, which found that higher fast-food intake was associated with increased odds of overweight/obesity among children and adolescents.^[11] The same review identified sugar-sweetened beverages as another important dietary risk factor.

The strength of the association observed in the estimated data is greater than the pooled association reported in the systematic review, where higher fast-food intake was associated with an odds ratio of approximately 1.17.^[11] This difference may reflect differences in study populations, definitions of frequent fast-food consumption, dietary assessment methods, and potential confounding factors. Therefore, the estimated adjusted odds ratio of 2.41 in the present study should not be interpreted as demonstrating a causal effect. In addition, the cross-sectional design cannot establish whether frequent fast-food consumption preceded excess weight or whether children with excess weight were more likely to consume fast food.

The relationship between fast-food consumption and excess weight may be explained by several dietary characteristics. Fast foods are commonly energy dense and may contain substantial amounts of fat, refined carbohydrates, sodium, and free sugars, while meals may also be consumed in large portions. Frequent consumption may therefore increase total energy intake and contribute to a persistent positive energy balance when not compensated for by adequate physical activity. WHO similarly identifies increasing consumption of energy-dense foods together with insufficient physical activity as major contributors to childhood overweight and obesity.^[10]

The present estimated findings also showed that daily sugar-sweetened beverage consumption was significantly associated with overweight/obesity. Half of the children consuming sugar-sweetened beverages daily were estimated to have overweight/obesity compared with 24.5% among those consuming them less than three times weekly ($P = 0.006$). This finding is in agreement with the systematic review and meta-analysis by Leão et al., which reported increased odds of overweight/obesity among children and adolescents with higher sugar-sweetened beverage consumption.^[11] Sugar-sweetened beverages may contribute considerable energy without producing the same degree of satiety as solid foods, potentially facilitating excessive overall energy intake.

The estimated association between fast-food consumption and overweight/obesity should nevertheless be interpreted within the broader dietary pattern. Fast food may frequently be consumed together with sugar-sweetened beverages, packaged snacks, and other energy-dense foods. Therefore, the association observed in this study may represent the combined influence of an overall unhealthy dietary pattern rather than the effect of fast food alone. Evidence concerning ultraprocessed food consumption in children and adolescents remains heterogeneous; a 2024 systematic review found inconsistent associations across pediatric studies and emphasized differences in dietary measurement, outcome definitions, and study design.^[12]

Physical activity was another important factor in the estimated results. Overweight/obesity was more frequent among children reporting less than 60 minutes of physical activity per day (50.0%) compared with those achieving at least 60 minutes (28.6%), with a significant association ($P = 0.004$). This finding is biologically plausible because energy expenditure through physical activity contributes to maintaining energy balance. WHO recommends that children and adolescents accumulate at least 60 minutes of moderate-to-vigorous physical activity daily.^[10]

Similarly, higher screen time was associated with a greater proportion of overweight/obesity in the unadjusted analysis. However, screen time was not statistically significant in the estimated multivariable model. This suggests that the apparent relationship may partly overlap with other dietary or lifestyle factors. Recent WHO surveillance data also demonstrate that sedentary behaviors and unhealthy dietary practices commonly coexist among school-aged children, supporting the importance of considering diet, physical activity, and screen-related behavior together rather than as isolated exposures.^[13]

In the estimated multivariable analysis, consuming fast food three or more times per week remained significantly associated with overweight/obesity (adjusted OR=2.41, 95% CI: 1.34–4.33, $P = 0.003$). Daily sugar-sweetened beverage consumption (adjusted OR=1.96) and physical

activity below 60 minutes per day (adjusted OR=1.88) also remained statistically significant. These findings indicate that the relationship between childhood excess weight and dietary behavior may involve several interacting lifestyle factors. However, because the current numerical results are estimated, these adjusted associations should be considered provisional until the final dataset is analyzed. The findings also have implications for the school environment. Schools provide an important setting for influencing children's food choices because children spend a substantial proportion of their daily lives there. WHO's recent guideline on healthy school food environments recommends increasing access to healthy foods and beverages while limiting the availability of unhealthy products in and around schools.^[14] Such approaches may be particularly relevant in settings where fast food and sugar-sweetened beverages are readily available to school-aged children.

The findings should be interpreted with several limitations in mind. First, the estimated study was based on a relatively small sample from a single school, limiting generalizability to all school-aged children in Mosul or Nineveh Governorate. Second, the cross-sectional design prevents determination of temporal or causal relationships. Third, dietary information was based on reported consumption and may be affected by recall or reporting bias. Fourth, fast-food consumption may be correlated with other unmeasured factors, including household socioeconomic characteristics, parental dietary practices, food availability, sleep, and genetic predisposition. Finally, the estimated results, particularly the regression estimates, require confirmation using the actual collected data.

5- CONCLUSION AND RECOMMENDATION

The estimated findings indicate that fast-food consumption is common among school-aged children and is significantly associated with overweight and obesity, with a higher prevalence of excess weight observed among children consuming fast food more frequently. Daily consumption of sugar-sweetened beverages and insufficient physical activity were also associated with overweight/obesity. These findings highlight the importance of promoting healthy dietary habits and active lifestyles among school-aged children. Therefore, school-based nutritional education programs should be strengthened, with particular emphasis on reducing frequent fast-food meals and sugar-sweetened beverages, increasing consumption of healthier foods, and encouraging at least 60 minutes of daily physical activity. Parents, teachers, primary healthcare providers, and schools should be involved in health-promotion activities, and regular monitoring of children's growth and weight status is recommended. Further multicenter studies with larger samples and longitudinal designs are recommended to confirm these associations and identify modifiable risk factors for childhood overweight and obesity.

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