



Screen Time and Its Relation with Fast-Food Consumption Among Adolescents: A Cross-Sectional Study

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العلاقة بين وقت الشاشة واستهلاك الوجبات السريعة لدى المراهقين: دراسة مقطعية

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Abstract:

The aim of this research was to evaluate the association between screen time use and fast-food consumption in adolescents. A total of 250 adolescents participated in this cross-sectional study, comprising 58.8% males and 41.2% females. Data collection involved validated questionnaires and anthropometric measurements. The mean daily screen time exposure was 300 minutes (SD=212.6), with smartphones being the primary contributor at 208.2 minutes per day. Anthropometric analysis showed an average body mass index (BMI) of 22.6 kg/m², with 61.6% of participants classified as having a healthy weight. Nearly half of the participants (49.6%) reported consuming food while using screens, and 78.8% recalled exposure to at least one food advertisement during screen use. Statistical analysis revealed a significant positive relationship between total screen time and the frequency of weekly food delivery orders (p=0.026), sugary drink consumption (p=0.003), snack intake (p<0.001), and the consumption of sweets and chocolate (p<0.001). However, no significant variation was observed among BMI categories (p=0.664) or between genders (p=0.075). These results demonstrate a concerning link between prolonged screen time and unhealthy dietary habits among adolescents, highlighting the urgent need for targeted public health strategies and digital media literacy programs to promote healthier lifestyles.

Keywords: Screen Time, Fast-Food Consumption, Adolescents, Dietary Habits, Digital Media.

الملخص

هدف هذا البحث إلى تقييم العلاقة بين استخدام وقت الشاشة واستهلاك الوجبات السريعة لدى المراهقين. شارك في هذه الدراسة المقطعية 250 مراهقاً، منهم 58.8% ذكور و41.2% إناث. تم جمع البيانات باستخدام استبيانات معتمدة وقياسات الجسم. بلغ متوسط وقت الشاشة اليومي 300 دقيقة (الانحراف المعياري=212.6)، حيث كانت الهواتف الذكية المساهم الرئيسي بمتوسط 208.2 دقيقة يومياً. أظهر تحليل قياسات الجسم متوسط مؤشر كتلة جسم (BMI) بلغ 22.6 كجم/م²، مع تصنيف 61.6% من المشاركين ضمن الوزن الصحي. أفاد ما يقرب من نصف المشاركين (49.6%) بتناول الطعام أثناء استخدام الشاشات، وذكر 78.8% التعرض لإعلان غذائي واحد على الأقل أثناء استخدام الشاشات. كشف التحليل الإحصائي عن وجود علاقة إيجابية ذات دلالة إحصائية بين إجمالي وقت الشاشة وتكرار طلبات توصيل الطعام الأسبوعية ($p=0.026$)، واستهلاك المشروبات السكرية ($p=0.003$)، وتناول الوجبات الخفيفة ($p<0.001$)، واستهلاك الحلويات والشوكولاتة ($p<0.001$) ومع ذلك، لم يلاحظ أي تباين كبير بين فئات مؤشر كتلة الجسم ($p=0.664$) أو بين الجنسين ($p=0.075$). توضح هذه النتائج وجود صلة مقلقة بين قضاء وقت طويل أمام الشاشات والعادات الغذائية غير الصحية لدى المراهقين، مما يسلب الضوء على الحاجة الملحة لاستراتيجيات الصحة العامة المستهدفة وبرامج محو الأمية الإعلامية الرقمية لتعزيز أنماط حياة أكثر صحة.

الكلمات المفتاحية: وقت الشاشة، استهلاك الوجبات السريعة، المراهقون، العادات الغذائية، الإعلام الرقمي.

1- Introduction

Technological advancement in digital media has significantly transformed adolescents' daily lives, with screen-based activities now occupying a substantial proportion of free time (Rose, N., et al., 2022). Activities like television watching, video gaming, smartphone usage, and participation in social media have become common behaviors in this age group (Mabanja & Puspitasari, 2025). At the same time, there has been a global rise in fast food consumption among young populations (Li, L., et al., 2022; Majabadi, et al., 2016). Because these foods are typically concentrated sources of saturated fat, sodium, and added sugars and sodium while providing relatively limited dietary fiber and micronutrients, their frequent consumption has been linked to obesity, diabetes, and cardiovascular risk (Banik, R., et al., 2020).

The current evidence indicates that prolonged screen exposure may promote unhealthy eating habits, particularly energy-dense food like fast food (Kim, D. B., et al. 2025). This association can be explained by several mechanisms such as exposure to food advertisements, sedentary behavior, and eating while distracted by screens (Coleman, A., et al. 2025). Prior studies have shown that adolescents with screen time exceed two hours tend to have higher consumption of sugar-sweetened beverages and fast food compared to those with less screen time exposure (Xu et al., 2020; Agarwal, 2025; Alnaqbi et al., 2025). Moreover, qualitative research revealed that adolescents frequently consume ultra-processed foods while using screens, and this behavior may be particularly affected by digital food advertising (Rodríguez Barniol, M., et al. 2024).

The adolescent stage is considered a critical developmental period during which lifetime lifestyle and dietary habits are developed (Arafa, A., et al. 2024; Parajuli, J., et al. 2025). Moreover, any pattern adopted during this time could continue with them to adulthood and contribute to future health problems (Carducci, B., et al. 2025). Thus, examining the association between screen time exposure and fast-food consumption is important for addressing one of the important modifiable detriments of health.

Although there has been growing global interest in eating habits and screen-related behaviors, relatively little focus has been given to this relation within adolescents' daily lifestyle practices and food choices in a local school-based environment. Therefore, exploring this association may provide valuable evidence for the development of effective nutrition education strategies, behavioral modification programs, and public health policies to encourage healthier food choices and reduce nutritional risks connected with excessive screen-based activities among adolescents. Consequently, the present study sought to explore the relationship between screen time and fast-food consumption in the adolescent population.

Methodology

Study design and setting

This study utilized a school-based cross-sectional design conducted in Benghazi, Libya, between November and December 2025. The target population comprised adolescents enrolled in public middle schools (grades 7-9, ages 12-14 years) and public high schools (grades 10-12, ages 15-17 years) during the 2025/2026 academic year.

Sample size and sampling strategy

The sample size was calculated to identify a Pearson correlation coefficient of 0.25 between total screen time and frequency of fast-food consumption, using a two-tailed alpha level of 0.05 and 80% statistical power. The minimum calculated sample was 123 participants. After adjustment for multivariable analysis, cluster sampling, and an anticipated non-response rate, the final target sample was increased to 300 students.

A two-stage stratified sampling approach was used. First, the 175 public schools in Benghazi were stratified according to educational level, geographical zone, and gender composition of the school. Second 11 schools were selected using probability proportional to size based on official enrollment data obtained from the Benghazi Education Authority. In each selected school, one class per grade level was randomly chosen, and all students in those classes were invited to participate until the predetermined stratum-specific sample quota was achieved. Of the 300 eligible students, 250 completed the study, resulting in a response rate of 83.3%. The final analytical sample comprised 250 adolescents, including 147 males and 103 females, with a mean age of 14.4 ± 1.9 years

Eligibility criteria

Participants were eligible for inclusion if they were between 12 and 17 years of age, enrolled in a public middle or high school in Benghazi, and provided informed assent to participate in the study. Exclusion criteria comprised any physical disability that could limit engagement in normal activities, adherence to medically prescribed therapeutic diets, or a clinically diagnosed eating disorder. Students who met any of the exclusion criteria were referred to the school health unit and excluded from the final analysis.

Ethical considerations

Ethical approval for this study was granted by the Research Ethics Committee of the Benghazi Education Monitoring Office. Written informed consent was obtained from parents or legal guardians, while assent was secured from all participating students prior to data collection. To ensure confidentiality and protect participants' privacy, all collected data were anonymized and de-identified during the data entry process.

Screen time assessment

Screen exposure was assessed using a validated Arabic adaptation of the Screen Time Questionnaire developed by HELENA study (2011). The instrument demonstrated satisfactory test-retest reliability among adolescents. Furthermore, the questionnaire effectively assessed weekday leisure-related screen exposure based on recall of the previous day and covered three domains: television/DVD/streaming, computer or tablet use for non-school purposes, and

leisure smartphone use. Responses were recorded as continuous variables in minutes, and total screen exposure time was calculated as the average total minutes of exposure per day.

Fast food consumption assessment

Fast food intake was evaluated using a semi-quantitative 24-hour dietary recall that was pilot tested in the study population. The pilot assessment included 30 participants and showed good internal consistency. In this study, fast food was defined as ready-to-eat meals or snacks purchased from restaurants, cafeterias, or street vendors that were high in fat, sugar, or salt, including food such as fried chicken, burgers, pizza, sandwiches, pastries, and sugar-sweetened beverages. Portion size was estimated using household measures and visual aids to improve recall accuracy. The main dietary outcomes included fast food consumption during the previous 24 hours and classification of participants as higher fast food consumers based on the previous day's intake. Data were collected by trained nutritionists using interviewer-administered recall procedures.

Anthropometric and covariate measures

Participants' body weight and height were measured using calibrated Seca 877 weighing scales and Seca 217 stadiometers following the standardized procedures outlined in the World Health Organization STEPS protocol. Body mass index (BMI) was subsequently calculated, and BMI-for-age z-scores were generated based on the WHO 2007 growth reference standards. Participants were classified into nutritional status categories as underweight, normal weight, overweight, and obese according to established z-score classification criteria. In addition, demographic and behavioral characteristics were obtained through a structured study questionnaire

Statistical analysis

The primary objective of the statistical analysis was to evaluate the association between total screen time and the frequency of fast-food consumption. Descriptive statistics were used to summarize the study variables. Continuous variables were presented as means with standard deviations, while categorical variables were expressed as frequencies and percentages. Potential outliers in screen time and fast-food intake were identified using a cutoff of ± 3 standard deviations from the mean. Bivariate relationships were assessed one way ANOVA, and comparisons of screen time across BMI categories were conducted using independent-samples *t* tests.

Results

Participant Characteristics

A total of 250 adolescents were enrolled in the study. Table 1 summarizes the demographic distribution of the sample. Males constituted 58.8% ($n = 147$) and females 41.2% ($n = 103$). The largest proportion of participants was from grade 8 (24.0%), followed by grade 9 (21.6%) and grade 12 (18.0%).

Table 1: Sample Demographics

Characteristic	n	%
Total Sample	250	100.0
Sex		
Male	147	58.8

Female	103	41.2
Grade Level		
Grade 7	28	11.2
Grade 8	60	24.0
Grade 9	54	21.6
Grade 10	33	13.2
Grade 11	30	12.0
Grade 12	45	18.0

Anthropometric Findings

Anthropometric measurements are summarized in Table 2. The average height was 161.7 cm (SD = 8.08), weight was 59.7 kg (SD = 14.2), and BMI was 22.6 kg/m² (SD = 4.63). The distribution of participants across BMI categories is summarized in Table 3 and visually in Figure 1. A majority of participants (61.6%) were classified as healthy weight, while 19.6% were at risk of overweight and 14.0% were overweight. Only 4.8% were underweight.

Table 2: Anthropometric Characteristics of Adolescents

Characteristic	Mean (SD)
Height (cm)	161.7 (8.08)
Weight (kg)	59.7 (14.2)
BMI (kg/m ²)	22.6 (4.63)

Table 3: Distribution of BMI Categories

BMI Category	n	%
Underweight	12	4.8
Healthy Weight	154	61.6
At Risk of Overweight	49	19.6
Overweight	35	14.0

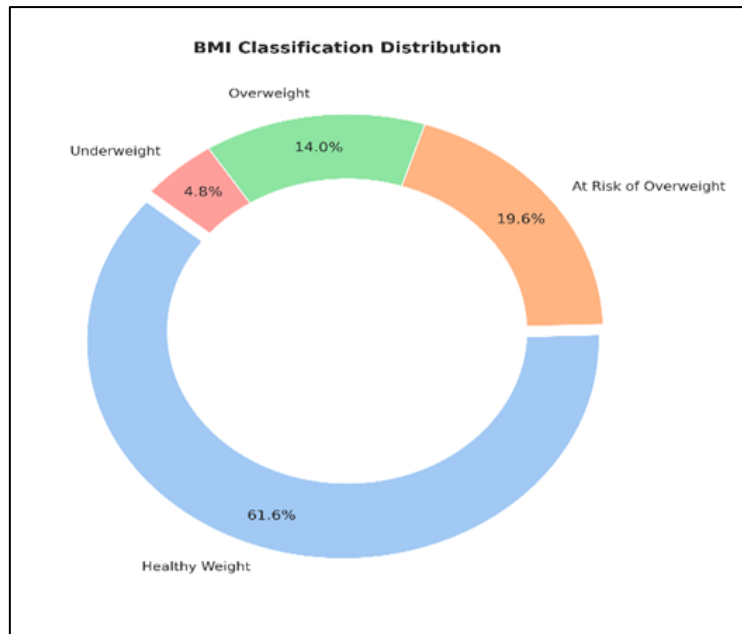


Figure 1: BMI Classification Distribution

Screen Time Exposure

Table 4 shows the average daily screen time. The total average screen time was 300 minutes per day with SD + 212.6. Smartphone use accounted for the largest share, averaging 208.2 minutes per day, followed by TV live streaming, averaging 57.5 minutes per day, and then computer gaming devices, averaging 33.4 minutes per day. Figure 2 presents the distribution of screen time by device.

Table 4: Average Daily Leisure Screen Time by Device

Device Category	Mean Minutes/Day (SD)
Total Leisure Screen Time	300.0 (212.6)
Smartphone Use	208.2 (191.9)
TV/Streaming	57.5 (97.7)
Computer/Console	33.4 (68.6)

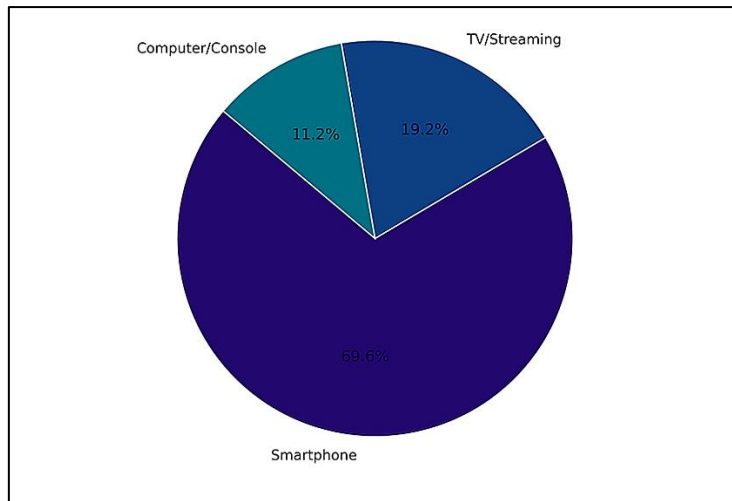


Figure 2: Distribution of Leisure Screen Time by Device

No significant difference in total leisure screen time was observed between males with a mean of 279.03 ± 206.5 minutes and females with a mean of 330.14 ± 218.7 minutes ($p = 0.075$), as shown in Figure 3.

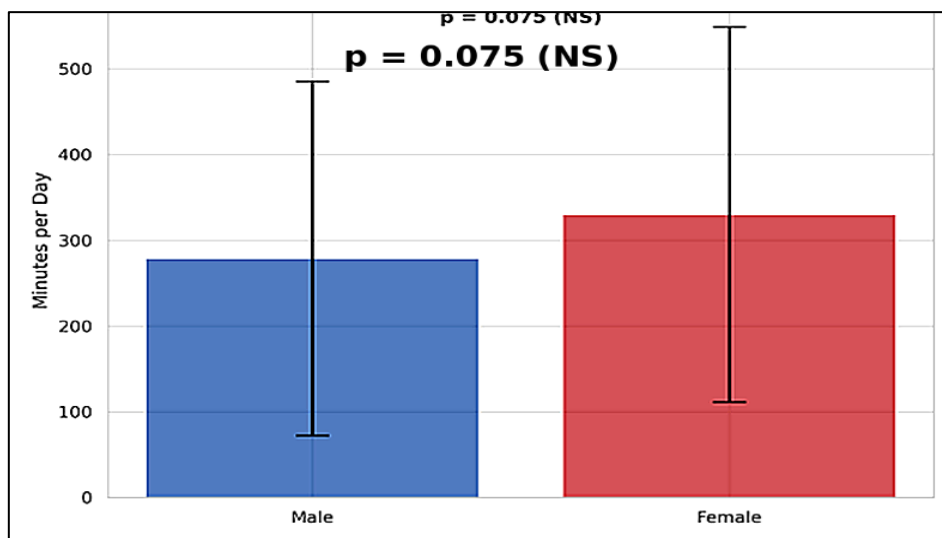


Figure 3: Mean Daily Leisure Screen Time by Gender

Eating Related Behaviors and Advertising Exposure

Table 5 summarizes eating-related behaviors. Nearly half of the participants (49.6%) reported eating while a screen was on. Regarding food advertising exposure, 78.8% of adolescents recalled seeing at least one food advertisement during screen use, while only 21.2% recalled none. The frequency of recalled advertisements is presented in Table 6 and Figure 4.

Table 5: Eating Related Behaviors Associated with Screen Use

Behavior	n	%
Eaten while a screen was on (Yes)	124	49.6
Eaten while a screen was on (No)	126	50.4

Table 6: Recalled Food Advertising Exposure During Screen Use

Advertisements Recalled	n	%
None	53	21.2
1 – 2 times	88	35.2
3 – 5 times	48	19.2
6 – 9 times	40	16.0
Over 10 times	21	8.4

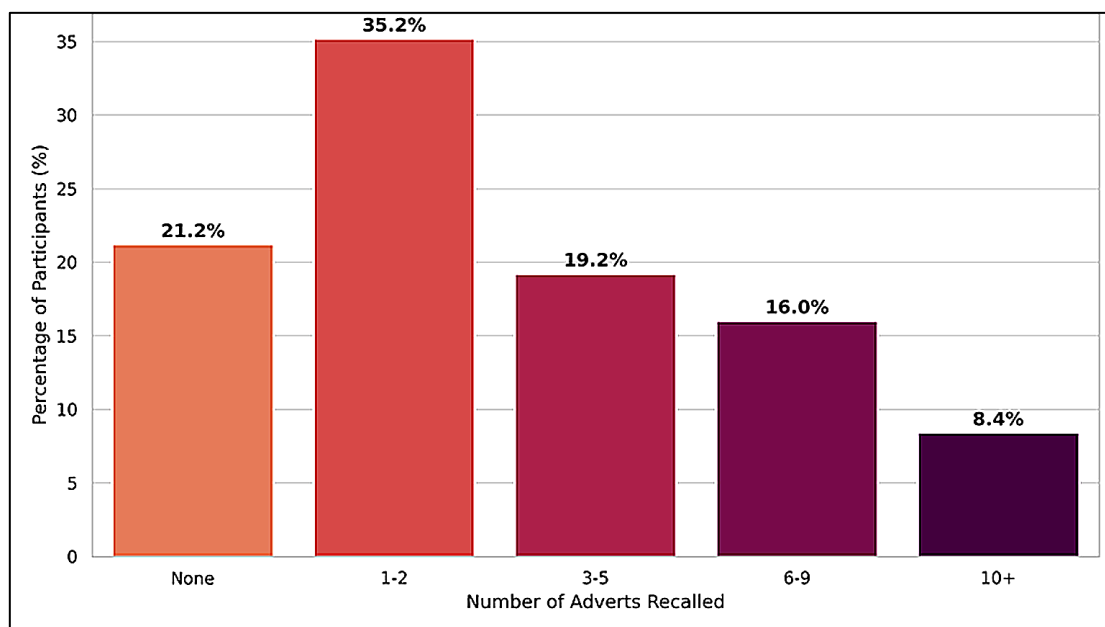


Figure 4: Recall of Food Advertisements During Screen Use

Average screen exposure during meal times was relatively low: 5.56 minutes during breakfast, 6.12 minutes during lunch, and 6.86 minutes during dinner. However, the average screen time in the hour before sleep was considerably higher, about 68.8 minutes with SD=65.5.

Association Between Screen Time and Eating Habits

Table 7, figure 5 presents the relationship between weekly dietary habits and total leisure screen time. A statistically significant relationship was observed between overall screen time exposure and multiple indicators of eating behavior.

- Weekly ordering of delivered food: Adolescents with a high level of ordering (5-7 times/week) had a significantly higher mean screen time (454.6-246.65 minutes) compared to a low level (0-1 time/week) of ordering (278.19-207.07) ($p=0.026$).
- Surgery drink intake: High-level consumption (5-7 times/week) was associated with a higher mean screen time (336.33-221.53 minutes) compared to low and moderate levels ($p=0.003$).

- Snack intake (crisps / nachos / similar snacks): Mean screen time increased with higher snack intake, from 236.69 to 200.29 minutes (low level) to 356.13-248.5 minutes (high level) ($p < 0.001$).
- Sweets / chocolate intake: High-level consumption (5-7 times/week) was linked to a higher mean screen time (349.83-211.67 minutes) compared to lower consumption levels ($p < 0.001$).

Conversely, no statistically significant difference in total screen time exposure was observed across BMI categories ($p = 0.664$) as previously noted or in the number of friends who consumed fast food ($p = 0.767$).

Table 7: Association Between Weekly Dietary Habits and Total Leisure Screen Time

Eating Habit (Frequency per Week)	Consumption Level	Mean \pm Std. D (minutes)	p-value
Ordering food	Low (0-1 times)	278.19 \pm 207.07	0.026
	Moderate (2-4 times)	319.88 \pm 21.56	
	High (5-7 times)	454.6 \pm 246.65	
Sugary drinks	Low (0-1 times)	257.92 \pm 201.67	0.003
	Moderate (2-4 times)	232.35 \pm 174.21	
	High (5-7 times)	336.33 \pm 221.53	
Snacks (crisps/nachos)	Low (0-1 times)	236.69 \pm 200.29	< 0.001
	Moderate (2-4 times)	333.06 \pm 188.91	
	High (5-7 times)	356.13 \pm 248.5	
Sweets/chocolate	Low (0-1 times)	251.35 \pm 210.55	< 0.001
	Moderate (2-4 times)	247.58 \pm 199.51	
	High (5-7 times)	349.83 \pm 211.67	

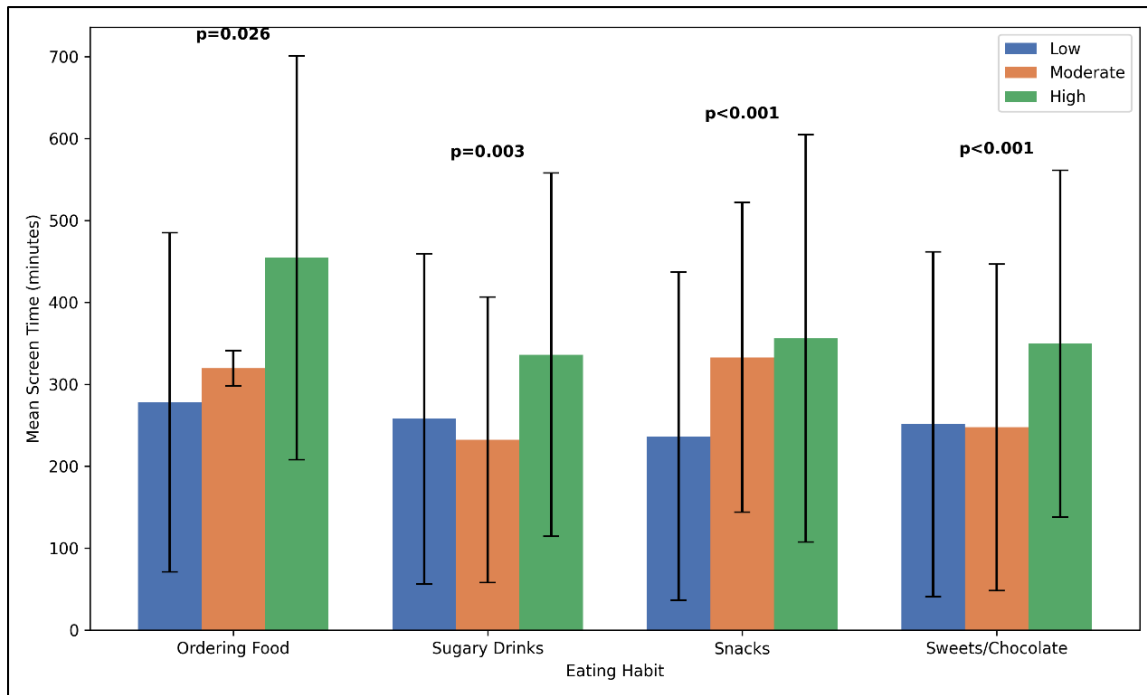


Figure 5: Mean Screen Time by Frequency of Unhealthy Eating Habits

Discussion

This Benghazi-based cross-sectional study adds to existing evidence suggesting that higher screen time exposure in adolescents is associated with less healthy eating habits. The adolescents in this sample have reported a mean screen time exposure of 300 minutes a day, with smartphones accounting for the largest proportion of this time. Moreover, the higher total screen exposure time was significantly linked to more frequent food ordering and higher consumption of snacks, sugary drinks, sweets, and chocolate. In addition, about half of participants reported eating while watching a screen, and most of them reported at least one food advertisement during their screen use. Nevertheless, screen time was not significantly associated with BMI category or gender. Collectively, these results indicate screen time exposure in the adolescent population may be more strongly related to behavioral dietary risk than with cross sectional anthropometric status.

The results from this study indicated a correlation between increased screen time and increased consumption of fast food. This finding is in line with previous studies indicating that screen use in the adolescent population often corresponds with poor diet quality, including increased consumption of sugary drinks, high-energy snacks, and ultra-processed foods (Kim et al., 2025; Futsy and Kotilidakis, 2025; Hua et al., 2024). Similarly, in 2022, a systematic review reported that social media use is frequently correlated with increased utilization of unhealthy food and sugary beverages and poorer overall diet quality among children's and adolescents' populations (Sena et al., 2022). Furthermore, a study of Korean adolescents indicated time and pattern of smartphone usage are associated with dietary risk factors (Ryo et al., 2022). Recent evidence from a large cross-sectional study further reported that extended smartphone screen time exposure has been associated with increased fast-food intakes among adolescents (Kim et al., 2025).

These findings could be explained by several mechanisms. The first possible mechanism is that screen time can shape food choice through repeated exposure to persuasive food-related advertising (Nagadharshini et al., 2025; Geuder & Martin, 2025). In the present study, nearly four out of five adolescents reported recalling food advertisements during their screen use. This finding is noteworthy because food marketing exposure has been associated with increased

preference for ultra-processed foods and beverages in this population. Moreover, evidence from a systematic review and meta-analysis published in *JAMA Pediatrics* indicated food and nonalcoholic beverage marketing has been associated with increased consumption, greater selection, and preferences among children's and adolescents' populations. In addition, Scully and colleagues also reported links between adolescents' exposure to food marketing and increased intake of fast-food, sugary drink, and unhealthy snack (Boyland et al., 2022; Scully et al., 2012). Thus, in the current research, the high recall of advertisements provides a plausible explanation for linking screen exposure to dietary behavior in this setting.

The second possible mechanism is that screen-based activities may facilitate distracted or automatic eating behaviors (Agarwal, 2025). Nearly half of the adolescents in this study reported eating while watching a screen, suggesting that media use is often incorporated within eating occasions rather than being a separate behavior. Distracted eating can reduce attention to internal satiety cues, lengthening eating episodes, and promote passive consumption of palatable food, e.g., high-energy snacks and sugary beverages (LaMarra et al., 2020). Furthermore, qualitative study among adolescents has suggested that screens create a setting that promotes impulsive and less thankful eating of ultra-processed foods (Rodriguez-Barniol, 2024). These behavioral patterns may be relevant for smartphone-dominant media environments, where exposure is frequent, mobile, and incorporated into everyday routines (Ryu et al., 2022).

A third possible mechanism is the timing and type of screen exposure. In this sample, smartphone use accounted for the majority of screen time exposure. Moreover, adolescents reported particularly frequent screen exposure in the hour before sleep. Screen exposure close to bedtime has been correlated with reduced in both sleep duration and quality in young populations (Brosnan, et al., 2024). Furthermore, insufficient sleep has been correlated with appetite dysregulation, a stronger preference for energy dense foods, and more irregular eating behaviors (Hale, et al., 2015). Although sleep was not specifically assessed in this study, the high near-sleep screen use that has been reported here could be one behavioral pathway through which screen habits reinforce unhealthy eating habits.

A notable finding in this study is that screen time was related to several unhealthy eating behaviors but to the BMI of participants. This is not necessarily a represented contradiction (Rocka, et al., 2022). BMI is influenced by numerous factors other than food intake and screen time use, such as physical activity, pubertal stage, genetic susceptibility, sleep, and family context (Jebeile, et al., 2022). Furthermore, cross-sectional studies may have limited capacity to detect body weight changes that emerge over longer periods. Similarly, the WHO evidence summary indicates that prolonged recreational screen time use is generally correlated with adverse health outcomes (Chaput, et al., 2020), much of this evidence is cross sectional and insufficient to define precise thresholds or short-term dose-response patterns (Kim et al., 2025; Votsi & Koutelidakis, 2025; Nedjar Guerre et al., 2023). In adolescence, unhealthy behavioral patterns may develop before any measurable changes in adiposity are observed (Bodega et al., 2023) accordingly, the absence of an association between BMI and screen use should not be considered an absence of risk.

It is notable that the findings indicate that total screen-based activities were not statistically different between male and female. Although some studies have reported gender-related patterns in device preferences or content type (Kim et al., 2025; Ray & Meena, 2025; Becker, 2022; Gracia et al., 2022), the current study suggests that high screen exposure may be broadly distributed across boys and girls in this context. This may reflect the centrality of smartphones in adolescences' social lives, which has blurred older distinctions between television or gaming-based screen habits. Even with similar total screen time across sex, the social contents, and advertising exposure may still differ and could affect eating patterns in

different ways. Therefore, future research should move beyond total screen time and explore platform choice, multitasking, and food marketing exposure.

From a public health perspective, these findings have practical implications. Average leisure screen time, as observed in this study, exceeded the commonly accepted standard of two hours per day, which is used in many national recommendations. The World Health Organization advises reducing sedentary behaviors, particularly screen time for leisure, among young populations (Chabot et al., 2020). In an environment where smartphone use is prevalent and food advertising is frequently recalled (Sena et al., 2022) interventions focused solely on (reducing screen use) may be limited in scope. A more effective strategy might combine digital media literacy, restrictions on unhealthy foods advertising targeting minors, family guidance on screen-free eating, school-based nutrition education targeting sugary drinks, snacks, and sweets, and regulations in frequent food delivery orders (Jones et al., 2021 Elieva et al., 2025). Because these behaviors tend to cluster, integrated prevention approaches are likely to be more effective than addressing each behavior individually.

Th results also point to several priorities for future research in Libya and comparable co. follow-up studies are required to understand temporality: whether increased screen time leads to unhealthy eating patterns, whether poor dietary patterns promote more sedentary behaviors, or whether both behaviors are driven by shared environmental and family factors. Future research should include validated assessment of screen content, social media use, physical activity level, sleep pattern, parental monitoring, and socioeconomic context. Objective assessment or a time track tool for screen exposure would strengthen findings' validity, as would more detailed dietary evaluation and repeated anthropomorphic measurement. Given the high recall of food advertisements in the study sample, experimental or mixed methods studies examining adolescents' responses to digital food marketing in Arabic language media environments would be especially valuable.

The present study concludes that among adolescents in Benghazi, prolonged screen time exposure is strongly linked to more frequent fast food related behaviors and higher exposure to food advertising, even in the absence of a direct association with BMI. The results strengthen the prospective that screened based activities extends beyond sedentary behavior, rather, its embedded with a broader behavioral environment that may normalize unhealthy eating habits. acknowledging and addressing the combination of digital exposure and dietary risk is likely to be important for adolescents' health promotion in Benghazi and comparable settings.

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

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