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Mukbang media: correlations with the dietary behavior of children and adolescents in Korea

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ABSTRACT

BACKGROUND/OBJECTIVES: *Mukbang*, a trend originating in South Korea and gaining global popularity, could influence children's food choices and eating habits. This study analyzed the correlation between *Mukbang* viewing time in children and adolescents, their meal consumption frequency, nutrition quotient (NQ), and frequency of food intake.
SUBJECTS/METHODS: From July to August 2022, this cross-sectional study investigated upper elementary students (ages 9–11 yrs) and adolescents (aged 12–18 yrs) using an online survey. The survey items included key demographic factors, *Mukbang* viewing frequency and duration, frequency of main meal consumption, commonly consumed foods, and the validated NQ, which was used to assess food intake quality. Multiple linear regression analysis was used to explore the link between *Mukbang* viewing and nutritional habits.
RESULTS: Weekly *Mukbang* viewing time was significantly correlated with eating habits after adjusting for gender, age, physical activity frequency past week, household income, and primary caregiver's level of education. Increased *Mukbang* viewing time correlated with reduced frequency of breakfast (P for trend < 0.001) and dinner (P for trend = 0.012), while the frequency of eating out (P for trend < 0.001) and late-night snacking (P for trend = 0.008) increased. Higher *Mukbang* viewing time notably decreased scores in the moderation domain (P for trend < 0.001), in the practice domain (P for trend = 0.031), and overall NQ (P for trend < 0.001). It also significantly elevated intake of sweets (P for trend = 0.001), Korean-style street food, Western-style fast food, instant noodles, sweetened beverages, caffeinated beverages, and fruit and vegetable juices (P for trend < 0.001).
CONCLUSION: This study identifies a negative correlation between *Mukbang* viewing and eating habits among Korean children and adolescents. The results indicate the importance of incorporating children and adolescents' media usage and environmental factors on dietary education and the development of policy programs.

Keywords: Children; adolescents; eating behavior; social media; screen time

INTRODUCTION

Adolescence is a time of rapid physical, mental, and social growth [1]. Eating habits formed during this period can have lifelong effects, and it is therefore important to adopt healthy

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Conflict of Interest

The authors declare no potential conflicts of interests.

Author Contributions

Conceptualization: Jang E, Ko E, Sim J, Jeong M, Park S; Formal analysis: Jang E, Park S; Investigation: Jang E, Park S; Methodology: Jang E, Park S; Supervision: Park S; Writing - original draft: Jang E, Park S; Writing - review & editing: Jang E, Ko E, Sim J, Jeong M, Park S.

dietary practices during this time. However, worldwide, many adolescents are developing unhealthy eating habits [2,3]. the consumption of ultra-processed foods rose in most countries, including South Korea, over the course of the coronavirus disease 2019 (COVID-19) pandemic [4]. According to the results of the 2021 National Health and Nutrition Survey, it was found that adolescents' sugar intake from processed foods exceeded the World Health Organization's daily recommended sugar intake [5]. The 2022 Adolescent Health Behavior Survey showed an increase rise in skipping breakfast and consumption of fast food among adolescents, accompanied by a decline in fruit intake [6]. It is crucial for global public health to address the dietary habits of children and adolescents.

In adolescence, various lifestyle habits, including dietary patterns, are formed under the influence of family, friends, and the media environment [7]. Among them, children and adolescents are very vulnerable to exposure to the media environment. Even before the onset of the COVID-19 pandemic, adolescents were exposed to various forms of media, including the internet and social media platforms. However, the shift to remote learning during the pandemic significantly increased media usage and dependency [8]. The Korea Press Promotion Foundation reported that in 2022, internet usage among teenagers rose to approximately 8 h per day, marking a 1.8-fold increase from 2019. Notably, this surge in internet use was most pronounced among senior students in elementary schools [9]. While various media offers diverse information and can expand social networks, its excessive use is linked to decreased sleep quality, lower physical fitness, and poorer mental health in adolescents [10].

Most countries, including South Korea, lack regulations on internet or smartphone media. Studies have shown that YouTube, which is widely used by children, contains a large number of food advertisements in its child-targeted content, notably featuring advertisements for high-calorie, low-nutrition foods in content that is intended for audiences over 15 yrs old [11]. The impact of media on children and adolescents is under-researched, with a lack of related policies.

Platforms such as YouTube, Instagram, and TikTok, which are frequently used by children and adolescents, feature significant food content. In particular, online *Mukbang*, a phenomenon that began in South Korea, has become popular in numerous countries [12]. *Mukbang*, or broadcasted eating, offers vicarious satisfaction to viewers and a sense of companionship to solitary eaters, leading to social and emotional fulfillment [13,14]. However, an analysis of online *Mukbang* content in Korea showed a frequent appearance of high-calorie fast food and food with excessive flavor [15]. To increase viewership, *Mukbang* often emphasizes the quantity of food eaten, along with its taste [15]. The 2016 youth media usage survey of the Korea Press Foundation found that among respondents who watched solo broadcasts in the previous week, 38.1% viewed *Mukbang*, ranking it as the second most popular video genre [16]. The 2019 survey showed that 87.4% of teenagers used online video platforms, and *Mukbang* and *cookbang* content ranked fourth in terms of viewership in the previous week, at 39.5% [17]. The popularity of *Mukbang* among children and adolescents and its potential impact on their eating habits indicate the need for further study in this area.

Existing study on the media environment has primarily focused on the relationship between screen time on TVs, computers, smartphones, food advertising, and children's eating habits [18]. Most studies on *Mukbang* have been content analyses, with limited research devoted to addressing its relationship to children and adolescents' eating habits. Among these, one study targeting adolescents found no significant impact of food content viewing time on scores

on the nutrition quotient (NQ) [19], while another study indicated that higher frequencies of watching *Mukbang* and *cookbang* were associated with poorer dietary habits among adolescents [20]. This study investigated sociodemographic factors related to *Mukbang* viewing among children and adolescents across Korea to examine its association with their dietary habits. This study compared the frequency of meal consumption, the intake frequency of major food groups, and the NQ in relation to the frequency and duration of *Mukbang* viewing. The study hypothesized posited that increased *Mukbang* viewing correlates with higher rates of skipping breakfast, increased consumption of processed foods, and lower NQ scores.

SUBJECTS AND METHODS

This study analyzed data collected in a policy development project on processed foods consumed by children that was conducted by the Ministry of Food and Drug Safety in South Korea. The survey used was developed from qualitative research findings, probes, and pre-existing questionnaires. The target respondents were caregivers of upper elementary school children (ages 9–11 yrs) and middle to high school students (aged 12–18 yrs) who were registered with a survey company. Participants were evenly recruited nationwide, primarily from Gyeonggi·incheon (35.01%) and Seoul (22.53%) in South Korea. The participants were stratified by age group for recruitment. Household income and level of education of the primary caregivers of the participating children and adolescents were determined using the responses from a survey of the primary caregivers. Recruitment was conducted by contacting parents with children in the relevant age groups from the online panel of the survey company via email, and respondents were collected up to the designated quota for each age group (**Fig. 1**). The study did not have any exclusion criteria except for individuals with chronic diseases or specific dietary restrictions. The survey was conducted from July 2, 2022, to August 1, 2022. Each family was assigned a unique household ID to link the responses of the children to those of their primary caregivers, who completed their surveys separately. The overall participants were 375 upper elementary school children, 375 middle and high school adolescents, and 750 primary caregivers, totaling 1,500 individuals. The study protocol was approved by the Institutional Review Board of Hallym University (HIRB-2022-016-1-R-CR).

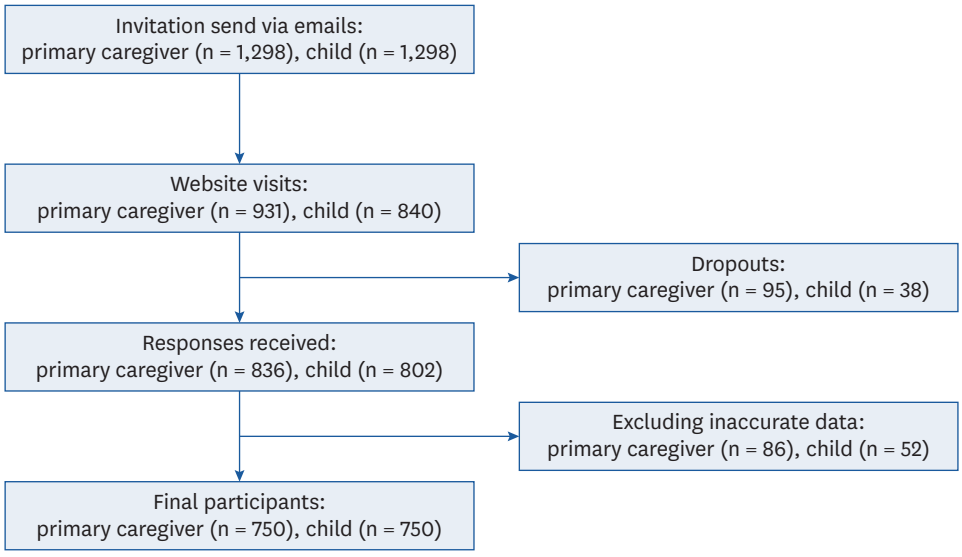

Fig. 1. Participant selection and recruitment process.

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Measures

Explanatory variables

In this study, the explanatory variables were the frequency of *Mukbang* viewing per week and the average duration of each *Mukbang* viewing session. The average weekly time spent watching *Mukbang* was calculated based on these variables. The frequency categories included "never watch," "less than once a week," "1–2 days a week," "3–4 days a week," "4–5 days a week," "5–6 days a week," and "more than once a day." For those who watched *Mukbang*, the average duration of each viewing session was classified as "less than 15 minutes," "15 to less than 30 minutes," "30 to less than 60 minutes," "more than 60 minutes". To calculate the weekly time spent watching *Mukbang*, the frequency was quantified (e.g., "less than once a week" as 1, "1–2 days a week" as 1.5, etc.), then multiplying by the average duration of each viewing session. Additionally, the weekly time spent watching *Mukbang* was divided into tertiles for comparative analysis.

Outcome variables (dietary and nutritional variables)

1. Nutrition quotient for children and adolescents (NQ-C, NQ-A)

The Adolescent Nutrition Quotient (NQ-A), which was developed by The Korean Nutrition Society and the Ministry of Food and Drug Safety, was used for adolescents aged 12–18 [21,22]. For children aged 9–11 yrs (upper elementary students), the Nutrition Quotient for Children (NQ-C) was utilized [22,23]. This tool has 20 items, divided into three domains: balance, moderation, and practice. The balance domain assesses the frequency of consumption of fruits, milk, beans or bean products, and fish. The moderation domain includes the consumption of cookies, sweet and fatty bread, processed drinks, ramen, caffeinated beverages, late-night meals, and street food. The practice domain investigates checking nutritional labels, the frequency of exercise, and handwashing before meals. Scores are calculated for each area using item-specific scores and weights provided by The Korean Nutrition Society, and the total NQ score is a comprehensive score reflecting all three domains [21-23]. All scores are calculated out of 100. The higher the NQ score, the better the quality of meals and eating behavior.

2. Dietary habits and food intake frequency

To evaluate dietary behaviors, the regularity with which breakfast, lunch, dinner, snacks, and late-night meals were consumed over the preceding 7 days was surveyed using an 8-point scale, ranging from 0 to 7 times. Additionally, the frequency of having breakfast and dinner with the family over the previous week was assessed using a 5-point scale, with the options "almost never," "1–2 times a week," "3–4 times a week," "5–6 times a week," and "every day." The recent monthly intake frequency of snacks commonly consumed by students was surveyed with options like "almost never eat," "once a month," "2–3 times a month," "3–4 times a month," "1–2 times a week," "3–4 times a week," "5–6 times a week," "once a day," and "more than twice a day." The study collected data on sweet snacks (including cookies and biscuits), salty snacks (including potato chips), cereals (including cereal bars), chocolates, and candies (jellies) as snack types. Korean-style street food including *tteokbokki*, *gimbap*, dumplings, and other fried items were identified, as well as Western-style fast foods, such as hamburgers, pizza, chicken, and processed meat products. Beverages were categorized into Sweetened beverages, Caffeinated beverages, fruit and vegetable juices, and dairy milk or soy milk. Healthy snacks, such as fruits and nuts, were also measured. The frequency of consumption over the past month was converted to a weekly basis for analysis.

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Statistical analysis

Descriptive statistics were used to present general characteristics and the proportions or averages of the outcome variables. Multiple linear regression was used to analyze factors related to watching *Mukbang*, adjusting for gender, age, education level of the primary caregiver, and household income, physical activity frequency past week. The sociodemographic variables collected included gender, age and physical activity frequency past week and socioeconomic status was evaluated using the education level of the primary caregiver and household income as covariates. All analyses were performed using Stata MP 17 (StataCorp LLC, College Station, TX, USA).

RESULTS

General characteristics of study participants

The participants in the study were 750 South Korean children and adolescents, including 375 upper elementary students (aged 9–11 yrs), 261 middle school students, and 114 high school students. To accurately assess household incomes and the level of education of the primary caregivers, 750 primary caregivers were surveyed. Only household income and final level of education of the primary caregivers were reported in the results (**Table 1**), as they were used as variables for statistical adjustment. The students' average age was 12.8 yrs, and 51.3% of the sample was male. The average weekly frequency of viewing *Mukbang* was 1.9 times, and the average duration per viewing was 22.7 minutes. The average weekly time spent watching *Mukbang* was 43.1 minutes. **Table 1** presents the general characteristics of the participants by gender. An analysis of differences between male and female students showed that boys had a significantly higher physical activity frequency past week ($P = 0.008$), weekly frequency of *Mukbang* viewing ($P = 0.004$), average viewing time per session ($P = 0.017$), weekly time spent watching *Mukbang* ($P = 0.002$), weekly frequency of breakfast ($P = 0.025$).

Correlation between weekly Mukbang viewing time and key meal-related behaviors

Table 2 displays the frequency of meal consumption in relation to weekly time spent watching *Mukbang*. Following adjustments for gender, age, physical activity frequency past week, educational level of primary caregiver, and household income, an increase in weekly time spent watching *Mukbang* was associated with a decrease in the frequency of breakfast (P for trend < 0.001) and dinner (P for trend = 0.012). An increase in late-night snacking (P for trend = 0.008) and eating out (P for trend < 0.001) was observed. There were no significant results regarding family meals in relation to weekly time spent watching *Mukbang*.

Correlation between weekly Mukbang viewing time and Nutrition Quotient scores

Table 3 shows the results for NQ scores by domain based on weekly time spent watching *Mukbang*. After adjustments, an increase in weekly time spent watching *Mukbang* was found to be significantly associated with lower scores in the moderation (P for trend < 0.001) and practice domains (P for trend = 0.031), but not in the balance domain (P for trend = 0.555). The total NQ score, which combines all three domains, was significantly lower in the group with higher *Mukbang* viewing (P for trend < 0.001).

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Table 1. General characteristics of participants by gender (n = 750)

Variables	Boys	Girls	Total	*P*-value[1]
Total	385	365	750	
School level				0.094
Elementary school	201 (52.2)	174 (47.7)	375 (50.0)	
Middle school	136 (35.3)	125 (34.3)	261 (34.8)	
High school	48 (12.5)	66 (18.1)	114 (15.2)	
Highest level of education of the primary caregiver				0.149
High school graduate or below	38 (9.9)	45 (12.3)	83 (11.1)	
College graduate or above	302 (78.4)	264 (72.3)	556 (75.5)	
Master's degree or above	45 (11.7)	56 (15.3)	101 (13.5)	
Pre-tax household income				0.809
Under 4 million won	65 (16.9)	58 (15.9)	123 (16.4)	
4 million to under 6 million won	130 (33.8)	127 (34.8)	257 (34.3)	
6 million to under 8 million won	108 (28.1)	94 (25.8)	202 (26.9)	
8 million or more won	82 (21.3)	86 (23.6)	168 (22.4)	
Physical activity frequency past week[2]				0.001
None	91 (23.6)	128 (35.1)	219 (29.2)	
1–2 day/wk	132 (34.3)	124 (34.0)	256 (34.1)	
3–4 day/wk	99 (25.7)	80 (21.9)	179 (23.9)	
5–7 day/wk	63 (16.4)	33 (9.0)	96 (12.8)	
Regions				0.456
Seoul	83 (21.6)	86 (23.6)	169 (22.5)	
Gyeonggi and Incheon	126 (32.7)	137 (37.5)	263 (35.1)	
Chungcheong	42 (10.9)	32 (8.8)	74 (9.9)	
Jeolla	34 (8.8)	22 (6.0)	56 (7.5)	
Gyeongsang	88 (22.9)	77 (21.1)	165 (22.0)	
Gangwon and Jeju	12 (3.1)	11 (3.0)	23 (3.1)	
Weekly frequency of watching *Mukbang*				0.004
No viewing	187 (48.6)	137 (37.5)	324 (43.3)	
Less than twice a week	149 (38.7)	159 (43.6)	308 (41.1)	
More than three times a week	49 (12.7)	69 (18.9)	118 (15.7)	
Mukbang viewing time per session				0.017
No viewing	187 (48.6)	138 (37.8)	325 (43.3)	
Less than 15 min	66 (17.1)	90 (24.7)	156 (20.8)	
15 min to less than 30 min	87 (22.60)	84 (23.0)	171 (22.8)	
30 min to less than 60 min	37 (9.6)	47 (12.9)	84 (11.2)	
More than 60 min	8 (2.1)	6 (1.6)	14 (1.9)	
Weekly time spent watching *Mukbang*				0.002
No viewing	187 ± 47.6	138 ± 37.8	325 ± 43.3	
T1	50 ± 13.0	65 ± 17.8	115 ± 15.3	
T2	90 ± 23.4	77 ± 21.1	167 ± 22.3	
T3	58 ± 15.1	85 ± 23.3	143 ± 19.1	
Frequency of meals/wk				
Frequency of breakfast meals	5.0 ± 2.6	4.6 ± 2.7	4.8 ± 2.6	0.025
Frequency of lunch meals	6.4 ± 1.5	6.4 ± 1.6	6.4 ± 1.5	0.546
Frequency of dinner meals	6.5 ± 1.5	6.3 ± 1.6	6.4 ± 1.6	0.227
Frequency of snack	7.2 ± 4.8	7.2 ± 4.8	7.2 ± 4.8	0.902
Late-night snacks	1.2 ± 1.6	1.2 ± 1.5	1.2 ± 1.6	0.973
Frequency of eating out	2.2 ± 2.1	2.1 ± 2.0	2.1 ± 2.0	0.629
Frequency family meals/wk				
Breakfast	2.6 ± 2.8	2.3 ± 2.7	2.5 ± 2.7	0.216
Dinner	5.0 ± 2.2	4.8 ± 2.2	4.9 ± 2.2	0.190

Values are presented as number (%) or mean ± SD.
T1, tertile 1; T2, tertile 2; T3, tertile 3.
[1]*P*-values were obtained using χ^2 tests for categorical variables and *t*-tests for continuous variables.
[2]Physical activity frequency past week: number of days in the past 7 days with 60 min or more of activities causing increased heart rate or breathlessness.

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Table 2. Frequency of key meal-related behaviors by weekly time spent watching *Mukbang* (n = 750)

Variables	Tertiles of weekly time spent watching *Mukbang* (min/wk)				*P* for trend[1)]
	No viewing	T1 (1–3.75)	T2 (11.25–41.25)	T3 (52.5–420)	
Frequency of meals/wk					
Frequency of breakfast	5.2 ± 0.1	4.8 ± 0.2	4.7 ± 0.2	4.1 ± 0.2	< 0.001
Frequency of lunch	6.5 ± 0.1	6.5 ± 0.1	6.3 ± 0.1	6.2 ± 0.1	0.101
Frequency of dinner	6.5 ± 0.1	6.6 ± 0.1	6.2 ± 0.1	6.1 ± 0.1	0.012
Frequency of snacking	7.5 ± 0.3	6.9 ± 0.4	6.9 ± 0.4	7.0 ± 0.4	0.481
Frequency of late-night snacking	1.0 ± 0.1	1.4 ± 0.1	1.2 ± 0.1	1.5 ± 0.1	0.008
Frequency of eating out	1.8 ± 0.1	1.9 ± 0.2	2.5 ± 0.2	2.6 ± 0.2	< 0.001
Frequency family meals/wk					
Breakfast	2.6 ± 0.2	2.2 ± 0.3	2.4 ± 0.2	2.3 ± 0.2	0.379
Dinner	5.1 ± 0.1	4.7 ± 0.2	5.0 ± 0.2	4.7 ± 0.2	0.149

Values are presented as mean ± SD.
T1 (1–3.75), T2 (11.25–41.25), and T3 (52.5–420) represent the range of values for the first, second, and third tertiles, respectively.
T1, tertile 1; T2, tertile 2; T3, tertile 3.
[1)]*P* for trend was obtained using a multiple linear regression, adjusting for gender, age, physical activity frequency past week, the highest level of primary caregiver's education, and household income. The trend analysis was performed across four groups (No viewing, T1, T2, and T3).

Table 3. NQ index of participants by weekly time spent watching *Mukbang* (n = 750)

Variables	Tertiles of weekly time spent watching *Mukbang* (min/wk)				*P* for trend[1)]
	No viewing	T1 (1–3.75)	T2 (11.25–41.25)	T3 (52.5–420)	
Balance	39.5 ± 0.8	40.1 ± 1.3	38.3 ± 1.1	38.0 ± 1.2	0.555
Moderation	64.0 ± 0.7	60.0 ± 1.2	58.8 ± 1.0	54.3 ± 1.1	< 0.001
Practice	60.0 ± 1.2	56.6 ± 1.8	55.0 ± 1.5	52.6 ± 1.6	0.031
Total NQ score	57.4 ± 0.7	55.2 ± 1.2	53.9 ± 1.0	51.1 ± 1.1	< 0.001

Values are presented as mean ± SD.
T1 (1–3.75), T2 (11.25–41.25), and T3 (52.5–420) represent the range of values for the first, second, and third tertiles, respectively.
T1, tertile 1; T2, tertile 2; T3, tertile 3; NQ, nutrition quotient.
[1)]*P* for trend was obtained using a multiple linear regression, adjusting for gender, age, physical activity frequency past week, the highest level of primary caregiver's education, and household income. The trend analysis was performed across four groups (No viewing, T1, T2, and T3).

Correlation between weekly Mukbang viewing time and specific food consumption frequency

Table 4 presents the results for the weekly frequency of food consumption in relation to weekly time spent watching *Mukbang*. After adjusting for gender, age, physical activity frequency past week, final educational level of primary caregivers, and household income, increased weekly time spent watching *Mukbang* was significantly associated with an increase in the consumption of sweets (*P* for trend = 0.001), Korean-style street food, Western-style fast food, instant noodles, sweetened beverages, caffeinated beverages, and fruit and vegetable juices (*P* for trend < 0.001). There were no significant differences in the consumption of milk, soy milk, fruits, nuts, and seeds in relation to the weekly time spent watching *Mukbang*.

DISCUSSION

This cross-sectional study of children and adolescents, after adjustment for sociodemographic characteristics, analyzed the correlation between weekly *Mukbang* viewing time and eating habits, meal frequency, and food intake frequency. Most participants, 56.7%, watched *Mukbang*, with an average of 1.9 viewings per week and an average duration of 22.7 minutes per viewing. The average weekly viewing time was 43.1 minutes. By comparison, a study in Iran on adult women aged 18–31 showed a 60.5% rate of *Mukbang* viewing [24], while another study in Korea found an average daily viewing time of food-related content among teenagers with an average age of 15.6 yrs was 47.3 minutes [19]. These findings suggest that the viewing rate and time in our study were lower than those found in other studies, possibly

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Table 4. Weekly consumption frequency of specific food items among participants according to weekly *Mukbang* viewing frequency (n = 750)

Variables	Tertiles of weekly time spent watching *Mukbang* (min/wk)				*P* for trend[1]
	No viewing	T1 (1–3.75)	T2 (11.25–41.25)	T3 (52.5–420)	
Cookies and sweets[2]	8.0 ± 0.5	8.1 ± 0.8	8.2 ± 0.6	9.9 ± 0.7	0.120
Cookies	2.5 ± 0.2	2.2 ± 0.3	2.3 ± 0.2	2.7 ± 0.2	0.494
Chips	1.6 ± 0.1	1.8 ± 0.2	1.8 ± 0.2	1.9 ± 0.2	0.469
Sweets[3]	2.4 ± 0.2	2.8 ± 0.3	2.7 ± 0.3	3.6 ± 0.3	0.001
Cereal	1.4 ± 0.1	1.3 ± 0.2	1.3 ± 0.2	1.6 ± 0.2	0.431
Ice cream	3.2 ± 0.2	3.1 ± 0.3	3.4 ± 0.3	3.7 ± 0.3	0.311
Korean-style street food[4]	2.5 ± 0.2	3.2 ± 0.3	3.9 ± 0.3	4.3 ± 0.3	< 0.001
Western fast food[5]	2.3 ± 0.2	3.0 ± 0.3	3.9 ± 0.3	4.5 ± 0.3	< 0.001
Instant noodles[6]	1.4 ± 0.1	1.7 ± 0.2	1.8 ± 0.1	2.1 ± 0.1	< 0.001
Sweetened beverages[7]	3.9 ± 0.3	4.8 ± 0.6	6.9 ± 0.5	7.0 ± 0.5	< 0.001
Caffeinated beverages	0.2 ± 0.1	0.3 ± 0.1	1.5 ± 0.2	1.8 ± 0.2	< 0.001
Fruit and vegetable juices	0.8 ± 0.1	0.9 ± 0.2	1.5 ± 0.2	1.8 ± 0.2	< 0.001
Milk, soy milk	5.9 ± 0.3	4.9 ± 0.5	5.6 ± 0.4	5.2 ± 0.5	0.374
Fruits	3.5 ± 0.2	3.1 ± 0.3	3.2 ± 0.3	3.1 ± 0.3	0.628
Nuts and seeds	0.6 ± 0.1	0.7 ± 0.1	0.9 ± 0.1	0.7 ± 0.1	0.426

Values are presented as mean ± SD.
T1 (1–3.75), T2 (11.25–41.25), and T3 (52.5–420) represent the range of values for the first, second, and third tertiles, respectively.
T1, tertile 1; T2, tertile 2; T3, tertile 3.
[1]*P* for trend was obtained using a multiple linear regression, adjusting for gender, age, physical activity frequency past week, the highest level of primary caregiver's education, and household income. The trend analysis was performed across four groups (No viewing, T1, T2, and T3).
[2]Cookies and sweets: cookies, chips, cereal, candy, chocolate.
[3]Sweets: candy, chocolate.
[4]Korean-style street food: *tteokbokki*, *gimbap*, *mandu*, fried foods.
[5]Western fast food: hamburgers, pizza, fried chicken, sausages.
[6]Instant noodles: packaged ramen, cup noodles.
[7]Sweetened beverages: flavored milk, carbonated beverages, fruit-flavored drinks, other beverages (sports drinks, etc.).

due to the younger average age of 12.8 yrs in our participants, indicating a trend of increased *Mukbang* viewing with age.

Due to the global interest in *Mukbang*, more influencers are creating content on this theme [12]. Interest in *Mukbang* spans age groups. A 2020 survey of Korean children aged 3–9 showed that 11.0% watched *Mukbang* or cooking videos in the previous week [17]. A report on Seoul's food statistics indicated that 34.6% of viewers watched *Mukbang* programs [25]. These trends require deeper and more active research into the impact of *Mukbang* on eating habits and health.

As the weekly time spent watching *Mukbang* increases, a greater tendency is seen for children and adolescents to skip breakfast and dinner and consume more snacks at night. Increased viewing time, leading to a decrease in the frequency of breakfast and dinner and an increase in late-night snacking suggests a decline in the regularity of meals, as the timing of the first and last meals of the day is delayed. Meal frequency and timing are associated with various health outcomes and lifestyle habits; irregular eating habits can negatively impact health in children and adolescents [26]. In particular, skipping meals can increase the risk of obesity in children [27] and is associated with the inadequate intake of fruits, vegetables, and milk and dairy products, as well as excessive consumption of fats and sodium. Skipping dinner is linked to lower fruit consumption [28]. Breakfast plays an important role in health in children and adolescents; skipping it not only increases the risk of overweight and obesity but is also associated with unhealthy dietary habits [29]. Skipping breakfast is linked to metabolic factors in adolescents' hearts [30] and can affect academic performance [31]. Late-night snacking is expected to negatively impact lifestyle habits due to delayed bedtimes. Studies have shown that late-night snacking is associated with skipping breakfast and in increased body mass index (BMI) in physically inactive children [32]. Further, increased

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screen time can lead to more snacking in the evening and can degrade the quality of adolescents' dietary habits [33]. Lower sleep duration and late bedtimes are associated with late dinner times [34]. Regularity in meals is crucial for children and adolescents in their growth phase, indicating the need for the proper management of their eating habits.

As the weekly time spent watching *Mukbang* increases the frequency of eating out increases. In the group that did not watch *Mukbang*, the average number of meals eaten out per week was 1.8, whereas in the group that watched it the most, this number rose to 2.7. A study in China of children aged 6–17 yrs found a significant influence of eating out more than three times a week on increased overweight and obesity among boys [35]. Furthermore, higher frequenciees of eating out are associated with increased intakes of energy, total fat, saturated fat, sugar, and sodium and decreased intakes of fiber, dairy products, fruits, vegetables, and micronutrients, leading to declines in diet quality [36]. Additionally, research among adults has shown that frequent dining out is significantly associated with an increased risk of mortality from all causes [37].

With increased time spent watching *Mukbang*, a decrease was seen in the scores for moderation, practice, and the overall NQ. Lower scores in the moderation domain indicate a generally poor level of consuming unhealthy foods, highlighting the need for improvement. Likewise, lower scores in the practice domain suggest inadequate levels of the practice of healthy and safe eating behaviors, necessitating improvement. The NQ score, which reflects the balance, moderation, and practice domains, indicates that lower scores correspond to an overall poor dietary lifestyle requiring enhancement. Therefore, longer weekly *Mukbang* viewing times suggest poorer overall dietary habits among children and adolescents. A study of nutrition index development and validation for school-age children found an average NQ score of 65.7, with balance at 66.4, moderation at 55.4, and practice at 69.2 [23]. A study using the revised adolescent nutrition index reported an average NQ score of 51.5, with balance at 41.4, moderation at 56.0, and practice at 53.0 [23]. In our study, which investigated both children and adolescents, the average NQ score for the group that watched *Mukbang* for the longest was 51.3, with balance at 38.4, moderation at 54.3, and practice at 51.3. This score is lower than that of other studies, indicating a poorer dietary lifestyle in the group that watched *Mukbang* more frequently.

With increasing times spent watching *Mukbang*, a significant increase was seen in the intake of ultra-processed foods such as sweets, instant noodles, sweetened beverages, caffeinated beverages, and fruit and vegetable juices. Generally, ultra-processed foods are high in energy density and contain high levels of sodium, sugars, trans fats, and saturated fats, often using food additives and flavorings to enhance taste and preservation while being low in vitamins, minerals, and dietary fiber [38,39]. Increased consumption of ultra-processed food is associated with higher energy and free sugar intake and decreased fiber intake [40]. Studies of children and adolescents show that higher intake of ultra-processed foods is linked to a lower-quality diet [41-43]. For children and adolescents, who are at crucial stages of growth and development, it is vital to consume nutritionally rich natural foods. Our study, even after related confounders were adjusted for, found a correlation between *Mukbang* viewing by children and adolescents and their consumption of processed foods, suggesting that *Mukbang* content could potentially influence dietary habits.

As the weekly time spent watching *Mukbang* increased, the frequency of consumption of Korean-style street food and Western-style fast food also increased. The foods featured in

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online *Mukbang* content are mostly processed or delivery foods, predominantly consisting of snack foods (Korean-style street food) and fast food [15]. *Mukbang* scenes often depict the consumption of large quantities of a single type of food, emphasizing its stimulating flavors [15]. Therefore, *Mukbang* exposes imbalanced dietary habits, which could negatively impact the formation of eating habits in children and adolescents.

By contrast, the intake of relatively healthier food groups, such as fruits, dairy milk and soy milk, and nuts and seeds showed no significant difference in relation to weekly *Mukbang* viewing. This aligns with the results indicating no correlation between *Mukbang* viewing time and the balance domain score of the NQ index. This could be because children and adolescents' overall dietary habits are generally poor, thus showing no significant difference in this area based on *Mukbang* viewership. Globally, a trend has been seen of infrequent consumption of fruits and vegetables among adolescents [44]. Furthermore, according to the 2022 Adolescent Health Behavior Survey, the daily consumption rate for fruits and milk has further declined [6].

Food content has some advantages. *Cookbang* (cooking videos) and recipe videos, which showcase the cooking process, can enhance the understanding of and interest in cooking through cooking tutorials, providing opportunities for practical cooking experiences. Studies indicate that individuals who watch *cookbang* videos tend to develop improved dietary habits, whereas those who watch *Mukbang* often report a worsening in their eating patterns [45]. *Mukbang* content, often showcasing appetizing and stimulating foods, can negatively impact dietary habits and health. Notably, reports show that students tend to prefer *Mukbang* over *cookbang* [46]. A growing presence of food and *Mukbang*-related content has been seen on various platforms. With algorithms on TikTok, YouTube Shorts, and Reels making it easier to encounter such videos, it is crucial to regulate *Mukbang* content. However, even when exposed to such videos, children's individual capabilities of making independent judgments must be strengthened. Enhancing the ability of children and adolescents to make informed decisions is important, and this necessitates media literacy and nutrition education related to food. Taking into account the significant amount of time that children and adolescents spend exposed to media each day, there is a need for policies that involve the creation and distribution of educational content, such as cooking tutorials, which can positively influence their dietary habits and health.

Our study has several strengths. First, *Mukbang* is currently a prominent phenomenon in media culture, and this study is the first to examine associations between *Mukbang* viewership and actual food consumption frequency among children and adolescents. It covers a range of ages, offering insights into behaviors in various age groups and providing valuable information for the exploration of effective directions for policy and educational interventions. However, it has some limitations. As a cross-sectional study, it cannot establish a causal relationship between *Mukbang* viewing time, meal frequency, the NQ index, and food consumption frequency. Additionally, it may be challenging to apply the findings to populations other than upper elementary and high school students. Finally, there may be confounding factors that are not considered in this study that could influence the results.

In this study, it was found that *Mukbang* viewership among Korean children is significantly associated with breakfast skipping, dinner skipping, nighttime snacking frequency, eating out frequency, quality of dietary habits, and frequency of unhealthy food consumption. Taking these effects into consideration, the development and implementation of programs

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in media literacy education and nutrition education for children are crucial for promoting healthy media habits. It is expected that the findings of this study will serve as foundational information for future efforts to encourage proper media consumption related to food among children and adolescents.

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REFERENCES

1. Sawyer SM, Azzopardi PS, Wickremarathne D, Patton GC. The age of adolescence. Lancet Child Adolesc Health 2018;2:223-8. PUBMED | CROSSREF
2. Rosi A, Paolella G, Biasini B, Scazzina F, Alicante P, De Blasio F, dello Russo M, Rendina D, Tabacchi G, Cairella G; SINU Working Group on Nutritional Surveillance in Adolescents. Dietary habits of adolescents living in North America, Europe or Oceania: A review on fruit, vegetable and legume consumption, sodium intake, and adherence to the Mediterranean Diet. Nutr Metab Cardiovasc Dis 2019;29:544-60. PUBMED | CROSSREF
3. Wang L, Martínez Steele E, Du M, Pomeranz JL, O'Connor LE, Herrick KA, Luo H, Zhang X, Mozaffarian D, Zhang FF. Trends in consumption of ultraprocessed foods among US youths aged 2-19 years, 1999-2018. JAMA 2021;326:519-30. PUBMED | CROSSREF
4. Ruíz-Roso MB, de Carvalho Padilha P, Matilla-Escalante DC, Brun P, Ulloa N, Acevedo-Correa D, Arantes Ferreira Peres W, Martorell M, Rangel Bousquet Carrilho T, de Oliveira Cardoso L, et al. Changes of physical activity and ultra-processed food consumption in adolescents from different countries during Covid-19 pandemic: an observational study. Nutrients 2020;12:2289. PUBMED | CROSSREF
5. Food and Drug Safety Evaluation Institute. High Sugar Intake in Children and Adolescents Requires Attention [Internet]. Cheongju: Food and Drug Safety Evaluation Institute; 2021 [cited 2023 December 11]. Available from: https://www.nifds.go.kr/brd/m_21/view.do?seq=12928.
6. Korea Disease Control and Prevention Agency. Announcement of the 2022 Student Health Examination and Adolescent Health Behavior Survey Results [Internet]. Cheongju: Korea Disease Control and Prevention Agency; 2023 [cited 2023 December 11]. Available from: https://www.kdca.go.kr/yhs/.
7. Story M, Neumark-Sztainer D, French S. Individual and environmental influences on adolescent eating behaviors. J Am Diet Assoc 2002;102 Suppl:S40-51. PUBMED | CROSSREF
8. Madigan S, Eirich R, Pador P, McArthur BA, Neville RD. Assessment of changes in child and adolescent screen time during the COVID-19 pandemic: a systematic review and meta-analysis. JAMA Pediatr 2022;176:1188-98. PUBMED | CROSSREF
9. Korea Press Foundation. Major Findings from the '2022 Survey on Media Use Among Adolescents' [Internet]. Seoul: Korea Press Foundation; 2022 [cited 2023 December 11]. Available from: https://www.kpf.or.kr/front/board/boardContentsView.do?board_id=246&contents_id=29ff236264724e3fbe02e544185aac03.
10. Wacks Y, Weinstein AM. Excessive smartphone use is associated with health problems in adolescents and young adults. Front Psychiatry 2021;12:669042. PUBMED | CROSSREF
11. Lee YJ, Yoo SJ. A study on the types and harmfulness of video ads after the change of content policy for children on YouTube. Korean J Animat 2020;16:114-36. CROSSREF
12. Associated Press. Meet South Korea's binge eating YouTube stars: Thousands watch videos of young men and women consuming colossal amounts of food as bizarre 'mukbang' trend hits the U.S. [Internet]. New York (NY): Associated Press; 2019 [cited 2023 December 11]. Available from: https://www.dailymail.co.uk/news/article-7534875/Binge-eating-videos-big-audience-weight-loss.html.
13. Choe H. Eating together multimodally: collaborative eating in mukbang, a Korean livestream of eating. Lang Soc 2019;48:171-208. CROSSREF
14. Kircaburun K, Harris A, Calado F, Griffiths MD. The psychology of mukbang watching: a scoping review of the academic and non-academic literature. Int J Ment Health Addict 2021;19:1190-213. CROSSREF
15. An ST, Lim YJ, Lee HN. A content analysis of eating show (Mukbang) programs on television and online program content in South Korea. Korea J Broadcast Telecommun Stud 2020;34:39-79.

16. Korea Press Foundation. Announcement of the Results of the 2016 Survey on Media Usage by Adolescents [Internet]. Seoul: Korea Press Foundation; 2017 [cited 2023 December 11]. Available from: https://www.kpf.or.kr/front/board/boardContentsView.do?board_id=246&contents_id=000344023CDC69EA3D82BD939221C516.
17. Korea Press Foundation. Announcement of Results from the '2016 Survey on Media Use Among Adolescents' [Internet]. Seoul: Korea Press Foundation; 2020 [cited 2023 December 11]. Available from: https://www.kpf.or.kr/front/board/boardContentsView.do?board_id=246&contents_id=000344023AF698BACC27EEE5D6A2ABEB.
18. Lioutas ED, Tzimitra-Kalogianni I. 'I saw Santa drinking soda!' Advertising and children's food preferences. Child Care Health Dev 2015;41:424-33. PUBMED | CROSSREF
19. Kim DM, Kim BM, Kim KH. The mediating effects of food content watching motivation on the between watching time and nutrition quotient of adolescents in Seoul, Korea. Nutrients 2022;14:3901. PUBMED | CROSSREF
20. Kim SK, Kim JY, Kim HK, An ST, Lim YJ, Park HS. Association between food-related media program watching and dietary behaviors in Korean adolescents. Korean Public Health Res 2020;46:31-46.
21. Kim HY, Lee JS, Hwang JY, Kwon SH, Chung HR, Kwak DK, Kang MH, Choi YS. Development of NQ-A, Nutrition Quotient for Korean Adolescents, to assess dietary quality and food behavior. J Nutr Health 2017;50:142-57. CROSSREF
22. Ministry of Food and Drug Safety. Customized health and dietary information development and application [Internet]. Cheongju: Ministry of Food and Drug Safety; 2021 [cited 2023 December 11]. Available from: https://scienceon.kisti.re.kr/srch/selectPORSrchReport.do?cn=TRKO202200005227.
23. Lee JS, Hwang JY, Kwon SH, Chung HR, Kwak TK, Kang MH, Choi YS, Kim HY. Development of nutrition quotient for elementary school children to evaluate dietary quality and eating behaviors. J Nutr Health 2020;53:629-47. CROSSREF
24. Manafi Anari F, Eghtesadi S. The relationship between watching mukbang (eating show), eating behaviors, and anthropometric parameters in Iranian female students. J Res Health Sci 2023;23:e00574. PUBMED | CROSSREF
25. Food Policy Team of the Seoul Metropolitan Government. 2021 Seoul Food Survey (SFS) [Internet]. Seoul: Food Policy Team of the Seoul Metropolitan Government; 2022 [cited 2010 August 10]. Available from: https://www.seoulnutri.co.kr/food-db/98.do?curPage=1.
26. Manoogian EN, Chaix A, Panda S. When to eat: the importance of eating patterns in health and disease. J Biol Rhythms 2019;34:579-81. PUBMED | CROSSREF
27. Koletzko B, Toschke AM. Meal patterns and frequencies: do they affect body weight in children and adolescents? Crit Rev Food Sci Nutr 2010;50:100-5. PUBMED | CROSSREF
28. Rodrigues PR, Luiz RR, Monteiro LS, Ferreira MG, Gonçalves-Silva RM, Pereira RA. Adolescents' unhealthy eating habits are associated with meal skipping. Nutrition 2017;42:114-120.e1. PUBMED | CROSSREF
29. Ricotti R, Caputo M, Monzani A, Pigni S, Antoniotti V, Bellone S, Prodam F. Breakfast skipping, weight, cardiometabolic risk, and nutrition quality in children and adolescents: a systematic review of randomized controlled and intervention longitudinal trials. Nutrients 2021;13:3331. PUBMED | CROSSREF
30. de Souza MR, Neves ME, Souza AM, Muraro AP, Pereira RA, Ferreira MG, Rodrigues PR. Skipping breakfast is associated with the presence of cardiometabolic risk factors in adolescents: study of cardiovascular risks in adolescents - ERICA. Br J Nutr 2021;126:276-84. PUBMED | CROSSREF
31. Feye D, Gobena T, Brewis A, Roba KT. Adolescent breakfast skipping is associated with poorer academic performance: a school-based study from Hidhabu Abote District, Ethiopia. J Health Popul Nutr 2023;42:79. PUBMED | CROSSREF
32. Karatzi K, Moschonis G, Choupi E, Manios Y, Skenderi KP, Grammatikaki E, Androutsos O, Tanagra S, Koumpitski A, Siatitsa PE; Healthy Growth Study group. Late-night overeating is associated with smaller breakfast, breakfast skipping, and obesity in children: The Healthy Growth Study. Nutrition 2017;33:141-4. PUBMED | CROSSREF
33. Ciccone J, Woodruff SJ, Fryer K, Campbell T, Cole M. Associations among evening snacking, screen time, weight status, and overall diet quality in young adolescents. Appl Physiol Nutr Metab 2013;38:789-94. PUBMED | CROSSREF
34. Spaeth AM, Hawley NL, Raynor HA, Jelalian E, Greer A, Crouter SE, Coffman DL, Carskadon MA, Owens JA, Wing RR, et al. Sleep, energy balance, and meal timing in school-aged children. Sleep Med 2019;60:139-44. PUBMED | CROSSREF
35. Ma Y, Gong W, Ding C, Song C, Yuan F, Fan J, Feng G, Chen Z, Liu A. The association between frequency of eating out with overweight and obesity among children aged 6-17 in China: a National Cross-sectional Study. BMC Public Health 2021;21:1005. PUBMED | CROSSREF

36. Gesteiro E, García-Carro A, Aparicio-Ugarriza R, González-Gross M. Eating out of home: influence on nutrition, health, and policies: a scoping review. Nutrients 2022;14:1265. PUBMED | CROSSREF

37. Du Y, Rong S, Sun Y, Liu B, Wu Y, Snetselaar LG, Wallace RB, Bao W. Association between frequency of eating away-from-home meals and risk of all-cause and cause-specific mortality. J Acad Nutr Diet 2021;121:1741-1749.e1. PUBMED | CROSSREF

38. Monteiro CA, Cannon G, Levy RB, Moubarac JC, Louzada ML, Rauber F, Khandpur N, Cediel G, Neri D, Martinez-Steele E, et al. Ultra-processed foods: what they are and how to identify them. Public Health Nutr 2019;22:936-41. PUBMED | CROSSREF

39. Moubarac JC, Batal M, Louzada ML, Martinez Steele E, Monteiro CA. Consumption of ultra-processed foods predicts diet quality in Canada. Appetite 2017;108:512-20. PUBMED | CROSSREF

40. Neri D, Steele EM, Khandpur N, Cediel G, Zapata ME, Rauber F, Marrón-Ponce JA, Machado P, da Costa Louzada ML, Andrade GC, et al. Ultraprocessed food consumption and dietary nutrient profiles associated with obesity: a multicountry study of children and adolescents. Obes Rev 2022;23 Suppl 1:e13387. PUBMED | CROSSREF

41. Lauria F, Dello Russo M, Formisano A, De Henauw S, Hebestreit A, Hunsberger M, Krogh V, Intemann T, Lissner L, Molnar D, et al. Ultra-processed foods consumption and diet quality of European children, adolescents and adults: Results from the I.Family study. Nutr Metab Cardiovasc Dis 2021;31:3031-43. PUBMED | CROSSREF

42. Vandevijvere S, De Ridder K, Fiolet T, Bel S, Tafforeau J. Consumption of ultra-processed food products and diet quality among children, adolescents and adults in Belgium. Eur J Nutr 2019;58:3267-78. PUBMED | CROSSREF

43. Cornwell B, Villamor E, Mora-Plazas M, Marin C, Monteiro CA, Baylin A. Processed and ultra-processed foods are associated with lower-quality nutrient profiles in children from Colombia. Public Health Nutr 2018;21:142-7. PUBMED | CROSSREF

44. Beal T, Morris SS, Tumilowicz A. Global patterns of adolescent fruit, vegetable, carbonated soft drink, and fast-food consumption: a meta-analysis of global school-based student health surveys. Food Nutr Bull 2019;40:444-59. PUBMED | CROSSREF

45. Yun S, Kang H, Lee H. Mukbang- and Cookbang-watching status and dietary life of university students who are not food and nutrition majors. Nutr Res Pract 2020;14:276-85. PUBMED | CROSSREF

46. Korea Food Service News. Preference for 'Mukbang' Over 'Cookbang' Among Adolescents [Internet]. Seoul: Korea Food Service News; 2023 [cited 2010 August 10]. Available from: https://www.fsnews.co.kr/news/articleView.html?idxno=48543.