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Association between watching eating broadcasts like *mukbang* and *cookbang* and generalized anxiety disorder among Korean adolescents

Jung-Hwan Kim^{1,3}, Jinyhun Kim^{2,4,5}, Suk-Yong Jang^{5,6} and Eun-Cheol Park^{2,5*}

Abstract

Background Anxiety disorders are common during adolescence; therefore, detecting anxiety disorders among adolescents and providing appropriate treatment are crucial. Studies have suggested that watching online audiovisual broadcasts like *mukbang* and *cookbang* (hereafter *mukbang*), where hosts eat or cook food, may influence anxiety disorders. However, there is insufficient research on the association between watching *mukbang* and generalized anxiety disorder (GAD). Therefore, we investigated the association between watching *mukbang* and GAD among Korean adolescents.

Methods We analyzed 51,764 adolescents who participated in the 2020 Korea Youth Risk Behavior Web-Based Survey (KYRBS). The participants were asked how frequently they watched *mukbang* per week over the past 12 months. Anxiety disorders were assessed using the generalized anxiety disorder-7 (GAD-7) questionnaire. A multiple logistic regression analysis was performed after adjusting for confounding variables.

Results The prevalence of GAD was higher among adolescents who watched *mukbang* compared to those who did not (aOR: 1.100, 95% CI: 1.026–1.180, $P=0.008$ in male participants; aOR: 1.090, 95% CI: 1.003–1.185, $P=0.042$ in female participants). The frequency of watching *mukbang* showed a dose-dependent relationship with a greater likelihood of GAD in female adolescents.

Conclusion This study's results showed that watching *mukbang* is associated with GAD in Korean adolescents. Proper interventions for mental health are needed for adolescents who watch *mukbang*.

Keywords Generalized anxiety disorder, GAD-7, Mukbang and cookbang, KYRBS, Adolescents

*Correspondence:

Eun-Cheol Park
ecpark@yuhs.ac

¹Department of Health Informatics and Biostatistics, Graduate School of Public Health, Yonsei University, Seoul, Republic of Korea

²Department of Preventive Medicine, Yonsei University College of Medicine, Seoul, Republic of Korea

³Department of Family Medicine, Yonsei University College of Medicine, Seoul, Republic of Korea

⁴Department of Psychiatry, Yonsei University College of Medicine, Seoul, Republic of Korea

⁵Institute of Health Services Research, Yonsei University, Seoul, Republic of Korea

⁶Department of Healthcare Management, Graduate School of Public Health, Yonsei University, Seoul, Republic of Korea



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Introduction

Anxiety disorders are common during adolescence [1]. Anxiety is a negative emotion that arises from fear, threats, or stress [2]; while short-term anxiety can be beneficial and help people solve problems and prepare for danger [3], long-term anxiety can develop into an anxiety disorder. Anxiety disorders in adolescence are chronic conditions that can be accompanied by other psychiatric illnesses such as depression [4]; therefore, it is critical to prevent anxiety disorders in adolescents. A lifetime prevalence of anxiety disorders is estimated at 26.1% in male students and 38.0% in female students. Among adolescents with anxiety disorders, 8.3% develop severe impairment [5]. As anxiety disorders can have a negative impact on adolescents' mental health, the early management of anxiety disorders is important to reduce the burden of the disease [6].

Mukbang (eating broadcast)—a portmanteau of *meokneun* (eating) and *bangsong* (broadcast)—is a type of online eating show, while *cookbang* is an online cooking show. *Mukbang* and *cookbang* (hereinafter referred to as *mukbang*) originated in South Korea [7] in the late 2000s and has become widely popular along with the increasing popularity of single broadcasting media. An estimated 38% of Koreans watch *mukbang* online [8]. Over the past decade, *mukbang* has been disseminated worldwide and gained popularity through social media platforms such as YouTube [9]. With the increasing popularity of *mukbang*, interest in the impact of *mukbang* consumption is also growing.

Studies have shown that watching *mukbang* can be addictive, and there are concerns that it could lead to poor mental health outcomes [10]. The dissemination of *mukbang* through media channels is known to encourage overeating, and young people in particular are affected by food-related broadcasts [11, 12]. To increase viewership, *mukbang* creators not only overeat within a set time but also eat unhealthy foods or try risky foods [13]. Adolescent viewers may consume addictive foods through the imitation effect, develop poor eating habits, and sometimes develop eating disorders [14].

Despite the suggestion that *mukbang* may influence anxiety disorders [15], there is insufficient research on the association between watching *mukbang* and generalized anxiety disorder (GAD); furthermore, no research has been conducted on GAD in adolescents. Understanding the impact of *mukbang* on GAD could help to improve the mental health status of adolescents. This study investigates the association between watching *mukbang* and GAD in Korean adolescents.

Methods

Study population and data

Data were collected from the 2022 Korea Youth Risk Behavior Web-Based Survey (KYRBS), which has been conducted by the Korea Disease Control and Prevention Agency (KDCA) since 2005. The KYRBS is an anonymous, self-report online survey conducted nationwide among middle and high school students. This study provides fundamental data to evaluate the health of Korean adolescents and formulate health-related policies [16].

This study adhered to the principles of the Declaration of Helsinki, and the participant recruitment procedure was approved by Statistics Korea (Approval no.: 117,058) as a national official statistic. Research on the topic of *mukbang* began in 2022. To maintain the representativeness of Korean adolescents, this study selected a total of 400 middle schools and 400 high schools by sampling from all regions and types of schools in Korea under the supervision of the KDCA. The sample schools were selected using permanent random sampling within each stratum [17]. This survey investigated socioeconomic status and health-related behaviors through health-related interviews or assessments using 114 questions [18]. The study population consisted of 2,589,173 Korean middle and high school students. The response rate of the survey was 92.2%, resulting in the exclusion of 4,363 non-participants. Non-participation occurred due to teachers' heavy workload related to the survey and their inability to use computer labs. Additionally, 86 participants were excluded owing to missing data. The final sample included 51,764 students (26,354 male and 25,410 female) (Fig. 1).

Measures

Generalized anxiety disorder-7

The generalized anxiety disorder-7 (GAD-7) questionnaire is an online questionnaire comprising seven items. It is used to screen for anxiety disorders and is included in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV, 4th edition) [19]. The GAD-7 has been confirmed as a reliable tool for detecting GAD [20]. Each item is rated between 0 and 3, with a maximum combined score of 21 [21]. Studies have verified the optimal sensitivity and validity of the GAD-7 [22]. Cronbach's alpha for the Korean version of GAD-7 was 0.915 with a cutoff score of 5. Positive predictive value, negative predictive, sensitivity, and specificity of GAD-7 were 46.3%, 92.4%, 78.1%, and 74.6%, respectively. So, if a GAD-7 score was ≥ 5 , participants were assumed to have an anxiety disorder [23]. In this study, the Cronbach's α indicating the internal consistency of the scale was 0.91.

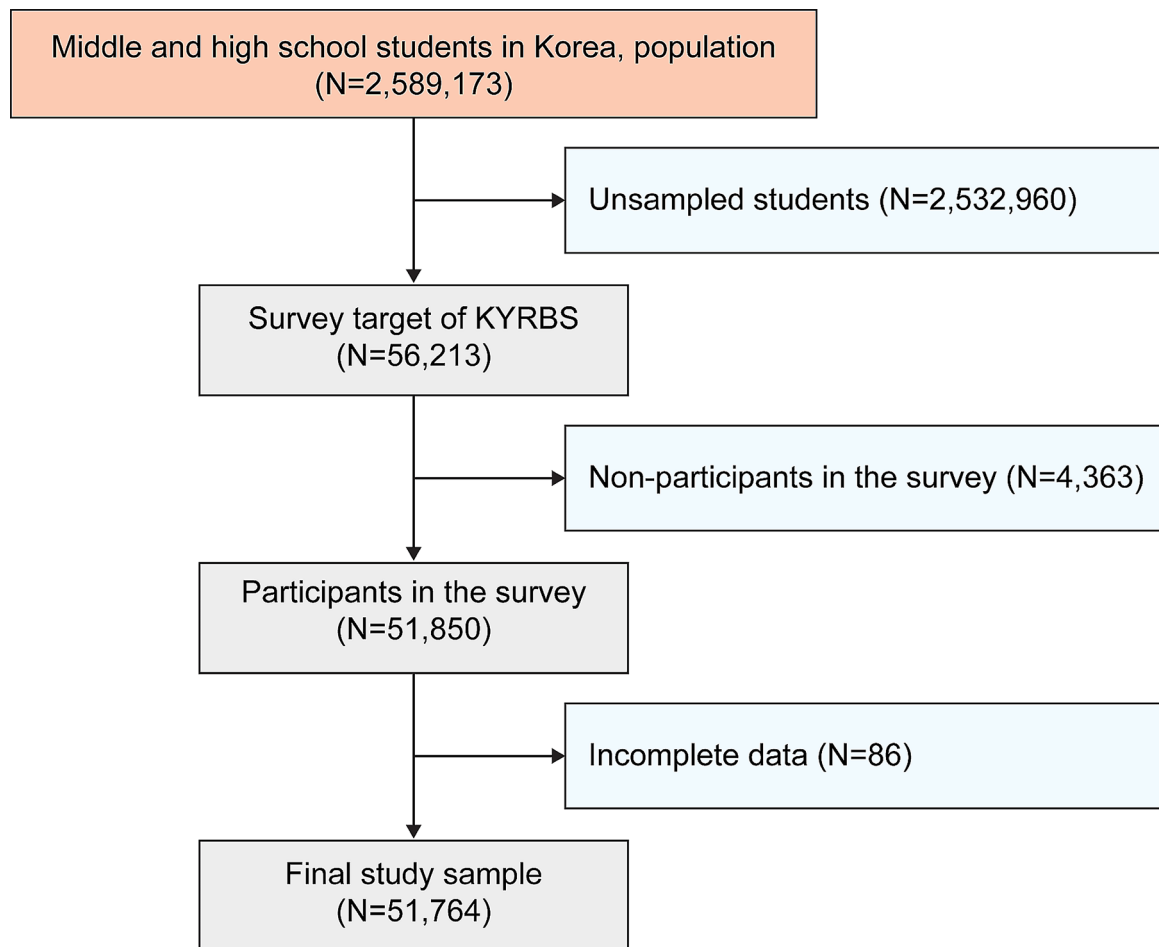


Fig. 1 Flowchart of the study population

Mukbang and cookbang

Adolescents were surveyed to assess their frequency of viewing *mukbang* over the past 12 months. Answer options were: 1 (“Not at all”), 2 (“Less than once/month”), 3 (“Once–three times/month”), 4 (“Once–twice/week”), 5 (“Three–four times/week”), 6 (“Five–six times/week”), and 7 (“Daily”). Participants were categorized into two groups: “Never watching” (those who chose option 1) and “Ever watching” (those who chose options 2–7). To examine the dose response, the “Ever watching” group was further subdivided into four groups based on their frequency of viewing *Mukbang*: “Never” (option 1), “Rarely” (options 2–3), “Often” (options 4–6), and “Always” (option 7).

Covariates

Sociodemographic, health-related, and psychosocial factors were assessed as covariates. Sociodemographic factors included gender, age, type of family, socioeconomic status, and grade; health-related factors included physical activity, drinking, smoking, average sleep duration, and body mass index (BMI); and psychosocial factors

included perceived stress level, self-reported health condition, and suicidality.

Age was divided into two groups based on the school the students attended: middle school (12–15 years old) and high school (16–18 years old). Family structure was classified as one parent, both parents, or none. Socioeconomic status, perceived stress levels, academic achievement, and self-reported health status were categorized into three groups.

Sleep duration was categorized into three groups: less than 6 hours’ sleep, 6–8 hours’ sleep, and more than 8 hours’ sleep [24]. Sufficient physical activity was defined as occurring more than 5 days a week, otherwise it was classified as insufficient based on the participants’ response to the item: “How many days a week did you engage in physical activity over 60 minutes per day?” We calculated the participants’ BMI and percentile values for height and weight. Participants were classified as underweight if their BMI percentile was <5th percentile, normal weight if it was within the ≥5th and <85th percentile, overweight if it was within the ≥85th and <95th percentile, and obese if it was ≥95th percentile [25].

Suicidalities included suicidal ideation, suicide plans, and suicide attempts over the past year.

Statistical analysis

The chi-square test was used to examine the statistical differences within each categorized group. All the analyses were stratified by sex. We conducted a multiple logistic regression after adjusting for confounding variables to investigate the association between *mukbang* watching and GAD-7. Subgroup analyses were conducted to examine the association between the frequency of watching *mukbang* using the GAD-7. The results were expressed as adjusted odds ratios (aOR) with 95% confidence intervals (CIs). The analyses were conducted using the stratified sampling variables (strata) and weighted variables recommended by the KYRBS. SAS version 9.4 was used for the data analysis, and the statistical significance level in all the analyses was set to $P < 0.05$.

Results

Table 1 shows the baseline characteristics of the study population stratified by sex. Among the total 51,764 participants, 26,354 (50.9%) were male and 25,410 (49.1%) were female; 16,882 (64%) males and 20,142 (79.3%) females watched *mukbang*. Among all the adolescents who watched *mukbang*, GAD was present in 5,145 (30.5%) male and 8,598 (42.7%) female participants.

Table 2 presents a multiple logistic regression analysis of the association between watching *mukbang* and GAD. Even after adjusting for various covariates, both male and female participants who watched *mukbang* showed a statistically significant higher likelihood of GAD occurrence (aOR: 1.100, 95% CI: 1.026–1.180, $P = 0.008$ in male participants, aOR: 1.090, 95% CI: 1.003–1.185, $P = 0.042$ in female participants).

Table 3 shows the results of the subgroup analysis of the association between watching *mukbang* and GAD-7 stratified by independent variables. After dividing the adolescents based on whether they watched *mukbang*, most subgroups exhibited similar trends to the main results. Subgroups with high levels of perceived stress (aOR: 1.136, 95% CI: 1.027–1.257, $P = 0.013$ in male participants, aOR: 1.166, 95% CI: 1.040–1.307, $P = 0.009$ in female participants) and those that engaged in insufficient physical activity showed significantly higher odds ratio of GAD in the “Ever watching” group compared to the “Never watching” group.

Figure 2 shows the results of subgroup analysis for male participants based on their frequency of watching *mukbang*. The analysis showed that among those who always watched *mukbang*, the likelihood of GAD increased compared to participants who never watched *mukbang* (aOR: 1.155, 95% CI: 1.003–1.331, p -for-trend = 0.0291).

Figure 3 shows the results of subgroup analysis for female participants based on their frequency of watching *mukbang*. The analysis showed that among those who always watched *mukbang*, the likelihood of GAD increased compared with participants who never watched *mukbang* (aOR: 1.273, CI: 1.120–1.447, p -for-trend < 0.0001). As the frequency of watching *mukbang* increased, the likelihood of GAD among female participants increased compared to those who never watched *mukbang*. A dose-dependent relationship was observed between the frequency of watching *mukbang* and the likelihood of GAD among female adolescents.

Discussion

This study confirmed that watching *mukbang* is associated with GAD among Korean adolescents. Even after adjusting for various covariates and stratifying by sociodemographic, health-related, and psychosocial factors, the association persisted. Moreover, we found a dose-dependent relationship between the frequency of *mukbang* watching and GAD in female adolescents.

Eating disorders are an important public health issue characterized by disturbances in eating patterns and thoughts related to eating, food, body weight and shape [26]. The type of eating disorders include bulimia nervosa, binge-eating disorder, and anorexia nervosa [27]. Previous research has shown a correlation between watching mukbang and disordered eating behaviors [28]. Famous mukbang creators typically prepare and consume meals with excessive calories, but it is common in mukbang video to see slender hosts eating large quantities of food [9]. Such discrepancies, like slim hosts consuming large amounts of food, can lead to distorted body image, body dissatisfaction, and disordered eating behaviors among viewers [29].

Our results tend to align with research that shows problematic online behaviors, including excessive *mukbang* watching, are associated with difficulties in regulating emotions like anxiety [30–33]. Adolescence is the transitional and developmental period from childhood to adulthood [34]. Detecting and evaluating anxiety disorders in adolescents is challenging but necessary [35]. Protecting adolescents from anxiety disorders is important because they can lead to adult anxiety and potentially lifelong mental health issues [36, 37]. Male individuals were more vulnerable to media and Internet addiction [38]. The relationship between watching *mukbang* and anxiety disorders has shown differences based on gender. In the result, the likelihood of having GAD was higher in male adolescents (Table 2). Both male and female adolescents who watched *mukbang* and also had other bad habits, including insufficient physical activity or high perceived stress levels, were more likely to have GAD (Table 3). Female individuals experience

Table 1 Baseline characteristics of the study population according to GAD-7

Variables	Male (N=26,354)				p-value	Female (N=25,410)				p-value
	GAD-7 < 5		GAD-7 ≥ 5			GAD-7 < 5		GAD ≥ 5		
	N	(%)	N	(%)		N	(%)	N	(%)	
Mukbang and Cookbang					< 0.001					< 0.001
Never watching	6,824	(72.0)	2,648	(28.0)		3,206	(60.9)	2,062	(39.1)	
Ever watching	11,737	(69.5)	5,145	(30.5)		11,544	(57.3)	8,598	(42.7)	
Age					< 0.001					0.649
12–15	11,002	(71.9)	4,302	(28.1)		8,679	(58.2)	6,242	(41.8)	
16–18	7,559	(68.4)	3,491	(31.6)		6,071	(57.9)	4,418	(42.1)	
Family structure					0.314					< 0.001
Both parents	12,926	(70.4)	5,447	(29.6)		11,785	(58.0)	8,530	(42.0)	
Single parent	747	(68.7)	340	(31.3)		578	(52.1)	531	(47.9)	
No parent	4,888	(70.9)	2,006	(29.1)		2,387	(59.9)	1,599	(40.1)	
Alcohol status					< 0.001					< 0.001
Non-drinker	11,755	(72.7)	4,417	(27.3)		11,054	(61.3)	6,973	(38.7)	
Past drinker	6,554	(67.3)	3,178	(32.7)		3,591	(50.2)	3,558	(49.8)	
Current drinker	252	(56.0)	198	(44.0)		105	(44.9)	129	(55.1)	
Smoking status					< 0.001					< 0.001
Non-smoker	16,618	(71.4)	6,662	(28.6)		14,157	(59.1)	9,803	(40.9)	
Current smoker	1,943	(63.2)	1,131	(36.8)		593	(40.9)	857	(59.1)	
Academic achievement					< 0.001					< 0.001
High	7,416	(71.2)	2,997	(28.8)		5,752	(59.9)	3,855	(40.1)	
Middle	5,523	(72.7)	2,079	(27.3)		4,717	(60.0)	3,144	(40.0)	
Low	5,622	(67.4)	2,717	(32.6)		4,281	(53.9)	3,661	(46.1)	
Sleep duration					< 0.001					< 0.001
More than 8 h	2,348	(78.5)	642	(21.5)		1,102	(70.1)	470	(29.9)	
6–8 h	7,621	(74.1)	2,659	(25.9)		5,208	(63.6)	2,980	(36.4)	
Less than 6 h	8,592	(65.7)	4,492	(34.3)		8,440	(53.9)	7,210	(46.1)	
Perceived stress level					< 0.001					< 0.001
High	4,289	(45.6)	5,118	(54.4)		4,101	(34.3)	7,845	(65.7)	
Middle	9,174	(79.9)	2,301	(20.1)		7,587	(74.8)	2,553	(25.2)	
Low	5,098	(93.2)	374	(6.8)		3,062	(92.1)	262	(7.9)	
Physical activity					0.011					0.006
Insufficient	14,008	(70.0)	5,996	(30.0)		13,461	(58.3)	9,621	(41.7)	
Sufficient	4,553	(71.7)	1,797	(28.3)		1,289	(55.4)	1,039	(44.6)	
Socioeconomic status					< 0.001					< 0.001
High	8,559	(72.6)	3,237	(27.4)		6,137	(61.1)	3,912	(38.9)	
Middle	8,309	(71.0)	3,387	(29.0)		7,301	(58.7)	5,127	(41.3)	
Low	1,693	(59.2)	1,169	(40.8)		1,312	(44.7)	1,621	(55.3)	
Perceived health status					< 0.001					< 0.001
High	13,830	(76.7)	4,205	(23.3)		10,003	(55.5)	4,793	(26.6)	
Middle	3,637	(62.1)	2,221	(37.9)		3,838	(65.5)	3,848	(65.7)	
Low	1,094	(44.5)	1,367	(55.5)		909	(36.9)	2,019	(82.0)	
Suicidality					< 0.001					< 0.001
Never	17,577	(75.4)	5,731	(24.6)		13,631	(65.9)	7,041	(34.1)	
Ever	984	(32.3)	2,062	(67.7)		1,119	(23.6)	3,619	(76.4)	
BMI^a					0.002					0.006
Underweight	1,318	(68.4)	610	(31.6)		1,386	(71.9)	1,042	(54.0)	
Normal	12,068	(71.2)	4,878	(28.8)		10,606	(62.6)	7,468	(44.1)	
Overweight	1,954	(70.3)	825	(29.7)		1,118	(40.2)	848	(30.5)	
Obese	2,814	(68.7)	1,282	(31.3)		1,235	(30.2)	1,001	(24.4)	
Total	18,561	(70.4)	7,793	(29.6)		14,750	(58.0)	10,660	(42.0)	

Abbreviation GAD-7, Generalized anxiety disorder-7; BMI, body mass index

^aBMI: underweight (BMI < 5th percentile), normal (5th < BMI ≤ 85th percentiles), overweight (85th < BMI ≤ 95th percentiles), and obese (BMI > 95th percentile)

Table 2 Results of factors associated between watching *mukbang* and GAD-7

Variables	Male (N=26,350)			Female (N=25,410)		
	GAD-7 ≥ 5			GAD-7 ≥ 5		
	aOR	95% CI	P-value	aOR	95% CI	P-value
Mukbang and Cookbang						
Never watching	1.000			1.000		
Ever watching	1.100	(1.026-1.180)	0.008	1.090	(1.003-1.185)	0.042
Age						
12–15	1.000			1.000		
16–18	1.075	(0.997-1.159)	0.059	0.850	(0.787-0.919)	<0.0001
Family structure						
Both parents	1.000			1.000		
Single parent	0.971	(0.817-1.153)	0.734	0.908	(0.777-1.061)	0.223
No parent	0.893	(0.820-0.972)	0.009	0.853	(0.779-0.935)	0.001
Smoking status						
Non-smoker	1.000			1.000		
Current smoker	1.005	(0.905-1.116)	0.921	1.225	(1.038-1.446)	0.017
Alcohol status						
Non-drinker	1.000			1.000		
Past drinker	1.024	(0.946-1.109)	0.556	1.191	(1.100-1.290)	<0.0001
Current drinker	1.217	(0.914-1.619)	0.178	1.424	(0.976-2.076)	0.066
Academic achievement						
Low	1.000			1.000		
Middle	0.951	(0.868-1.041)	0.275	1.032	(0.946-1.125)	0.480
High	1.070	(0.977-1.173)	0.145	1.022	(0.936-1.117)	0.626
Sleep duration						
More than 8 h	1.000			1.000		
6–8 h	1.226	(1.069-1.406)	0.004	1.200	(1.02-1.412)	0.0002
Less than 6 h	1.428	(1.251-1.629)	<0.0001	1.360	(1.160-1.594)	0.028
Perceived stress level						
Low	1.000			1.000		
Middle	3.214	(2.826-3.655)	<0.0001	3.618	(3.126-4.186)	<0.0001
High	11.735	(10.315-13.351)	<0.0001	15.308	(13.333-17.575)	<0.0001
Physical activity						
Insufficient	1.000			1.000		
Sufficient	1.015	(0.933-1.104)	0.731	1.067	(0.955-1.193)	0.251
Socioeconomic status						
High	1.000			1.000		
Middle	0.991	(0.920-1.068)	0.812	1.043	(0.968-0.968)	0.2662
Low	1.221	(1.085-1.373)	0.001	1.305	(1.162-1.467)	<0.0001
Perceived health status						
High	1.000			1.000		
Middle	1.580	(1.465-1.703)	<0.0001	1.497	(1.393-1.609)	<0.0001
Low	2.476	(2.206-2.780)	<0.0001	2.362	(2.095-2.664)	<0.0001
Suicidality						
Never	1.000			1.000		
Ever	3.823	(3.462-4.222)	<0.0001	3.293	(3.004-3.609)	<0.0001
BMI						
Underweight	0.998	(0.869-1.146)	0.978	0.982	(0.873-1.105)	0.765
Normal	1.000			1.000		
Overweight	0.909	(0.809-1.021)	0.107	0.922	(0.811-1.047)	0.211
Obese	0.860	(0.783-0.946)	0.002	0.915	(0.816-1.026)	0.129

Abbreviation aOR, adjusted odds ratio; CI, confidence interval; GAD-7, Generalized anxiety disorder-7; BMI, body mass index

All variables except 'Mukbang and Cookbang' and 'GAD-7' are covariates

Table 3 Subgroup analysis of the association between watching *mukbang* and GAD-7 stratified by independent variables

Variables	Never watching		Ever watching			Never watching		Ever watching		
			GAD-7 ≥ 5					GAD-7 ≥ 5		
	aOR		aOR	95% CI	P-value	aOR		aOR	95% CI	P-value
	Boys (N=26,350)					Girls (N=25,410)				
Age										
	12–15	1.000	1.131	(1.026-1.247)	0.014	1.000	1.080	(0.969-1.204)	0.166	
	16–18	1.000	1.068	(0.965-1.182)	0.203	1.000	1.107	(0.618-1.007)	0.116	
Family structure										
	Both parents	1.000	1.048	(0.959-1.144)	0.300	1.000	1.079	(0.982-1.185)	0.113	
	Single parent	1.000	1.030	(0.726-1.461)	0.869	1.000	1.295	(0.854-1.965)	0.224	
	No parent	1.000	1.240	(1.077-1.426)	0.003	1.000	1.101	(0.903-1.341)	0.340	
Alcohol status										
	Non-drinker	1.000	1.148	(1.056-1.249)	0.001	1.000	1.112	(1.009-1.225)	0.032	
	Past drinker	1.000	1.025	(0.908-1.157)	0.690	1.000	1.029	(0.869-1.219)	0.738	
	Current drinker	1.000	1.334	(0.784-2.271)	0.287	1.000	1.291	(0.533-3.127)	0.572	
Smoking status										
	Non-smoker	1.000	1.113	(1.033-1.200)	0.005	1.000	1.104	(1.014-1.202)	0.023	
	Current smoker	1.000	1.000	(0.819-1.220)	0.998	1.000	0.831	(0.540-1.279)	0.400	
Academic achievement										
	High	1.000	1.117	(0.996-1.251)	0.058	1.000	1.047	(0.923-1.189)	0.474	
	Middle	1.000	1.109	(0.974-1.263)	0.119	1.000	1.194	(1.029-1.387)	0.020	
	Low	1.000	1.074	(0.948-1.218)	0.260	1.000	1.053	(0.910-1.219)	0.485	
Sleep duration										
	More than 8 h	1.000	0.941	(0.750-1.181)	0.598	1.000	1.144	(0.839-1.559)	0.395	
	6–8 h	1.000	1.290	(1.145-1.454)	<0.0001	1.000	1.054	(0.905-1.228)	0.495	
	Less than 6 h	1.000	1.023	(0.929-1.127)	0.638	1.000	1.101	(0.992-1.223)	0.071	
Perceived stress level										
	High	1.000	1.136	(1.027-1.257)	0.013	1.000	1.166	(1.040-1.307)	0.009	
	Middle	1.000	1.048	(0.936-1.175)	0.415	1.000	0.992	(0.865-1.138)	0.912	
	Low	1.000	1.135	(0.886-1.453)	0.315	1.000	1.127	(0.789-1.611)	0.511	
Physical activity										
	Insufficient	1.000	1.095	(1.010-1.187)	0.028	1.000	1.101	(1.008-1.202)	0.032	
	Sufficient	1.000	1.124	(0.958-1.318)	0.150	1.000	0.999	(0.759-1.315)	0.996	
Socioeconomic status										
	High	1.000	1.100	(0.992-1.220)	0.070	1.000	1.182	(1.034-1.352)	0.015	
	Middle	1.000	1.136	(1.016-1.269)	0.025	1.000	0.985	(0.872-1.112)	0.806	
	Low	1.000	0.957	(0.780-1.174)	0.670	1.000	1.206	(0.954-1.524)	0.117	
Perceived health status										
	High	1.000	1.101	(1.000-1.211)	0.051	1.000	1.164	(1.038-1.304)	0.010	
	Middle	1.000	1.117	(0.977-1.276)	0.105	1.000	1.043	(0.901-1.209)	0.571	
	Low	1.000	1.048	(0.849-1.293)	0.663	1.000	0.908	(0.712-1.158)	0.437	
Suicidality										
	Never	1.000	1.123	(1.039-1.212)	0.003	1.000	1.049	(0.956-1.150)	0.314	
	Ever	1.000	0.948	(0.792-1.135)	0.562	1.000	1.293	(1.041-1.605)	0.669	
BMI										
	Underweight	1.000	1.090	(0.845-1.405)	0.507	1.000	1.021	(0.796-1.309)	0.872	
	Normal	1.000	1.089	(1.000-1.184)	0.049	1.000	1.106	(1.006-1.217)	0.038	
	Overweight	1.000	1.173	(0.935-1.472)	0.167	1.000	1.036	(0.772-1.390)	0.814	
	Obese	1.000	1.107	(0.926-1.324)	0.264	1.000	1.110	(0.840-1.467)	0.463	

Abbreviation aOR, adjusted odds ratio; CI, confidence interval, GAD-7, Generalized anxiety disorder-7; BMI, body mass index

All variables except 'Mukbang and Cookbang' and 'GAD-7' are covariates

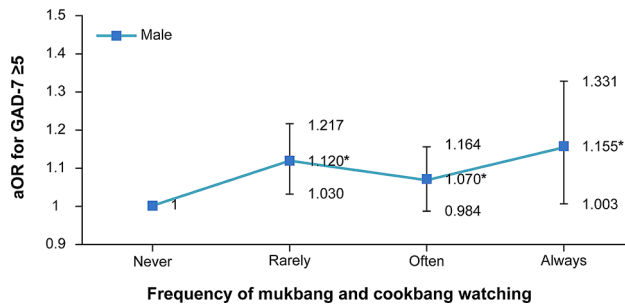


Fig. 2 Association between *mukbang* and *cookbang* watching categorized by frequency and GAD-7 among male participants, where “Rarely” is less than once a week, “Often” is less than seven times a week, “Always” is every day

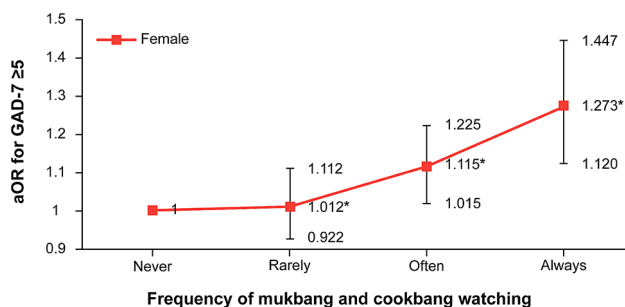


Fig. 3 Association between *mukbang* and *cookbang* watching categorized by frequency and GAD-7 among female participants, where “Rarely” is less than once a week, “Often” is less than seven times a week, and “Always” is every day

more stress regarding eating than male individuals do after consuming food-related content [39]. In this study, these differences were more pronounced in female than in male participants. After adjustment, female participants tended to have higher perceived stress levels than male participants (Table 3). When anxiety disorders are associated with bad habits, watching excessive *mukbang* could potentially exacerbate anxiety disorders [40]. Therefore, regulating adolescents’ viewing of *mukbang* and considering the limitations of viewing time and content are warranted.

The mechanism underlying the relationship between *mukbang* watching and GAD remains unclear. Several hypotheses have been proposed. First, impulsive behaviors associated with watching *mukbang* may lead to GAD [41]. These behaviors include eating quickly or in large quantities, imitating foods seen in programs, eating snacks instead of regular meals, and consuming stimulating foods [42]. Second, watching *mukbang* may influence GAD in individuals with difficulties in emotion regulation. Individuals with poor emotion regulation seem to use online activities to control and regulate their emotional experiences, and *mukbang* watching may be one of these activities [43]. Third, there is a possibility that *mukbang* could aggravate psychological distress. *Mukbang*

watching provides social comfort by showing individuals in videos producing satisfactory sounds and visuals while enjoying food and interacting with viewers. However, excessive *mukbang* watching can potentially worsen the psychological distress in individuals with anxiety disorder, as it may develop into problematic online behavior that attempts to avoid anxiety about real-life issues [44]. Furthermore, watching *mukbang* may contribute to anxiety by reducing participation in other activities, such as physical activities or social interactions [45]. Those who watch *mukbang* frequently and for longer periods at a time are more likely to exhibit tendencies toward obesity. Obesity is both a risk factor for anxiety and the result of a dietary calorie imbalance [46, 47]. Adolescents with anxiety may, therefore, be more inclined to watching *mukbang* [48].

Previous studies have identified several beneficial uses of recreational *mukbang* watching, *Mukbang* has become popular among individuals dissatisfied with their real lives, who use the internet and social media as a way of experiencing immediate satisfaction and escaping from reality [8]. *Mukbang* provides entertainment and relaxation by virtually consuming harmful foods without experiencing actual health consequences [10]. Additionally, watching *mukbang* allows people who eat or prepare meals alone to reduce their feelings of loneliness by engaging in conversations with online *mukbang* hosts [49, 50].

This study had some limitations. First, cross-sectional data is a cross-sectional study, so it is difficult to establish a causal relationship between watching *mukbang* and GAD, or to determine the impact of watching *mukbang* on GAD. Additional studies using experimental or longitudinal designs are needed to establish causality. Second, self-reports may diverge from legitimate information due to recall bias and the potential for participant misunderstanding. Third, there is a lack of objective scales for measuring certain variables such as specific details of *mukbang*, including daily content and viewing data on *mukbang*.

Despite these limitations, our study has certain strengths. The KYRBS includes nationally representative data, allowing the study results to be generalized to the entire population of Korean adolescents. These findings could be beneficial for public health policies related to the impact of media on adolescent mental health. Ultimately, further research is needed to define the causal relationship between watching *Mukbang* and GAD, and to investigate the underlying mechanisms.

Conclusion

This study found that adolescents who watched *mukbang* may be more susceptible to GAD, with a dose-dependent relationship observed in female individuals. Therefore,

proper interventions for mental health are needed for adolescents who watch *mukbang*.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12888-024-05957-z>.

Supplementary Material 1

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Author contributions

J.H.K. designed the study, analyzed the data, and wrote the first draft and revised later drafts. J.K. assisted to perform the statistical analysis. S.Y.J. provided expertise. E.C.P. revised and provided feedback the paper. All authors read and approved the final manuscript.

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Data availability

The data analyzed in this study were taken from the 2022 KYRBS which is available to the public. All data can be downloaded from the KYRBS official website (<https://www.kdca.go.kr/yhs/>).

Declarations

Ethics approval and consent to participate

All methods were carried out in accordance with relevant guidelines and regulations (declaration of helsinki).

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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