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RESEARCH ARTICLE

Factors Affecting the Eating Behavior Disorders of Korean College Students

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Abstract:

Background:

University students are exposed to environments that may negatively influence their physical and mental health. New trends such as cooking shows may affect their eating habits.

Objective:

This study investigated factors such as general characteristics, diet, eating habits, and eating attitudes that may be associated with eating behavior disorders among university students in Korea.

Methods:

This descriptive research was conducted on 207 students who attend A University located in C city using an online self-administered questionnaire including questions on their general characteristics, eating habits, eating attitudes, and eating behavior disorders. Data were analyzed using descriptive statistics, t-test, one-way ANOVA and Scheffé test, Pearson's correlation, and multiple linear regression (hierarchical) using SPSS.

Results:

Two independent variables and seven factors under general characteristics were analyzed using hierarchical multiple regression analysis. In Model 1, the degree of eating behavior disorders was significantly higher among women ($\beta = .17, p = .016$) and those on diet compared to those not on diet ($\beta = -.38, p < .001$). Eating alone led to a higher degree of eating behavior disorders than eating with friends ($\beta = -.23, p = .001$). In Model 2, eating habits ($\beta = -.24, p < .001$) and eating attitudes ($\beta = .27, p < .001$) accounted for 27.4% of the explanatory power as factors affecting eating behavior disorders ($F = 8.06, p < .001$).

Conclusion:

Eating habits and attitudes affect the eating behavior of university students.

Keywords: Eating habits, Eating attitude, Eating behavior disorder, University students, Statistics, T-Test, ANOVA.

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1. INTRODUCTION

University students experience psychological stress due to several factors, such as having an irregular lifestyle, school events and gatherings, academic burden, and preparing to search for a job. Furthermore, they are exposed to environments and behaviors that negatively influence their physical and mental health, such as smoking and drinking [1]. Since these may not have any immediate impact on their health, it is

not easy to conduct health promotion activities among university students [2]. Moreover, they are vulnerable to health-related problems as they tend to overlook the importance of health care at this age. They also adopt eating habits that are detrimental to health. Nowadays, a new trend called "eating shows" has emerged, and this greatly affects dietary behavior. Several food-based shows are frequently broadcasted on the Internet in Korea and abroad. Eating shows originated in 2009 in Korea, when a host on African TV, a personal broadcasting website, tried various foods [3]. Such shows contain different types of content, such as autonomous sensory meridian response, gourmet restaurant visits, cookery

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shows, home shopping, and so on. Currently, there are about 4,000 creators of eating shows who have their own online channels with over three million subscribers. This implies that “eating broadcasting” has become an important part of the Internet [4].

This trend arose mainly due to the increasing number of single-person households, as most people who live alone eat alone. These individuals prefer watching eating shows because it makes them feel like they are eating with a partner [5]. By watching such shows, they pursue the satisfaction of their appetite vicariously [6], and psychologically compensate for the internalized repression and pent-up frustration in their lives [7]. According to a 2018 survey, among 20-year-old students who watch such videos on the internet, 80.1% said they watched videos by one media creative, an increase of 17.2% from the previous year [8].

Most foods students eat delivery foods or instant foods, which are far from being healthy [9]. Most people who watch eating shows wish to eat the way the hosts eat [9]. This can affect the eating habits of viewers and can increase obesity rates [9]. Furthermore, university students in their twenties neglect their diets due to having irregular classes, limited time, and poor nutritional knowledge, leading to a possible risk of malnutrition or obesity [10].

In 2018, the Korean Ministry of Health and Welfare announced a comprehensive plan for obesity management. Related measures included the establishment of guidelines and monitoring systems for eating broadcasting to improve the culture and environment that aggravates and induces obesity. After the announcement, a controversy broke out whether eating broadcasting caused obesity, and opinions were divided. Researchers at the Seoul National University Hospital conducted a survey on the pros and cons of broadcasting regulation, and 51.9% of the respondents agreed with the imposition of regulation on eating broadcasting [11]. Contrary to this finding, some people believe binge eating is not caused by eating broadcasting, or that limiting eating broadcasting is an excessive step [12]. Considering the discussion above, it is necessary to identify how the aforementioned factors influence the eating habits of university students in their twenties. This study aims to investigate factors such as the general characteristics, diet, eating habits, and eating attitudes that may cause eating behavior disorders among university students in their twenties in Korea.

2. METHODS

2.1. Aims

The purposes of this study are to:

- (1) Analyze the characteristics of participants, their eating habits, eating attitudes, and how these impact their eating behavior;
- (2) Compare the differences in eating behavior disorders based on participant characteristics;
- (3) Analyze the correlation among participants' eating habits, eating attitudes, and eating behavior disorders; and

- (4) Identify the factors that lead to eating behavior disorders among university students.

2.2. Design

This study is descriptive research that investigates the effects of watching eating shows on the eating behavior of university students. The general characteristics of the study participants include age, sex, diet, residence type, daily dining partner, and time spent watching eating shows. The independent variables include eating habits and eating attitudes, and the dependent variable is eating disorders.

2.3. Participants

Convenience sampling was conducted among college students in their twenties who attend A University located in C city. The number of participants required was calculated by setting the median effect size as .15, significance level as .05, power as .95, and the number of variables as nine, followed by a multiple regression analysis of a two-sided test using the sample size calculation program G Power 3.1.9.4 (Faul, Buchner, Erdfelder, & Lang, 2020). A minimum sample size of 166 was found to be appropriate, but data were collected from a total of 207 participants, considering a 20% chance of dropout.

2.4. Ethical Considerations

The survey was conducted online through a self-report questionnaire. On the first page of the questionnaire, the participants were informed that the data collected would be used for research purposes only and that their personal information would remain confidential. Participation was voluntary, and we explained to the participants that if they did not wish to complete the questionnaire, they could withdraw at any time. The participants were asked to check the consent box, and only those who agreed could take the survey. The contact details of the participants were used to offer them compensation in return for their participation. We secured the questionnaire data file with a password for safety.

2.5. Research Tools

2.5.1. Eating Habits

Eating is a part of daily life, and eating habits are formed *a posteriori*. Dietary content may include attitudes toward food, eating behavior, and food preferences [13]. To study eating habits, we used the tool developed by Boo and Park [14], which consisted of 19 items: five on dining regularity, two on dining speed, five on meal volume, four on obesity-related food intake, and three on snack intake. The score for each item ranged from 1 to 5; the higher the score, the better the eating habits. Regarding the reliability of the tool, it had a Cronbach's $\alpha = .74$ at the time of development, and .76 in this study.

2.5.2. Eating Attitudes

Eating attitudes can be defined as beliefs, thoughts, feelings, behavior, and relationship with food [15]. To study the participants' eating attitudes, we used the modified version of the EAT tool developed by Garner and Garfinkel [16],

which consisted of sub-factors such as fasting, food preoccupation, and eating control. It was later revised as EAT-26, which included 26 items, and then translated into Korean by Rhee, Go, Lee, Whang, and Lee [17]. Each question was scored on a 5-point Likert scale, where 1 corresponded to “not at all” and 5 corresponded to “absolutely true.” A higher score indicated that there was a problem related to dining. As for the reliability, the tool had a Cronbach's $\alpha=.84$ at the time of development, and .86 in this study.

2.5.3. Eating Behavior Disorders

Eating behavior disorders are maladaptive behaviors and can significantly degrade an individual's health and psychosocial functioning. These disorders include anorexia nervosa, bulimia nervosa, and binge eating disorder [18]. To study eating behavior disorders in the participants, we used the 33-item Dutch Eating Behavior Questionnaire [19], which was translated into Korean by Kim, Lee, and Kim [20]. The tool comprises 10 items on restrained eating, which indicates weight control by controlling food intake; 13 items on emotional eating, which identify the effect of negative emotional states such as anger, fear, and anxiety on dietary behavior; and 10 items on external eating, which measure the extent to which external stimuli such as smell and taste cause eating behavior disorders. The scores ranged from 1 to 5 points, where 1 corresponded to “not at all” and 5 corresponded to “absolutely true.” A higher score indicated a higher degree of eating behavior disorder. The overall reliability of the tool was Cronbach's $\alpha=.90$; in this study it was .85.

2.6. Data Collection

We surveyed 207 students attending a university located in Cheongju and who had recently watched *Meokbang* (eating shows) for at least one month. The survey data were collected online using Google Forms from 19 December to 31 December 2019 after posting the URL on a social network system.

2.7. Data Analysis Method

The data collected were analyzed using the SPSS program. The analysis method was as follows.

The general characteristics of the study participants were analyzed using frequency analysis, and their eating habits, eating attitudes, and eating behavior disorders were studied using descriptive statistics. T-test and one-way ANOVA were conducted to investigate the differences in eating behavior based on participant characteristics, and the Scheffé test was used as a post-test. Furthermore, Pearson's correlation was used to examine the correlations among the participants' eating habits, eating attitudes, and eating behavior variables, and to identify the factors affecting their eating behavior. In Model 1, the categorical variables of gender, diet, residence, and daily eating partner were treated as dummy variables, whereas participants' age and time spent watching eating shows were considered continuous variables. In Model 2, eating habits and eating attitudes were entered as continuous variables, and hierarchical regression analysis was performed.

3. RESULTS

3.1. General Characteristics of the Participants

The average age of the participants was 22.51 ± 1.87 years (range: 20-19 years), and 119 (57.5%) participants were younger than the average. In total, 121 females were included (58.5%), of which 83 were on a diet (40.1%). As for residence type, 80 participants (38.6%) were self-lodging, 69 (33.3%) lived in a dormitory, 56 (27.1%) resided in their own homes, and 2 (1.0%) lived in lodging houses and *Gossitel* (which offer meals). Meanwhile, 76 people (36.7%) usually had their meals alone, 118 people (57.0%) dined with friends, and 13 people (6.3%) ate with their family members. In the last week, the average time spent watching eating shows was 4.18 ± 6.38 hours (range: 0-72) (Table 1).

Table 1. Characteristics of the participants (n=207).

Characteristics	N	%	Mean	Standard Deviation	
Age	≤22.51	119	57.5	22.51	1.87
-	>22.51	88	42.5	-	-
Gender	Male	86	41.5	-	-
-	Female	121	58.5	-	-
Diet	No	124	59.9	-	-
-	Yes	83	40.1	-	-
Residence	self-lodging	80	38.6	-	-
-	Dormitory	69	33.3	-	-
-	With family	56	27.1	-	-
-	Lodging	2	1.0	-	-
Eating partner	Alone	76	36.7	-	-
-	Friend	118	57.0	-	-
-	Family	13	6.3	-	-
Watching time of broadcast	≤4.18	150	72.5	-	-
-	>4.18	57	27.5	4.18	6.38

3.2. Eating Behavior Disorders, Eatings Habits, and Eating Attitudes

The total mean score for eating behavior disorders was 93.66 ± 17.21 points (range: 54-137). As for the sub-factor, the mean score for restrained eating was 30.65 ± 10.71 points (range: 10-50), for emotional eating, the mean score was 29.38 ± 13.66 points (range: 13-65), and for external eating, it was 33.63 ± 6.59 points (range: 10-47). For eating habits, the mean score was 60.77 ± 8.64 points (range: 37-84), and for eating attitude, it was 58.68 ± 14.16 points (range: 28-98) (Table 2).

3.3. Differences in Eating Behavior Disorders According to Participant Characteristics

The score for eating behavior disorders was higher for participants on a diet than for those who were not on a diet ($t=5.18, p<.001$). Eating alone led to higher scores in eating behavior disorders than eating with friends ($F=5.01, p=.008$). However, there were no differences in eating behavior disorders according to age, type of residence, or time spent watching eating broadcasts (Table 3).

Table 2. Eating behavior disorders, eating habits, and eating attitudes (n=207).

Variables	Items	Mean	Standard Deviation	Minimum	Maximum
Eating behavior disorders	33	93.66	17.21	54	137
Restrained behaviors	10	30.65	10.71	10	50
Emotional behaviors	13	29.38	13.66	13	65
External behaviors	10	33.63	6.59	10	47
Eating habits	19	60.77	8.64	37	84
Eating attitudes	26	58.68	14.16	28	98

Table 3. Difference of the eating behavior disorders according to characteristics of the participants (n=207).

Characteristics		Mean±Standard Deviation	t or F	p (Scheffé Test)
Age	≤22.51	93.69±16.37	0.03	.979
-	>22.51	93.63±18.40	-	-
Gender	Male	91.34±15.41	-1.64	.102
-	Female	95.31±18.27	-	-
Diet	No	98.44±15.25	5.18	<.001
-	Yes	86.52±17.59	-	-
Residence	self-lodging	91.99±17.76	0.64	.589
-	Dormitory	95.86±16.68	-	-
-	With family	93.45±17.38	-	-
-	Lodging	91.00±4.24	-	-
Eating partner	Alone ^a	98.41±18.86	5.01	.008 (a>b)
-	Friend ^b	90.55±15.68	-	-
-	Family ^b	94.15±15.11	-	-
Watching time of broadcast	≤4.18	93.78±16.85	0.16	.873
-	>4.18	93.35±18.28	-	-

3.4. Correlations among Eating Behavior Disorders, Eating Habits, and Eating A

The score for eating behavior disorders was significantly lower than that for eating habits ($r = -.30, p < .001$). Thus, eating behavior disorders were not found to be significantly correlated with eating attitudes. Eating attitudes and eating habits were also not significantly correlated (Table 4).

3.5. Factors Affecting Eating Behavior Disorders

Hierarchical regression analysis was performed to calculate the explanatory power of related independent variables affecting eating behavior disorders. Variables were selected based on the significance probability .05, and variables were removed based on the significance probability .10. Tolerance

limits ranged from .548 to .950-all above 0.1. VIFs ranged from 1.052 to 1.826, which were less than 10, and thus, there was no problem with multicollinearity, which satisfied the assumption of regression analysis. The Durbin-Watson value was 2.050, close to the reference value of 2, and there was no autocorrelation of the residuals. The regression model in this study was appropriate.

Table 4. Correlations among the variables (n=207).

Variables	Eating Behavior Disorders	Eating Habits	Eating Attitudes
	r (p)		
Eating behavior disorders	1	-	-
Eating habits	-.30 (<.001)	1	-
Eating attitudes	.05 (.478)	.04 (.536)	1

In Model 1, categorical variables such as age, sex, diet, type of residence, and daily dining partners were treated as dummy variables, whereas age and viewing time of eating shows were entered as continuous variables. The degree of eating behavior disorders was high in women ($\beta = .17, t = 2.42, p = .016$) and in those who were on a diet compared to those who were not on a diet ($\beta = -.38, t = -5.78, p < .001$). Eating alone led to a higher degree of eating behavior disorders than eating with friends ($\beta = -.23, t = -3.30, p = .001$). Thus, Model 1 identified three variables-gender, dietary status, and eating partner-as factors affecting eating behavior disorders, and the explanatory power of the model was 17.0% ($F = 5.70, p < .001$).

In Model 2, a regression analysis was conducted by entering eating habits and eating attitudes as continuous variables. Eating habits ($\beta = -.24, t = -3.87, p < .001$) and eating attitudes ($\beta = .27, t = 3.69, p < .001$) accounted for 27.4% of the explanatory power as factors affecting eating behavior disorders ($F = 8.06, p < .001$) (Table 5).

4. DISCUSSION

Based on the analysis of factors causing eating behavior disorders, it was found that the degree of eating behavior disorders was high in women, those who were on a diet, and those who ate alone. The high rate of eating behavior disorders among women is consistent with findings of previous studies, which stated that women tend to go on diets despite having low or normal weight [21]. A study found a high degree of eating behavioral disorders among those who diet, which supports the finding that the more the diet attempts, the poorer the eating attitude [22], and the poorer the eating attitude, the higher the degree of eating behavior disorders [23, 24]. This is in line with the findings reported in the literature that those who refrain from eating are more vulnerable to external stimuli such as stress and tempting foods [25, 26], and thus repeatedly go on yo-yo diets, which cause eating behavior disorders [27, 28]. The study also found that eating alone led to a higher degree of eating behavior disorders than eating with friends, which is consistent with the findings of previous studies that eating alone causes eating behavior disorders [29, 30].

Table 5. Factor affecting on the eating behavior disorders (n=207).

Variables	Model 1					Model 2				
	B	Standard Error	β	t	p	B	Standard error	β	t	p
Intercept	86.44	16.84	-	5.13	<.001	99.49	18.80	-	5.29	<.001
Age	0.68	0.69	0.07	0.98	.327	-	-	-	-	-
Gender (ref.=Male)	6.05	2.50	0.17	2.42	.016	-	-	-	-	-
Diet	-13.20	2.29	-0.38	-5.78	<.001	-	-	-	-	-
Residence (ref.=With family)	-	-	-	-	-	-	-	-	-	-
self-lodging	-3.60	3.01	-0.10	-1.20	.233	-	-	-	-	-
dormitory	0.48	3.09	0.01	0.15	.878	-	-	-	-	-
lodging	-0.05	11.44	0.00	0.00	.997	-	-	-	-	-
Eating partner (ref.=Alone)	-	-	-	-	-	-	-	-	-	-
Friend	-8.03	2.43	-0.23	-3.30	.001	-	-	-	-	-
Family	-7.19	5.21	-0.10	-1.38	.169	-	-	-	-	-
Watching time of broadcast	-0.03	0.18	-0.01	-0.17	.864	-	-	-	-	-
Eating habits	-	-	-	-	-	-0.47	0.12	-0.24	-3.87	<.001
Eating attitudes	-	-	-	-	-	0.33	0.09	0.27	3.69	<.001
F (p)	5.70 (<.001)					8.06 (<.001)				
Adj. R ²	.170					.274				
Tolerance	.553 ~ .948					.548 ~ .950				
VIF	1.055 ~ 1.807					1.052 ~ 1.826				

Notes. VIF: Variance Inflation Factor.

Although watching eating shows was not found to be the main cause of eating behavior disorders, it may lead to eating disorders in vulnerable women. Furthermore, people who are on a diet and eating alone need to be careful when watching eating shows. Ratings show that women watched these eating shows more than men [6, 31, 32]. Furthermore, women on diets felt the urge to eat when they saw show hosts eat delicious food, and even if they did not feel hungry, they still exhibited an increased appetite after watching the show [33]. Meanwhile, people who ate alone said they felt that watching eating shows helped them deal with loneliness [34].

The fact that people with a high likelihood of suffering from eating behavior disorders tend to enjoy watching eating shows likely leads to an increased preference for delivery foods such as pork belly, *Jokbal* (pork trotter meat cooked with soy sauce and spices), snacks, and Chinese foods, which are often seen in eating shows [34]. This may also lead to increase the rate of impulsive food intake or binge eating [33]. When eating alone, people prefer ready-to-eat foods, and as a result, consume large amount of sodium through unhealthy snacks [35]. Moreover, they indulge in habits such as fast eating and overeating. Eventually, such habits lead to eating behavior disorders [36, 37]. One study showed that the frequency with which people in their twenties ate unhealthy foods such as fast food or ramen, ate out often, and skipped breakfast was higher than that in people in other age groups [5]. When eating alone, the rate of eating unhealthy meals is also expected to be higher.

Based on the results, eating attitudes and eating habits were found to cause eating behavior disorders. However, as the current health focus in Korea is on the middle-aged and older generations-the age group where health problems occur prominently-there is relatively little interest in the health

problems of university students [38].

Furthermore, a study that surveyed university students found that they prefer eating meals that cost less and take less time to prepare [39]. However, because university students are in the early stages of adulthood, it is easier for them to modify their health behaviors compared to people in their mid and late adulthood. In fact, health habits formed during this phase might determine their later health behaviors [2, 40], and thus, health promotion in this age group is important. Interestingly, health-promoting behaviors see a sharp decline at the age of 18, when an individual's university life begins [41]. Sociocultural factors are considered the leading factors causing this decline. Students are driven by the idea that they have to invest much time in productive work as finding jobs is difficult and they need adequate qualifications to get a job, and thus, they manage with quick meals [39].

University students need to reduce their exposure to and minimize the impact of environments that are harmful to their health. Regarding eating behavior, it is necessary to examine the sociocultural factors influencing university students to reduce their eating behavior disorders and inculcate healthy eating habits. This study indicates an association between eating behavior disorders among students and the pressure of employment or the influence of media. Although we only measured the total time spent watching eating shows, other methods of measurement, such as program content and operating method, should also be considered.

CONCLUSION

This study identified the eating habits, eating attitudes, and eating behavior disorders among university students in their twenties and investigated the factors causing eating behavior disorders.

The findings suggest that eating behavior disorders are negatively correlated with eating habits. The degree of eating behavior disorders was high in women, those on a diet, and participants with no dining partners, and the model's explanatory power was 17%. Eating attitudes and eating habits were found to have a significant effect on eating behavior disorders, and the model's explanatory power was 27.4%.

This study found that factors such as gender, diet, eating alone, eating habits, and eating attitudes affect eating behavior. The impact of the media and the culture among university students are regarded as possible factors of eating behavior disorders among students. Since eating broadcasting is a new social phenomenon, it is necessary to analyze its effect on viewers' eating behavior.

Based on the results of this study, we provide some suggestions for future research. First, since the sample for this study was limited to students in their twenties who were attending a university in Cheongju city, future studies should expand the population. Second, future studies should investigate further the different types of eating shows and the lifestyle variables of university students.

The results of this study can be applied to the current situation in which dietary culture is changing due to the outbreak of COVID-19. Due to social distancing, the rate of eating alone increases and there are significant lifestyle changes, such as having increased time to watch media. According to the results of this study, the degree of eating behavior disorder was high in the absence of an eating partner. Furthermore, it is important to consider that eating attitudes and eating habits are factors influencing eating behavior disorder. The results of this study serve to prevent the worsening of eating behavior disorders. The data from this study is meaningful for related research and intervention development.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was an observational study without intervention, and was a one-time questionnaire study, which is the minimum risk for the subjects, and was maintained until the end of the study so that there were no ethical problems.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures were followed in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants.

AVAILABILITY OF DATA AND MATERIALS

The data sets used during the current study can be provided from the corresponding author [M.Y.], upon reasonable request.

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None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

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