

Preference and the Frequency of Processed Food Intake according to the Type of Residence of College Students in Korea

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한국 일부 대학생의 거주형태에 따른 가공식품의 선호도 및 섭취빈도

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ABSTRACT

Objectives: The purpose of this study was to investigate the eating behavior toward processed foods among college students who live in different types of residence.

Methods: This is a cross-sectional study targeting a total of 476 college students living at home with their family, living in a rental house with self-boarding, living in a lodging house, and living in a dormitory. Eating behaviors, including preference and the frequency of processed food intake were surveyed and compared according to the type of residence.

Results: The rate of skipping a meal was significantly higher among students who reported self-boarding than those living in other types of residences. The main reason for skipping meals was that they got up late. In the entire study population, the main reason for consuming processed food was easy-to-cook (33.8%) and the primary consideration for choosing processed food was the price (54.0%). The processed food the most favored by college students was the processed noodles; those living at home with their family or living in a dormitory preferred milk products; those living in a rental house with self-boarding or in a lodging house preferred confectionery, retort pouch, convenience food, and canned/bottled food. The frequency of processed food intake was significantly higher in the students who reported self-boarding than those living in other types of residences ($p < 0.001$).

Conclusions: Students' preference toward processed foods differed according to their type of residence. The frequency of processed food intake was significantly higher in students who reported self-boarding indicating that the type of residence of student is associated with their choices and consumption of processed foods.

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KEY WORDS residence type, processed food, eating behavior, college students

Introduction

Human dietary life is greatly influenced by various factors such as social status, the type of residence, economic status, religion, culture or by an interaction among these factors [1]. Usually, the period of college life is a main turning point for eating habits or behaviors for students as it is the beginning of adulthood due to an independent management of their school life departure from school meal programs and changes in the type of residence, typically away from their parents. When the type of residence is changed to such as living apart from their family, a person in charge of cooking a regular meal is changed from his/her parents to the student alone. Under these circumstances, the students may tend to cook simple and easy recipes by utilizing processed foods or ready-to-eat foods [2] and also may practice diet behaviors unfavorable to their health such as irregular meals, skipping breakfast, frequent eating-out and late-night meals [3]. A study by Kim & Kim [4] also reported that rate of students staying in college housing or live apart from their family has increased over the years and these students often try eating-out or consume processed food which can be simply prepared. Once such eating habits are developed and repeated over a long period of time from adulthood this cannot be easily reversed and may continue to later life [5] and consequently lead to undesirable health outcomes [6, 7].

Processed foods are classified as food products modified from the agriculture, livestock, marine or forest products to make them edible, preserve their nutrients and provide storage quality for longer periods of time by using physical, chemical or biological methods. For consumers, processed foods are convenient for eating and cooking as well as for reinforcing micronutrient insufficiencies in raw food items. On the other hand, consuming processed foods raises many concerns for undesirable health outcomes because the food contains many kinds of food additives and sauces made of saturated fat, sugar, cholesterol and sodium [8, 9]. In spite of health concerns, many college students still choose processed food for their convenience for eating and cooking. In a study of eating behavior and food labeling recognition related to processed food for college students living in different types of residences, students mostly answered “convenience” as the reason for using processed food [10]. Also, similar results were shown in

a study conducted in Kwangju area. i.e. both male and female students preferred processed food for convenience although they recognized maleficent issues with the use of processed foods including lack of minerals, the presence of higher fat and sodium content [11].

Although education about nutrition labeling can be one of the strategies for right choice or use of processed foods, other kinds of motivation, including environmental and physical factors affecting students’ choice of processed food should be evaluated to establish proper guidelines for college students in order for them to make better decisions regarding the consumption of processed foods. Particularly, college students who change their residence away from their family are more likely to consume processed foods and their eating pattern or selecting processed food may differ by the type of residence. In fact, such aspects due to living apart from their family are common among many Korean college students, but only a few studies addressed this issue even partially.

The purpose of this study was to investigate the status of using processed food among Korean college students according to different types of residences and to explore if the residential environment affected eating behavior toward processed food by conducting a comparative analysis of eating behavior, choices of processed food, preference and intake frequency of processed food by college students.

Subjects and Methods

1. Subjects

Definitions of the residence type used in this study for grouping subjects are as follows: living at home with their family; self-boarding in a rental house with preparing their meals by themselves; living in a lodging house which provides meals and living space; living in a dormitory which provides with a school meal plan. This study targeted college students studying in universities of similar academic ranking, located in the same area, in order to secure a pool of students from various types of residence under the conditions of similar environment and resources. The study was conducted from May 8 to August 7, 2014 through surveying healthy students enrolled in one of the two neighboring universities located in the area of Chungnam, Korea. The purpose and intent of this study were explained in detail and the college students who

volunteered to participate in the study were surveyed. Subjects who had a disease or were taking medications were excluded from the survey. The survey was carried out with 500 students and the respondents who might have given unfaithful responses, plural responses or no response were excluded from the study. Finally, questionnaire data from 476 participants were used for the data analysis. After being approved by the Institutional Review Board of Kongju National University (KNU_IRB_2014-8), this study was conducted in accordance with the Helsinki Declaration.

2. Instruments

This study used the questionnaire survey method, and questions used were prepared by consulting previous studies and were modified to suit the purpose of this study [3, 10, 12]. The questionnaire was self-administered and this process took approximately 20 minutes. The questionnaire was categorized into four topics including the general characteristics of the research subjects, their eating behavior, purchase of processed food, and preference and intake frequency of processed food. Questionnaires of the general characteristics were composed of questions asking about gender, age, height, weight, residence type, and monthly average pocket money. Using these information, the body mass index (BMI) was calculated (weight of kilograms divided height in meters squared). The eating behavior was evaluated using the following 5 questions: the number of times of meals a day, meal time, skipping a meal, the reason of skipping a meal, and the meal they focus on. The topic on purchase of processed food was composed of 3 questions: the reason for intake of processed food, what they check when buying processed food, and place of purchase. To evaluate the acceptability and intake frequency of processed food of the subjects, review of Korean National Health and Nutrition Examination Survey (KNHANES) were preceded and then processed foods listed in the data of KNHANES were grouped into one of following 12 processed food categories, namely, fish products (fish cake, crab stick, cremi, fish cake bar, etc.), milk products (milk, yogurt, cheese, etc.), processed meat products (ham, bacon, sausage, etc.), frozen processed products (dumpling, pizza, pork cutlet, etc.), processed noodle products (ramen, udon, spicy cold chewy noodles, noodles, spaghetti, cold noodles, etc.), confectionery (biscuit, Korean sweets and cookies, gluten and rice cake, cereal, etc.), bread

products (doughnut, cake, bread, etc.), beverages (fruit juice, vegetable juice, carbonated drink, etc.), retort food (three-minute cooking, meatball, etc.), convenience food (sandwich, hamburger, gimbap, etc.), canned/bottled food (spam, mackerel pike, whelk, yellow peach, fruit cocktail, corn, etc.), and dried processed products (dried squid, dried fruit, etc.). The acceptability of processed food was evaluated by using the 5-point scale: 1 point - 'hate a lot'; 2 points - 'dislike'; 3 points - 'so-so'; 4 points - 'like'; 5 points - 'love a lot'. The intake frequency of processed food was scored as follows: 1 point - 'rarely eat'; 2 points - 'once or twice a month'; 3 points - 'once to three times a week'; 4 points - 'four to six times a week'; 5 points - 'more than once a day'. Point scale was designed to reflect that a higher score is associated with a higher preference and the intake frequency of processed food.

3. Statistical analysis

The frequency, percentage, average and standard deviation were calculated with the data obtained through the survey, using the SAS program (Ver. 9.3, SAS Institute Inc., Cary, NC, USA). When non-continuous variables were compared among different residence types, the significance of the difference was verified by conducting χ^2 -test. When continuous variables were analyzed, ANOVA test was conducted and followed by Duncan's multiple test for the post hoc analysis. Significance of the data from all statistical analyses were declared at $p < 0.05$.

Results

1. General characteristics of the subjects

The average age of the subjects who participated in this study was 21.8 years; their average weight, height, and BMI were 62.2 kg, 168.2 cm, and 21.9 kg/m², respectively. The study population consisted of 47.1% men and 52.9% women. With regard to types of residences, 35.7% of them lived in rental houses with self-boarding, followed by their own houses (25.2%), dormitories (24.8%), and lodging houses (14.3%). The distribution of the types of residences was not statistically significant by the gender (data not shown). With regard to monthly average pocket money, 42.7% of the study subjects used 300-400 dollars; 31.3% less than 300 dollars; 26.1% more than 400 dollars (Table 1).

Table 1. Characteristics of the subjects (n=476)

Variables	
Age (years)	21.8 ± 2.0 ¹⁾
Weight (kg)	62.2 ± 7.3
Height (cm)	168.2 ± 7.3
BMI (kg/m ²)	21.9 ± 2.9
Gender	
Male	47.1 ²⁾
Female	52.9
Type of residence	
Living at home with parents	25.2
Self-boarding	35.7
Lodging house	14.3
Dormitory with meal plan	24.8
Monthly spending money (USD) ³⁾	
Less than 300	31.3
300 – 400	42.7
More than 400	26.1

1) Mean ± SD

2) Percentage of total subjects

3) Excluded living expenses, educational expenses, and rents

2. Typical eating behavior by the residence type

The results of the eating behavior by the type of residence of the research subjects are shown in Table 2. With regard to the number of meals a day, twice accounted for 46.4%, the largest proportion, followed by three times (45.4%), once (5.3%) and more than four times (2.9%). 59.3% of students living in a dormitory, 55.8% of those living in their house with their family, and 50.0% of those living in a lodging house consumed three times a day; but those living in rental houses with self-boarding, twice a day meals accounted for 64.7%, the largest proportion, which showed a significantly different meal frequency compared to subjects living in other types of residences ($p < 0.001$). The meal time and the meal skipped frequently were not significantly different among subjects living in different types of residences. The reasons for skipping meals, irrespective of the types of residences were as follows: over slept (27.9%); no time to eat (25.8%); no appetite (15.6%); became accustomed to it (13.5%); to reduce their

Table 2. Eating behaviors of the subjects by types of residence

Variable	Criteria	Type of residence				Total (n=476)	χ^2 value
		Home with parents (n=120)	Self-boarding (n=170)	Lodging house (n=68)	Dormitory (n=118)		
Frequency of meals a day	Once	5 (4.2) ¹⁾	11 (6.5)	6 (8.8)	3 (2.5)	25 (5.3)	49.76***
	2 times	41 (34.2)	110 (64.7)	27 (39.7)	43 (36.4)	221 (46.4)	
	3 times	67 (55.8)	45 (26.5)	34 (50.0)	70 (59.3)	216 (45.4)	
	More than 4 times	7 (5.8)	4 (2.4)	1 (1.5)	2 (1.7)	14 (2.9)	
Average spending time on eating per meal	Less than 10 min	7 (5.8)	16 (9.4)	7 (10.3)	11 (9.3)	41 (8.6)	16.59
	10 – 20 min	56 (46.7)	79 (46.5)	26 (38.2)	67 (56.8)	228 (47.9)	
	20 – 30 min	43 (35.8)	54 (31.8)	26 (38.2)	28 (23.7)	151 (31.7)	
	30 – 40 min	14 (11.7)	17 (10.0)	9 (13.2)	12 (10.2)	52 (10.9)	
The most skipped meal	Breakfast	89 (74.2)	135 (79.4)	48 (70.6)	95 (80.5)	367 (77.1)	8.65
	Lunch	17 (14.2)	16 (9.4)	15 (22.1)	13 (11.0)	61 (12.8)	
	Dinner	14 (11.7)	19 (11.2)	5 (7.4)	10 (8.5)	48 (10.1)	
Reason of skipping a meal	Sleep	27 (22.5)	43 (25.3)	15 (22.1)	48 (40.7)	133 (27.9)	61.23***
	No appetite	19 (15.8)	28 (16.5)	12 (17.7)	15 (12.7)	74 (15.6)	
	Nothing to eat	4 (3.3)	26 (15.3)	3 (4.4)	2 (1.7)	35 (7.4)	
	Difficulties in digestion	4 (3.3)	4 (2.4)	1 (1.5)	0 (0.0)	9 (1.9)	
	Weight loss	15 (12.5)	10 (5.9)	6 (8.8)	7 (5.9)	38 (8.0)	
	Lack of time	42 (35.0)	27 (15.9)	20 (29.4)	34 (28.8)	123 (25.8)	
	Habit from the youth	9 (7.5)	32 (18.8)	11 (16.2)	12 (10.2)	64 (13.5)	
The most well organizing meal	Breakfast	10 (8.3)	10 (5.9)	9 (13.3)	8 (6.8)	37 (7.8)	4.37
	Lunch	52 (43.3)	71 (41.8)	29 (42.7)	50 (42.4)	202 (42.4)	
	Dinner	58 (48.3)	89 (52.4)	30 (44.1)	60 (50.9)	237 (49.8)	

1) N (%)

***: $p < 0.001$

weight (8.0%); nothing to eat (7.4%); and indigestion (1.9%). The responses accounting for the largest proportion of the reasons for skipping a meal by the residence type were “a shortage of time for preparing a meal” for those living in their own houses and the lodging houses and “sleeping” for those living in the dormitories and living in rental houses with self-boarding. Therefore, the distribution of responses was significantly different by the residence type ($p < 0.001$). The response to “the most well organized meal among three meals a day” was not significantly different among subjects depending on the type of residence.

3. Purchase of processed food by the residence type

Purchase of processed food by the residence type of research subjects is shown in Table 3. The reasons for choosing processed food were simple cooking method (33.8%), being delicious (25.0%), reasonable price (22.1%). Although a large portion of students from all residence types answered that cooking was simple as the reason for choosing processed food, those living in the dormitories answered that the palatability was the main reason for choosing processed food ($p < 0.01$). The most considered factor for buying processed food among

all subjects was the price (54.0%), followed by brand awareness (16.8%) and the indication of expiration date (11.6%), nutrient content (11.1%), and food additives (6.5%). The rate of checking for prices of food was most common among those living in rental houses with self-boarding (64.7%), followed by living in lodging houses (58.9%), living in the dormitories (54.2%). The rate of checking prices of food among those living at home with family was only 35.8% and this rate was significantly lower than the other groups ($p < 0.01$). The usual purchase place of processed food was not significantly different among subjects living in different residence types.

4. Preference for processed food by the residence type

Preference for processed food by the residence type is shown in Table 4. Processed food with the highest preference of the study population was the processed noodles, followed by breads, beverages, convenience foods, processed meat products, cakes and confectionery, frozen foods, canned/bottled products, fish and meat processed products, retort foods, dried processed products, and milk products. The preference for milk products was significantly higher among those living in their

Table 3. Criteria for purchasing processed foods by the type of residence

Variable	Criteria	Type of residence				Total (n=476)	χ^2 value
		Home with parents (n=120)	Self-Boarding (n=170)	Lodging house (n=68)	Dormitory (n=118)		
Reason for consuming processed Foods	Taste/Flavor	32 (26.7) ¹⁾	29 (17.1)	17 (25.0)	41 (34.8)	119 (25.0)	36.49**
	Low price	21 (17.5)	46 (27.1)	16 (23.5)	22 (18.6)	105 (22.1)	
	Easy to cook	38 (31.7)	72 (42.4)	24 (35.3)	27 (22.9)	161 (33.8)	
	Good nutrition	5 (4.2)	3 (1.8)	1 (1.5)	0 (0.0)	9 (1.9)	
	Curiosity for new product	8 (6.7)	8 (4.7)	1 (1.5)	6 (5.1)	23 (4.8)	
	Others	16 (13.3)	12 (7.1)	9 (13.2)	22 (18.6)	59 (12.4)	
Most considered criteria for purchasing processed foods	Price	43 (35.8)	110 (64.7)	40 (58.9)	64 (54.2)	257 (54.0)	32.98**
	Brand awareness	26 (21.7)	19 (11.2)	13 (19.1)	22 (18.6)	80 (16.8)	
	Nutrient content	18 (15.0)	11 (6.5)	7 (10.3)	17 (14.4)	53 (11.1)	
	Expiration date	21 (17.5)	21 (12.4)	5 (7.4)	8 (6.8)	55 (11.6)	
	Food additives	12 (10.0)	9 (5.3)	3 (4.4)	7 (5.9)	31 (6.5)	
Usual place for purchasing processed foods	Hypermarket	57 (47.5)	74 (43.5)	22 (32.4)	44 (37.3)	197 (41.4)	12.84
	Convenience store	42 (35.0)	69 (40.6)	32 (47.1)	58 (49.2)	201 (42.2)	
	Department store	1 (0.8)	2 (1.2)	1 (1.5)	0 (0.0)	4 (0.8)	
	Korean traditional market	1 (0.8)	1 (0.6)	1 (1.5)	1 (0.9)	4 (0.8)	
	Town supermarket	15 (12.5)	22 (12.9)	10 (14.7)	10 (8.5)	57 (12.0)	
	Online market	4 (3.3)	2 (1.2)	2 (2.9)	5 (4.2)	13 (2.7)	

1) N (%)

** : $p < 0.01$

own houses or in dormitories compared to those living in loading houses ($p < 0.05$). The preference for confectionery, retort food, convenience food, canned/bottled food was significantly higher among those living in rental houses with self-boarding or living in loading houses compared to those living in their own house with their family or in dormitories ($p < 0.05$).

5. Intake frequency of processed food by the residence type

The intake frequency of processed food by the type of residence of the study subjects is shown in Table 5. The frequency of intake of beverages was the highest in the study population, followed by processed noodles, processed meat, confectionery, breads and convenience food. Except for processed fish and noodles, there were significant differences

Table 4. Types of processed foods preferred by the subjects by different residence types

Variable	Type of residence				Total (n=476)	F value
	Home with parents (n=120)	Self-boarding (n=170)	Lodging house (n=68)	Dormitory (n=118)		
Fish products	3.5 ± 1.0 ¹⁾	3.7 ± 1.1	3.3 ± 1.0	3.6 ± 1.0	3.6 ± 1.1	2.09
Milk products	3.2 ± 1.2 ^a	3.1 ± 1.3 ^{ab}	2.9 ± 1.3 ^b	3.4 ± 1.2 ^a	3.2 ± 1.3	3.33*
Meat products	3.9 ± 1.0	3.9 ± 1.0	3.7 ± 1.1	3.9 ± 0.9	3.9 ± 1.0	1.52
Frozen products	3.9 ± 0.9	3.8 ± 1.1	3.7 ± 1.0	3.8 ± 1.0	3.8 ± 1.0	0.74
Noodles	4.0 ± 1.0	4.1 ± 1.0	3.9 ± 1.1	3.9 ± 1.0	4.0 ± 1.0	0.58
Confectionery	3.7 ± 1.0 ^b	4.0 ± 1.0 ^a	3.9 ± 0.9 ^{ab}	3.7 ± 1.0 ^b	3.9 ± 1.0	3.05*
Breads	3.9 ± 1.0	4.0 ± 1.0	4.0 ± 0.9	3.9 ± 1.0	3.9 ± 1.0	0.43
Beverages	3.8 ± 1.1	4.1 ± 1.0	3.8 ± 1.0	3.9 ± 1.0	3.9 ± 1.1	2.24
Retort foods	3.3 ± 1.1 ^{ab}	3.5 ± 1.1 ^a	3.5 ± 1.0 ^a	3.2 ± 1.2 ^b	3.4 ± 1.1	2.92*
Convenience foods	3.8 ± 1.0 ^b	4.0 ± 1.0 ^{ab}	4.1 ± 0.8 ^a	3.7 ± 1.1 ^b	3.9 ± 1.0	3.05*
Canned & bottled foods	3.6 ± 1.1 ^{ab}	3.8 ± 1.1 ^a	3.7 ± 1.1 ^a	3.3 ± 1.1 ^b	3.6 ± 1.1	3.95**
Dried products	3.4 ± 1.2	3.2 ± 1.2	3.3 ± 1.1	3.0 ± 1.2	3.2 ± 1.2	2.31
Mean	3.7 ± 0.5	3.8 ± 0.6	3.6 ± 0.6	3.6 ± 0.6	3.7 ± 0.6	1.71

1) Mean ± SD, score (hate a lot: 1 point, dislike: 2 point, so-so: 3 point, like: 4 point, love a lot: 5 point)

ab: Values with different alphabets in each row are significantly different at $\alpha=0.05$ by Duncan's multiple range test

*: $p < 0.05$, **: $p < 0.01$

Table 5. Intake frequency of processed foods by the residence type of the subjects

Variable	Type of residence				Total (n=476)	F value
	Home with parents (n=120)	Self-Boarding (n=170)	Lodging house (n=68)	Dormitory (n=118)		
Fish products	2.3 ± 1.0 ¹⁾	2.4 ± 1.1	2.4 ± 0.9	2.3 ± 0.9	2.4 ± 1.0	0.36
Milk products	2.5 ± 1.3 ^a	2.1 ± 1.2 ^b	2.0 ± 1.1 ^b	2.7 ± 1.2 ^a	2.3 ± 1.2	9.42***
Meat products	2.9 ± 1.0 ^b	3.2 ± 0.9 ^a	3.1 ± 1.0 ^{ab}	2.8 ± 0.9 ^b	3.0 ± 1.0	5.14**
Frozen products	2.5 ± 1.0 ^b	2.9 ± 1.0 ^a	2.7 ± 0.9 ^b	2.6 ± 0.7 ^b	2.7 ± 0.9	6.28***
Noodles	3.2 ± 0.9	3.5 ± 1.0	3.3 ± 0.9	2.9 ± 0.8	3.2 ± 1.0	0.58
Confectionery	3.0 ± 1.0 ^a	3.2 ± 1.0 ^a	3.0 ± 0.9 ^a	2.6 ± 1.0 ^b	3.0 ± 1.0	11.37***
Breads	2.9 ± 0.9 ^{ab}	3.2 ± 1.0 ^a	3.0 ± 1.0 ^a	2.7 ± 0.8 ^b	3.0 ± 1.0	8.82***
Beverages	3.3 ± 1.3 ^{ab}	3.6 ± 1.1 ^a	3.4 ± 1.0 ^{ab}	3.2 ± 1.0 ^b	3.4 ± 1.1	6.26***
Retort foods	2.0 ± 1.0 ^b	2.4 ± 1.0 ^a	2.1 ± 0.9 ^b	1.7 ± 0.8 ^c	2.1 ± 1.0	13.99***
Convenience foods	2.8 ± 1.0 ^b	3.4 ± 1.0 ^a	3.1 ± 0.9 ^a	2.5 ± 1.0 ^c	3.0 ± 1.1	19.83***
Canned & bottled foods	2.5 ± 1.1 ^b	2.8 ± 1.0 ^a	2.4 ± 1.0 ^b	2.0 ± 0.8 ^c	2.5 ± 1.0	14.61***
Dried products	2.0 ± 1.2 ^a	1.8 ± 1.0 ^{ab}	1.7 ± 0.9 ^b	1.7 ± 0.9 ^b	1.8 ± 1.0	2.75*
Mean	2.7 ± 0.5 ^b	2.9 ± 0.6 ^a	2.7 ± 0.6 ^b	2.5 ± 0.5 ^c	2.7 ± 0.6	14.02***

1) Mean ± SD, score (rarely eat: 1 point, 1-2 times a month: 2 point, 1-3 times a week: 3 point, 4-6 times a week: 4 point, more than once a day: 5 point)

abc: Values with different alphabets in each row are significantly different at $\alpha=0.05$ by Duncan's multiple range test

*: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$

in the processed products by the residence type. The average intake frequency of processed foods was highest among students living in rental houses with self-boarding followed by living in their own house with their family, living in lodging houses, and living in the dormitories and these differences were statistically significant ($p < 0.001$).

Discussion

This study investigated eating behavior of college students by their residence type: living at home with their family; self-boarding in a rental house with accommodating their meals by themselves; living in a lodging house which provides meals and living space; living in a dormitory with a school meal plan. The rate of skipping meals was the highest among students living in rental houses with self-boarding and the main reason for such behavior was getting up late. The reason for consuming processed food items was that cooking was simple, and the primary consideration in choosing the products was the price. The most preferred kind of processed foods in the study population was noodles and the intake frequency of beverages in them was the highest. Students with self-boarding had high preference toward processed foods such as confectionery, retort food, convenience food, and canned/bottled food and high intake frequency of all kinds of processed foods.

According to the KNHANES [13], 42.7% of young people aged 19-29 years skipped breakfast, which was the highest rank among all age groups and women skipped breakfast (50.0%) more frequently than men (35.8%). According to Jung's study [14] conducted among college students in Chungbuk, Korea, 65.2% of female students skipped breakfast frequently and 21.7% of them skipped breakfast everyday indicating that women's skipping a meal is becoming a serious problem. In present study, 65% of students with self-boarding had a meal twice a day, which means they skipped one meal a day. Only 7.8% of all students considered breakfast as the most important meal of the day. Since the most common reason for skipping a meal was getting up late, the most skipped meal was breakfast. Many epidemiological and clinical researches suggest that having breakfast affects people's physical and mental activity of the day as well as their long term health [15]. In Western countries, the rate of skipping breakfast is especially high among adolescents [16]. It has been reported

that skipping breakfast is related to a nutritional imbalance, poor weight management and development of chronic diseases, and insufficient energy supply which may exert a negative influence on the learning and cognitive function [17, 18]. The nutritional issues associated with skipping breakfast may continue from the period of their adolescence and such issues may worsen because of the free life style in a college environment. In particular, the rate of skipping a meal was the highest among students living apart from their family, indicating that residential environment is closely related to their eating habits.

The International Food Information Council Foundation classifies food as follows based on physical, chemical and sensory changes of food in comparison with its natural conditions: minimally processed foods, foods processed for preservation, nutrient enhancement and freshness, mixtures of combined ingredients, ready-to-eat processed foods, and prepared foods/meals. The processed foods investigated mostly in this study were ready-to-eat processed foods and prepared foods/meals. In this study, the most common reason for accepting processed food was easy cooking, followed by good taste and low price. This pattern of students' answers was similar to a previous study [10]. Easy cooking was the most frequent response for consuming processed food in the study population, but the second most frequent response was significantly different among students with different residence types. Students with self-boarding chose low price, while those living in other types of residences answered tasty flavor. The reason for choosing processed food among students living in rental houses with self-boarding was "cheap" and "easy-to cook" because they had to prepare their meals by themselves and had to adjust their living expenses based on food expenses. In this study, the price of food was the most frequent response (64.7%) for choosing processed foods among students with self-boarding. Those living in rental houses with self-boarding appear to use processed food because such food items are cheap and simple to prepare. Therefore, nutrition composition and the impact of processed food consumption on overall health need to be considered in the development of processed food products by the commercial food product companies.

Processed foods such as milk, cola, fruit drink, soybean milk, bread, and ramen were included among 30 kinds of the commonly consumed foods in the 2012 KNHANES and the

same kinds of processed foods utilized in 2012 KNHANES were used in the questionnaire of this study. In this study, the processed food the most favored by college students was processed noodles, and they had a high frequency of intake of beverages. The study by Won [10] that investigated the preference for processed food of students studying in local universities, the preference for noodles and beverages was in higher in ranking among all processed food, which was identical to the result from this study. Kinds of the processed noodles investigated in this study were ramen, udon, spicy cold chewy noodles, noodles, spaghetti, and cold noodles; the intake frequency of ramen, also appeared in the KNHANES, was also had a higher ranking in our study. The preference for processed food and its intake frequencies were different according to the residence type of college students. The notable results were that students with self-boarding highly preferred confectionery, retort food, convenience food, and canned/bottled food, and the intake frequency of whole processed foods was the highest in general. In a previous study which investigated among college students in the same area as this study showed that the order of higher intake frequency of processed food was students living in the dormitories, living in rental houses with self-boarding and living in the lodging houses, while the intake of kimchi, vegetables, fruits, milk products and beans was the highest in students living at home with their family [19]. Particularly, students with self-boarding frequently selected and consumed processed food and preferred to use retort food, convenience food and canned/bottled food because those are easier to cook or can be consumed without cooking.

Rozman [20] reported that the Asians usually considered highly of building relationship with others in developing self-identity and they preferred having a meal with their families together. The study predicted that the eating behaviors of students with self-boarding are changed easily than the students living in the other types of residence, as they had meals with their family together and started to prepare and have meals alone [20]. These results from Rozman's study [20], along with the results of this study, indicated that guidance on a desirable dietary life for college students need to be developed. Lee & Cho [21] reported that, among middle school students, the intake frequency of processed food such as processed meat, noodles, frozen food, breads, confectionery

except for milk and milk products was greatly reduced after the nutrition education. Nutrition education based on their residential environment is necessary to facilitate proper intake of processed food, especially for the college students living in various types of residences.

This study was a cross-sectional design and had several limitations which prevent generalization of results to other populations of college students. The research subjects of this study were selected in a limited location. Also, the type and the definition of residence may vary and differently interpreted by different countries. Therefore, the results from this study specific to Korea may not be relevant to the conditions of other countries. Nonetheless, this study drew significant results suggesting that the residence type of college students was closely related with their intake of processed foods. Particularly, public health care and policy should pay attention to the fact that students living apart from their family and living in rental houses with self-boarding have unusually high preference and intake frequency of processed food. A study to identify a causal relationship between the residence type and the intake of processed food among college students is warranted in the future.

Conclusion

Main predictors of students' consuming processed foods were easy cooking and low price. Students' preference toward some processed foods was different according to their residence type and the intake frequency of processed food was significantly higher in students with self-boarding than students living in other types of residences indicating that the residence type influences their choices and intake of processed foods.

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