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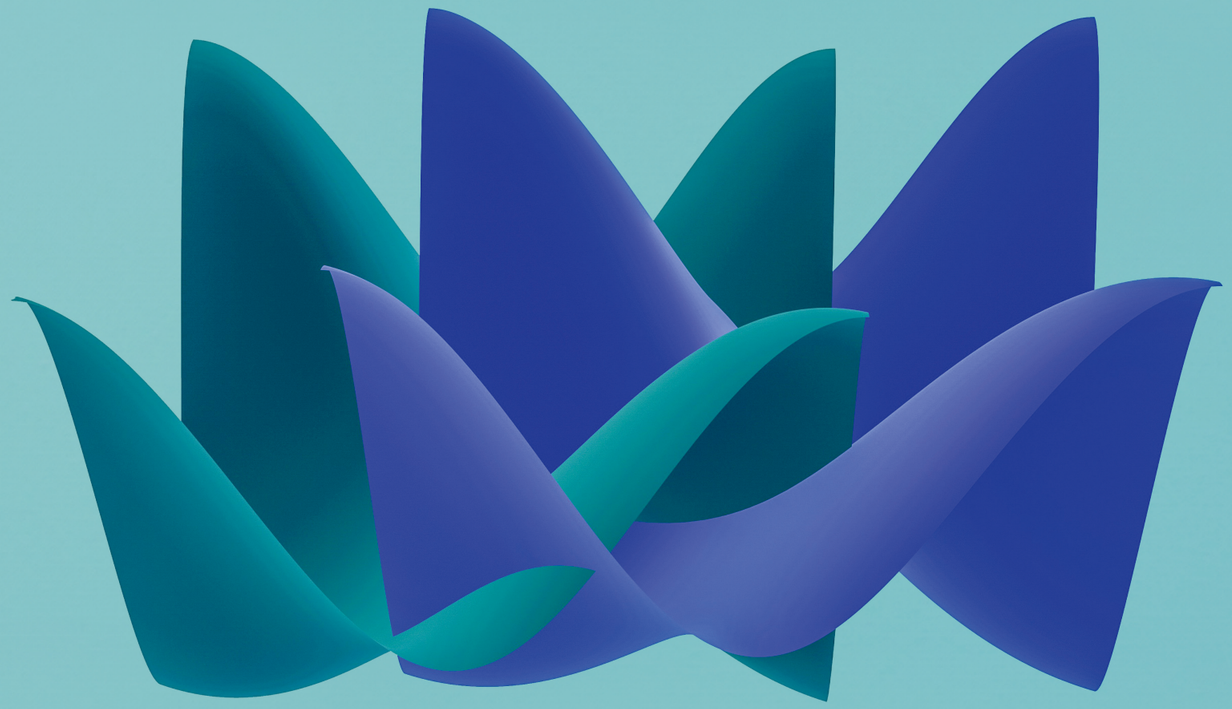

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AIMS AND SCOPE

The *Korean Journal of Community Nutrition* is the official peer-reviewed journal of the Korean Society of Community Nutrition. It was launched in 1996. The previous primary titles were Jiyeog sahoe yeong-yang hag-hoeji (pISSN 1226-0983) from vol. 1, no. 1 to vol 3. no. 5, and Daehan Jiyeok sahoe yeong-yang hakoeji (pISSN 1226-0983, eISSN 2287-1624) from vol. 4, no. 1 to vol. 27 no. 4. The English title (parallel tilte) was Korean Journal of Community Nutrition from vol. 4, no. 1 to vol. 27 no. 4. The *Korean Journal of Community Nutrition* has been the current primary title since October, 2022 (eISSN 2951-3126). The abbreviated title of the journal is *Korean J Community Nutr.* It is published bimonthly in February, April, June, August, October and December. It began to be published only as an e-journal from 2022.

BACKGROUND

KJCN was first published in March, 1996. Three issues were published in 1996, and then five issues per year was published from 1997 to 2001. Since 2002, KJCN has become a bimonthly journal. It is published in February, April, June, August, October and December. This work was supported by the Korean Federation of Science and Technology Societies(KOFST) grant funded by the Korean government. The abbreviated title of the journal is 'Korean J Community Nutr'.

DISTRIBUTION

KJCN is distributed to the members of Korean Society of Community Nutrition. This journal is open access and full text PDF files are available at the official website (https://kjcn.or.kr/). The membership fee including subscription fee and postal charges is 50,000 Won for regular members, 20,000 Won for students, and 500,000 Won for institutional members.

ABSTRACTING AND INDEXING

KJCN is abstracted and indexed in the following databases: KoreaScience (1996-), KoMCi (2000-2020.2), Korea Citation Index (2002-), KoreaMed Synapse (2011-2020.2, 2024.8-), KoreaMed (2011-), Science Central (2014-), CrossRef, Chemical Abstracts Service (CAS), CAB Abstracts, Directory of Open Access Journals (DOAJ, 2022-), SCOPUS (2022-), and google scholar.

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Editor in Chief Ji-Myung Kim, PhD
Korean Society of Community Nutrition
Room 904 Hyundai Hyel, 213-12, Saechang-ro, Yongsan-gu, Seoul 04376, Korea
Tel +82-2-749-0747 **Fax** +82-2-749-0746 **E-mail** kjcn45@koscom.or.kr

Printing office

M2PI
#805, 26 Sangwon 1-gil, Seongdong-gu, Seoul 04779, Korea
Tel +82-2-6966-4930 **Fax** +82-2-6966-4945 **E-mail** support@m2-pi.com

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Erratum

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Research Article

Relationship between self-care and health-related behaviors among Korean adults: a cross-sectional study

EunJung Lee[1], Jin A Jang[2], Ji-Myung Kim[3),4),†]

[1)]Professor, Food and Nutrition Major, School of Wellness Industry Convergence, Hankyong National University, Anseong, Korea
[2)]Professor, Wellness Food Therapy Department, Ansan University, Ansan, Korea
[3)]Professor, Department of Food and Nutritional Science, Shinhan University, Uijeongbu, Korea
[4)]Professor, Smart Care Food Major, Shinhan University, Uijeongbu, Korea

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†Corresponding author:
Ji-Myung Kim
Department of Food and Nutritional Science, Shinhan University, 95 Hoam-ro, Uijeongbu 11644, Korea
Tel: +82-31-870-3515
Fax: +82-31-870-3509
Email: kjm@shinhan.ac.kr

Objectives: This study investigated the relationship between self-care and health-related behaviors such as medication use, dietary supplementation, dietary habits, and physical activity among Koreans aged 20–60 years.
Methods: Data from a total of 300 participants (150 men and 150 women) living in Seoul and Gyeonggi provinces in Korea were analyzed to assess the relationship between health behaviors and dietary supplements (DSs) related to self-care. Based on self-care levels, the participants were classified into three groups: low (n = 124), medium (n = 78), and high (n = 98).
Results: DSs ($P < 0.001$), physical activity ($P < 0.001$), recognizing the perceived health benefits of self-care ($P < 0.001$), self-care when sick ($P = 0.039$), and the reasons for self-care ($P = 0.028$) differed among the self-care groups. Daily diet frequency ($P = 0.001$), breakfast frequency ($P = 0.026$), regular exercise ($P < 0.001$), DSs use rate ($P < 0.001$), DSs use frequency ($P = 0.013$), and total dietary behavior score ($P < 0.001$) also differed significantly depending on the degree of self-care. The degree of self-care was significantly and positively correlated with DSs intake ($r = 0.377$, $P < 0.001$), physical activity ($r = 0.433$, $P < 0.001$), and total dietary behavior score ($r = 0.185$, $P < 0.01$).
Conclusion: The results demonstrated that the degree of self-care was related to DSs, physical activity, and total dietary behavior scores in Korean adults. Additionally, self-care capacity should be increased through health-related behaviors based on health education programs.

Keywords: self care; health behavior; dietary supplements; eating behavior; exercise

INTRODUCTION

Self-care is a consumer-practiced means of health improvement based on their preferences, without guidance from healthcare professionals [1]. Self-care activities range from broad activities, such as dietary habits and exercise, that the public performs as part of health management [2] to specific self-care actions carried out without a physician's intervention to manage mild chronic conditions

[3, 4]. The World Health Organization emphasizes that self-care is important for sustainable disease prevention, health promotion, and a major form of healthcare accessible to all individuals [5]. Many governments, including those in the United States, Europe, and Australia, are increasingly interested in supporting self-care, as it benefits long-term healthcare and can reduce medical costs for minor illnesses [6-8].

Self-directed physical activity and dietary choices are significantly associated with better health outcomes, particularly in weight management and reducing the risk of chronic diseases [9]. Medication adherence, smoking cessation, diabetes self-care, and weight loss are examples of successful health behavior interventions based on changes in daily life [10]. In contrast, behaviors such as frequent medication nonadherence, overeating, and substance abuse (e.g., alcohol, tobacco, and illegal drugs) play roles in poor health and increased mortality [11]. However, a lack of professional guidance on self-care behaviors can lead to inconsistencies in health outcomes owing to the misuse or misunderstanding of related products and practices. For instance, the unsupervised consumption of dietary supplements (DSs) and medications can have both benefits and side effects, depending on individual perceptions and the appropriateness of the products used [12]. The use of DSs along with prescription medications is often believed to improve health. An estimated 12%–20% of patients taking both DSs and prescription medications may have potential drug-supplement interactions [13]. Therefore, the indiscriminate use of DSs and some DSs may be dangerous when taken with prescription drugs.

However, despite many recent studies on self-care, research on health behaviors related to self-care is lacking, and few studies have examined the relationships among general medicine use, DSs use, and self-care. Therefore, this study aimed to understand the practice of self-care among Korean adults and identify the relationship between self-care and health-related behaviors.

METHODS

Ethics statement

The written informed consent was obtained from all participants for the survey. The study protocol was approved by the Institutional Review Board of Shinhan University (approval number: SHIRB-202305-HR-184-02).

1. Study design

This was a cross-sectional study. It was described according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (https://www.strobe-statement.org/).

2. Participants and data collection

This study was conducted in June 2023, using an online survey targeting people in the age group of 20–60 years living in Seoul and Gyeonggi-do, South Korea. Data from a total of 300 respondents were analyzed. The questionnaire used in this study consisted of questions regarding general characteristics, self-care, health-related behaviors, DSs, and dietary habits.

3. General characteristics

General information on gender, age, marital status, household type, occupation, education level, average household income, frequency of breakfast and meal intake, stress, drinking, smoking, and regular exercise were recorded.

4. Self-care behavior

Participants were questioned about their self-care experiences within the last 6 months, self-care methods when sick, source of self-care information, the reasons for self-care, and the side effects to determine their self-care status. Additionally, the degree of self-care, self-administration of medicine without a doctor's prescription, DSs use when sick, physical activity when ill, and perception of the health benefits of self-care were investigated using a five-point Likert scale (1 = not at all, 5 = very much). The participants were classified into three groups according to the degree of self-care: Low, those who reported "not at all" and "a little" self-care (LS, n = 124); medium, those who answered "usually" (MS, n = 78); and high, those who answered, "a lot" and "very much" (HS, n = 98).

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5. Health-related behaviors and dietary supplements

The frequencies of daily diet consumption, breakfast consumption, alcohol consumption, regular exercise, and smoking status were investigated, along with current DS intake and frequency of DSs intake. The investigation included 13 types of DSs: multivitamins and minerals, vitamin B complex, vitamin A & lutein, vitamin C, vitamin D, calcium, probiotics, omega-3 fatty acids, red ginseng and ginseng products, iron supplements, folic acid, protein supplements, and others.

6. Dietary behaviors

The questionnaire on dietary behaviors included 20 items and used a five-point Likert scale (1 = not at all, 5 = very much) [14]. Regarding questions on dietary behaviors, higher scores (average individual scores for each item and the total diet scores on a 100-point scale) indicated better dietary behaviors.

7. Statistical analysis

SAS version 9.4 (SAS Institute Inc.) was used to perform all statistical analyses. The analyzed results were presented as means ± standard error or number (%). Chi-square or Fisher's exact tests were used to analyze the demographic information, DSs intake, and self-care of each group to identify their characteristics. The differences in dietary behavior scores among the groups were determined through analysis of variance using Duncan's multiple range test. The correlations between major variables related to self-care were analyzed and expressed as partial Spearman's rank order correlation coefficient after adjusting for age. Statistical significance was set at $P < 0.05$.

RESULTS

1. General characteristics

Table 1 presents general information on the survey participants. Age differed significantly among the groups according to self-medication. The LS, MS, and HS groups had the highest proportions of people in their 40s, 30s, and 60s, respectively ($P = 0.035$). However, no significant differences were observed across groups in terms of gender, marital status, household type, occupation status, educational level, or average monthly income.

2. Self-care behaviors

The participants' self-care behaviors are presented in Table 2. Self-care experience within the past six months differed significantly among the groups, with 39.52%, 55.13%, and 93.88% of participants in the LS, MS, and HS groups, respectively, reporting self-care experience ($P < 0.001$). There was a significant difference in the degree of self-care by DSs intake when sick among the LS (2.60 ± 1.17), MS (3.03 ± 1.02), and HS (3.56 ± 1.08) groups ($P < 0.001$). There was a significant difference in the degree of self-care through physical activity when sick among the LS (2.70 ± 0.99), MS (2.97 ± 0.58), and HS (3.56 ± 0.72) groups ($P < 0.001$). The perceived health benefits of self-care were significantly higher in the HS group (3.83 ± 0.67) than in the LS (3.32 ± 0.61) and MS (3.29 ± 0.56) groups ($P < 0.001$). Regarding the use medicines or DSs when sick, while the LS group was most likely to report taking "prescription medicines only" (39.52%), both the MS (41.03%) and HS (42.86%) group were most likely to say "both prescription medicines and DSs," with a significant difference among the groups ($P = 0.039$). The most common reason for self-care was "convenience of easily obtaining drugs/health supplements" in all groups (33.67% of the total), followed by "not taking the disease seriously" (25.00%) in the LS group and "easy access to information" in the MS (23.08%) and HS (26.53%) groups, with a significant difference among the groups ($P = 0.028$).

3. Health behaviors and dietary supplements

The health behaviors of the participants are presented in Table 3. The frequencies of daily diet, breakfast, alcohol, smoking, regular exercise, and DSs intake differed significantly according to the degree of self-care. There was a significant difference in the daily diet frequency, with the LS and MS groups having the highest frequency of consuming two times per day, and the HS group having the highest frequency of consuming three times per day ($P = 0.001$). Regarding the frequency of breakfast consumption, the LS and HS groups had a high rate of consuming breakfast 5–7 times a week, while the MS group revealed of almost never eating breakfast, with a significant difference among the groups ($P = 0.026$). The frequency of regular exercise differed significantly among the groups ($P < 0.001$). In the LS group, the

Table 1. Sociodemographic characteristics of the participants according to the degree of self-care

Variable	Total (n = 300)	Low (n = 124)	Medium (n = 78)	High (n = 98)	*P*-value[1)]
Gender					0.086
Men	150 (50.00)	55 (44.35)	47 (60.26)	48 (48.98)	
Women	150 (50.00)	69 (55.65)	31 (39.74)	50 (51.02)	
Age (year)					0.035
20–29	60 (20.00)	27 (21.77)	19 (24.36)	14 (14.29)	
30–39	60 (20.00)	27 (21.77)	20 (25.64)	13 (13.27)	
40–49	60 (20.00)	29 (23.39)	13 (16.67)	18 (18.37)	
50–59	60 (20.00)	23 (18.55)	14 (17.95)	23 (23.47)	
60–69	60 (20.00)	18 (14.52)	12 (15.38)	30 (30.61)	
Marital status					0.488
Married	172 (57.33)	68 (54.84)	43 (55.13)	61 (62.24)	
Single	128 (42.67)	56 (45.16)	35 (44.87)	37 (37.76)	
Household type					0.178
Single-person household	45 (15.00)	24 (19.35)	8 (10.26)	13 (13.27)	
Multi-person household	255 (85.00)	100 (80.65)	70 (89.74)	85 (86.73)	
Occupation					0.429
Yes	217 (72.33)	92 (74.19)	52 (66.67)	73 (74.49)	
None	83 (27.67)	32 (25.81)	26 (33.33)	25 (25.51)	
Education					0.477
High school	43 (14.33)	14 (11.29)	12 (15.38)	17 (17.35)	
In college	14 (4.67)	5 (4.03)	5 (6.41)	4 (4.08)	
Completed college	205 (68.33)	89 (71.77)	55 (70.51)	61 (62.24)	
Graduate school	38 (12.67)	16 (12.90)	6 (7.69)	16 (16.33)	
Average monthly income					0.691
< 2 million won	24 (8.00)	13 (10.48)	4 (5.13)	7 (7.14)	
2–3 million won	44 (14.67)	19 (15.32)	12 (15.38)	13 (13.27)	
3–4 million won	43 (14.33)	18 (14.52)	14 (17.95)	11 (11.22)	
4–5 million won	47 (15.67)	17 (13.71)	13 (16.67)	17 (17.35)	
5–6 million won	50 (16.67)	23 (18.55)	14 (17.95)	13 (13.27)	
≥ 6 million won	92 (30.67)	34 (27.42)	21 (26.92)	37 (37.76)	

n (%).
[1)]*P*-value estimated using the χ^2 test.

most common response was "rarely" (38.71%). In the MS group, the highest response rates were for "1–3 times a month" (25.64%), "1–2 times a week" (24.36%), and "rarely" (23.08%), in that order. In the HS group, the most frequent response was "3–4 times a week" (29.59%), and the proportion of participants who reported exercising "everyday" (16.33%) was substantially higher than in the other groups.

The frequency of DSs intake differed significantly among the groups. The proportions of participants reporting "everyday" intake were 38.04% in the LS group, 55.38% in the MS group, and 64.52% in the HS group, with the HS group showing a significantly higher frequency ($P = 0.013$).

4. Dietary behaviors

The dietary behaviors of the participants are presented in Table 4. The total dietary behavior score for the HS group was 65.26 ± 8.97 points, which was significantly higher than those in the LS (59.74 ± 10.06 points) and MS (59.24 ± 10.04 points) groups ($P < 0.001$). The groups revealed significant differences in the following 12 dietary behavior items: "I have three meals a day" ($P = 0.043$), "I eat a good breakfast" ($P = 0.023$), "I eat regularly" ($P = 0.040$), "I don't overeat" ($P < 0.001$), "I eat food with oil at every meal" ($P = 0.042$), "I rarely eat

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Table 2. Self-care behaviors of the participants according to the degree of self-care

Variable	Total (n = 300)	Low (n = 124)	Medium (n = 78)	High (n = 98)	*P*-value[1]
Self-care within the last 6 months					< 0.001
Yes	184 (61.33)	49 (39.52)	43 (55.13)	92 (93.88)	
No	116 (38.67)	75 (60.48)	35 (44.87)	6 (6.12)	
Take medicines without a doctor's prescription when sick[2]	2.83 ± 1.12	2.80 ± 1.07	2.76 ± 1.15	2.92 ± 1.16	0.595
Take DSs when sick[2]	3.03 ± 1.18	2.60 ± 1.17[c]	3.03 ± 1.02[b]	3.56 ± 1.08[a]	< 0.001
Physical activity when sick[2]	3.05 ± 0.89	2.70 ± 0.99[c]	2.97 ± 0.58[b]	3.56 ± 0.72[a]	< 0.001
Perceived health benefits of self-care[2]	3.48 ± 0.66	3.32 ± 0.61[b]	3.29 ± 0.56[b]	3.83 ± 0.67[a]	< 0.001
Self-care when are sick					0.415
Go to the hospital	174 (58.00)	69 (55.65)	51 (65.38)	54 (55.10)	
Take leftover prescription medicine instead of going to the hospital	46 (15.33)	24 (19.35)	8 (10.26)	14 (14.29)	
Take general medicines instead of going to the hospital	51 (17.00)	20 (16.13)	9 (11.54)	22 (22.45)	
Take DSs	9 (3.00)	4 (3.23)	3 (3.85)	2 (2.04)	
Eat healthy foods	20 (6.67)	7 (5.65)	7 (8.97)	6 (6.12)	
How medicines/DSs are taken when sick					0.039
Take only prescription medicines	95 (31.67)	49 (39.52)	23 (29.49)	23 (23.47)	
Take only general medicines/prescription medications	39 (13.00)	20 (16.13)	10 (12.82)	9 (9.18)	
Take only DSs	13 (4.33)	5 (4.03)	3 (3.85)	5 (5.10)	
Take both prescription medicines and DSs	102 (34.00)	28 (22.58)	32 (41.03)	42 (42.86)	
Take both general medicines and DSs	31 (10.33)	13 (10.48)	5 (6.41)	13 (13.27)	
Stop taking supplements/DSs	4 (1.33)	1 (0.81)	0 (0.00)	3 (3.06)	
Simple stretches or exercises	10 (3.33)	5 (4.03)	2 (2.56)	3 (3.06)	
Not applicable	6 (2.00)	3 (2.42)	3 (3.85)	0 (0.00)	
Reasons for self-care					0.028
High medical expenses	25 (8.33)	11 (8.87)	6 (7.69)	8 (8.16)	
Medicines easily obtained and DSs (because it is convenient)	101 (33.67)	40 (32.26)	29 (37.18)	32 (32.65)	
Not taking the disease seriously	53 (17.67)	31 (25.00)	10 (12.82)	12 (12.24)	
Left-over previously prescribed medications	16 (5.33)	4 (3.23)	8 (10.26)	4 (4.08)	
Ease of access to useful information (recommendations from acquaintances, YouTube, etc.)	64 (21.33)	20 (16.13)	18 (23.08)	26 (26.53)	
Preference for alternative medicine (natural healing therapies, herbal medicines, etc.)	17 (5.67)	4 (3.23)	3 (3.85)	10 (10.20)	
No time, etc.	24 (8.00)	14 (11.29)	4 (5.13)	6 (6.12)	

n (%) or Mean ± SE.
DSs, dietary supplements.
[1]*P*-value was estimated using χ^2 or Fisher's exact tests and analysis of variance (ANOVA).
[2]Five-point Likert scale: not at all = 1; slightly = 2; moderately = 3; very = 4; extremely = 5.
[a–c]Means with different letters within the same row differ significantly according to Duncan's multiple range test.

processed foods" ($P = 0.003$), "I rarely eat sweet foods" ($P = 0.022$), "I avoid spicy and strong-tasting food" ($P < 0.001$), "I rarely eat animal fat" ($P < 0.001$), "I avoid heavy smoking" ($P = 0.003$), "I exercise > 30 min every day" ($P < 0.001$), and "I apply nutritional knowledge to daily life" ($P < 0.001$). In all items showing significant differences, the HS group scored significantly higher than the other groups.

Table 3. Health-related behaviors of the participants according to the degree of self-care

Variable	Total (n = 300)	Low (n = 124)	Medium (n = 78)	High (n = 98)	*P*-value[1]
Daily diet frequency					0.001
1 time	4 (1.33)	3 (2.42)	0 (0.00)	1 (1.02)	
2 times	162 (54.00)	63 (50.81)	56 (71.79)	43 (43.88)	
≥ 3 times	134 (44.67)	58 (46.77)	22 (28.21)	54 (55.10)	
Breakfast frequency					0.026
Rarely	109 (36.33)	39 (31.45)	37 (47.44)	33 (33.67)	
1–2 times/week	37 (12.33)	20 (16.13)	10 (12.82)	7 (7.14)	
3–4 times/week	33 (11.00)	12 (9.68)	11 (14.10)	10 (10.20)	
5–7 times/week	121 (40.33)	53 (42.74)	20 (25.64)	48 (48.98)	
Alcohol frequency					0.748
Rarely	127 (42.33)	51 (41.13)	33 (42.31)	43 (43.88)	
1–3 times/month	75 (25.00)	33 (26.61)	21 (26.92)	21 (21.43)	
1–2 times/week	64 (21.33)	25 (20.16)	15 (19.23)	24 (24.49)	
3–4 times/week	22 (7.33)	12 (9.68)	4 (5.13)	6 (6.12)	
≥ 5–6 times/week	12 (4.00)	3 (2.42)	5 (6.41)	4 (4.08)	
Regular exercise					< 0.001
Rarely	80 (26.67)	48 (38.71)	18 (23.08)	14 (14.29)	
1–3 times/month	43 (14.33)	14 (11.29)	20 (25.64)	9 (9.18)	
1–2 times/week	71 (23.67)	32 (25.81)	19 (24.36)	20 (20.41)	
3–4 times/week	55 (18.33)	14 (11.29)	12 (15.38)	29 (29.59)	
5–6 times/week	28 (9.33)	11 (8.87)	7 (8.97)	10 (10.20)	
Every day	23 (7.67)	5 (4.03)	2 (2.56)	16 (16.33)	
Smoking					0.432
Present smoker	60 (20.00)	27 (21.77)	19 (24.36)	14 (14.29)	
Past smoker	66 (22.00)	24 (19.35)	17 (21.79)	25 (25.51)	
Never	174 (58.00)	73 (58.87)	42 (53.85)	59 (60.20)	
Current DSs intake					< 0.001
Yes	250 (83.33)	92 (74.19)	65 (83.33)	93 (94.90)	
No	50 (16.67)	32 (25.81)	13 (16.67)	5 (5.10)	
Frequency of DSs intake[2]					0.013
< 1 time/month	1 (0.40)	0 (0.00)	0 (0.00)	1 (1.08)	
1–3 times/month	2 (0.80)	2 (2.17)	0 (0.00)	0 (0.00)	
1–2 times/week	15 (6.00)	10 (10.87)	3 (4.62)	2 (2.15)	
3–4 times/week	48 (19.20)	22 (23.91)	13 (20.00)	13 (13.98)	
5–6 times/week	53 (21.20)	23 (25.00)	13 (20.00)	17 (18.28)	
Every day	131 (52.40)	35 (38.04)	36 (55.38)	60 (64.52)	

n (%).
DSs, dietary supplements.
[1]*P*-value was estimated using χ^2 or Fisher's exact tests.
[2]Includes only respondents currently taking DSs.

5. Correlation analysis between self-care degree and health-related variables

Table 5 presents the correlations between the degree of self-care and related variables adjusted for age. The degree of self-care was positively correlated with DSs intake (r = 0.377, $P < 0.001$), physical activity (r = 0.433, $P < 0.001$), and total dietary behavior score (r = 0.185, $P < 0.01$). The degree of medication use without a doctor's prescription was positively correlated with the degree of DSs intake (r = 0.170, $P < 0.01$) and negatively correlated

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Table 4. Dietary behavior scores of the participants according to the degree of self-care

Items	Total (n = 300)	Low (n = 124)	Medium (n = 78)	High (n = 98)	*P*-value[1)]
I have three meals a day.	2.91 ± 1.35	2.90 ± 1.35[ab]	2.64 ± 1.18b	3.15 ± 1.45[a]	0.043
I eat a good breakfast.	2.76 ± 1.33	2.80 ± 1.28[a]	2.42 ± 1.22[ab]	2.97 ± 1.44[a]	0.023
I eat regularly.	3.32 ± 1.04	3.24 ± 1.08[ab]	3.17 ± 0.95[b]	3.53 ± 1.03[a]	0.040
I eat slowly.	3.12 ± 0.97	3.02 ± 1.00	3.06 ± 0.93	3.29 ± 0.94	0.101
I don't overeat.	2.94 ± 0.99	2.69 ± 0.99[b]	3.04 ± 0.96[a]	3.18 ± 0.95[a]	< 0.001
I eat grains every meal (rice, bread, pasta, and potato).	3.45 ± 1.00	3.51 ± 1.00	3.29 ± 0.99	3.49 ± 1.01	0.297
I eat protein every meal (meat, fish, egg, legumes, and tofu).	3.26 ± 0.85	3.27 ± 0.83	3.21 ± 0.86	3.29 ± 0.86	0.798
I eat vegetables more than twice a day except Kimchi.	2.97 ± 0.92	2.93 ± 0.92	2.87 ± 0.86	3.10 ± 0.96	0.205
I eat food with oil every meal.	2.74 ± 0.86	2.86 ± 0.88[a]	2.76 ± 0.82[ab]	2.57 ± 0.85[b]	0.042
I drink milk (cheese, yogurt) every day.	2.78 ± 1.11	2.75 ± 1.15	2.73 ± 1.10	2.86 ± 1.08	0.702
I eat fruits more than twice a day.	2.40 ± 0.97	2.37 ± 1.00	2.41 ± 0.93	2.44 ± 0.99	0.874
I rarely eat processed food.	2.68 ± 1.00	2.49 ± 1.02[b]	2.63 ± 0.88[b]	2.95 ± 1.03[a]	0.003
I rarely eat sweet food.	2.97 ± 1.09	2.82 ± 1.10[b]	2.90 ± 0.92[b]	3.21 ± 1.15[a]	0.022
I eat non-salty food.	2.95 ± 0.95	2.88 ± 0.98[ab]	2.85 ± 0.95[b]	3.13 ± 0.90[a]	0.073
I avoid spicy and strong-tasting food.	2.95 ± 1.03	2.80 ± 1.01[b]	2.74 ± 0.95[b]	3.30 ± 1.03[a]	< 0.001
I rarely eat animal fat.	2.90 ± 0.98	2.77 ± 0.97[b]	2.74 ± 0.95[b]	3.20 ± 0.95[a]	< 0.001
I avoid heavy, frequent drinking.	3.90 ± 1.18	3.86 ± 1.21	3.78 ± 1.19	4.04 ± 1.13	0.319
I avoid heavy smoking.	4.32 ± 1.32	4.23 ± 1.18[b]	4.08 ± 1.31[b]	4.63 ± 0.82[a]	0.003
I exercise > 30 minutes every day.	2.99 ± 1.21	2.66 ± 1.17[b]	2.92 ± 1.09[b]	3.46 ± 1.21[a]	< 0.001
I apply nutritional knowledge to daily life.	3.10 ± 0.92	2.89 ± 0.95[b]	3.00 ± 0.79[b]	3.46 ± 0.88[a]	< 0.001
Total	61.41 ± 10.04	59.74 ± 10.06[b]	59.24 ± 10.04[b]	65.26 ± 8.97[a]	< 0.001

Mean ± SD.
[1)]*P*-value estimated by analysis of variance (ANOVA).
[a–c]Means with different letters (a–c) within the same row differ significantly according to Duncan's multiple range test.

Table 5. Correlation analysis between self-care and related variables (n = 300)

Variables	Degree of self-care	Taking medication without a prescription	DS intake	Physical activity	Total dietary behavior score
Degree of self-care	1[1)]				
Taking medication without a prescription[2)]	0.055	1			
DSs intake[2)]	0.377[***3)]	0.170[**]	1		
Physical activity[2)]	0.433[***]	0.056	0.438[***]	1	
Total dietary behavior score	0.185[**]	−0.119[*]	0.073	0.264[***]	1

DSs, dietary supplements.
[1)]Partial Sperman's rank order correlation coefficient adjusted for age.
[2)]Five-point Likert scale: not at all = 1; slightly = 2; moderately = 3; very = 4; extremely = 5.
[3)]*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

with total dietary behavior score (r = −0.119, $P < 0.05$). The degree of DSs intake was positively correlated with the degree of physical activity (r = 0.438, $P < 0.001$). Finally, the degree of physical activity was positively correlated with the total dietary behavior score (r = 0.264, $P < 0.001$).

DISCUSSION

This study aimed to understand the practice of self-care among Korean adults and to identify health-related behaviors that influence the degree of self-care. Degree of self-care in adults was associated with DSs intake, physical activity, and total diet scores, but not with general medicine use. The importance of self-care is increasingly emphasized in modern society, particularly with the high prevalence of chronic diseases [15, 16]. Self-care is defined as health activities performed by individuals to promote health, prevent disease, and recover from illnesses [17]. These activities may include managing one's health through regular diet management, DSs intake, exercise [18] and seeking medical care or taking general medicines when feeling unwell [19]. Regarding self-care activities, the daily use of DSs, such as vitamins, was high, while the use of general medicine was relatively less common, and information-seeking for self-care activities are conducted daily, primarily using the Internet [20].

Prescription medications are used to treat specific diseases and there is a trend toward increasing self-medication using over-the-counter drugs [21]. In contrast, DSs are mainly used to promote general health [22, 23]. A previous study reported a high self-medication rate (88.2 %) in Thai adults, with the common use of over-the-counter medications such as non-steroidal anti-inflammatory drugs and antibiotics. While self-medication was common owing to mild symptoms and easy access to pharmacies, the authors emphasized that complete treatment of diseases often requires additional care [24]. Our results showed no correlation between the degree of self-care and the use of general medicine. Thus, general medicine use may be an independent factor in personal health management behaviors. As general medicine is primarily aimed at temporary symptom relief, it may not be a suitable indicator of self-care abilities.

The results of the present study showed that when feeling unwell, the participants actively engaged in self-care by increasing their DSs intake or physical activity. Additionally, they tended to take DSs along with prescription medications when they felt unwell. DSs or their compounds can directly affect prescription drugs, potentially inhibiting their clinical effects or exacerbating symptoms, making the combination of certain DSs and prescription drugs potentially dangerous [25]. Although previous studies have reported that women, the elderly, and those with formal education often believe that using DSs along with prescription medications can further improve their health [26, 27], the present study did not observe significant differences in DSs intake or self-care behaviors by gender or education level. These discrepancies may be due to differences in the study population or sample size. Further research is needed to explore these associations in more diverse populations.

A study examining the relationship between age and self-care found that older adults are highly dependent on self-care [28], and a report from the United States showed that the time spent on self-care increases with age among adults aged > 25 years [29]. Similarly, the results of the present study confirmed that the participants who actively engaged in self-care were older adults. This may be owing to increased disease risk and health awareness with increasing age, leading to the recognition of the importance of health management. These results highlight the importance of nutrition education and physical activity programs for improving self-care behaviors, especially among older adults. Appropriate management of DSs intake is likely to enhance self-care abilities effectively. Future research should explore these associations further to develop practical interventions for diverse populations. Previous research has reported that many adults engage in health-related behaviors without professional supervision and are often influenced by a strong will to maintain personal health [30]. These results suggest that an environment in which DSs are easily accessible and useful information is readily available provides conditions conducive to self-care. DSs intake supports overall health by providing additional nutrition, especially for individuals with nutritional imbalances [31]. In this study, groups with high DS intake also showed high self-care abilities, suggesting that DSs may be an effective tool to promote self-care behaviors.

Additionally, the degree of self-care was related to total diet scores and physical activity. The degree of self-care improved as DSs intake increased, physical activity increased, and the total dietary behavior scores improved. Specifically, three regular meals per

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day, breakfast consumption, and overall better dietary habits along with regular exercise were observed. Self-care encompasses regular physical activity, adhering to medication regimens, monitoring symptom, following prescribed diuretics, and seeking medical advice from health-care professionals [32]. Similar to the results of previous studies [33, 34] that the higher the self-efficacy, the better the health promotion behavior, the better the self-care was in this study as well as the better the eating habits and the more exercise. A previous study also reported improvements in nutritional assessment scores and nutrient intake status in the elderly following a meal intervention after hospital discharge [34]. Another study observed that among individuals aged > 50 years, better adherence to dietary guidelines was associated with better self-rated health, thus confirming a significant relationship between perceived health status and healthy eating habits [35].

In this study, the more physical activity one did, the higher the degree of self-care. Clearly, obesity is the result of modern lifestyles, such as irregular physical activity and being sedentary. Physical Activity Guidelines in the US also suggest that obesity is the result of modern lifestyles, such as irregular physical activity and being sedentary [36]. According to Chung *et al.* [37], it was found that the group that exercised was more concerned about their health concern and had better diet habits and DSs intake compared to the group that did not exercise. Regular physical activity helps maintain overall physical function, including mood improvement, self-awareness, and the prevention of mental health issues [38]. These results indicated that good dietary habits, nutritional status, and physical activity contribute to improved self-care abilities. Thus, specific dietary improvement programs for adult are required, and it is necessary to consider the practice of nutrition education and physical activity.

Limitations

This study has several limitations. First, the study included a relatively small sample of 300 participants, limited to the Seoul and Gyeonggi regions of Korea, which reduced the generalizability of the findings. Second, the data collection relied on self-report surveys; thus, response bias was possible. Third, the degree of self-care was based on subjective self-reported data, limiting the accuracy of group classification.

Conclusion

The findings of this study provide valuable insights into the relationship between self-care behaviors and health-related factors, such as DSs intake, physical activity, and dietary habits, among Korean adults. The results highlight the importance of promoting healthy dietary behaviors and regular physical activity as integral components of self-care. Furthermore, these results suggest that DSs intake, when appropriately managed, could play a supportive role in enhancing self-care abilities. Future research should incorporate diverse populations, examine causal relationships between self-care and health behaviors, and integrate objective measures to enhance understanding of health outcomes. These efforts will help develop health strategies and effective programs to enhance self-care across diverse groups.

CONFLICT OF INTEREST

The corresponding author, Ji-Myung Kim, serves as the Editor-in-Chief of the Korean Journal of Community Nutrition. To mitigate any potential conflicts of interest, Ji-Myung Kim abstained from the peer review and editorial decision-making process for this manuscript, which was managed by an independent responsible editor. No other authors have any conflicts of interest to declare.

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DATA AVAILABILITY

Research data is available upon request to the corresponding author.

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Research Article

Healthy eating intentions among adults in China: a cross-sectional study of northern and southern regions and city tiers based on the theory of planned behavior

Yi Jiang[1], **Ji-Yun Hwang**[2,†]

[1]Graduate Student, Department of Foodservice Management and Nutrition, Graduate School, Sangmyung University, Seoul, Korea
[2]Professor, Major of Foodservice Management and Nutrition, Sangmyung University, Seoul, Korea

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†Corresponding author:
Ji-Yun Hwang
Major of Foodservice Management and Nutrition, Graduate School, Sangmyung University, Seoul 03016, Korea
Tel: +82-2-781-7521
Fax: +82-2-2287-0104
Email: jiyunhk@smu.ac.kr

Objectives: The theory of planned behavior (TPB) has been widely employed to predict healthy eating intentions. Regional differences may affect dietary habits, health status, and personality traits, whereas variations in urbanization influence accessibility to fresh and healthy food, thereby impacting TPB components. This study aimed to explore whether regional differences between northern and southern China including city-tier development are associated with healthy eating intentions among Chinese adults.

Methods: The study included data from 2,114 Chinese adults aged 19–64 years collected between 2019 and 2023. Participants were categorized by geographic region (north or south) and city-tier status (first-tier or other).

Results: Compared to individuals from northern first-tier cities, those from southern regions exhibited stronger attitudes, perceived behavioral control (PBC), and intention to eat healthily. Participants from other cities in the north had more positive attitudes, subjective norms, PBC, and intentions to participate in healthy eating. Furthermore, residents of southern cities revealed weaker subjective norms than those of cities in the north. The adjusted odds ratio (OR) for compliance with intention to engage in healthy eating was higher among participants from other cities in both the north and south compared to those from northern first-tier cities (northern other cities: OR = 2.43, 95% confidence interval [CI]: 1.49–3.97, $P < 0.001$; southern other cities: OR = 1.95, 95% CI: 1.08–3.51, $P = 0.027$). No significant differences existed among the subjects from first-tier cities according to their geographic regions. These trends remained consistent even after including the interaction term between geographic regions and city-tier classification.

Conclusion: These findings underscore the complexity of regional variations influencing dietary intentions and indicate that tailored health promotion strategies should incorporate regional characteristics. Future research should explore underlying factors, including regional cultural influences, to better inform policies and interventions.

Keywords: diet; intention; regional health planning; health behavior; China

INTRODUCTION

The theory of planned behavior (TPB) [1] is widely employed to explore how attitude, subjective norms, and perceived behavioral control (PBC) influence behav-

ioral intentions, particularly health-related decisions in adults [2-7]. Stronger intentions are associated with a higher likelihood of performing a particular behavior [1]. Attitude reflects the positive or negative evaluation of a behavior, subjective norms involve social pressure and willingness to comply with others' expectations, and PBC refers to the perceived ease or difficulty in executing a behavior [1]. PBC also directly influences behavior when factors are beyond individual control, especially when actions are not entirely voluntary [1]. As healthy eating is challenging and not fully controllable, PBC plays a crucial role [1]. The intention to practice healthy eating is strongly associated with the probability of engaging in certain behavior [2-7].

Healthy eating behaviors are influenced by dietary environment, as emphasized by Brug [8]. Among Chinese adults, healthy eating intentions have previously been studied using TPB because it is believed to predict intentions for rationally determined behavior, with findings consistent across multiple studies in multiple locations in China [9-11]. However, the unique characteristics of China, such as its regional living conditions, necessitate further examination, to data, no previous study has directly examined the healthy eating intentions of Chinese adults in different regions. China's vast geography, characterized by distinct northern and southern regions, contributes to variations in eating habits, health conditions, and cultural practices. Previous research has often overlooked comparative analyses of these regional differences, either underscoring solely on individual regions or lacking direct comparisons between regions [12-14].

Some regional studies, such as those conducted in Guanzhong (Shanxi) and southeastern Guizhou, have revealed the significant impact of geographic differences on food culture, highlighting the importance of addressing the interplay between human behavior and geographic environments to foster a healthier and more harmonious dietary culture [15]. Furthermore, regional disparities, including prevalence of diseases such as dementia, have been linked to differences in dietary patterns, potentially reflecting the broader influence of regional variations on healthy eating [16]. Historical differences between the northern and southern regions have also shaped distinct dietary preferences and health outcomes, affecting intentions towards healthy eating among Chinese adults [17].

In addition to geographic variations, urbanization influences access to healthy foods and perceptions of healthy eating [18, 19]. Consequently, regional decision-making disparities can affect healthy eating habits substantially. Thus, effective nutritional interventions require careful consideration of regional contexts in alignment with China's 2030 Health Plan [20].

Geographically, the Qinling-Huaihe Line has historically served as a natural boundary dividing northern and southern China, primarily based on climatic differences that have significantly shaped agricultural practices and dietary habits. These dietary differences influence individual variations in healthy eating intentions, which in turn impact the feasibility of adopting healthy eating plans. For instance, understanding the healthy eating intentions of northern adults accustomed to a red meat-based diet is crucial [21].

Moreover, city-tier classifications in China, which reflect urban development levels, city size, and population density, play a central role in shaping dietary accessibility and preferences. First-tier cities, such as Beijing, Shanghai, and Guangzhou, differ markedly from lower-tier cities in terms of resources and infrastructure, which can significantly influence healthy eating intentions. Examining how these urban development factors intersect with regional dietary differences offers valuable insights for promoting healthier eating intentions among Chinese adults [22-24]. Hence, this study examined how the combined factors of regional (north-south) and urban development (city tier) differ in terms of healthy eating intentions.

METHODS

Ethics statement

This study was approved by the Institutional Review Board of Sangmyung University between 2019 and 2023 (BE2019-01-05, SMUIRBC-2020-009, and SMUIRBC-2023-001).

1. Study design

This cross-sectional study was designed in accordance with the Strengthening the Reporting of Observational

Studies in Epidemiology (STROBE) guidelines (https://www.strobe-statement.org/).

2. Theoretical concepts

This study was based on Ajzen's [1] TPB, which includes attitudes, subjective norms, PBC, and intentions towards healthy eating. To explore potential regional differences in the relationships among these TPB constructs, two regional characteristics—the geographic distinction between north and south and city-tier classification (first-tier cities vs. other cities) were examined.

3. Study participants and data collection period

This study integrated data collected from numerous regions across China, including Anhui, Henan, Heilongjiang, Beijing, and Shanghai, using the sampling methodologies described in previous studies [9-11]. These regions were carefully selected to facilitate a comprehensive analysis of regional (north-south) and urban development (city-tier) differences in healthy eating intentions. By including both northern and southern regions, including first-tier and other cities, this study aimed to capture diverse dietary practices and their potential influence on healthy eating intentions (Fig. 1) [25]. Furthermore, the geographical locations of these regions were relatively aligned, improving the study's ability to compare findings across different contexts.

Anhui and Henan were selected to represent cities outside the first-tier category. As of 2024, Henan comprises 17 prefecture-level cities with a population of approximately 98.15 million and a per capita disposable income of 31,552 Chinese Yuan (CNY), while Anhui consists of 16 prefecture-level cities with a population of about 61.23 million and a per capita disposable income of around 36,800 CNY. Both provinces are predominantly inhabited by Han ethnic groups. Geographically, Henan is located between 31°23′–36°22′ north latitude and 110°21′–116°39′ east longitude, while Anhui is situ-

Fig. 1. Study locations in China. Modified from Wikipedia [Internet]. Wikipedia; 2009 [cited 2025 Mar 24] (https://upload.wikimedia.org/wikipedia/commons/thumb/9/98/ROC_vs_PRC.svg/1280px-ROC_vs_PRC.svg.png) [25].

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ated between 29°41′–34°38′ north latitude and 114°54′–119°37′ east longitude. Although both provinces are situated near the central region of China, Henan is positioned relatively more to the north and Anhui is more to the south. Including these two provinces allowed us to capture regional dietary differences between the north and south, excluding the influence of major metropolitan areas [26, 27].

Beijing and Shanghai were selected as first-tier cities in northern and southern China, respectively. As of 2024, Beijing's permanent population will be approximately 21.832 million, with a per capita disposable income of approximately 85,415 CNY. Shanghai's permanent population is approximately 24.7589 million, with a per capita disposable income of approximately 84,834 CNY. Both cities are predominantly inhabited by Han ethnic groups. Geographically, Beijing is located between 39°28′–41°05′ north latitude and 115°20′–117°30′ east longitude, while Shanghai is situated between 30°42′–31°48′ north latitude and 120°52′–122°16′ east longitude. The inclusion of these internationally recognized metropolises allows us to explore how city-tier status influences healthy eating intentions [28, 29].

Because most of the samples were concentrated in areas closer to the south, data from Heilongjiang were integrated to address potential gaps and enhance the study's comparison between the northern and southern regions. As of 2024, Heilongjiang's permanent population is approximately 21.832 million, with a per capita disposable income of approximately 31,269 CNY. The population is predominantly Han, and its geographical location spans 43°26′–53°33′ north latitude and 121°11′–135°05′ east longitude [30]. Heilongjiang broadened the geographical scope of this study and strengthened the comparative analysis of the regional differences.

Given the vastness and diversity of China, which is comprised of 34 provinces, municipalities, and autonomous regions, it is unrealistic to collect responses from adults nationwide. Furthermore, aside from Liu et al. [9], Liu et al. [10], and Ma et al. [11], no studies have directly focused on healthy eating intentions of Chinese adults. Therefore, we strategically organized the data based on the regional selection outlined above, which included Beijing, Shanghai, Henan, Anhui, and Heilongjiang. This approach allows for a comprehensive analysis of both north-south regional differences and city-tier distinctions, with Beijing and Shanghai representing first-tier cities and Henan, Anhui, and Heilongjiang representing "other cities." This regional sampling framework was designed to provide a balanced and meaningful comparison of healthy eating intentions across diverse geographical and urban developmental contexts. Data were collected using online questionnaires distributed by five investigators between 2019 and 2023, resulting in 2,232 completed responses. A total of 118 responses were excluded because of lack of consent (n = 10), insufficient response time (< 4 minutes; n = 9), age criteria violations (< 18 or > 64 years; n = 88), missing data (n = 9), and data errors (n = 2). Consequently, 2,114 valid responses were included in the final analyses [31, 32]. Although an a priori power analysis was not conducted, the sample size of 2,114 participants was considered sufficient to yield statistically significant results given the sample sizes used in previous studies and the analytical design of the current study.

4. Study measures

1) General characteristics

The demographic variables collected included sex, age (years), marital status (married or unmarried), alcohol consumption (categorized as never, < once/week, ≥ once/week, everyday), lifetime smoking status (never or ever), presence of disease, cohabitation with family, employment status, education level (≤ high school, ≥ college), monthly income (< 5,000 CNY, > 5,000 CNY), and physical activity level (low, moderate, active). Moreover, the participants were classified based on geographic region (north or south) and city-tier status (first-tier or other cities).

2) TPB constructs

The survey instrument evaluated the constructs of the TPB, including attitudes, subjective norms, PBC, and intentions towards healthy eating. In previous studies, detailed descriptions of these measurement items and their reliabilities have been documented [9-11]. All constructs were evaluated using a 5-point Likert scale, with Cronbach's alpha coefficients exceeding 0.7, indicating good reliability.

Attitudes towards healthy eating were evaluated using

six evaluative adjectives: harmful/beneficial, useful/useless, good/bad, pleasant/unpleasant, boring/interesting, and desirable/undesirable. Subjective norms were measured by asking respondents to rate their perceptions of social pressure to eat healthily from numerous sources, including family, friends, classmates, colleagues, experts (e.g., doctors and nutritionists), government authorities, TV programs, newspapers, and internet information (e.g., blogs and YouTube). PBC was evaluated through four questions rated from "definitely yes" to "definitely no." These questions assessed the respondents' confidence in their ability to eat healthily, including: "Will you try to eat healthily?", "Do you have enough self-discipline to eat healthy?", "Do you have enough time to eat healthy?", and "Do you want to eat healthy regardless of any difficulties you encounter?" Behavioral intentions regarding healthy eating were measured through four statements rated from "definitely yes" to "definitely no." These statements included: "In the next two weeks, I am willing to eat healthy meals," "Eat a healthy meal," "Have plans to eat healthy food," and "Want to recommend healthy food to my family, friends, and colleagues."

5. Statistical analysis

Categorical variables were compared using the chi-squared test, while continuous variables were presented as means ± standard deviations and analyzed using independent-sample t-tests. These analyses were conducted according to the geographical region and city-tier classification. Multiple linear regression analyses were conducted to examine the differences in the scores of each TPB construct according to regional factors. Owing to significant differences in demographic characteristics across regions, the analyses were adjusted for potential confounding factors, including sex, age, alcohol consumption, lifetime smoking, presence of disease, cohabitation with family, employment status, education level, monthly income, and physical activity level. Furthermore, multiple logistic regression analyses were employed to identify regional differences, with the results expressed as odds ratios (ORs) and 95% confidence intervals (CIs) for the TPB constructs. In the binary logistic regression model, each TPB construct was recoded as "compliance" if the average score on the 5-point scale was 4 or higher and as "noncompliance" if it was below 4. The number of respondents classified as noncompliant for each construct was as follows: attitude (n = 585), subjective norm (n = 798), PBC (n = 869), and intention (n = 835). The analysis process consisted of three steps: (1) Predicting each TPB construct as a dependent variable while controlling for confounders. (2) The intention to engage in healthy eating was examined as a dependent variable, using the three TPB constructs (attitude, subjective norm, and PBC) as independent variables, along with confounders. (3) The interaction between geographical region and city-tier classification was added to the second model to assess its potential effects. Data analysis was conducted using SPSS software version 26 (IBM Corp.). Statistical significance was set at $P < 0.05$.

RESULTS

1. General characteristics of participants by geographic region and city-tier classification

Participants from northern regions were more likely to be male ($P < 0.001$), more adults aged 18–25 ($P < 0.001$), more than 15.3% of people tried drinking alcohol ($P < 0.001$), nonsmokers ($P = 0.018$), less educated ($P = 0.010$), and had lower income levels ($P = 0.001$) than those from southern regions. Conversely, participants residing in first-tier cities were more likely to be female ($P = 0.044$), young adults under 40 years old ($P < 0.001$), have tried alcohol consumption (approximately 60%; $P < 0.001$), have a diagnosed disease ($P = 0.001$), live with family ($P < 0.001$), be employed ($P < 0.001$), have higher education levels ($P = 0.010$), have higher income levels ($P < 0.001$), and engage in more physical activity ($P < 0.001$) compared to those living in other cities (Table 1).

2. Comparison of TPB constructs by geographic region and city-tier classification

Compared to participants from the southern region, those from the northern region had higher scores for subjective norms (t = 3.69, $P < 0.001$), PBC (t = 2.09, $P = 0.037$) and intention to engage in healthy eating (t = 2.57, $P = 0.010$). Participants residing in first-tier cities had lower scores across all TPB constructs (all $P < 0.001$). When further classified by geographic region, partici-

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Table 1. General characteristics of participants by geographic region and city-tier classification

Contents	Total (n = 2,114)	Geographic region				City-tier			
		North (n = 1,439)	South (n = 675)	χ^{2} [1]	*P*-values[2]	First-tier (n = 640)	Other cities (n = 1,474)	χ^{2} [1]	*P*-values[2]
Sex				24.18	<0.001			4.07	0.044
Male	912 (43.1)	673 (46.8)	239 (35.4)			261 (40.8)	651 (44.2)		
Female	1,202 (56.9)	766 (53.2)	436 (64.6)			379 (59.2)	823 (55.8)		
Age (year)				48.49	<0.001			44.72	<0.001
18–25	716 (33.9)	523 (36.3)	193 (28.6)			206 (32.2)	510 (34.6)		
26–39	724 (34.2)	422 (29.3)	302 (44.7)			244 (38.1)	480 (32.6)		
40–64	674 (31.9)	494 (34.3)	180 (26.7)			190 (29.7)	484 (32.8)		
Marital status				0.40	0.527			2.53	0.111
Married	1,147 (54.3)	774 (53.8)	373 (55.3)			336 (52.5)	811 (55.0)		
Unmarried	967 (45.7)	665 (46.2)	302 (44.7)			304 (47.5)	663 (45.0)		
Alcohol consumption				22.80	<0.001			48.14	<0.001
Never	861 (40.7)	545 (37.9)	316 (46.8)			260 (40.1)	601 (40.8)		
< Once per week	642 (30.4)	471 (32.7)	171 (25.3)			144 (22.5)	498 (33.8)		
≥ Once per week	538 (25.4)	364 (25.3)	174 (25.8)			219 (34.2)	319 (21.6)		
Everyday	73 (3.5)	59 (4.1)	14 (2.1)			17 (2.7)	56 (3.8)		
Lifetime smoking				5.59	0.018			0.30	0.586
Never	1,429 (67.6)	949 (65.9)	480 (71.1)			438 (68.4)	991 (67.2)		
Ever	685 (32.4)	490 (34.1)	195 (28.9)			202 (31.6)	483 (32.8)		
Presence of disease				1.45	0.229			11.28	0.001
Yes	352 (16.7)	230 (16.0)	122 (18.1)			126 (19.7)	226 (15.3)		
No	1,762 (83.3)	1,209 (84.0)	553 (81.9)			514 (80.3)	1,248 (84.7)		
Cohabitation with family				0.01	0.938			33.67	<0.001
Yes	1,490 (70.5)	1,015 (70.5)	475 (70.4)			492 (76.9)	998 (67.7)		
No	624 (29.5)	424 (29.5)	200 (29.6)			148 (23.1)	476 (32.3)		
Employment status				3.04	0.081			30.77	<0.001
Yes	1,385 (65.5)	925 (64.3)	460 (68.1)			475 (74.2)	910 (61.7)		
No	729 (34.5)	514 (35.7)	215 (31.9)			165 (25.8)	564 (38.3)		
Education level				6.63	0.010			113.91	<0.001
≤ High school	753 (35.7)	539 (37.5)	214 (31.7)			120 (18.8)	633 (42.9)		
≥ College	1,361 (64.3)	900 (62.5)	461 (68.3)			520 (81.2)	841 (57.1)		
Monthly income (CNY)				10.26	0.001			17.07	<0.001
≤ 5,000	1,069 (50.6)	762 (52.9)	307 (45.5)			280 (43.8)	789 (53.5)		
> 5,000	1,045 (49.4)	677 (47.1)	368 (54.5)			360 (56.2)	685 (46.5)		
Physical activity				5.27	0.072			138.66	<0.001
Low	712 (33.7)	485 (33.7)	227 (33.6)			228 (35.6)	484 (32.8)		
Moderate	698 (33.0)	495 (34.4)	203 (30.1)			107 (16.7)	591 (40.1)		
Active	704 (33.3)	459 (31.9)	245 (36.3)			305 (47.7)	399 (27.1)		

n (%).
CNY, Chinese Yuan.
[1]chi-square test was used for comparison.
[2]The significance level for statistical analysis was $P < 0.05$.

pants from northern first-tier cities had lower scores for attitude (t = –3.76, $P < 0.001$), PBC (t = –2.22, $P = 0.027$), and intention to engage in healthy eating (t = –2.12, $P = 0.034$) compared to those from southern first-tier cities. Among participants living in other cities, those from the northern regions had lower scores for attitude (t = –3.79,

$P < 0.001$) and higher scores for subjective norms (t = 3.32, $P = 0.001$) and PBC (t = 4.25, $P < 0.001$) than their southern counterparts. Furthermore, when participants were analyzed based on city-tier within each geographic region, those from northern first-tier cities had significantly lower scores for attitude (t = –6.60, $P < 0.001$), subjective norms (t = –5.28, $P < 0.001$), PBC (t = –5.73, $P < 0.001$), and intention to engage in healthy eating (t = –5.65, $P < 0.001$) compared to those from northern other cities. However, no significant differences were observed between participants living in the first tier and those living in other cities in the southern region (Table 2).

3. Relationships among TPB constructs by geographic region and city-tier classification

Multiple linear regression analyses were conducted after adjusting for potential confounders, including sex, age, alcohol consumption, lifetime smoking, presence of disease, living with family, employment status, education level, monthly income, and physical activity. The results indicated that participants from the northern region had significantly higher scores for subjective norms (t = 3.74, $P < 0.001$), PBC (t = 2.09, $P = 0.037$), and intention to engage in healthy eating (t = 2.57, $P = 0.010$) than those from the southern region. Conversely, participants residing in first-tier cities scored significantly lower across all TPB constructs (attitude, subjective norms, PBC, and intention) than those living in other cities (all t > 6, all $P < 0.001$). Further analyses of the city-tier classification within each geographic region demonstrated different patterns. Among participants from the northern regions, those residing in first-tier cities exhibited significantly lower scores for attitude, subjective norms, PBC, and intention to engage in healthy eating than those living in other cities (all t > 6, all $P < 0.001$). Conversely, among participants from the southern regions, no significant differences were observed across the TPB constructs based on city-tier classification (Table 3).

4. OR (95% CI) for compliance with TPB constructs by geographic region and city-tier classification

First, compliance with each TPB construct was examined by geographic region and city-tier classification. Compared to individuals from northern first-tier cities, those residing in northern other cities exhibited significantly stronger attitudes (OR = 3.57, 95% CI: 2.62–4.86, $P < 0.001$), subjective norms (OR = 2.33, 95% CI: 1.73–3.14, $P < 0.001$), PBC (OR = 2.58, 95% CI: 1.91–3.48, $P < 0.001$), and intentions to engage in healthy eating (OR = 3.04, 95% CI: 2.25–4.12, $P < 0.001$). Moreover, individuals from southern first-tier cities revealed higher values for all constructs except subjective norms, compared to those from northern first-tier cities (attitudes, OR = 2.08, 95% CI: 1.48–2.92, $P < 0.001$; PBC, OR = 1.48, 95% CI: 1.06–2.07, $P = 0.020$; intention, OR = 1.52, 95% CI: 1.09–2.12, $P = 0.014$). Similarly, participants from other southern cities showed significantly stronger attitudes (OR = 6.06, 95% CI: 3.94–9.31, $P < 0.001$), PBC (OR = 1.98, 95% CI: 1.37–2.86, $P < 0.001$), and intentions to engage in healthy eating (OR = 2.23, 95% CI: 1.54–3.23, $P < 0.001$). Second, compliance with the intention to engage in healthy eating, including all three TPB constructs, was examined by geographic region and city tier. No significant differences existed among the subjects from first-tier cities according to their geographic regions. However, compared to northern first-tier cities, participants from other cities in both the north and south displayed stronger intentions (northern other cities: OR = 2.43, 95% CI: 1.49–3.97, $P < 0.001$; southern other cities: OR = 1.95, 95% CI: 1.08–3.51, $P = 0.027$). In the model, all three TPB constructs remarkably predicted intention: attitude (OR = 1.09, 95% CI: 0.79–1.50, $P = 0.603$), subjective norm (OR = 2.11, 95% CI: 1.51–2.96, $P < 0.001$), and PBC (OR = 41.56, 95% CI: 27.65–62.46, $P < 0.001$) (data not shown). Finally, additional analysis testing the interaction between geographical region and city-tier classification revealed no significant effect ($P = 0.422$), whereas geographic region ($P = 0.017$) and city-tier classification ($P = 0.044$) remained significant (data not shown) (Table 4).

DISCUSSION

The TPB has been widely used to study individuals' intentions towards healthy eating [7]. It has been employed to diverse demographic groups including adolescents [2], pregnant women [33], and individuals with varying weight statuses such as normal weight, overweight, and obese [34]. These studies were conducted

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Table 2. Comparison of theory of planned behavior constructs by geographic region and city-tier classification

	Attitude	t-value	*P*-value[1)]	Subjective norms	t-value	*P*-value[1)]	Perceived behavioral control	t-value	*P*-value[1)]	Intention	t-value	*P*-value[1)]
Total	4.04 ± 0.79			3.90 ± 0.80			3.82 ± 0.83			3.78 ± 0.88		
Geographic region		−1.39	0.165		3.69	<0.001		2.09	0.037		2.57	0.010
North	4.03 ± 0.79			3.94 ± 0.79			3.85 ± 0.82			3.81 ± 0.87		
South	4.08 ± 0.80			3.80 ± 0.82			3.77 ± 0.83			3.71 ± 0.89		
City-tier		−5.91	< 0.001		−5.16	<0.001		−4.90	<0.001		−4.76	<0.001
First-tier	3.84 ± 0.93			3.70 ± 0.91			3.63 ± 0.92			3.58 ± 0.97		
Other cities	4.13 ± 0.70			3.99 ± 0.73			3.91 ± 0.76			3.87 ± 0.83		
City-tier and geographic region												
First-tier		−3.76	< 0.001		−0.90	0.371		−2.22	0.027		−2.12	0.034
North	3.61 ± .1.00			3.59 ± 0.99			3.49 ± 0.98			3.42 ± 1.05		
South	3.98 ± 0.85			3.76 ± 0.85			3.72 ± 0.88			3.68 ± 0.91		
Other cities		−3.79	< 0.001		3.32	0.001		4.25	<0.001		0.26	0.797
North	4.11 ± 0.70			4.01 ± 0.72			3.92 ± 0.77			3.89 ± 0.81		
South	4.22 ± 0.69			3.86 ± 0.78			3.84 ± 0.75			3.74 ± 0.88		
Between northern first-tier cities and other cities		−6.60	< 0.001		−5.28	<0.001		−5.73	<0.001		−5.65	<0.001
Between southern first-tier cities and other cities		−1.71	0.088		−0.48	0.633		−0.03	0.974		−0.31	0.754

Mean ± SD.
[1)]The significance level for statistical analysis was $P < 0.05$. The comparison was performed using t-test.

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Table 3. Linear regression results of the relationships among theory of planned behavior constructs by geographic region and city-tier classification

Factors			Beta	SE	t	*P*-value[1)]
Independent variables		Dependent variables				
Geographic region north (ref = south)		Attitude	−0.03	0.37	−1.39	0.165
		Subjective norms	0.08	0.04	3.74	<0.001
		Perceived behavioral control	0.05	0.04	2.09	0.037
		Intention	0.06	0.04	2.57	0.010
City tier other cities (ref = first-tier)		Attitude	0.17	0.04	8.03	<0.001
		Subjective norms	0.16	0.04	7.63	<0.001
		Perceived behavioral control	0.15	0.04	7.12	<0.001
		Intention	0.15	0.04	6.84	<0.001
City-tier by geographic region other cities (ref = first-tier)	North	Attitude	0.20	0.05	7.64	<0.001
	South		0.07	0.06	1.71	0.088
	North	Subjective norms	0.16	0.05	6.00	<0.001
	South		0.02	0.06	0.48	0.633
	North	Perceived behavioral control	0.16	0.05	6.27	<0.001
	South		0.01	0.06	0.33	0.974
	North	Intention	0.16	0.05	6.22	<0.001
	South		−0.01	0.07	−0.31	0.754

Adjusted for sex, age, alcohol consumption, lifetime smoking, presence of disease, living with family, employment status, education level, monthly income, and physical activity.
[1)]*P*-value was determined by Linear regression results.

in numerous countries, including the United States and New Zealand. Given the strong predictive power of the TPB for healthy eating behavior, this study applied it to Chinese adults across different regions, addressing a gap in prior research that did not account for regional variations in China.

This study revealed significant regional differences in healthy eating intentions among Chinese adults. This study found notable differences in TPB constructs between individuals in the first-tier and those in other cities, including between the northern and southern regions, after accounting for confounding factors. These differences may be influenced by the regional food culture, economic development, and historical factors [35]. The results indicate that healthy eating intentions vary depending on geographic and urban classifications. When each TPB factor was separately analyzed, participants residing in other cities generally reported higher scores across all constructs. However, when intention was explored as the dependent variable with all three TPB constructs (attitude, subjective norm, and PBC) included as predictors, no significant difference in healthy eating intentions was noted within first-tier cities, regardless of geographical region. Notably, all three constructs significantly predicted intention. This finding may be explained by an increased preference for convenience foods during the coronavirus disease 2019 (COVID-19) pandemic [36]. During the pandemic, individuals attempted to maintain healthier and more regular diets as a coping mechanism. However, after the pandemic, their focus shifted towards other activities, resulting in greater reliance on convenience foods. Moreover, the resumption of local social activities after prolonged restrictions may have contributed to "revenge consumption" [37]. During social gatherings, people are more likely to select less healthy foods, which may partially explain the negative correlation observed between TPB constructs and the intention to engage in healthy eating. This finding may be attributed to an increased preference for convenience foods during COVID-19 pandemic [36]. People have attempted to adopt healthier and more regular diets as a coping mechanism during the pandemic. However, after the pandemic, their focus shifted towards other activities, leading to greater reliance on convenience foods. Additionally, the resumption of local social activities after prolonged restrictions

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Table 4. Odds ratios (95% confidence intervals) for compliance with theory of planned behavior constructs by geographic region and city-tier classification (ref = first-tier in north)

Theory of planned behavior constructs	Geographic region and city-tier classification			
	First-tier cities in north (n=243)	Other cities in north (n=1,196)	First-tier cities in south (n=397)	Other cities in south (n=278)
Each construct as dependent variable				
Attitude	1.00	3.57***[1)] (2.62–4.86)	2.08*** (1.48–2.92)	6.06*** (3.94–9.31)
Subjective norms	1.00	2.33*** (1.73–3.14)	1.14 (0.82–1.57)	1.22 (0.85–1.74)
Perceived behavioral control	1.00	2.58*** (1.91–3.48)	1.48* (1.06–2.07)	1.98*** (1.37–2.86)
Intention	1.00	3.04*** (2.25–4.12)	1.52* (1.09–2.12)	2.23*** (1.54–3.23)
Intention as a dependent variable including three constructs as independent variable				
Intention	1.00	2.43*** (1.48–3.97)	1.34 (0.78–2.29)	1.95* (1.08–3.51)

Odds ratios or (95% confidence intervals).
Adjusted for sex, age, alcohol consumption, lifetime smoking, presence of disease, living with family, employment status, education level, monthly income, and physical activity.
[1)] *P*-value was determined by Binary logistics regression analysis results.
*$P < 0.05$, ***$P < 0.001$.

may have contributed to "revenge consumption" [37]. During social gatherings, individuals are more likely to choose less healthy foods, which may partially explain the observed negative correlation.

Importantly, the samples integrated in this study were collected during this transitional period [38, 39]. Geographical variation may explain some of these findings. For instance, while Henan Province and Heilongjiang Province are both in northern China, their latitudinal differences are substantial (Henan: 31°23'N–36°22'N; Heilongjiang: 43°26'N–53°33'N). Conversely, Anhui Province and Shanghai, both classified as southern regions in this study, have minimal latitudinal differences (Anhui: 29°41'N–34°38'N; Shanghai: 30°40'N–31°53'N). These geographical similarities may contribute to the lack of significant differences between southern first-tier cities and other southern cities, as regions with similar food cultures and health conditions tend to exhibit comparable dietary behaviors.

Building upon prior research, this study underscored on regional differentiation, recognizing that eating habits vary significantly across China [40]. Previous findings indicated that "freshness" plays a crucial role in food choices, potentially linked to regional differences. Freshness also reflects the accessibility to fresh food and is closely related to PBC. This study introduces urban development as a key factor as infrastructure and economic development significantly impact access to healthy food options. These findings indicate that demographic characteristics vary across regions, raising the question of whether these variations indirectly influence healthy eating intentions [41]. Despite incorporating regional variations, the TPB remains a robust framework for predicting healthy eating intentions among Chinese adults [9-11]. Previous studies have emphasized that PBC is a strong determinant of behavioral intentions, indicating that promoting knowledge, ability, and self-efficacy can enhance decision-making regarding healthy diets [42]. Moreover, previous research by other scholars examined only a single region from the four regions included in this study. For example, Ma et al. [11] focused on Heilongjiang, Liu et al. [9] on Beijing, and Liu et al. [10] on Shanghai and Anhui. Findings from the Heilongjiang and Beijing studies indicate that both subjective norms and PBC significantly influence short-term healthy eating intentions. However, the significant effect of sub-

jective norms disappeared in Shanghai and Anhui. This discrepancy indicates that regional differences moderate the influence of TPB constructs on healthy eating intentions.

Therefore, implementing uniform nutrition intervention policies across different regions may not yield optimal results owing to variations in regional food culture, health concerns, and personality traits [17]. Research on dementia prevalence suggests that regional disparities in China may be linked to dietary patterns [16]. This study highlighted the need to consider regional differences from a broader perspective. These variations ultimately affect the effectiveness of dietary policies, necessitating a more nuanced approach to decision-making. Research in Europe has demonstrated the effectiveness of targeted policy interventions, such as advertising regulations, which reduced fast-food purchases by 7.1%–9.3% in Quebec in 1980 [43].

The strength of this study lies in its detailed analysis of regional differentiation, incorporating both geographic and urban development factors that influence TPB constructs and ultimately affect healthy eating intentions. The literature suggests that dietary habits vary significantly across China, with certain regions (e.g., southern and coastal areas) favoring healthier diets characterized by reduced red meat consumption and a higher intake of fiber-rich foods [21]. Differences in subjective norms and PBC further complicate the effectiveness of nutritional intervention policies across regions.

Beyond differences in geographic and urban development, variations in regional agriculture may shape local food culture and dietary preferences [44, 45]. For example, the famous "Huaiyang cuisine," one of China's four major culinary traditions, originated in Yangzhou City, Jiangsu Province, and spans Jiangsu, Anhui, Shanghai, and other regions [46]. However, this culinary tradition does not extend to areas such as Henan, Beijing, and Heilongjiang, which may partly explain why Shanghai, as a first-tier city, exhibits analysis results that are more similar to Anhui than to the northern regions. Additionally, first-tier cities were among the first to develop and perfect the takeout industry, rendering it easier for residents to access convenient but less healthy food options [47]. This factor may explain why scores from other cities generally exceed those of first-tier cities and why the TPB structure in first-tier cities shows similar predictions of intention. Considering that diet is a fundamental aspect of culture, exploring its role in shaping regional dietary norms could provide valuable insights into the development of more effective nutritional policies.

Limitations

A key limitation of this study is the imbalance in the sample distribution, particularly between the northern and southern regions and between male and female participants. To minimize their impact on the research results, sex, age, and other demographic factors were included as confounding variables in the analysis and adjusted accordingly. However, future research should aim for a more balanced sample to improve accuracy and generalizability. Interestingly, no significant differences were observed in the TPB constructs among adults in the southern regions, first-tier cities, and other cities. This finding indicates that cultural and historical factors may play an essential role in shaping regional dietary behavior, which warrants further exploration. When implementing nutritional policies in China, policymakers should consider regional factors when developing effective strategies tailored to different populations. A regionally sensitive approach may yield more reliable and impactful results, ensuring that health interventions align with the needs and preferences of diverse communities. Future studies should explore how regional differences influence healthy eating intentions among Chinese adults. Identifying the underlying causes of these differences is essential because relying solely on geography and urban development is insufficient to inform government policies. Effective decision-making requires comprehensive research to ensure accurate insights.

Conclusion

This study explored regional differences in healthy eating intentions among Chinese adults using TPB. These findings suggest that a uniform nutritional policy may not be effective across China owing to regional variations in food culture, economic development, and accessibility to fresh food. Future policies should consider these differences to create targeted and effective interventions.

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CONFLICT OF INTEREST

There are no financial or other issues that might lead to conflict of interest.

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DATA AVAILABILITY

Research data is available from the corresponding author upon request.

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Research Article

Comparison of clinical characteristics and dietary intakes according to phenotypes of type 2 diabetes mellitus in South Korea: a cross-sectional study

Mi-Jin Kim[1),*], Ji-Sook Park[2),*], Sung-Rae Cho[3)], Daeung Yu[4),5)], Jung-Eun Yim[4),5),†]

[1)]Student, Department of Food and Nutrition, Changwon National University, Changwon, Korea
[2)]Instructor, Department of Food and Nutrition, Changwon National University, Changwon, Korea
[3)]Doctor, Department of Endocrinology, Changwon Fatima Hospital, Changwon, Korea
[4)]Professor, Department of Food and Nutrition, Changwon National University, Changwon, Korea
[5)]Professor, Interdisciplinary Program in Senior Human Ecology, Changwon National University, Changwon, Korea

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†Corresponding author:
Jung-Eun Yim
Department of Food and Nutrition, Changwon National University, 20 Changwondaehak-ro, Uichang-gu, Changwon 51140, Korea
Tel: +82-55-213-3517
Fax: +82-55-281-7480
Email: jeyim@changwon.ac.kr

*These authors contributed equally to this work.

Objectives: Clinical nutrition treatment is the central part of diabetes management, such as prevention, treatment, and self-management of diabetes, and personalized clinical nutrition treatment, which enables improvement in patients with type 2 diabetes mellitus (T2DM). Our study aimed to contribute to the improvement of appropriate nutrition management in personalized treatment for obese and non-obese diabetes patients.

Methods: T2DM patients were recruited as participants, and 36 final participants were assigned to the lean diabetes mellitus group (LDM; body mass index [BMI] < 25 kg/m^2) and the obese diabetes mellitus group (ODM; BMI ≥ 25 kg/m^2). We assessed the dietary intakes, body composition, dietary habits, the Korean version of obesity-related quality of life, and biochemical indices.

Results: According to the phenotype's comparison, the ODM group had a high prevalence of T2DM complications and hypertension, had a dietary habit of less than 10 minutes of mealtime duration and preferred fast food intake, and had a low obesity-related quality of life. However, the LDM group had a high choice of Korean dishes at the time of eating out and a high intake of vitamin C, and iodine because of the intake of vegetables and seaweeds.

Conclusion: We observed differences in diet, nutrient intake, and clinical characteristics according to the phenotype of T2DM patients. In particular, obese diabetes patients have an increased risk of cardiovascular diseases, bad dietary habits, and low obesity-related quality of life. Therefore, personalized nutrition treatment is needed in consideration of the risk of cardiovascular disease and dietary habits for patients in the ODM group, as well as determining the energy requirements of Korean patients with T2DM.

Keywords: diabetes mellitus, type 2; obesity; feeding behavior; cardiovascular disease

INTRODUCTION

Rapid socioeconomic development and changes in lifestyle have led to stress, an increased intake of energy-dense foods, irregular dietary habits, and a lack of physical activities, thereby causing an increase in metabolic diseases. Among them, obesity and type 2 diabetes mellitus (T2DM) are recognized as major public health problems worldwide. The global obesity prevalence rate nearly tripled between 1975 and 2016, and the global diabetes prevalence population reported in the 10th edition of the International Diabetes Federation in 2021 is expected to increase to 537 million adults (20–79 years old) and 642 million by 2040.

In the case of Korea, the prevalence of diabetes among adults aged 30 or older was reported to be 16.3% as of 2021, and the prevalence of obesity was also reported to be 37.1% as of 2021, continuously increasing for 10 years [1, 2]. Moreover, about 54.4% of patients with T2DM as of 2019–2020 were found to be accompanied by obesity, showing the severity of both diabetes and obesity [1].

T2DM can manifest various phenotypes through interactions with different environmental and genetic factors. Recent studies have focused on the severity of diabetes and its phenotype rather than the recent etiology and genetic factors [3]. T2DM phenotype can be divided according to the body mass index (BMI). In Korea, the incidence of non-obese diabetes is relatively higher than in Western countries. However, in recent years, the number of obese diabetic patients has increased. This trend is commonly observed in Asia, including Korea, and is related to a greater risk of T2DM in the Asian population than in the Caucasian population, despite lower BMI [4-7]. The studies have shown that the accompanying overweight and obesity in Asians with diabetes can increase the risk of health problems such as microvascular and cardiovascular complications. The risk of complications such as diabetic retinopathy, end-stage renal disease, and cardiovascular disease (CVD) is higher in overweight and obese individuals with diabetes compared to those with normal weight [5, 8-10]. Therefore, for the rapidly increasing number of non-obese and obese diabetic patients to learn self-management lifestyle of clinical nutrition therapy and control their diabetes, differences in diets and other factors must be understood first.

The purpose of this study was to evaluate differences in and relationships of clinical characteristics, dietary habits, obesity-related quality of life, nutrient intake, and biochemical indicators in obese and non-obese T2DM patients. This study aimed to suggest appropriate nutrition management strategies in personalized treatment of obese and non-obese diabetes patients and thereby, contribute to improved health of these patients.

METHODS

Ethics statement

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and obtained clearance from the Institutional Review Boards of Changwon Fatima Hospital (approval No. 17-04). All participants provided informed consent.

1. Study design

This study was a cross-sectional study and compared two groups based on their diabetes phenotypes. It was described in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement, available at https://www.strobe-statement.org/.

2. Setting and participants

T2DM patients between the age of 19 and 60 years were recruited in this study. Participants were visited to Changwon Fatima Hospital (Changwon, Korea) for diabetes management from April 2017 to July 2018. Recruitment was carried out through publicity at the endocrine center within the hospital. The number of participants was determined using on an effect size of 0.9, a significance level of 0.05, and a power of 0.9. A total of 36 participants who understood the contents and purpose of the study and voluntarily wished to participate were enrolled. T2DM was diagnosed as glycated hemoglobin level ≥ 6.5% or fasting blood glucose level ≥ 126 mg/dL. The participants were assigned to lean diabetes mellitus group (LDM; BMI < 25 kg/m^2, n = 18) and obese diabetes mellitus group (ODM; BMI ≥ 25 kg/m^2, n = 18). Given that Asians have a higher risk of CVD than Caucasians, obesity has been defined differently in Asia com-

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pared to other regions. Specifically, the World Health Organization (WHO) Asia-Pacific Guidelines recommend a low BMI cutoff point of 25 kg/m^2 for obesity [11]. Thus, lower BMI cutoff points have been used in studies conducted in Asia, including Korea [12]. Patients with thyroid, cerebrovascular, gallbladder, or gastrointestinal diseases, gout, depression, and mental conditions, such as porphyria, alcohol addiction, schizophrenia, and drug addiction, were excluded from the study. Additionally, those who were under prescription of weight control drugs, who were pregnant or lactating, and who participated in commercial diabetes programs within 30 days from the start date of this study were excluded.

3. General characteristics, health-related lifestyle, and medical history

The general characteristics, health-related lifestyle, and intake of medication of all participants were analyzed through questionnaires and medical interviews. The general characteristics of age, marital status (married/not married), occupation (office worker, production worker, service, business, housewife, etc.) were assessed. The health-related lifestyle was categorized as follows: smoking status (never-smoked, ex-smoker, current smoker), alcohol consumption (yes, no), physical activity (yes, no), intake of dietary supplements. Data on diabetic complications (hypertension, hyperlipidemia, etc.) were collected and multiple responses were used.

4. Anthropometric and body composition measurements

The participants were asked to undress any accessories and shoes and stand in an upright position with comfortable clothes to conduct anthropometric and body composition measurements using bioimpedance analysis program (InBody 720; InBody Co., Ltd.). BMI was calculated by dividing the body weight (kg) by the square of height (m). According to the WHO Asia Pacific and the Korean Society for the Study of Obesity (KSSO), obesity was defined as BMI of > 25 kg/m^2. Skeletal muscle mass (SMM), body fat mass (BFM), percent of body fat mass (PBF), intracellular water, extracellular water, and total body water were measured and used in this study. As suggested by the KSSO, waist circumference ≥ 90 cm and ≥ 85 cm were considered as abdominal obesity for male and female, respectively. While standing comfortably in a vertical position with arms stretched, waist circumference was measured between the lowest lower rib and iliac crest, and hip circumference was measured at the widest part of the pelvis. Systolic blood pressure and diastolic blood pressure were measured using a standard electric pressure gauge (FT 500; Jawon Medical) in a relaxed state. All measurements were made by a single trained researcher.

5. Nutrition intake assessment

To investigate the daily intake of nutrients, such as energy, carbohydrate, protein, and fat, 24-hour recall method was used. Prior to assessment, a trained clinical nutritionist educated the study participants on the recording method and explained accurate observational measurements and food material recordings to the study participants. After assessment, the exact amount of food intake was investigated through one-on-one inter-views with the participants for the names of food consumed in a total of 3 days, including 2 days on weekdays and 1 day on weekends. The collected data was analyzed using the Computer Aided Nutritional Analysis Program 5.0 (CAN-Pro 5.0; The Korean Nutrition Society) to calculate average daily intake of nutrients. Nutrient intake was compared to the standards for each sex and age group as suggested in the 2020 Dietary Reference Intakes for Koreans (KDRIs) by the Ministry of Health and Welfare and Korean Nutrition Society. Nutrient intake was then converted into percentage to calculate KDRIs % [13].

6. Dietary habit evaluation

The dietary habits of the participants were investigated using a questionnaire that consisted of a total of 13 items on the number of meals per day, eating breakfast, regularity of mealtime, mealtime duration, frequency of snack, and frequency of eating out. A questionnaire developed for adults in Korea [14] was modified and used for this study.

7. Food intake frequency evaluation

A draft version of food intake frequency questionnaire was prepared based on the food intake frequency of the National Health and Nutrition Examination Survey. The questionnaire was then revised according to the pur-

pose of this study [15]. The items of food intake frequency questionnaire were subdivided into 62 categories, including carbohydrates (7 types), legumes and potatoes (5 types), meat and seafoods (14 types), vegetables and seaweeds (13 types), fruits (11 types), dairy products (3 types), beverages (6 types), and instant foods (3 types). For each food item, the amount of intake per serving was presented. The frequency of intake was divided into "rarely," "6–11 times a year," "once a month," "2–3 times/month," "once a week," "2–3 times/week," "4–6 times/week," "once a day," "twice a day," and "three times a day." In this study, frequency of food intake was converted into servings/per day. The frequency of nutrient intake was analyzed using CAN-Pro version 5.0 for experts to calculate nutrient intake.

8. Evaluation of obesity-related quality of life

Much research mainly evaluated health-related quality of life using Europe version quality of life (EuroQol) questionnaire. EuroQol comprises of two parts, the health states descriptive system and visual analogue scale. The Korean version of those tools has been modified culturally and translated [16]. The Korean version quality of life (KOQOL) was established to evaluate obesity related quality of life after sufficient testing for reliability and validity. The Korean version of obesity-related quality of Life, developed by Park *et al.* [17], was used. The reliability analysis results of KOQOL showed that Cronbach's alpha coefficient was 0.838. The questionnaire consisted of a total of six sub-domains and 15 items with four items on psychosocial health, three items on physical health, three items on task, two items on daily living, two sex-related items, and one food-related item. Each item was scored on a 4-point Likert scale (one point: "not at all," two points: "sometimes," three points: "often," and four points: "always"). A higher score indicated a lower quality of life.

9. Biochemical examination

On the second visit, approximately 10 mL of blood was collected from the brachial vein after 12 hours of fasting. Blood was centrifuged at 3,000 rpm for 15 minutes to separate the serum, which was then used to test various biochemical parameters. Fasting glucose, triglycerides, total cholesterol, high-density lipoprotein-cholesterol, low-density lipoprotein-cholesterol, aspartate aminotransferase, and alanine aminotransferase levels were measured using an enzymatic quantification kit (AM201, AM157S, AM202, A203ST, AM103-K, AM102, Asan set Assay kit; Asan Pharmaceutical Co.) [18]. Atherogenic index was calculated using total cholesterol and HDL-C according to Lauer *et al.*'s formula [19]. Serum insulin concentration was measured using a commercial kit (80-INSHU-E01.1, Insulin EIA; ALPCO Co.), and homeostasis model assessment of insulin resistance (HOMA-IR), which is an indicator of insulin resistance was assessed using a formula suggested by Bradford [20].

10. Statistical analysis

The study results were analyzed using the Statistical Package for Social Science Statistics (SPSS version 26; IBM Corp.). Data are presented using mean ± standard deviation, and the chi-square test was conducted to compare the characteristics and dietary habits of the participants. When the expected counts were less than 5, analysis was performed using Fisher's exact test. The Mann-Whitney *U*-test conducted to compare differences in anthropometric measurement and body composition, nutrition intake, food intake frequency, and biochemical parameters between the two groups. The obesity-related quality of life variables was tested for Normality Test using Shapiro-Wilk analysis and independent t-tests were performed. A P-value of < 0.05 was considered statistically significant.

RESULTS

1. General characteristics of the participants

The general characteristics of the participants are shown in Table 1. The participants were divided into two groups according to BMI. A total of 18 participants were included in each of the ODM and LDM groups. There was no significant difference between the two groups in general characteristics, but the prevalence of diabetic complications was significantly higher in the ODM group. The prevalence of hypertension was significantly higher in the ODM group ($P = 0.011$), and the prevalence of dyslipidemia also tended to be high.

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Table 1. General characteristics of the participants

Variable	ODM (n = 18)	LDM (n = 18)	Total (n = 36)	*P*-value
Sex				0.157
Male	14 (77.8)	10 (55.6)	24 (66.7)	
Female	4 (22.2)	8 (44.4)	12 (33.3)	
Age (year)	41.9 ± 10.2	47.7 ± 10.1	44.8 ± 10.4	0.097
Marital status				0.423
Married	13 (72.2)	15 (83.3)	28 (77.8)	
Not married	5 (27.8)	3 (16.7)	8 (22.2)	
Occupation				0.292[1)]
Office worker	7 (38.9)	5 (27.8)	12 (33.3)	
Production worker	3 (16.7)	4 (22.2)	7 (19.4)	
Service	0 (0.0)	4 (22.2)	4 (11.1)	
Business	2 (11.1)	1 (5.6)	3 (8.3)	
Housewife	2 (11.1)	4 (22.2)	6 (16.7)	
Etc.	4 (22.2)	0 (0.0)	4 (11.1)	
Smoking status				0.169
Never-smoked	7 (38.9)	11 (61.1)	18 (50.0)	
Ex-smoker	5 (27.8)	1 (5.6)	6 (16.7)	
Current smoker	6 (33.3)	6 (33.3)	12 (33.3)	
Alcohol consumption				0.317
Yes	7 (38.9)	10 (55.6)	17 (47.2)	
No	11 (61.1)	8 (44.4)	19 (52.8)	
Physical activity				0.083
Yes	9 (50.0)	14 (77.8)	23 (63.9)	
No	9 (50.0)	4 (22.2)	13 (36.1)	
Intake of dietary supplement	9 (42.8)	12 (57.1)	21 (58.3)	0.407
Intake of medication	16 (88.9)	13 (72.2)	29 (80.6)	0.206
Comorbidities				
Complication of diabetes mellitus	13 (72.2)	7 (38.9)	20 (55.6)	0.044
Hypertension	9 (50.0)	2 (11.1)	11 (30.6)	0.011
Hyperlipidemia	16 (88.9)	11 (61.1)	27 (75.0)	0.054

n (%) or Mean ± SD.
The data were obtained from a chi-square test.
ODM, obese diabetes mellitus group; LDM, lean diabetes mellitus group.
[1)]The data were obtained from a Fisher's exact test.

2. Anthropometric measurements and body composition

Anthropometric measurements and body composition per group are shown in Table 2, for male, the weight of the ODM group was 89.1 kg and that of the LDM group was 66.3 kg, showing that the weight of the ODM group was higher ($P = 0.001$). Accordingly, the BMI of male in the ODM group was 29.8 kg/m^2, and that of the LDM group was 23.0 kg/m^2, which was higher in the ODM group ($P < 0.001$). SMM, BFM, PBF, protein, and mineral were significantly higher in the ODM group than in the LDM group in male, but only BFM and PBF were statistically significantly higher in the ODM group in female ($P < 0.050$).

3. Percentage of nutrition intake of Recommended Nutrient Intake (RNI)

Table 3 shows the percentage of nutrition intake compared to the Korean Dietary Reference Intakes per group. There were significant differences in the intake of vitamin C and iodine between the ODM and LDM groups ($P < 0.05$). Energy intake of each group was lower compared to that of Estimated Energy Requirements

Table 2. Anthropometric measurements and body composition of the participants

Variable	Male		*P*-value	Female		*P*-value
	ODM (n = 14)	LDM (n = 10)		ODM (n = 4)	LDM (n = 8)	
Weight (kg)	89.1 ± 17.6	66.3 ± 7.9	0.001	70.0 ± 8.4	55.4 ± 7.3	0.016
Height (cm)	172.6 ± 6.5	169.6 ± 5.3	0.212	159.0 ± 4.4	160.0 ± 4.8	0.808
BMI (kg/m^2)	29.8 ± 5.2	23.0 ± 2.1	< 0.001	27.7 ± 3.4	21.6 ± 2.2	0.004
AC (cm)	35.7 ± 5.5	29.9 ± 1.9	< 0.001	32.3 ± 2.9	27.7 ± 2.4	0.008
Waist (cm)	98.1 ± 11.4	83.1 ± 5.7	< 0.001	90.2 ± 5.9	75.8 ± 11.8	0.028
Hip (cm)	103.8 ± 9.9	92.9 ± 5.1	0.001	97.4 ± 6.3	86.1 ± 7.5	0.028
WHR	0.94 ± 0.0	0.89 ± 0.0	0.011	0.93 ± 0.0	0.88 ± 0.1	0.368
SBP (mmHg)	130.4 ± 12.7	124.0 ± 15.4	0.212	129.5 ± 7.2	117.7 ± 12.4	0.109
DBP (mmHg)	80.5 ± 7.3	76.8 ± 14.7	0.213	77.5 ± 8.4	68.5 ± 8.5	0.129
SMM (kg)	33.5 ± 4	29.5 ± 3.6	0.022	24.1 ± 1.9	21.1 ± 3.0	0.154
BFM (kg)	29.2 ± 13.3	13.9 ± 2.6	< 0.001	25.8 ± 5.5	16.1 ± 3.1	0.004
PBF (%)	31.7 ± 7.5	20.9 ± 2.4	< 0.001	36.6 ± 3.6	28.9 ± 3.2	0.004
ECW/TBW	0.382 ± 0.008	0.378 ± 0.008	0.212	0.386 ± 0.004	0.389 ± 0.005	0.283

Mean ± SD.
Differences among groups were assessed by Mann-Whitney *U*-test.
ODM, obese diabetes mellitus group; LDM, lean diabetes mellitus group; BMI, body mass index; AC, arm circumference; WHR, waist-hip ratio; SBP, systolic blood pressure; DBP, diastolic blood pressure; SMM, skeletal muscle mass; BFM, body fat mass; PBF, percent of body fat mass; ECW, extracellular water; TBW, total body water.

(EER). The rate of carbohydrate intake was 181.3% and 185.3% in the ODM and LDM groups, respectively, which were higher than the RNI. The rate of protein intake was 120.7% in the ODM and 107.7% in the LDM, both groups intake more carbohydrate and proteins than RNI. There was no significant difference in the percentage of macronutrient intake between the two groups.

4. Dietary habits

The dietary habits of the participants are shown in Table 4. For the number of meals per day, most of the participants had three meals per day (47.2%, n = 17), followed by those who had two meals per day (33.3%, n = 12), and irregular number of meals (19.4%, n = 7). Approximately 44.4% of the total participants answered that they always had breakfast. Comparing the eating habits of the two groups, significant differences were found in mealtimes duration and types of eating out.

The LDM group showed a difference from the ODM group in that the mealtime was '20 minutes' the most (83.3%) (P = 0.006). These findings indicate that obese diabetic patients had a shorter mealtime duration than the lean diabetic patients. And 55.6% of the participants mainly consumed "Korean dishes" for eating out. In the LDM group, 77.8% of the participants mainly consumed "Korean dishes," which was higher than that in the ODM group. In the ODM group, 27.8% of the participants mainly consumed "fast food," which was significantly higher than in the LDM group (0.0%).

5. Food intake frequency

The frequency of food intake is shown in Table 5. Food was divided into 11 groups, and one serving per day was treated as one for average intake. The intake of rice cakes and chicken was higher in the ODM group than in the LDM group (P = 0.050). The intake of pork, fruits such as tangerines, grapes, strawberries, oranges and yogurt were higher in the LDM group (P < 0.050). In both the groups, the intake frequency of mixed grains was more than once a day, suggesting a tendency to choose food with high levels of dietary fiber among carbohydrate foods. For meats and eggs intake frequency, the intake frequency of eggs as protein source was the highest at 0.4 and 0.5 in the ODM and LDM groups, respectively. And it was confirmed that fruit intake was low in both the groups. For milk and dairy products, the intake frequency of milk was 0.2 in the ODM group and 0.3 in LDM group, which was less than once a day.

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Table 3. Percentage of nutrition intake of Korean RNI of the participants

Variable	ODM (n = 18)	LDM (n = 18)	*P*-value
Energy[1)]	75.5 ± 24.0	76.1 ± 14.4	0.673
Carbohydrate	181.3± 60.6	185.3 ± 59.1	0.791
Protein	120.7± 45.2	107.7 ± 26.5	0.389
Fiber	69.7± 29.8	79.2 ± 41.2	0.963
Vitamin A	90.3 ± 47.1	115.9 ± 61.7	0.355
Vitamin D	9.3 ± 8.2	9.2 ± 7.9	0.308
Vitamin E	29.3 ± 12.3	23.2 ± 15.4	0.118
Vitamin K	46.8 ± 108.9	40.0 ± 45.2	0.293
Vitamin C	73.5 ± 48.6	123.9 ± 80.3	0.030
Vitamin B_1	151.2 ± 61.5	149.5 ± 45.9	0.839
Vitamin B_2	84.2 ± 30.9	90.8 ± 27.9	0.584
Niacin	99.2 ± 42.7	90.7 ± 28.3	0.226
Vitamin B_6	28.9 ± 18.4	20.9 ± 13.1	0.815
Folate	21.2 ± 10.4	20.5 ± 10.9	0.650
Vitamin B_{12}	155.7 ± 234.4	34.5 ± 31.4	0.022
Pantothenic acid	16.1 ± 18.6	14.2 ± 9.0	0.501
Biotin	4.3 ± 6.2	8.2 ± 10.9	0.279
Calcium	49.3 ± 21.9	62.2 ± 28.3	0.214
Phosphorus	144.5 ± 47.1	144.9 ± 45.7	0.938
Sodium	201.5 ± 84.7	200.8 ± 71.2	0.815
Chloride	3.0 ± 5.6	3.5 ± 4.6	0.406
Potassium	68.2 ± 21.5	76.4 ± 24.9	0.308
Magnesium	28.7 ± 12.5	29.6 ± 14.7	0.481
Iron	162.8 ± 72.7	158.9 ± 65.3	0.988
Zinc	62.6 ± 23.0	75.4 ± 28.1	0.339
Copper	82.2 ± 44.2	84.6 ± 45.4	0.815
Fluoride	0.5 ± 0.6	0.6 ± 0.6	0.815
Manganese	41.7 ± 17.6	48.8 ± 25.8	0.743
Iodine	31.4 ± 22.9	123.5 ± 172.3	0.038
Selenium	96.3 ± 39.1	83.2 ± 33.5	0.288
Cholesterol	64.4 ± 37.3	61.8 ± 40.1	0.841

Mean ± SD.
Differences among groups were assessed by Mann-Whitney *U*-test.
ODM, obese diabetes mellitus group; LDM, lean diabetes mellitus group.
[1)]Ratio of estimated energy requirements.

6. Korean version of obesity-related quality of life

Obesity-related quality of life of the participants is shown in Table 6. The total score was 28.2 in the ODM group, which was significantly higher than in the LDM group (23.7), suggesting that the quality of life was lower in the ODM group ($P = 0.043$). Analysis of the sub-domains showed that there were statistically significant differences in work-related health ($P = 0.014$) and diet

Table 4. Dietary habits of the participants

Variable	ODM (n = 18)	LDM (n = 18)	Total (n = 36)	*P*-value
No. of meals per day				0.102
3 times	7 (38.9)	10 (55.6)	17 (47.2)	
2 times	7 (38.9)	5 (27.8)	12 (33.3)	
Irregular	4 (22.2)	3 (16.7)	7 (19.4)	
Eating breakfast				0.539
Always	7 (38.9)	9 (50.0)	16 (44.4)	
Sometimes	5 (27.8)	5 (27.8)	10 (27.8)	
None	6 (33.3)	4 (22.2)	10 (27.8)	
Regularity of meal time				0.811
Regular	7 (38.9)	6 (33.3)	13 (36.1)	
Sometimes irregular	9 (50.0)	9 (50.0)	18 (50.0)	
Irregular	2 (11.1)	3 (16.7)	5 (13.9)	
Mealtime duration (min)				0.006
≤ 10	9 (50.0)	2 (11.1)	11 (30.6)	
10–20	6 (33.3)	15 (83.3)	21 (58.3)	
20–30	3 (16.7)	1 (5.6)	4 (11.1)	
> 30	0 (0.0)	0 (0.0)	0 (0.0)	
Meal size				0.509
Until full	1 (5.6)	3 (16.7)	4 (11.1)	
Irregular	16 (88.9)	13 (72.2)	29 (80.6)	
Small	1 (5.6)	2 (11.1)	3 (8.3)	
Diversity of food intake				0.241
Eat anything	9 (50.0)	8 (44.4)	17 (47.2)	
Sometimes	9 (50.0)	7 (38.9)	16 (44.4)	
Always	0 (0.0)	3 (16.7)	3 (8.3)	
Appetite				0.793
Always	8 (44.4)	9 (50.0)	17 (47.2)	
Sometimes	10 (55.6)	9 (50.0)	19 (52.8)	
No appetite	0 (0.0)	0 (0.0)	0 (0.0)	
Frequency of overeating				0.234
0–1/week	3 (16.7)	8 (44.4)	11 (30.6)	
2–3/week	14 (77.8)	10 (55.6)	24 (66.7)	
≥ 4/week	1 (5.6)	0 (0.0)	1 (2.8)	
Frequency of snack				0.956
0–1/week	4 (22.2)	6 (33.3)	10 (27.8)	
2–3/week	8 (44.4)	7 (38.9)	15 (41.7)	
≥ 4/week	6 (33.3)	5 (27.8)	11 (30.6)	
Frequency of eating out				0.496
0–1/week	4 (22.2)	8 (44.4)	12 (33.3)	
2–3/week	9 (50.0)	8 (44.4)	17 (47.2)	
≥ 4/week	5 (27.8)	2 (11.1)	7 (19.4)	

(Continued to the next page)

Table 4. Continued

Variable	ODM (n = 18)	LDM (n = 18)	Total (n = 36)	*P*-value
Eating out type				0.355
Korean dishes	6 (33.3)	14 (77.8)	20 (55.6)	
Western food	3 (16.7)	2 (11.1)	5 (13.9)	
Chinese dishes	2 (11.1)	2 (11.1)	4 (11.1)	
Japanese dishes	2 (11.1)	0 (0.0)	2 (5.6)	
Fast food	5 (27.8)	0 (0.0)	5 (13.9)	
Frequency of night eating				0.503
0–1/week	12 (66.7)	8 (44.4)	20 (55.6)	
2–3/week	6 (33.3)	8 (44.4)	14 (38.9)	
≥ 4/week	0 (0.0)	2 (11.1)	2 (5.6)	

n (%).
Differences among groups were assessed by Fisher's exact test.
ODM, obese diabetes mellitus group; LDM, lean diabetes mellitus group.

distress ($P = 0.007$) domains between the two groups.

7. Biochemical parameters

The biochemical parameters of the participants are shown in Table 7. There were no significant differences in biochemical parameters between the two groups.

DISCUSSION

The purpose of this study was to evaluate differences in clinical characteristics, dietary habits, obesity-related quality of life, nutrient intake levels, and biochemical parameters in obese and non-obese diabetic patients. The results of this study showed differences in dietary habits according to the phenotype of patients with type 2 diabetes and showed nutrition intake problems.

This study showed the relationship between obesity and CVD prevalence in patients with type 2 diabetes. Einarson *et al.* [8] reported that the prevalence of CVDs, such as dyslipidemia and hypertension, which are predictive factors for CVDs, increases when BMI increases among patients with T2DM. Similarly, in this study, the ODM group showed a significantly higher CVD comorbidity than the LDM group with Hypertension 50%. The waist circumference was found to be a value corresponding to abdominal obesity in both male and female in ODM for male and female when the KSSO's abdominal obesity standards were applied. It has been

Table 5. Daily food intake frequency of the participants

Variable	ODM (n = 18)	LDM (n = 18)	*P*-value
Carbohydrates			
Rice	1.9 ± 1.0	1.7 ± 0.9	0.118
Mixed grain	1.3 ± 1.2	1.1 ± 0.8	0.323
Ramen	0.2 ± 0.3	0.2 ± 0.3	0.372
Noodles	0.2 ± 0.2	0.1 ± 0.2	0.501
Bread	0.3 ± 0.5	0.2 ± 0.3	0.584
Rice cake	0.1 ± 0.1	0.0 ± 0.1	0.050
Confectionary	0.3 ± 0.5	0.2 ± 0.3	0.252
Legumes			
Bean curd	0.5 ± 0.4	0.6 ± 0.6	0.563
Legumes	0.6 ± 0.7	0.7 ± 0.7	0.913
Soybean milk	0.1 ± 0.2	0.1 ± 0.3	0.521
Potatoes			
Potato	0.2 ± 0.3	0.3 ± 0.5	0.883
Sweet potato	0.1 ± 0.1	0.1 ± 0.2	0.086
Meat and eggs			
Beef	0.2 ± 0.3	0.3 ± 0.3	0.226
Chicken	0.2 ± 0.2	0.1 ± 0.1	0.004
Pork	0.2 ± 0.3	0.3 ± 0.3	0.029
Ham	0.1 ± 0.1	0.1 ± 0.2	0.055
Eggs	0.4 ± 0.3	0.5 ± 0.3	0.226
Seafoods			
Mackerel	0.1 ± 0.1	0.1 ± 0.1	0.696
Tuna	0.1 ± 0.1	0.1 ± 0.1	0.265
Croaker	0.0 ± 0.0	0.0 ± 0.0	0.245
Pollack	0.0 ± 0.0	0.0 ± 0.0	0.521
Anchovy	0.2 ± 0.3	0.3 ± 0.7	0.839
Fish ball	0.1 ± 0.2	0.2 ± 0.3	0.521
Squid	0.0 ± 0.0	0.0 ± 0.1	0.864
Shellfish	0.1 ± 0.1	0.1 ± 0.2	0.443
Salted seafood	0.1 ± 0.2	0.0 ± 0.0	0.696
Vegetables			
Chinese cabbage	1.4 ± 1.0	1.3 ± 1.0	0.606
Radish	0.9 ± 0.9	0.5 ± 0.6	0.443
Radish leaves	0.2 ± 0.3	0.2 ± 0.3	0.406
Bean sprouts	0.4 ± 0.5	0.2 ± 0.1	0.606
Spinach	0.2 ± 0.3	0.3 ± 0.7	0.424
Cucumber	0.5 ± 0.5	0.4 ± 0.7	0.521
Red pepper	0.3 ± 0.3	0.2 ± 0.2	0.660
Pumpkin	0.3 ± 0.5	0.2 ± 0.3	0.481
Cabbage	0.2 ± 0.3	0.3 ± 0.7	0.719
Tomato	0.4 ± 0.6	0.6 ± 0.9	0.584
Mushrooms	0.3 ± 0.5	0.3 ± 0.4	0.372
Seaweeds			
Sea mustard	0.1 ± 0.1	0.2 ± 0.2	0.372
Laver	0.5 ± 0.7	0.3 ± 0.4	0.628

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Table 5. Continued

Variable	ODM (n = 18)	LDM (n = 18)	*P*-value
Fruits			
Tangerine	0.0 ± 0.1	0.1 ± 0.1	0.014
Persimmon	0.0 ± 0.0	0.0 ± 0.1	0.215
Pear	0.0 ± 0.1	0.0 ± 0.0	0.226
Watermelon	0.1 ± 0.2	0.1 ± 0.2	0.074
Oriental melon	0.1 ± 0.2	0.0 ± 0.0	0.181
Strawberry	0.0 ± 0.0	0.0 ± 0.0	< 0.001
Grape	0.0 ± 0.0	0.0 ± 0.1	0.042
Peach	0.0 ± 0.0	0.1 ± 0.2	0.152
Apple	0.2 ± 0.5	0.2 ± 0.4	0.462
Banana	0.1 ± 0.1	0.1 ± 0.2	0.203
Orange	0.0 ± 0.0	0.2 ± 0.7	0.019
Milk and dairy products			
Milk	0.2 ± 0.3	0.3 ± 0.5	0.171
Yogurt	0.1 ± 0.1	0.1 ± 0.3	0.037
Ice cream	0.1 ± 0.2	0.0 ± 0.1	0.406
Beverages			
Soft drink	0.1 ± 0.2	0.0 ± 0.1	0.521
Coffee	1.3 ± 1.1	1.6 ± 1.0	0.134
Tea	0.2 ± 0.5	0.2 ± 0.3	0.339
Beer	0.1 ± 0.1	0.2 ± 0.5	0.888
Soju	0.1 ± 0.1	0.2 ± 0.5	0.584
Rice wine	0.0 ± 0.0	0.0 ± 0.1	0.203
Instant foods			
Hamburger	0.0 ± 0.0	0.0 ± 0.1	0.946
Pizza	0.0 ± 0.0	0.0 ± 0.0	0.694
Fried foods	0.1 ± 0.2	0.0 ± 0.0	0.126

Mean ± SD.
Differences among groups were assessed by Mann-Whitney *U*-test.
ODM, obese diabetes mellitus group; LDM, lean diabetes mellitus group.

Table 6. Obesity-related quality of life of the participants

Variable	ODM (n = 18)	LDM (n = 18)	*P*-value
Psychosocial health	6.4 ± 2.3	5.4 ± 2.2	0.189
Physical health	6.5 ± 1.7	5.9 ± 1.7	0.298
Work-related health	6.7 ± 2.5	4.8 ± 1.9	0.014
Lifestyle	3.6 ± 1.5	2.9 ± 0.8	0.098
Sexual activity	3.1 ± 1.2	3.5 ± 1.7	0.429
Diet distress	1.9 ± 1.0	1.2 ± 0.4	0.007
Total KOQOL score	28.2 ± 7.1	23.7 ± 5.6	0.043

Mean ± SD.
Differences among groups were assessed by t-test.
ODM, obese diabetes mellitus group; LDM, lean diabetes mellitus group.

Table 7. Biochemical parameters of the participants

Variable	ODM (n = 18)	LDM (n = 18)	*P*-value
Glucose (mg/dL)	128.4 ± 33.1	125.4 ± 29.8	0.913
Insulin (μIU/mL)	6.0 ± 2.1	8.4 ± 5.5	0.339
HOMA-IR	1.9 ± 0.8	2.6 ± 1.7	0.424
TC (mg/dL)	170.7 ± 41.2	183.9 ± 27.7	0.111
HDL-C (mg/dL)	30.5 ± 10.4	34.6 ± 9.6	0.181
LDL-C (mg/dL)	54.6 ± 15.7	58.1 ± 10.0	0.214
TG (mg/dL)	178.8 ± 65.7	146.1 ± 136.6	0.043
Atherogenic index	5.0 ± 1.5	4.7 ± 1.7	0.719
AST (IU/L)	14.8 ± 5.8	12.6 ± 8.1	0.134
ALT (IU/L)	29.6 ± 15.4	25.3 ± 16.3	0.214

Mean ± SD.
Differences among groups were assessed were assessed by Mann-Whitney *U*-test.
ODM, obese diabetes mellitus group; LDM, lean diabetes mellitus group; HOMA-IR, homeostatic model assessment of insulin resistance; TC, total cholesterol; HDL-C, high-density lipoprotein-cholesterol; LDL-C, low-density lipoprotein-cholesterol; TG, triglyceride; AST, aspartate aminotransferase; ALT, alanine aminotransferase.

reported that the prevalence of atherosclerosis, high blood pressure, and CVD is high in patients with T2DM accompanied by abdominal obesity [21, 22].

Nagao *et al.*'s study [23] showed the prevalence of CVD in non-obese patients with abdominal obesity (BMI < 25 kg/m^2) was similar in obese patients (BMI ≥ 25 kg/m^2) and was higher than in non-obese patients without abdominal obesity (BMI < 25 kg/m^2). In this study, the prevalence of waist circumference and hypertension in the ODM group was high, showing results consistent with this. Therefore, it is important for T2DM patients to prevent CVD when accompanied by obesity or abdominal obesity, and for this, it is believed that intervention in reducing visceral fat accumulation through weight loss is necessary.

The percentage of nutrient intake was analyzed per group. Energy intake was 75.5% in the ODM group and 76.1% in the LDM group, which suggested diabetic patients' intake lower calories compared to EER. The results were consistent; the energy intake of diabetic patients in Korea was 93.9% of the EER, whereas the energy intake of diabetic patients in this study was lower [24]. In Korean obese adults without diabetes, energy intake was 2,627.9 kcal [25], and in normal-weight adults, it

was 2,261.0 kcal (middle-aged men) [26], which was higher than the energy intake of the participants of this study regardless of obesity. Analysis of nutrient intake showed that the intake of vitamin C and iodine was high in the LDM group, and the intake of vitamin B_{12} was high in the ODM group. However, the intake rates of most nutrients for vitamins and minerals were lower than the KDRIs. Both groups showed low intake rates of calories, vitamin D, vitamin E, calcium, potassium, magnesium, and zinc, which are likely to be deficient in diabetic patients [27-29]. Therefore, it is thought that patients with T2DM, with or without obesity, should need the importance of obtaining daily vitamin and mineral requirements through a balanced diet while consuming total energy appropriate for each individual's energy requirements.

Dietary habits are integrated into an individual's daily life over a long period of time, and are closely related to age, cultural, social, economic, and psychological factors. According to the Korea National Health and Nutrition Examination Survey, the proportion of unhealthy and irregular dietary habits, such as skipping breakfast and eating out, among Koreans is increasing every year [2]. It has been revealed through many articles that eating speed among dietary habits contributes to metabolic states such as obesity as well as the development of insulin resistance through its effect on body weight [30, 31]. In this study, 50% of the participants answered 'less than 10 minutes' in ODM. This is consistent with a study in which T2DM patients reported that those who reported their eating speed had a higher BMI [32, 33], and that chewing food slowly and thoroughly can contribute to weight loss and maintenance [34, 35].

The consumption of fast food in the eating out type is on the rise worldwide, and the consumption of such fast food has a great adverse effect on the quality of the diet because it is high in energy density and lacks in nutrients [36]. In this study, 77.8% of the respondents in the LDM group consumed 'Korean dishes' and did not consume fast food, but in the ODM group, 27% chose fast food, resulting in a high intake of convenience food. Jung and Chae's study [37] found that traditional Korean food, which contain high levels of whole grains and vegetables and low amounts of red meat increased the intake of antioxidant nutrients, vitamin A, C, E and β-carotene, thereby reducing serum gamma glutamyl-transerase, a risk factor for CVD. It has also been reported to reduce blood sugar and improve weight, BFM.

T2DM participants in this study had excessively restricted intake of fruits and dairy products regardless of obesity, which was consistent with a study of dietary intake in Korean diabetic patients [24].

In the case of obesity or overweight, the quality of life deteriorates due to a combination of factors such as the occurrence of physical function limitations or accompanying complications. However, relatively few studies have been conducted on obesity in patients with T2DM. In this study, the ODM group showed a higher score than the LDM group of 23.7 with a total score of 28.2, consistent with a study that found that obesity-related quality of life was further impaired as BMI increased [38]. Among the six areas, it was found that they had more difficulties in the areas of work-related health and diet distress. Lee *et al.*'s study [39] reported that obesity-related quality of life was improved through weight loss after obesity treatment. Therefore, it is thought that if a lifestyle intervention program is carried out for type 2 diabetes patients, obesity-related quality of life, including social health and daily life, can be improved.

In summary, our study indicated that both the LDM and ODM groups had unbalanced nutrient intakes in the differences in dietary intake according to obesity in T2DM patients. In addition, unhealthy eating behaviors such as fast eating speed and increased fast food intake were higher in obese diabetic patients. Therefore, patients with T2DM should consume a balanced diet of various food groups such as fruits and dairy products to prevent complications and chronic diseases [35]. In addition, when diabetic patients with obesity choose a type of eating out, it is thought that nutrition education is necessary to encourage them to consider Korean food consisting of whole grains and vegetables, as well as to have a habit of chewing their meals slowly. We suggest that a comprehensive lifestyle modification, including individualized nutrition treatment, is necessary in consideration of the risk of the disease and dietary habits that are characteristic when divided into phenotypes.

Limitations

This study had some limitations. Data were self-re-

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ported based on 24-hour recall for nutrition intake assessment. The amount of food intake recorded by the participants may be less than the actual intake. As a small cross-sectional study, it is difficult to generalize the results due to the small number of participants, which complicates the establishment of a clear causal relationship.

Previous studies have showed that classifying obese patients according to the location or amount of adipose tissue may be appropriate. However, BMI is correlated with body fat percentage, so it may be suitable for this study [40]. Despite these limitations, this study demonstrated an association between the prevalence of CVD, bad dietary habits, and obesity when T2DM patients were classified according to phenotype. In addition, it is meaningful in that it compared dietary habits, nutrient intake, and obesity-related quality of life in Korean diabetic patients. The results of this study will help to implement more effective medical nutrition treatment reflecting dietary habits to prevent CVD in T2DM patients with obesity.

Conclusion

In conclusion, obese diabetes patients had an increased risk of CVDs, bad dietary habits, and low obesity-related quality of life. Therefore, based on these findings, personalized nutrition treatment considering the risk and differences in dietary habits according to the phenotype of diabetes would be necessary for treatment of diabetic patients. Personalized nutrition treatment, including strategies for selection of food and nutrient balance and dietary education, would be helpful for effective treatment of diabetes. Future studies on the effects of personalized treatment in patients according to the obesity status in T2DM patients and related mechanisms would be necessary.

CONFLICT OF INTEREST

There are no financial or other issues that might lead to conflict of interest.

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DATA AVAILABILITY

Research data is available after a reasonable request to the corresponding author.

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Research Article

지역 간 식생활 행태 및 만족도 차이에 대한 연구: 도시와 비도시 비교를 중심으로

나종연[1], 김소현[2),†,a], 이해랑[3], 길주현[4]

[1]서울대학교 소비자학과 교수
[2]서울대학교 소비자학과 강사
[3]서울대학교 생활과학연구소 연구조교수
[4]서울대학교 소비자학과 학생

A study on regional differences in dietary behaviors and satisfaction in Korea focusing on urban and rural comparisons: a cross-sectional study

Jong-Youn Rha[1], Sohyun Kim[2),†,a], Hae-Rang Lee[3], Juhyeon Kil[4]

[1]Professor, Department of Consumer Science, Seoul National University, Seoul, Korea
[2]Lecturer, Department of Consumer Science, Seoul National University, Seoul, Korea
[3]Assistant Research Professor, Research Institute of Human Ecology, Seoul National University, Seoul, Korea
[4]Student, Department of Consumer Science, Seoul National University, Seoul, Korea

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†Corresponding author:
Sohyun Kim
Department of Consumer Science, Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul 08826, Korea
Tel: +82-2-880-6821
Fax: +82-2-885-2679
Email: shkim0422@snu.ac.kr

[a]Current affiliation:
서울대학교 생활과학연구소 선임연구원
Senior Researcher, Research Institute of Human Ecology, Seoul National University, Seoul, Korea

Objectives: This study aims to examine regional differences in dietary behavior and satisfaction between urban and rural residents in Korea, identifying key factors associated with dietary satisfaction in each group to deepen understanding of these variations.

Methods: The data were obtained from the Consumer Behavior Survey for Food 2022 by the Korea Rural Economic Institute. The analysis involved 6,365 adult participants, using the complex survey χ^2-test and complex survey t-tests to compare dietary behavior across regions and complex survey regression analysis to explore factors related to dietary satisfaction. Data were analyzed with R 4.3.1 (for macOS; Posit PBC).

Results: Urban and rural areas differed in consumer characteristics such as gender, age, income, and household type, as well as in food consumption behaviors and in dietary competencies associated with purchasing and intake. Specifically, dining out and processed food consumption were more prevalent in urban areas, whereas home-cooked meals were more frequent in rural areas. Overall, dietary competencies were higher among urban residents. However, there was no significant difference in dietary satisfaction between the two regions. This finding suggests that satisfaction is based on subjective evaluations, with consumers in each region forming satisfaction in ways that align with their environment and lifestyle. Accordingly, the factors contributing to dietary satisfaction differed by region. In urban areas, information utilization competency and maintaining a balanced diet played a significant role in dietary satisfaction, whereas in rural areas, regular mealtimes were more influential. Urban consumers reported higher dietary satisfaction when meals provided a sense of appropriate convenience, whereas rural consumers showed greater satisfaction when meals were shared with family at home.

Conclusion: The findings indicate regional differences in food consumption behaviors and dietary competencies, as well as variations in how consumers achieve dietary satisfaction. These insights provide a foundation for developing dietary policies and programs aimed at improving dietary satisfaction.

Keywords: eating; life style; consumer behavior; cross-sectional studies; environment

INTRODUCTION

건강에 있어 식생활은 매우 중요하다. 식생활은 인간 생명 유지를 위하여 필수불가결한 요소이며, 인간은 식생활을 통하여 기본적인 생리적 욕구를 충족하고 건강한 신체를 위한 영양분을 공급받는다[1, 2]. 식생활 행태는 식품을 선택하고 섭취하는 행위를 포괄하는 개념으로[3], 개인의 영양소 섭취 및 식습관 등 식생활의 질과 건강의 주요 평가 기준 중 하나이다[4-6]. 아침식사를 하는 것, 규칙적 식사, 고른 영양소 섭취와 같은 건강한 식생활 행동은 대사증후군의 유병률을 낮추고 만성질환 예방 혹은 완화, 궁극적으로 건강 증진에 도움을 주는 것으로 알려져 있다[5, 7, 8]. 식생활의 질을 살펴볼 수 있는 주요 변수에는 개인의 식생활 만족도가 있다. 식생활에 대한 개인의 주관적 평가인 식생활 만족은 개인의 기준에 따른 식품 및 식사의 조달, 준비, 소비 전반에 대한 평가를 의미한다[9, 10]. 건강한 식생활 행동은 식생활 만족도와 양의 관련성을 보임이 보고된다[11, 12]. 개인의 식생활 관련 행동과 만족도를 살펴보는 일은 개인의 건강 수준을 평가함에 있어 의미가 있다.

개인의 건강 상태를 증진시키는 데에는 개인적 요인 외에도 사회적인 환경의 역할이 존재한다[13]. 이러한 이유로 모든 국민은 개인과 가족의 건강에 관하여 국가의 보호를 받을 권리를 가지고, 국가 역시 국민이 건강한 생활을 실천할 수 있도록 지원하게끔 국민건강증진법에 명시되어 있다. 선행연구들도 개인 혹은 집단 간 건강의 차이를 성별, 지역, 소득, 교육수준 등 다양한 인구사회학적 측면에서 살펴보며 건강불평등에 대한 논의를 전개했다[13-16]. 식생활도 개인적 요인과 더불어 개인이 속한 환경적 요인과 관련이 있다. 개인의 수준에서는 식품의 구매와 섭취 측면에서 경제적 접근성, 소득, 식품 구매력, 개인의 식생활 역량, 가구의 특성 등이 중요하며, 사회적 측면에서는 식품의 유통과 분배의 측면에서 식품에 대한 지리적, 물리적, 디지털 접근성, 식품의 안전성 등의 요인이 중요하다[17-21]. 이에 따라 선행연구들은 집단 간 식생활 차이 비교를 통해 집단별 식생활 특징을 도출하고, 특정 집단의 식생활 취약성을 발견하고 해결책을 제시하였다. 이러한 연구에는 가구 유형에 따른 식생활 차이를 살펴본 연구[4, 22-24], 성별이나 연령에 따라 식생활 차이를 비교한 연구[6, 25, 26] 등이 있다.

식품에 대한 물리적, 환경적 접근성 측면에서 식품소비자의 거주지는 소비자의 식생활에 있어 중요한 요인이다[27]. 선행연구들은 거주지를 포괄하는 지역에 따른 건강 수준의 차이를 살펴봄으로써 건강과 관련한 시설에 대한 국민들의 접근성이나 지역적 지원 정책 등을 살펴보는 등[13, 15, 28] 건강 측면에 초점을 맞춘 연구를 활발히 진행하였다. 이러한 연구들은 지역별 건강 불균형 해소에 있어 중요한 시사점을 제시하였다. 그러나 식생활 측면에서는 지역적 차이를 고려한 국내의 연구들은 상대적으로 부족하다. 국내 연구들 중 도시 거주자의 식생활, 농촌 거주자의 식생활, 혹은 특정 지역 거주자의 식생활 특징을 살펴본 연구들은 있지만[29-32], 2010년 초반 이후 각 지역의 식생활을 살펴보는 연구 및 지역 간의 식생활을 비교한 연구[33, 34]는 많지 않다. Kim 등[33]이 거주지에 따른 식생활 만족도를 비교하였으나, 식생활이 가지는 복합적인 특징을 고려했을 때, 추가적인 연구의 필요성은 여전히 존재한다.

지역 간의 식생활 차이를 살펴봄으로써 지역 간의 건강, 영양, 삶의 질 차이에 대한 이해를 도모할 수 있다. 본 연구는 도시와 비도시로 지역을 구분하여 지역 간 식품소비행태, 식생활 역량 및 만족도의 차이를 검증하여 지역 간 차이를 탐색하고, 지역별로 식생활 만족도와 유의한 관계를 가지는 변수에 대하여 살펴보는 것을 통해 지역 간 식생활 차이에 대한 이해를 심화하는 것을 목표한다. 이를 위하여 장소 및 소비행태, 구매와 섭취를 아우르는 식생활 역량, 그리고 식생활 만족도 측면에서 지역 간 비교를 실시하고 지역 별로 식생활 만족도와 유의한 관계를 보이는 요인들을 살펴본다.

METHODS

Ethics statement

This study was exempted from review by the Research Ethics Committee under Article 2 of the Bioethics and Safety Act and its Enforcement Rules, as it uses data collected directly by the government for public welfare.

1. 연구설계

본 연구는 국가 패널데이터를 활용하여 실시한 단면 연구로서, STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) 보고지침을 참고하여 기술하였다(https://www.strobe-statement.org/).

2. 연구대상 및 자료

본 연구는 한국농촌경제연구소의 '식품소비행태조사' 2022년 원자료를 활용하였다. 식품소비행태조사는 매년 시행되는 조사로서, 주 구입자, 성인가구원, 청소년 가구원 조사로 구성된다. 추출된 표본가구의 식품 주 구입자를 대상으로 하는 면접 조사가 실시되며, 해당 조사에 주 구입자를 포함한 19세 이상의 성인이 성인가구원으로 참여한다. 성인가구원 데이터 중 지역 유형(도시/비도시) 및 본 연구의 분석변수들에 대한 결측치가 존재하지 않았음에 따라, 최종 6,365명(남성 2,823명, 여성 3,542명)의 응답을 대상으로 분석을 진행하였다.

3. 분석 변수

1) 지역구분

식품소비행태조사는 지역을 17개의 시도로 구분하고, 동과 면/

읍 단위로 구분한다. 본 연구는 특별시와 광역시, 경기도 및 세종특별자치시에서 동에 해당하는 지역을 도시로, 그 외 지역을 비도시로 구분하였다(도시 = 1, 비도시 = 2).

2) 섭취장소 및 식료품 조달빈도

지역 간 식품소비 및 섭취 행태 비교를 위하여 다음 변수들에 대하여 분석을 실시하였다. 먼저, 섭취 행태를 살펴보기 위하여 섭취장소 변수를 활용하였다. 섭취 행동의 경우, 편의점, 테이크아웃, 배달 등 외식을 포괄하는 범주들과 집밥 등의 범주에 있어 응답자들로 하여금 지난 일주일 간 아침, 점심, 저녁에 해당 장소에서 식사한 횟수를 기입하도록 하였다. 본 연구는 아침, 점심, 저녁의 횟수를 합산하여 일주일 간 각각의 섭취장소 빈도 변수를 구성하였다. 또한, 집밥의 구체적인 양상에 대한 이해와 연계될 수 있는 식품소비행태를 살펴보기 위해 식료품의 조달빈도를 살펴보았다. 구체적으로 전체 식료품 조달빈도와 사전조리가 내포된 품목인 가공식품 조달빈도를 변수로 활용하였다. 식료품 조달빈도의 경우, 일주일 동안 식품을 조달한 빈도를 기록하는 방식으로 수집되었다. 가공식품 조달빈도의 경우, 해당 식품을 얼마나 자주 구입하는지에 대한 7개의 선택지를 통해 수집되었으며, 분석을 위해 본 연구에서는 그 결과를 역코딩하여 활용하였다[0 = 구매하지 않음, 1 = 월 1회 미만(그보다 드물게), 2 = 월 1회 이상, 3 = 월 2–3회 이상, 4 = 주 1회 이상, 5 = 주 2–3회 이상, 6 = 매일]. 사용된 빈도변수들의 경우, 분석을 위하여 빈도의 수준을 세 범주로 구분하였으며, 상위빈도 30%, 하위빈도 30% 및 그 외를 각각 High, Low, Middle의 범주로 구분하였다.

3) 식생활 역량 및 식생활 만족도

지역 간 식생활 역량을 살펴보기 위하여 농식품과 관련하여 구매 시 정보활용 역량, 구매환경 역량, 섭취역량을 변수로 활용하였다. 구체적으로, 구매 시 정보활용 역량에는 농식품을 구입할 때 단위당 가격 등 가격정보를 비교하여 선택하는 가격정보 비교, 건강한 농식품 소비를 위해 객관적이고 정확한 정보를 활용하는 객관적 정보 활용, 그리고 국가나 관련기관 등 중립적 정보원천으로 분류될 수 있는 기관[35]에서 제공하는 농식품 정보를 활용하는 중립적 정보원천 활용이 포함된다. 구매환경 역량에는 거주지 근거리에 식료품점이 충분히 존재하는가를 측정하는 오프라인 구매환경과 인터넷 사이트, 모바일 애플리케이션 등 온라인을 통한 식품구매를 측정하는 온라인 구매환경이 포함된다. 섭취행태를 통해 건강한 식생활을 영위할 수 있는 역량인 섭취역량의 경우 규칙적인 식사, 과식하지 않고 필요한 양 만큼 섭취하는 적정량의 식사, 그리고 다양한 식품을 골고루 먹는 균형 잡힌 식사가 포함된다. 변수의 측정에 있어 응답자가 해당 분야의 역량을 갖추고 있다고 동의하는 정도를 응답하도록 하였으며, 5점 리커트 척도가 사용되었다(1 = 전혀 그렇지 않다, 5 = 매우 그렇다). 식생활 역량과 관련하여 활용된 문항은 Appendix Table 1에 제시되어 있다. 마지막으로, 식생활 만족도 변수를 활용하였다. 식생활 만족도는 응답자의 식생활 만족도의 정도를 5점 리커트 척도가 사용되어 측정되었다(1 = 매우 불만족한다, 5 = 매우 만족한다).

4. 자료 분석

본 연구의 자료 분석은 R 4.3.1 (for macOS; Posit PBC)을 이용하여 진행하였다. 한국농촌경제연구원의 식품소비행태조사 원시자료 이용가이드에 따라 계층, 군집, 그리고 표준가중치에 해당하는 변수를 반영하여 복합표본설계로 분석을 실시하였다. 조사대상자의 일반적 특성은 복합표본 빈도분석을 이용하였다. 도시와 비도시 간 인구통계학적 특성의 비교는 복합표본 χ^2-test를 이용하였으며 n (weighted %)로 나타냈다.

지역 간 식품소비 및 섭취의 차이를 분석하기 위하여 복합표본 χ^2-test와 복합표본 t-test를 실시하였다. 구체적으로, 행태 측면에서 지역에 따른 차이가 있는지 살펴보기 위해서는 복합표본 χ^2-test를, 식생활 역량과 식생활 만족도에 있어 지역 간 차이가 있는지 살펴보기 위해서는 복합표본 t-test를 실시하였다. 지역 별로 식생활 만족도와 관련 요인을 분석하기 위하여 지역 별로 복합표본 다중회귀분석을 실시하였다. 모든 통계 검정의 유의수준은 $\alpha = 0.05$로 설정하였다.

RESULTS

1. 연구대상자의 일반사항

연구대상자의 일반사항은 Table 1과 같다. 연구대상자의 성별은 남성 2,823명(49.0%), 여성 3,542명(51.0%)이었다. 연령분포 비율은 40대 미만 1,490명(31.5%), 40대 1,234명(19.0%), 50대 1,829명(20.2%), 그리고 60대 이상 1,812명(29.3%)이었다. 거주지의 경우, 도시 거주자가 3,698명(66.1%), 비도시 거주자가 2,667명(33.9%)이었다. 월 개인소득의 경우, 200만원 미만이 2,586명(39.3%), 200–300만원 미만이 2,094명(32.9%), 300만원 이상이 1,685명(27.8%)이었다. 가구형태의 경우, 1인가구 949명(18.8%), 다인가구 5,416명(82.2%)이었다.

도시와 비도시 거주자로 구분하였을 때, 도시 거주자의 경우, 남성 1,671명(50.3%), 여성 2,027명(49.7%)으로 나타났다. 연령분포 비율은 40대 미만 978명(34.7%), 40대 754명(20.0%), 50대 1,079명(21.2%), 그리고 60대 이상 887명(24.1%)이었다. 월 개인소득의 경우, 200만원 미만이 1,305명(32.9%), 200–300만원 미만이 1,256명(35.5%), 그리고 300만원 이상이 1,137명(31.6%)이었다. 가구형태의 경우, 1인가구 472명(16.1%), 다인가구 3,226명(83.9%)으로 나타났다. 비도시 거주자의 경우, 남성 1,152명(46.6%), 여성 1,515명(53.4%)으로 나타났다. 연령분포 비율은 40대 미만 512명(25.3%), 40대 480명(17.2%), 50대

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Table 1. Descriptive statistics of the sample

Variable	Category	Total (n = 6,365)	Region		*P*-value[1)]
			Urban (n = 3,698)	Rural (n = 2,667)	
Gender	Men	2,823 (49.0)	1,671 (50.3)	1,152 (46.6)	0.006
	Women	3,542 (51.0)	2,027 (49.7)	1,515 (53.4)	
Age (year)	Under 40	1,490 (31.5)	978 (34.7)	512 (25.3)	<0.001
	40's	1,234 (19.0)	754 (20.0)	480 (17.2)	
	50's	1,829 (20.2)	1,079 (21.2)	750 (18.1)	
	60 and above	1,812 (29.3)	887 (24.1)	925 (39.4)	
Income level (monthly)[2)]	< 200	2,586 (39.3)	1,305 (32.9)	1,281 (51.8)	<0.001
	200–300	2,094 (32.9)	1,256 (35.5)	838 (27.8)	
	≥ 300	1,685 (27.8)	1,137 (31.6)	548 (20.4)	
Household type	Single-person household	949 (18.8)	472 (16.1)	477 (24.0)	<0.001
	Multi-person household	5,416 (82.2)	3,226 (83.9)	2,190 (76.0)	

n (weighted %).
[1)]*P*-value from a complex survey χ^2-test.
[2)]The unit for monthly income level is 10,000 KRW.

750명(18.1%), 그리고 60대 이상 925명(39.4%)이었다. 월 개인 소득의 경우, 200만원 미만이 1,281명(51.8%), 200–300만원 미만이 838명(27.8%), 그리고 300만원 이상이 548명(20.4%)으로 나타났다. 가구형태의 경우, 1인가구 477명(24.0%), 다인가구 2,190명(76.0%)으로 나타났다.

2. 지역 간 차이 비교

1) 지역 간 식품소비행태 비교

도시와 비도시 간 식품소비행태의 차이를 살펴본 결과는 Table 2와 같다. 분석 결과, 장소 측면의 소비행태에 있어, 도시와 비도시 간 유의한 차이가 발견되었다. 구체적으로, 집밥의 경우, 비도시에서 보다 비율이 높았으며($P < 0.001$), 외식 전체의 경우 도시에서 높았다($P < 0.001$). 품목 측면의 소비행태에 있어, 전체 식료품의 구매빈도가 도시가 비도시에 비하여 높았다($P < 0.001$). 가공식품 구매빈도 또한 도시가 비도시에 비하여 높았다($P < 0.001$).

2) 지역 간 식생활 역량 및 식생활 만족도 비교

Table 3은 도시와 비도시 여부에 따른 지역 간 식생활 역량 및 식생활 만족도의 차이를 살펴본 결과이다. 농식품 구매환경의 경우, 오프라인 구매환경에서는 유의한 차이가 발견되지 않았으나($M_{도시} = 3.8$, $M_{비도시} = 3.7$, $P > 0.05$), 온라인 구매환경에서는 도시가 유의하게 높은 수준을 보였다($M_{도시} = 2.8$, $M_{비도시} = 2.1$, $P < 0.001$). 농식품 정보활용은 전반적으로 도시가 비도시에 비해 높은 수준을 나타냈다. 구체적으로, 도시가 가격 정보 비교($M_{도시} = 3.5$, $M_{비도시} = 3.3$, $P < 0.05$), 객관적 정보 활용($M_{도시} = 3.5$, $M_{비도시} = 3.4$, $P < 0.05$), 중립적 정보원천 활용($M_{도시} = 3.5$, $M_{비도시} = 3.4$, $P < 0.001$)에 있어 모두 유의하게 높은 수준을 보였다. 건강한 식생활의 경우, 규칙적인 식사에서는 유의한 차이가 발견되지 않았다($M_{도시} = 3.6$, $M_{비도시} = 3.7$, $P > 0.05$). 적정량의 식사($M_{도시} = 3.6$, $M_{비도시} = 3.5$, $P < 0.05$)와 균형잡힌 식사($M_{도시} = 3.5$, $M_{비도시} = 3.4$, $P < 0.05$)의 경우 도시가 유의하게 높은 수준을 보였다. 식생활 만족도는 비도시와 도시 간 유의한 차이가 없었다($M_{도시} = 3.6$, $M_{비도시} = 3.6$, $P > 0.05$).

3. 지역별 식생활 만족도와 유의한 관계를 보이는 변수

지역별 식생활 만족도와 유의한 관계를 보이는 변수를 살펴본 결과는 Table 4에 제시되어 있다. 모든 모형에서 분산팽창지수(variance inflation factor, VIF) 지수가 2 미만의 값을 보여(1.1–1.4), 독립변수들 간의 다중공선성 가능성이 낮음을 확인하였다.

도시에서 식생활 만족도와 유의한 관계를 보이는 변수를 살펴본 결과(Model 1), 오프라인 구매환경($\beta = 0.070$, $P < 0.01$), 가격정보 비교($\beta = 0.213$, $P < 0.001$), 중립적 정보원천 활용($\beta = 0.111$, $P < 0.01$), 그리고 균형잡힌 식사($\beta = 0.069$, $P < 0.05$)가 식생활 만족도와 유의한 관계를 보였다. 소비행태 변수 중에서는 외식 빈도가 식생활 만족도와 유의한 관계를 보였다. 구체적으로, 준거집단에 해당하는 주 6회 이하 외식 집단에 비하여 주 7–13회 및 14회 이상 집단의 식생활 만족도가 낮았다(7–13 times a week: $\beta = -0.138$, $P < 0.01$; ≥ 14 times a week: $\beta = -0.347$, $P < 0.05$). 가공식품 조달빈도 또한 식생활 만족도와 유의한 관계를 보였다. 구체적으로, 준거집단에 해당하는 월 1회 미만 가공식품 조달 집단에 비하여 2주 1회 및 주 1회 집단의 식생활 만족도가 높았다(once every two weeks: $\beta = 0.143$, $P < 0.05$; once a week: $\beta = 0.131$, $P < 0.05$). 그러나 그보다 높은

Table 2. Comparison of consumption behavior between urban and rural regions

Variable	Urban (n = 3,698)	Rural (n = 2,667)	*P*-value[1]
Consumption behavior (by location)			
Home-cooked meals (times a week)[2]			< 0.001
≤ 6	182 (7.1)	118 (5.4)	
7–13	1,620 (49.8)	706 (25.3)	
≥ 14	1,896 (43.1)	1,843 (69.3)	
Dining out (times a week)[3]			< 0.001
≤ 6	2,022 (47.1)	2,004 (75.8)	
7–13	1,637 (51.2)	630 (22.5)	
≥ 14	39 (1.6)	33 (1.7)	
Consumption behavior (by item)			
Food[4]			< 0.001
≤ Once a week	1,484 (39.4)	1,487 (55.4)	
2–6 times a week	2,122 (58.4)	1,124 (42.6)	
≥ 7 times a week	92 (2.2)	56 (2.0)	
Home meal replacement[5]			< 0.001
Less than once a month	587 (13.8)	671 (22.8)	
Once a month	508 (14.4)	343 (14.5)	
Once every two weeks	908 (25.3)	724 (26.8)	
Once a week	1,032 (25.8)	684 (26.2)	
2–3 times a week	608 (18.9)	238 (9.4)	
Daily	55 (1.9)	7 (0.3)	

n (weighted %).
[1]*P*-value from a complex survey χ^2-test.
[2]The frequency with which the study participants had breakfast, lunch, and dinner at home over the past week.
[3]The frequency with which the study participants had breakfast, lunch, and dinner at places that include convenience stores, takeout, and delivery, over the past week.
[4]The frequency with which the study participants purchased food over the past week.
[5]The frequency which the study participants purchased home meal replacement.

Table 3. Comparison of dietary competence and satisfaction between urban and rural regions

Variable	Urban (n = 3,698)	Rural (n = 2,667)	*P*-value[1]
Purchase environment[2]			
Offline purchasing environment	3.8 ± 0.0	3.7 ± 0.0	0.699
Online purchasing environment	2.8 ± 0.1	2.1 ± 0.1	< 0.001
Competence in purchasing information use[3]			
Price comparison	3.5 ± 0.0	3.3 ± 0.0	0.013
Use of objective information	3.5 ± 0.0	3.4 ± 0.0	0.022
Use of neutral information sources	3.5 ± 0.0	3.4 ± 0.0	< 0.001
Dietary habits[4]			
Regular meals	3.6 ± 0.0	3.7 ± 0.0	0.126
Appropriate food quantity	3.6 ± 0.0	3.5 ± 0.0	0.036
Balanced meals	3.5 ± 0.0	3.4 ± 0.0	0.013
Satisfaction with dietary life[5]	3.6 ± 0.0	3.6 ± 0.0	0.132

Mean ± SD.
[1]*P*-value from complex survey t-test.
[2-5]Measured using a 5-point Likert scale (e.g., strongly disagree = 1, neutral = 3, strongly agree = 5).

조달빈도를 나타낸 집단은 준거집단보다 유의하게 더 높은 식생활 만족도를 보이지 않았다.

비도시에서 식생활 만족도와 유의한 관계를 보이는 변수를 살펴본 결과(Model 2), 가구형태(다인가구: $\beta = 0.253$, $P < 0.001$), 그리고 규칙적인 식사($\beta = 0.070$, $P < 0.05$)가 식생활 만족도와 유의한 관계를 보였다. 소비행태 변수 중에서는 집밥 빈도와 식품 조달빈도가 식생활 만족도와 유의한 관계를 보였다. 구체적으로, 집밥 빈도의 경우, 준거집단에 해당하는 주 6회 이하 집밥 집단에 비하여 주 7–13회 및 14회 이상 집단의 식생활 만족도가 높았다(7–13 times a week: $\beta = 0.529$, $P < 0.01$; ≥ 14 times a week: $\beta = 0.549$, $P < 0.001$). 식품 조달빈도의 경우, 준거집단에 해당하는 주 1회 미만 식품 조달집단에 비하여 주 7회 이상 식품 조달집단의 식생활 만족도가 높았다(≥ 7 times a week: $\beta = 0.427$, $P < 0.001$).

DISCUSSION

본 연구는 식생활 만족도 및 식생활 만족도와 연계되는 변수들에 대하여 지역 간 비교를 실시하여 삶의 질에 있어 중요한 역할을 하는 식생활에 대한 이해를 심화하고자 하였다. 분석 결과, 지역 간 소비자 특성뿐 아니라 소비자의 식품소비행태, 구매와 섭취 과정에 있어 식생활 역량, 그리고 식생활 만족도와 유의한 관계를 갖는 변수에 있어 지역 간 차이가 존재했다.

지역 간 식품소비행태 중 장소 측면의 소비행태에 있어, 도시가 비도시보다 외식의 빈도가 높고 비도시가 도시보다 집에서 식사하는 빈도가 보다 높았다. 품목 측면의 소비행태는 도시가 전체적인 식품 조달빈도 및 가공식품의 조달빈도가 비도시에 비해 높았다. 이는 도시와 비도시에 거주하는 소비자들의 라이프스타일의 차이를 반영하는 것으로 생각된다. 본 연구의 분석

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Table 4. Regional analysis of variables associated with dietary satisfaction

Variable[1]	Urban	Rural
	β[2]	β
Demographic Factors		
Gender (women)[3]	−0.037	−0.038
Age (40's)[4]	0.092	0.060
Age (50's)	0.040	0.036
Age (60+)	0.009	0.018
Income level (middle)[5]	−0.020	0.052
Income level (high)	−0.017	−0.007
Household type (multi-person)[6]	0.101	0.253***[7]
Purchase environment[8]		
Offline purchasing environment	0.070**	0.023
Online purchasing environment	0.001	0.011
Competence in purchasing information use[9]		
Price comparison	0.213***	0.038
Use of objective information	0.014	0.061
Use of neutral information sources	0.111**	−0.019
Dietary habits[10]		
Regular meals	0.037	0.070*
Appropriate food quantity	0.038	0.053
Balanced meals	0.069*	0.011
Consumption behavior		
Dining out (7–13 times a week)[11]	−0.138**	−0.050
Dining out (≥ 14 times a week)	−0.347*	−0.092
Home-cooked meal (7–13 times a week)[12]	0.186	0.529**
Home-cooked meal (≥ 14 times a week)	0.191	0.549***
Food (2–6 times a week)[13]	0.078	−0.013
Food (≥ 7 times a week)	0.098	0.427***
Home meal replacement (once a month)[14]	−0.108	0.013
Home meal replacement (once every two weeks)	0.143*	0.088
Home meal replacement (once a week)	0.131*	0.045
Home meal replacement (2–3 times a week)	−0.145	−0.073
Home meal replacement (daily)	0.324	−0.993
R^2	0.115	0.085
Adjusted R^2	0.111	0.080
F	29.868***	15.327***

[1]All variance inflation factor (VIF) values are below 2.0, indicating no multicollinearity concerns among the predictors in either region.
[2]Coefficients from the complex survey regression analysis; β indicates the standardized beta coefficient.
[3]The reference group for gender is men.
[4]The reference group for age is under 40.
[5]The reference group for income level is "low." Monthly income was measured in units of 10,000 KRW and categorized as: less than 200 (low), 200 to less than 300 (middle), and 300 or more (high).
[6]The reference group for household type is single-person household.
[7]*P*-value from complex survey regression analysis; *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.
[8-10]Measured using a 5-point Likert scale (e.g., strongly disagree = 1, neutral = 3, strongly agree = 5).
[11]The frequency with which the study participants had breakfast, lunch, and dinner at places that include convenience stores, takeout, and delivery, over the past week; the reference group for dining out is ≤ 6 times a week.
[12]The frequency with which the study participants had breakfast, lunch, and dinner at home over the past week; the reference group for home-cooked meals is ≤ 6 times a week.
[13]The frequency with which the study participants purchased food over the past week; the reference group for food purchase is ≤ once a week.
[14]The frequency which the study participants purchased home meal replacement; the reference group for home meal replacement is less than once a month.

대상 중 도시에 거주하는 응답자들은 비도시에 거주하는 응답자들과 비교하여 연령이 낮고, 소득이 높으며, 다인가구의 비율이 높았다. 즉, 도시에는 사회활동이 활발한 인구의 비율이 높으며, 이들은 대부분 집에서 식사하기 어렵기 때문에 도시는 외식의 비율이 높지만, 은퇴인구에 해당하는 60대 이상의 비율이 높은 비도시의 경우 상대적으로 시간적 여유를 가지고 집에서 식사하는 행동이 나타난 것으로 보인다. 또한 도시의 소비자들은 다인가구가 많으므로 식품 및 가공식품 전반의 조달빈도가 비도시보다 높았던 것으로 보인다.

지역 간 식생활 역량을 비교한 결과, 오프라인 구매환경과 규칙적인 식사를 제외하고 식생활 역량에 있어 도시에서의 수준이 비도시보다 유의하게 높게 나타나, 지역 간 유의한 차이를 발견하였다. 이러한 차이도 도시와 비도시를 구성하는 소비자들의 특성이 반영된 것으로 볼 수 있다. 보다 낮은 연령대에서 높은 정보활용 관련 역량을 보이는 결과는 선행연구의 결과와 맥을 같이한다[36]. 또한 섭취역량에 있어 적정량의 식사 및 균형 잡힌 식사 등 지식 기반의 행동역량의 경우 낮은 연령대에서 높은 수준을 보이며, 규칙적인 식사 등 습관 기반의 행동역량의 경우 높은 연령대에서 높은 수준을 보인다는 결과도 선행연구의 결과와 일치한다[37, 38].

지역 간 인구통계학적 특성, 식생활 관련 행동적 특성과 역량 등 인지적 특성의 차이가 유의하게 존재함에도, 지역간 식생활 만족도 결과는 유의한 차이를 보이지 않았다. 이것은 만족도가 주관적인 지표이기 때문으로 생각된다. 주관적 평가인 만족도는 일괄적인 방식으로 만족되는 것이 아닌 개인의 특성과 개인이 처한 환경의 특색에 적합한 방법을 통해 만족되기 때문이다. 지역 별 서로 다른 라이프스타일에 따라 상이한 방식으로 식생활의 만족을 도모하는 양상은 복합표본 다중회귀분석의 결과를 통하여 구체적으로 살펴볼 수 있다.

첫째, 오프라인 맥락에서의 구매환경에 대한 역량은 도시에 거주하는 소비자들에게 보다 유의하게 작용하고 있다. 분석 결과, 구매환경 역량에 있어 오프라인 구매환경은 도시에 거주하는 소비자들의 식생활 만족도와 유의한 관계가 있었으나, 비도시에 거주하는 소비자들의 식생활 만족도는 구매환경 역량과 유의한 관계를 보이지 않았다. 이것은 도시가 보다 다양한 여건의 오프라인 구매환경이 구축되어 있는 반면, 비도시의 오프라인 구매환경은 상대적으로 단순한 형태로 존재하기 때문일 것으로 사료된다.

둘째, 구매 시 정보활용 역량은 도시에 거주하는 소비자들에게 보다 중요하게 작용하는 역량이다. 분석결과, 도시에 거주하는 소비자들의 식생활 만족도와 유의한 양의 관련성을 보이는 변수에는 가격정보 비교와 중립적 정보원천 활용이 있었다. 그러나 비도시의 경우, 유의한 관련성을 보인 변수가 없었다. 이러한 점은 도시가 보다 복잡한 식품소비 환경을 가지고 있기 때문으로 생각된다. 도시에서는 다양한 종류의 식품들이 다양한 채널을 통해 소비자들에게 제공되기 때문에 이러한 복잡한 환경에서 정보의 중요성이 더욱 부각된다. 한편, 비도시의 경우 상대적으로 적은 종류의 식품들이 적은 숫자의 채널을 통해 공급된다. 따라서 소비자들은 이미 익숙한 제품과 경로를 선택하게 되어, 정보와 관련된 역량이 이들의 식생활 만족도에 있어 상대적으로 덜 중요한 역할을 할 수 있다.

셋째, 지역 별로 중요한 섭취역량의 유형이 다르다. 도시의 경우, 균형 잡힌 식사가 만족스러운 식생활에 있어 더 중요한 반면, 비도시의 경우 규칙적인 식사가 더 중요한 역할을 한다. 도시에 거주하는 소비자들은 상대적으로 속도감 있고 불규칙한 라이프스타일을 갖는다. 따라서 규칙적인 식사보다도, 식사를 할 때에 양질의 균형 잡힌 식사를 하는 것을 더 중요해지는 것으로 생각된다. 한편, 비도시의 경우 전반의 라이프스타일이 규칙적이고 이미 섭취해오던 익숙한 식품들을 구매하고 섭취하는 식생활이 전개되기 때문에, 규칙적으로 식사를 하는 것이 더욱 중요한 역할을 하는 것으로 보인다.

넷째, 소비행태 측면에서 지역 별로 소비자가 식생활 만족을 도모하는 양상에 차이가 존재한다. 도시 거주 소비자들의 경우, 외식빈도가 높은 집단의 식생활 만족도가 낮은 양상을 보였으며, 적정 수준의 가공식품이 조달되는 집단의 식생활 만족도가 높은 것을 확인할 수 있었다. 반면, 비도시 거주 소비자들의 경우, 집밥 빈도가 높은 집단의 식생활 만족도가 높게 나타났으며, 식품 조달빈도가 높은 집단 또한 높은 식생활 만족도를 보였다. 이 또한 도시와 비도시의 차이가 반영된 서로 다른 양상의 식생활 만족 추구 행동을 나타내는 결과로 볼 수 있다. 특히, 비도시에서 다인가구 집단이 1인가구 집단에 비하여 높은 식생활 만족도를 나타냄을 종합하여 볼 때, 도시의 소비자에게는 과도하게 외식에 의존하지 않는 상황에서 편의성이 적절하게 보장되는 식사가, 비도시의 소비자에게는 집, 즉, 가정이라는 공동체에서 가족들과 함께하는 식사가 이들의 식생활 만족에 있어 중요한 지점임을 살펴볼 수 있다.

이처럼 소비자가 각자가 처한 환경에 따라 다른 방식을 통해 주관적인 만족감을 얻을 수 있다는 점은, 소비자가 식생활 만족을 체감할 수 있도록 함에 있어 지역 별로 상이한 양상을 고려한 연구와 정책적 지원이 필요함을 시사한다.

Limitations

본 연구는 다음 한계점을 갖는다. 첫째, 지역의 구체적 특성이 반영된 심화 분석이 요구된다. 본 연구는 지역을 구분함에 있어 행정단위를 기준으로 크게 도시와 비도시를 구분하였다. 그러나 분석 결과는 도시와 비도시의 유통환경, 제공되는 제품의 다양성 등 도시 환경에서의 복잡성 및 도시에서의 시간적 여유 부족 등 지역별 구체적 특성에 대한 추가적인 탐색이 필요함을 제시한다. 둘째, 본 연구의 종속변수인 식생활 만족도는 주관적인 변수라는 점에서 본 연구는 한계점을 가진다. 식생활이 건강과

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밀접한 관련을 갖는다는 점에서 중요성을 갖는 만큼, 주관적 평가기준과 더불어 객관적인 평가기준이 추가되어 균형 잡힌 결과를 제시한다면 더욱 실효성 있는 제언이 가능할 것이다.

Conclusion

본 연구는 소비자들의 식생활과 관련하여 도시와 비도시로 지역을 구분하고, 지역 간 비교를 실시함으로써 지역에 따른 식생활에 대한 이해를 심화하였다. 더 나아가, 본 연구는 소비자들의 식생활과 관련하여 도시와 비도시 등 지역 간 차이의 기저에 해당하는 변수들에 대한 심도 깊은 이해의 필요성을 제시한다. 구체적으로, 본 연구의 분석 결과는 도시의 상대적 복잡성과 비도시의 상대적 단순성, 그리고 두 지역 간 시간적 여유 등의 삶의 맥락적 요소와 같은 배경이 궁극적으로 지역에 따른 소비자들의 식생활 만족도 차이로 이어질 수 있을 것임을 나타낸다. 이 같은 이해는 소비자의 만족스러운 식생활과 관련하여 더 효과적인 정책의 수립에도 도움을 줄 것이다.

CONFLICT OF INTEREST

There are no financial or other issues that might lead to conflicts of interest.

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DATA AVAILABILITY

Data supporting the findings of this study are available upon request from the corresponding author.

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APPENDIX

Appendix Table 1. Measurement items for dietary competence

Variable		Items
Purchase environment	Offline purchasing environment	There are enough grocery stores close to home, making it easy to buy and prepare food without physical limitations.
	Online purchasing environment	I purchase food online through websites, mobile apps, and other digital platforms.
Competence in purchasing information use	Price comparison	I diligently compare price information (such as per-unit price) when buying agricultural products.
	Use of objective information	I use objective and accurate information to make informed choices when selecting healthy agricultural products.
	Use of neutral information sources	I frequently use information provided by the government or relevant organizations about agricultural products in my daily life.
Dietary habits	Regular meals	I eat meals regularly, including breakfast.
	Appropriate food quantity	I consume food in appropriate quantities without overeating.
	Balanced meals	I eat a variety of foods to ensure balanced nutrient intake.

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Research Article

야식 섭취가 청소년의 구강건강 특징 및 구강 증상 경험에 미치는 영향: 제18차 청소년건강행태조사를 이용한 단면연구

홍승희†

신한대학교 식품영양학과 교수

Effects of night eating on oral health characteristics and symptoms of poor oral health in adolescents: a cross-sectional study using the 18th Korea Youth Risk Behavior Survey

Seung-Hee Hong†

Professor, Department of Food and Nutritional Science, Shinhan University, Uijeongbu, Korea

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†Corresponding author:
Seung-Hee Hong
Department of Food and Nutritional Science, Shinhan University, 95 Hoam-ro, Uijeongbu 11644, Korea
Tel: +82-31-870-3571
Fax: +82-31-870-3509
Email: hsh@shinhan.ac.kr

Objectives: To determine the association between night eating habits and oral health in adolescents.

Methods: Data from the 18th Korea Youth Risk Behavior Survey conducted in 2022 were analyzed. The study included 51,850 middle and high school students and assessed the frequency of night eating per week, dietary habits, oral health characteristics, and factors affecting the presence of symptoms of poor oral health.

Results: Almost thirty-seven percent (36.6%) of Korean adolescents have eaten at night one to two times per week and 23.0% more than three times per week. An increased frequency of night eating was associated with poor dietary habits. Adolescents who consumed more at night were less likely to have breakfast, drink water, and eat fruit, while their consumption of fast food, sweet drinks, and high-caffeine drinks increased (P < 0.001). An increased frequency of night eating was also associated with poor oral health. In a logistic regression analysis, more frequent night eaters were significantly less likely to brush their teeth at least three times per day (odds ratio [OR], 0.78; 95% confidence interval [CI], 0.75–0.82; P for trend < 0.001), and brush their teeth before going to sleep (OR, 0.70; 95% CI, 0.65–0.75; P for trend < 0.001), while they were more likely to experience sealant (OR, 1.19; 95% CI, 1.13–1.26). More frequent night eaters were significantly more likely to have tooth fracture (OR, 1.41; 95% CI, 1.30–1.53; P for trend < 0.001), tooth pain when eating (OR, 1.59; 95% CI, 1.50–1.67; P for trend < 0.001), toothache (OR, 1.60; 95% CI, 1.52–1.70), and bad breath (OR, 1.51; 95% CI, 1.43–1.60).

Conclusion: Our findings suggest that frequent night eating is linked to symptomatically poor oral health in adolescents. Therefore, oral health education programs related to dietary habits are necessary to reduce the potential of night eating to negatively influence dietary habits and oral health.

Keywords: night eating; dietary habits; oral health; oral symptoms; Korea youth risk behavior survey

INTRODUCTION

청소년기는 아동에서 성인기로 전환되는 시기로 신체적, 정신적, 생리적인 변화와 발달이 급속하게 진행되고[1], 이때 형성된 식습관과 생활습관은 성인기까지 지속되는 경향이 있어 생애주기에서 매우 중요한 시기이다[2]. 또한 건강 관련 습관과 행동이 확립되는 시기로, 건강 및 영양과 관련된 지식 및 인식이 부족하여 건강에 대한 중요성을 간과할 수 있어 바람직한 건강 관련 습관을 형성하고 실천하는 것이 중요하다[3, 4]. 특히 청소년기는 치아우식증과 치주질환 등의 다양한 구강질환을 경험하게 되는 시기로 이때 구강건강 관리 행위를 올바르게 확립해야 한다. 청소년들의 식습관은 구강건강에도 밀접한 관계가 있으며, 올바르지 못한 구강건강 관리는 성인기와 노년기에도 영향을 주게 된다[5]. 2023년도 국민건강영양조사 자료에 의하면 10–18세 청소년의 식품으로부터 섭취한 당 1일 섭취량은 전체 66.8 g, 남자 71.1 g, 여자 62.1 g으로 전 생애주기 중 가장 높게 나타났다[6]. 또한 하루동안 평균 칫솔질 횟수는 전체 2.3회, 남자 2.2회, 여자 2.5회로 하루 3회 이하의 칫솔질 횟수를 보였다[6].

야식(night eating)은 저녁과는 구분되는 것으로, 저녁을 먹은 후에 추가로 섭취하는 간식이나 식사를 의미한다[7]. 우리나라 청소년들은 밤늦은 시간까지 학업을 해야 하는 환경에서 저녁식사를 충분히 하지 못하거나 결식한 경우, 공복감으로 인하여 충동적이고 무분별한 야식의 섭취가 증가하는 것으로 보고되고 있다[8]. 야식의 잦은 섭취는 패스트푸드나 인스턴트 식품 등 높은 열량의 섭취로 인하여 비만 및 위장 장애를 유발하는 등 다양한 건강문제를 일으킬 수 있다[9]. 야식증후군(night eating syndrome)은 섭식장애에 속하는 질병으로 주 2회 이상 야식을 섭취하며, 하루 음식 섭취량의 25%를 섭취하는 경우이다[10]. 장기적인 야식의 섭취는 야식증후군을 유발할 수 있으며, 아침결식, 수면 장애, 위장 장애 등의 증상을 보이는 것으로 알려졌다[10]. 또한 현대인의 야식 섭취 습관이 비만, 우울, 스트레스, 수면 장애 등 다양한 건강문제와 연관되어 있는 것으로 보고되었다[11].

경기 일부 지역 중학생의 야식 섭취 실태에 대한 연구에서 일주일에 2–3회 섭취 빈도가 가장 높았으며[8], 고등학생에 대한 연구에서 역시 일주일에 2–3회가 가장 많았다[12]. 또한 경기지역 고등학생을 대상으로 한 연구에서는 일주일에 1–2회 46.7%, 일주일에 3회 이상 33.9%, 일주일에 1회 미만이 19.4%로 나타났다[13]. 고등학생을 대상으로 한 최근에 이루어진 연구에서는 일주일에 3–4회가 30.5%로 가장 많았고, 일주일에 1–2회가 27.3%로 나타나 청소년들의 야식 섭취 빈도가 높은 것을 알 수 있다[14]. 청소년들은 야식을 먹기 편하거나 기호 위주로 선택하기 때문에 패스트푸드나 인스턴트 식품 등을 섭취할 가능성이 높다. 청소년들의 기호도가 가장 높은 야식 메뉴는 치킨이고, 그 다음에 피자. 빙과류, 햄버거, 라면 등으로 나타났다[13, 15]. 청소년들의 섭취 빈도가 높은 야식 메뉴는 과일류, 빙과류, 라면, 치킨, 초콜릿 및 사탕류, 탄산음료, 빵 등으로 당류와 지방의 섭취가 높은 것으로 보고되었다[8, 13, 16].

청소년기의 대표적인 구강질환으로 치아우식증과 치주질환이 있으며, 이 중 치아우식증은 식습관과 밀접한 관계가 있다. 치아우식증은 치아 표면에 플라그(plaque)를 형성하고 있는 세균이 입 안에 남아있는 음식물을 이용하여 산을 생성하여 치아의 조직을 손상하는 것으로, 증상으로는 치아가 쑤시고 욱신거리며 구취 및 치주질환을 동반하여 통증을 유발한다[17, 18]. 치아우식증은 발생하면 건강한 치아로 되돌리기가 어려운 질환으로, 심해질 경우 치아를 발치해야 하므로 구강건강을 유지하기 위하여 초기 관리가 매우 중요하다[19]. 치주질환은 치은의 염증으로 시작하여 관리가 잘 이루어지지 않으면 치주염으로 진행되어 치아 주변의 조직까지 파괴된다[20].

청소년을 대상으로 한 식습관과 구강건강과 관련된 선행연구로는 경기 일부 지역 중학생을 대상으로 한 연구에서는 간식을 적게 섭취할수록 구강건강 행동이 높은 것으로 나타났다[21]. 또한 탄산음료 섭취가 구강증상 경험에 위험요인으로 작용하는 것으로 보고되었다[22, 23]. 식습관과 구강증상 경험과의 관련성 연구에서 단맛 나는 음료, 라면 등 인스턴트 식품, 패스트푸드 섭취가 구강질환 증상을 증가시키는 요인으로 작용하였다[24–27]. 중•고등학생을 대상으로 한 연구에서 패스트푸드 섭취 빈도와 칫솔질 횟수가 구강건강 상태에 영향을 미치는 것으로 나타났다[28]. 식생활에 따른 구강건강 증진 행위와 구강증상에 대한 연구에서 탄산음료와 패스트푸드를 섭취하는 경우 칫솔질 횟수가 적고, 구강 증상 경험은 높았다[4]. 또한 청소년의 칫솔질 빈도가 적고 탄산음료 섭취가 많은 경우 치아우식증에 걸릴 위험이 높은 것으로 보고되었다[29]. 패스트푸드 등 정크푸드 섭취가 치아 깨짐 증상, 잇몸 통증 및 출혈 증상에 유의한 영향을 미치는 것으로 나타났다[30].

청소년기는 구강질환이 시작되고 구강건강의 기초가 형성되는 시기로 구강질환 발생과 관련된 다양한 요인에 대한 연구가 필요하다. 그러므로 야식 섭취가 청소년의 구강건강에 미칠 가능성이 높음에도 불구하고 야식 섭취와 구강건강에 대한 연구가 거의 이루어지지 않았다. 따라서 본 연구에서는 전국의 중•고등학생을 대상으로 청소년의 야식 섭취 실태를 알아보고 야식의 섭취가 구강건강에 미치는 영향을 분석하고자 하였다. 이를 토대로 청소년의 야식 섭취 실태와 구강건강과 관련성을 파악하여 구강건강 증진에 도움이 될 수 있는 기초자료를 제공하고자 하였다.

METHODS

Ethics statement

This study was conducted as a secondary data using the Korea Youth Risk Behavior Survey, and it received exempt approval by the Institutional Review Board of Shinhan University (approval number: SHIRB-202501-HR-246-02).

1. 연구설계

본 연구는 단면연구로 STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) 보고지침(https://www.strobe-statement.org/)을 참고하여 기술하였다.

2. 자료출처 및 표본설계

청소년건강행태조사는 질병관리청과 교육부가 공동으로 주관하여 수행하는 국가승인통계(승인번호 117058호)조사로, 우리나라 청소년의 음주, 흡연, 식생활, 신체활동, 정신건강, 구강건강, 손상 등 건강행태 현황과 추이를 파악하기 매년 실시하는 익명성 자기기입식 온라인 조사이다. 청소년건강행태조사의 대상자는 전국의 중•고등학교 학생 전체이며 모집단 층화, 표본 배분의 단계를 거쳐서 표본학급을 추출한다. 표본으로 선정된 학급의 학생들은 1인 1대의 컴퓨터를 이용하여 익명으로 온라인 조사에 참여한다. 청소년건강행태조사는 2005년 11개 영역 92개 문항으로 조사가 시작되어 2012년 이후에는 15개 영역 약 120개 문항의 조사가 이루어지고 있다. 2022년 제18차 청소년건강행태조사는 2022년 4월 전국의 중•고등학교 재학생을 모집단으로 하여 조사를 실시하였다. 모집단 층화단계는 39개 지역군과 학교급을 층화변수로 사용하여 모집단을 117개 층으로 나누고, 표본 크기를 중학교 400개교, 고등학교 400개교로 배분하였다. 표본추출은 층화집락추출법을 이용하였으며 1차 추출단위는 학교, 2차 추출단위는 학급으로 하였다[31]. 최종적으로 798개교 51,850명 학생이 참여하여, 학생 수 기준 조사 참여율은 92.2%를 나타냈다. 장기 결석 또는 스스로 응답이 불가능한 특수 학생은 조사에서 제외하였다.

3. 연구내용 및 방법

1) 일반적 특성

청소년의 일반적 특성은 성별, 학년, 거주지역, 학업 성취, 가구의 경제, 아버지 학력, 어머니 학력, 가족과 거주 형태를 포함하여 8개의 문항을 이용하였다. 가구의 경제 수준과 학업 성취 수준은 '상, 중상'은 '상'으로, '중'은 '중'으로, '중하, 하'는 '하'로 재분류하여 분석하였다. 아버지 학력과 어머니 학력은 '잘 모름'을 결측치로 처리하고 나머지 변수를 그대로 이용하였다. 가족과 거주 형태는 '가족과 함께 살고 있다'를 '가족과 거주'로, '친척집에서 살고 있다, 하숙 또는 자취, 기숙사, 보육시설'을 '가족 외 거주'로 재분류하여 분석하였다.

2) 식습관 특성

식습관 특성은 최근 7일 동안 아침식사, 과일, 패스트푸드, 고카페인 음료, 단맛 나는 음료, 채소, 우유, 물 섭취 빈도에 대한 문항을 이용하였다. 우유나 주스만 먹은 것을 제외한 최근 7일 동안 아침식사 빈도는 주 5일 이상 섭취군, 주 2일에서 4일 섭취군, 주 1일 이하 섭취군으로 재분류하여 분석하였다. 과일주스를 제외한 과일 섭취 및 흰 우유와 가공우유를 포함하는 우유 섭취 빈도는 주 7회 이상 섭취군, 주 3회에서 6회 섭취군, 주 2회 이하 섭취군으로 재분류하여 분석하였다. 패스트푸드, 고카페인 음료, 단맛 나는 음료, 김치를 제외한 채소 빈도는 주 5회 이상 섭취군, 주 3에서 4회 섭취군, 주 2회 이하 섭취군으로 재분류하여 분석하였다. 생수, 탄산수, 보리차를 포함하는 최근 7일간 물 섭취 빈도는 하루 5컵 이상, 하루 3–4컵, 하루 2컵 이하로 재분류하여 분석하였다.

3) 야식 섭취 빈도 특성

과일이나 우유 등 간단한 간식을 제외한 저녁 식사 후 늦은 밤에 섭취하는 식사나 간식을 의미하는 야식 섭취 빈도는 "최근 7일 동안 얼마나 자주 야식을 먹었습니까?"라는 질문으로 평가하였다. 응답의 범주는 '최근 7일 동안 야식을 먹지 않았다', '주 1번', '주 2번', '주 3번', '주 4번', '주 5번', '주 6번', '주 7번'으로 측정하였다. 본 연구에서는 '7일 동안 먹지 않음', '주 1–2회', '주 3회 이상'으로 재분류하여 분석에 이용하였다.

4) 구강건강 특성

구강건강 특성은 어제 하루 동안 칫솔질 횟수, 잠자기 전 칫솔질 여부, 학교에서 점심식사 후 칫솔질 여부, 최근 12개월 동안 실란트(치아 홈메우기) 경험, 최근 12개월 동안 스케일링 경험 문항을 이용하였다. 어제 하루 동안 칫솔질 횟수는 '없음'부터 '9번 이상'의 응답을 '하루에 1번 이하', '하루에 2번', '하루에 3번 이상'으로 재분류하여 분석하였다. 잠자기 전 칫솔질 여부는 '했다', '안했다', '잠을 자지 않았다'는 응답에서 '잠을 자지 않았다'를 결측치로 처리하고 나머지 변수는 그대로 이용하였다. 학교에서 점심식사 후 칫솔질 여부는 '항상 했다, 대부분 했다, 가끔 했다'는 '했다'로 '안했다'는 '안했다'로 재분류하여 분석하였다. 실란트 경험과 스케일링 경험 문항은 원시자료를 그대로 사용하여 '있다'와 '없다'로 구분하였다.

5) 구강 증상 경험

구강 증상 경험은 최근 12개월 동안 경험한 구강 질환 증상을 묻는 설문을 분류하여 '치아가 깨지거나 부러짐'은 '치아 파절', '차갑거나 뜨거운 음료 혹은 음식을 마시거나 먹을 때 치아가 아픔'은 '먹을 때 치아 통증', '치아가 쑤시고 욱신거리고 아픔'은 '치아 통증', '잇몸이 아프거나 피가 남'은 '잇몸 출혈', '혀 또는 입 안쪽 뺨이 욱신거리며 아픔'은 '혀 또는 뺨 통증', '불쾌한 입 냄새가 남'은 '입 냄새'로 재분류하여 이용하였다. 각각의 변수에 '있다'와 '없다'로 응답한 원시자료를 그대로 사용하였다.

4. 자료분석

본 연구의 통계분석은 IBM SPSS Statistics 23.0 (IBM Corp.)을 이용하였다. 청소년건강행태조사 원시자료는 복합표본으로 설

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계되어 질병관리청의 원시자료 이용지침서에 따라 표본층화 변수(strata), 집락추출 변수(cluster), 집락 가중치(W), 유한모집단 수정계수(finite population correction)를 반영한 복합표본 계획파일을 생성하여 분석에 이용하였다. 야식 섭취 빈도에 따른 청소년의 일반적인 특성, 식습관, 구강건강 특성, 구강 증상 경험의 차이는 복합표본 교차분석 방법인 Rao-Scott χ^2 test로 분석하였다. 모델 1은 다른 변수를 보정하지 않고 야식 섭취 빈도가 하루에 3회 이상 칫솔질, 잠자기 전 칫솔질, 학교에서 점심식사 후 칫솔질, 실란트 경험, 스케일링 경험, 치아 파절, 먹을 때 치아 통증, 치아 통증, 잇몸 출혈, 입 냄새에 미치는 영향을 복합표본 로지스틱 회귀분석을 실시하여 각 변수에 대한 승산비(odds ratio, OR)와 95% 신뢰구간(confidence interval, CI)을 구하였다. 모델 2는 성별, 연령, 체질량지수(body mass index, BMI), 거주지역, 학교구분, 학업 성취 수준, 가구의 경제 수준, 가족과 거주 형태, 아버지 학력, 어머니 학력 변수를 보정하여 복합표본 로지스틱 회귀분석을 실시하였다. 범주형 독립변수의 각 카테고리의 중앙값을 기준으로 연속형 변수로 처리하여 트렌드(P for trend) 값을 분석하였다. 모든 분석의 통계적 유의성은 $P < 0.05$로 설정하였다.

RESULTS

1. 일반적 특성

야식 섭취 빈도에 따른 청소년의 일반적인 특징은 Table 1과 같다. 최근 7일 동안 야식을 섭취하지 않는 군이 20,962명(40.4%)으로 가장 높았으며, 주 1–2회 야식을 섭취하는 군이 18,963명(36.6%), 주 3회 이상 야식을 섭취하는 군이 11,925명(23.0%)으로 나타났다. 성별, 학년, 학업 성취 수준, 가정의 경제 수준, 가족과 거주 형태 항목에서 야식 섭취에 통계적으로 유의한 차이를 보였다($P < 0.001$). 주 3회 이상 야식을 섭취하는 남학생이 54.4%로 여학생 45.6%보다 높았다($P < 0.001$). 야식을 섭취하지 않는 중학생이 57.7%로 고등학생 42.3%보다 높았다. 반면에 주 3회 이상 야식을 섭취하는 고등학생이 56.1%로 중학생 43.9%보다 높아 중학생보다 고등학생이 야식을 더 많이 섭취하는 것으로 나타났다($P < 0.001$). 학업 성취 수준이 높은 경우 야식을 섭취하지 않는 군, 주 1–2회 야식을 섭취하는 군, 주 3회 이상 야식을 섭취하는 군의 비율이 각각 40.6%, 37.6%, 37.5%로 군별로 유의한 차이를 보였다($P < 0.001$). 야식을 섭취하지 않는 군에서 가정경제 수준이 높은 비율이 44.2%, 가정경제 수준이 낮은 비율이 10.1%로 나타났고, 주 3회 이상 야식을 섭취하는 군에서 가정경제 수준이 높은 비율이 43.1%, 가정경제 수준이 낮은 비율이 11.8%로 유의한 차이를 보였다($P < 0.001$). 가족과 같이 거주하지 않는 경우 야식을 섭취하지 않는 군, 주 1–2회 야식을 섭취하는 군, 주 3회 이상 야식을 섭취하는 군의 비율이 각각 3.3%, 5.1%, 5.3%로 나타나, 가족과 같이 거주하지 않는 경우 야식을 더 많이 섭취하였다($P < 0.001$).

2. 식습관 특성

야식 섭취 빈도와 식습관의 연관성을 분석한 결과는 Table 2와 같다. 야식을 섭취하지 않는 군에서 주 5회 이상 아침식사 비율이 51.6%로 가장 높았으며, 주 3회 이상 야식을 섭취하는 군에서 주 5회 이상 아침 식사 비율이 41.2%, 주 1회 이하 아침식사 비율이 32.3%, 주 2–4회 아침식사 비율이 26.5%로 나타나 유의한 차이를 보였다($P < 0.001$). 야식을 섭취하지 않는 군에서 주 2회 이하 과일을 섭취하는 비율이 41.6%, 주 7회 이상 과일을 섭취하는 비율이 19.2%로 나타났고, 주 3회 이상 야식을 섭취하는 군에서 주 2회 이하 과일을 섭취하는 비율이 42.3%, 주 7회 이상 과일을 섭취하는 비율이 17.4%로 유의한 차이를 보였다($P < 0.001$). 주 3회 이상 패스트푸드 섭취는 야식을 섭취하지 않는 군, 주 1–2회 야식을 섭취하는 군, 주 3회 이상 야식을 섭취하는 군의 비율이 각각 16.3%, 27.4%, 46.0%로 야식을 많이 섭취할수록 패스트푸드를 더 많이 섭취하는 것으로 나타났다($P < 0.001$). 주 3회 이상 고카페인 음료 섭취는 야식을 섭취하지 않는 군, 주 1–2회 야식을 섭취하는 군, 주 3회 이상 야식을 섭취하는 군의 비율이 각각 17.9%, 21.9%, 30.4%로 야식을 많이 섭취할수록 고카페인 음료를 더 많이 섭취하였다($P < 0.001$). 야식을 섭취하지 않는 군에서 주 2회 이하 단맛나는 음료 섭취 비율이 47.2%로 가장 높고, 주 3회 이상 야식을 섭취하는 군에서 주 5회 이상 단맛나는 음료 섭취 비율이 45.7%로 높게 나타났다($P < 0.001$). 야식을 섭취하지 않는 군에서 하루에 5컵 이상 물을 마시는 비율이 40.4%로 가장 높았고, 주 3회 이상 야식을 섭취하는 군에서 하루에 3–4컵 물을 마시는 비율이 39.9%로 높게 나타났다($P < 0.001$).

3. 구강건강 특성

야식 섭취 빈도와 구강건강 특성의 연관성을 분석한 결과는 Table 3과 같다. 하루에 3회 이상 칫솔질 횟수는 야식을 섭취하지 않는 군, 주 1–2회 야식을 섭취하는 군, 주 3회 이상 야식을 섭취하는 군의 비율이 각각 39.2%, 35.6%, 35.6%로 군별로 유의한 차이를 보였다($P < 0.001$). 잠자기 전 칫솔질 여부는 야식을 섭취하지 않는 군의 비율이 90.1%, 주 1–2회 야식을 섭취하는 군의 비율이 89.0%, 주 3회 이상 야식을 섭취하는 군의 비율이 86.6%로 야식을 많이 섭취할수록 잠자기 전 칫솔질을 적게 하는 것으로 나타났다($P < 0.001$). 최근 12개월간 동안 실란트 경험은 야식을 섭취하지 않는 군의 비율이 24.8%, 주 1–2회 야식을 섭취하는 군의 비율이 26.3%, 주 3회 이상 야식을 섭취하는 군의 비율이 27.8%로 유의한 차이를 보였다($P < 0.001$). 최근 12개월 동안 스케일링 경험은 야식을 섭취하지 않는 군, 주 1–2회 야식을 섭취하는 군, 주 3회 이상 야식을 섭취하는 군의 비율이 각각 30.7%, 31.6%, 33.5%로 군별로 유의한 차이를 보였다($P < 0.001$).

Table 1. General characteristics of frequent night eating

Characteristic	Total (n = 51,850)	Night eating consumption (times/week)			χ^2	*P*-value
		No (n = 20,962)	1–2 (n = 18,963)	≥ 3 (n = 11,925)		
Sex						
Male	26,397 (51.6)	10,401 (50.4)	9,567 (51.0)	6,429 (54.4)	54.3	< 0.001
Female	25,453 (48.4)	10,561 (49.6)	9,396 (49.0)	5,496 (45.6)		
Type of school						
Middle school	28,015 (51.6)	12,631 (57.7)	9,899 (50.0)	5,485 (43.9)	621.0	< 0.001
High school	23,835 (48.4)	8,331 (42.3)	9,064 (50.0)	6,440 (56.1)		
Residence area						
Metropolis	22,212 (41.5)	9,011 (41.7)	8,026 (40.9)	5,175 (42.2)	14.2	0.033
Middle city	25,814 (52.9)	10,355 (52.5)	9,532 (53.3)	5,927 (52.8)		
Rural area	3,824 (5.6)	1,596 (5.8)	1,405 (5.8)	823 (5.0)		
Academic achievement						
Upper	20,051 (38.8)	8,529 (40.6)	7,101 (37.6)	4,421 (37.5)	88.1	< 0.001
Middle	15,484 (30.0)	6,348 (30.4)	5,659 (30.1)	3,477 (29.3)		
Lower	16,313 (31.2)	6,085 (29.0)	6,202 (32.3)	4,026 (33.2)		
Household economic status						
Upper	21,888 (43.3)	9,051 (44.2)	7,822 (42.3)	5,015 (43.1)	37.3	< 0.001
Middle	24,143 (46.0)	9,695 (45.7)	9,032 (47.0)	5,416 (45.0)		
Lower	5,816 (10.7)	2,216 (10.1)	2,107 (10.6)	1,493 (11.8)		
Paternal education						
Middle or below	528 (1.4)	219 (1.4)	190 (1.5)	119 (1.4)	4.8	0.283
High school	8,073 (23.5)	3,253 (23.0)	3,034 (24.0)	1,786 (23.6)		
College or higher	23,599 (75.1)	9,736 (75.6)	8,578 (74.4)	5,285 (75.0)		
Maternal education						
Middle or below	458 (1.2)	182 (1.2)	171 (1.2)	105 (1.3)	8.8	0.056
High school	9,134 (26.3)	3,715 (25.9)	3,450 (27.2)	1,969 (25.5)		
College or higher	23,609 (72.5)	9,738 (72.9)	8,534 (71.6)	5,337 (73.2)		
Residential type						
Living with family	49,182 (95.5)	20,152 (96.7)	17,838 (94.9)	11,192 (94.7)	102.4	< 0.001
Not with family	2,663 (4.5)	809 (3.3)	1,122 (5.1)	732 (5.3)		

n (weighted %).
Differences in each variable were analyzed by the Rao-Scott χ^2 test.

4. 구강 증상 경험

야식 섭취 빈도와 구강 증상 경험의 연관성은 Table 4와 같다. 치아 파절 증상은 야식을 섭취하지 않는 군의 비율이 7.5%, 주 1–2회 야식을 섭취하는 군의 비율이 8.9%, 주 3회 이상 야식을 섭취하는 군의 비율이 10.3%로 유의한 차이를 보였다(P < 0.001). 먹을 때 치아 통증 증상은 야식을 섭취하지 않는 군의 비율이 29.0%, 주 1–2회 야식을 섭취하는 군의 비율이 33.9%, 주 3회 이상 야식을 섭취하는 군의 비율이 38.5%로 유의한 차이를 보였다(P < 0.001). 치아 통증 증상은 야식을 섭취하지 않는 군의 비율이 18.1%, 주 1–2회 야식을 섭취하는 군의 비율이 21.8%, 주 3회 이상 야식을 섭취하는 군의 비율이 26.3%로 유의한 차이를 보였다(P < 0.001). 잇몸 출혈 증상은 야식을 섭취하지 않는 군, 주 1–2회 야식을 섭취하는 군, 주 3회 이상 야식을 섭취하는 군의 비율이 각각 16.3%, 18.8%, 21.6%로 군별로 유의한 차이를 보였다(P < 0.001). 입 냄새 증상은 야식을 섭취하지 않는 군의 비율이 19.7%, 주 1–2회 야식을 섭취하는 군의 비율이 22.6%, 주 3회 이상 야식을 섭취하는 군의 비율이 25.7%로 유의한 차이를 보였다(P < 0.001).

5. 야식 섭취가 구강건강 특성에 미치는 영향

야식 섭취 빈도가 청소년의 구강건강 특성에 미치는 영향은 Table 5와 같다. 모델 1은 변수를 보정하지 않고 야식을 섭취하지 않는 군을 기준으로 로지스틱 회귀분석을 하여 승산비와 95% CI를 구하였다. 모델 2는 성별, 연령, 거주지역, 학교 구분, 가구

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Table 2. Dietary habits and frequency of night eating

Characteristic	Total (n = 51,850)	Night eating consumption (times/week)			χ^2	*P*-value
		No (n = 20,962)	1–2 (n = 18,963)	≥ 3 (n = 11,925)		
Breakfast (day/week)						
≤ 1	15,528 (29.8)	5,817 (27.5)	5,824 (30.8)	3,887 (32.3)	425.3	< 0.001
2–4	12,510 (24.0)	4,383 (20.9)	4,949 (25.7)	3,178 (26.5)		
≥ 5	23,806 (46.2)	10,760 (51.6)	8,188 (43.6)	4,858 (41.2)		
Fruit consumption (times/week)						
≤ 2	22,429 (43.0)	8,801 (41.6)	8,569 (44.9)	5,059 (42.3)	129.7	< 0.001
3–6	20,661 (39.8)	8,222 (39.2)	7,632 (40.1)	4,807 (40.3)		
≥ 7	8,736 (17.2)	3,923 (19.2)	2,760 (15.0)	2,053 (17.4)		
Fast food consumption (times/week)						
≤ 2	37,898 (72.7)	17,578 (83.7)	13,853 (72.6)	6,467 (54.0)	3,832.9	< 0.001
3–4	11,206 (22.0)	2,849 (13.8)	4,375 (23.5)	3,982 (33.7)		
≥ 5	2,746 (5.3)	535 (2.5)	735 (3.9)	1,476 (12.3)		
High-caffeine drinks consumption (times/week)						
≤ 2	40,593 (77.7)	17,317 (82.1)	14,923 (78.1)	8,353 (69.6)	783.0	< 0.001
3–4	6,175 (12.1)	2,014 (9.8)	2,403 (12.9)	1,758 (14.9)		
≥ 5	5,082 (10.2)	1,631 (8.1)	1,637 (9.0)	1,814 (15.5)		
Sweet drinks consumption (times/week)						
≤ 2	19,038 (36.4)	9,965 (47.2)	6,505 (34.1)	2,568 (21.6)	3,112.7	< 0.001
3–4	17,634 (34.0)	6,576 (31.3)	7,184 (37.9)	3,874 (32.7)		
≥ 5	15,178 (29.6)	4,421 (21.5)	5,274 (28.1)	5,483 (45.7)		
Vegetable consumption (times/week)						
≤ 2	11,932 (23.0)	4,333 (20.5)	4,542 (23.9)	3,057 (25.8)	314.1	< 0.001
3–4	14,213 (27.4)	5,324 (25.4)	5,585 (29.5)	3,304 (27.7)		
≥ 5	25,705 (49.6)	11,305 (54.2)	8,836 (46.6)	5,564 (46.5)		
Milk consumption (times/week)						
≤ 2	23,918 (46.7)	10,163 (48.9)	8,809 (47.0)	4,946 (42.4)	238.8	< 0.001
3–6	18,336 (35.4)	6,670 (32.0)	6,971 (36.6)	4,695 (39.1)		
≥ 7	9,596 (18.0)	4,129 (19.1)	3,183 (16.4)	2,284 (18.5)		
Water consumption (cups/day)						
≤ 2	12,102 (23.2)	4,486 (21.2)	4,541 (23.9)	3,075 (25.7)	199.8	< 0.001
3–4	20,540 (39.8)	8,007 (38.5)	7,778 (41.1)	4,755 (39.9)		
≥ 5	19,208 (37.0)	8,469 (40.4)	6,644 (35.0)	4,095 (34.3)		

n (weighted %).
Differences in each variable were analyzed by the Rao-Scott χ^2 test.

의 경제 수준, 학업 성취 수준, 가족과 거주 형태, 아버지 학력, 어머니 학력, BMI를 보정하고 분석하였다. 전체적으로 변수를 보정하지 않은 모델 1과 보정한 모델 2의 승산비와 95% CI의 차이를 보였다. 모델 2의 결과에 따르면, 하루에 3회 이상 칫솔질 횟수는 야식을 섭취하지 않는 군에 비해 주 1–2회 야식을 섭취하는 군의 승산비가 0.83 (OR, 0.83: 95% CI, 0.79–0.86; *P* for trend < 0.001)이고, 주 3회 이상 야식을 섭취하는 군의 승산비가 0.78 (OR, 0.78: 95% CI, 0.75–0.82; *P* for trend < 0.001)로 야식을 많이 섭취할수록 칫솔질을 적게 하는 것으로 나타났다. 잠자기 전 칫솔질은 야식을 섭취하지 않는 군에 비해 주 1–2회 야식을 섭취하는 군의 승산비가 0.90 (OR, 0.90: 95% CI, 0.84–0.96; *P* for trend < 0.001)이고, 주 3회 이상 야식을 섭취하는 군의 승산비가 0.70 (OR, 0.70: 95% CI, 0.65–0.75; *P* for trend < 0.001)으로 야식을 많이 섭취할수록 잠자기 전 칫솔질을 적게 하는 것으로 나타났다. 점심 식사 후 칫솔질은 변수를 보정하지 않은 모델 1에서는 야식을 섭취하는 군에서 야식을 섭취하지 않는 군에 비하여 더 많이 칫솔질을 하는 것으로 나타났으나, 변수를 보정한 모델 2에서는 야식을 섭취하지 않는

Table 3. The association between oral health characteristics and the frequency of night eating

Characteristic	Total (n = 51,850)	Night eating consumption (times/week)			χ^2	*P*-value
		No (n = 20,962)	1–2 (n = 18,963)	≥ 3 (n = 11,925)		
Tooth brushing (times/day)						
≤ 1	6,003 (11.3)	2,185 (10.2)	2,163 (11.1)	1,655 (13.5)	138.3	< 0.001
2	26,620 (51.7)	10,534 (50.6)	10,013 (53.3)	6,073 (50.9)		
≥ 3	19,227 (37.0)	8,243 (39.2)	6,787 (35.6)	4,197 (35.6)		
Tooth brushing before going to sleep						
No	5,956 (11.1)	2,134 (9.9)	2,197 (11.0)	1,625 (13.4)	96.6	< 0.001
Yes	45,367 (88.9)	18,710 (90.1)	16,581 (89.0)	10,076 (86.6)		
Tooth brushing after lunch						
No	34,426 (67.9)	14,164 (69.0)	12,428 (67.3)	7,834 (67.2)	17.4	< 0.001
Yes	17,424 (32.1)	6,798 (31.0)	6,535 (32.7)	4,091 (32.8)		
Sealant						
No	38,488 (73.9)	15,871 (75.2)	14,014 (73.7)	8,603 (72.2)	36.7	< 0.001
Yes	13,362 (26.1)	5,091 (24.8)	4,949 (26.3)	3,322 (27.8)		
Scaling						
No	35,945 (68.3)	14,748 (69.3)	13,151 (68.4)	8,046 (66.5)	27.2	< 0.001
Yes	15,905 (31.7)	6,214 (30.7)	5,812 (31.6)	3,879 (33.5)		

n (weighted %).
Differences in each variable were analyzed by the Rao-Scott χ^2 test.

Table 4. Association between the presence of symptoms of poor oral health and the frequency of night eating

Characteristic	Total (n = 51,850)	Night eating consumption (times/week)			χ^2	*P*-value
		No (n = 20,962)	1–2 (n = 18,963)	≥ 3 (n = 11,925)		
Tooth fracture						
No	47,290 (91.3)	19,370 (92.5)	17,240 (91.1)	10,680 (89.7)	79.0	< 0.001
Yes	4,560 (8.7)	1,592 (7.5)	1,723 (8.9)	1,245 (10.3)		
Tooth pain when eating						
No	34,841 (67.0)	14,915 (71.0)	12,595 (66.1)	7,331 (61.5)	326.4	< 0.001
Yes	17,009 (33.0)	6,047 (29.0)	6,368 (33.9)	4,594 (38.5)		
Toothache						
No	40,855 (78.6)	17,254 (81.9)	14,811 (78.2)	8,790 (73.7)	314.2	< 0.001
Yes	10,995 (21.4)	3,708 (18.1)	4,152 (21.8)	3,135 (26.3)		
Gingival bleeding						
No	42,345 (81.5)	17,559 (83.7)	15,432 (81.2)	9,354 (78.4)	142.0	< 0.001
Yes	9,505 (18.5)	3,403 (16.3)	3,531 (18.8)	2,571 (21.6)		
Tongue or cheek pain						
No	46,062 (88.5)	18,895 (89.9)	16,864 (88.5)	10,303 (86.3)	99.8	< 0.001
Yes	5,788 (11.5)	2,067 (10.1)	2,099 (11.5)	1,622 (13.7)		
Bad breath						
No	40,407 (77.8)	16,859 (80.3)	14,713 (77.4)	8,835 (74.3)	162.0	< 0.001
Yes	11,443 (22.2)	4,103 (19.7)	4,250 (22.6)	3,090 (25.7)		

n (weighted %).
Differences in each variable were analyzed by the Rao-Scott χ^2 test.

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Table 5. Association between consumption of late-night snacks and oral health characteristics of adolescents

	Night eating consumption	Oral health characteristic									
		Tooth brushing (≥3 times/day)		Tooth brushing before going to sleep (yes)		Tooth brushing after lunch (yes)		Sealant (yes)		Scaling (yes)	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Model 1	Never	1.00		1.00		1.00		1.00		1.00	
	1–2 times/week	0.86***	0.83–0.89	0.89***	0.83–0.94	1.08**	1.03–1.13	1.08**	1.03–1.13	1.04	1.00–1.09
	≥ 3 times/week	0.86***	0.82–0.90	0.71***	0.66–0.76	1.09***	1.03–1.14	1.17***	1.11–1.23	1.14***	1.08–1.19
	P for trend	< 0.001		< 0.001		0.001		< 0.001		< 0.001	
Model 2	Never	1.00		1.00		1.00		1.00		1.00	
	1–2 times/week	0.83***	0.79–0.86	0.90**	0.84–0.96	0.96	0.92–1.01	1.09***	1.04–1.14	1.01	0.96–1.05
	≥ 3 times/week	0.78***	0.75–0.82	0.70***	0.65–0.75	0.88***	0.84–0.93	1.19***	1.13–1.26	1.06**	1.01–1.12
	P for trend	< 0.001		< 0.001		< 0.001		< 0.001		0.016	

The reference is not consumption of late night snack.
Model 1: Unadjusted model.
Model 2: Adjusted for age, sex, residence area, type of school, academic achievement, household economic status, residential type, paternal education, maternal education, and body mass index.
P for trend was calculated using the median value of each category.
OR, odds ratio; CI, confidence interval.
**P* < 0.05, ***P* < 0.001.

군에 비하여 주 3회 이상 야식을 섭취하는 군의 승산비가 0.88 (OR, 0.88: 95% CI, 0.84–0.93; *P* for trend < 0.001)로 야식을 많이 섭취할수록 점심 식사 후 칫솔질을 적게 하는 것으로 나타나, 변수의 보정 여부에 따라 다른 결과를 보였다. 최근 12개월 동안 실란트 경험은 야식을 섭취하지 않는 군에 비해 주 1–2회 야식을 섭취하는 군의 승산비가 1.09 (OR, 1.09: 95% CI, 1.04–1.14; *P* for trend < 0.001)이고, 주 3회 이상 야식을 섭취하는 군의 승산비가 1.19 (OR, 1.19: 95% CI, 1.13–1.26; *P* for trend < 0.001)로 야식을 많이 섭취할수록 실란트 경험이 높은 것으로 나타났다. 최근 12개월 동안 스케일링 경험은 야식을 섭취하지 않는 군에 비하여 주 3회 이상 야식을 섭취하는 군의 승산비가 1.06 (OR, 1.06: 95% CI, 1.01–1.12; *P* for trend 0.016)으로 야식을 많이 섭취할수록 스케일링 경험이 많은 것으로 나타났다.

6. 야식 섭취가 구강 증상 경험에 미치는 영향

야식 섭취가 청소년의 구강 증상 경험에 미치는 영향은 Table 6과 같다. 변수를 보정하지 않은 모델 1과 성별, 연령, 거주지역, 학교 구분, 가구의 경제 수준, 학업 성취 수준, 가족과 거주 형태, 아버지 학력, 어머니 학력, BMI 변수들로 보정한 모델 2로 분석하였다. 전체적으로 모델 2의 결과에 따르면, 치아 파절 증상은 야식을 섭취하지 않는 군에 비해 주 1–2회 야식을 섭취하는 군의 승산비가 1.21 (OR, 1.21: 95% CI, 1.12–1.29; *P* for trend < 0.001)이고, 주 3회 이상 야식을 섭취하는 군의 승산비가 1.41 (OR, 1.41: 95% CI, 1.30–1.53; *P* for trend < 0.001)로 야식을 많이 섭취할수록 치아 파절 증상 경험이 많은 것으로 나타났다. 먹을 때 치아 통증 증상은 야식을 섭취하지 않는 군에 비해 주 1–2회 야식을 섭취하는 군의 승산비가 1.27 (OR, 1.27: 95% CI, 1.22–1.33; *P* for trend < 0.001)이고, 주 3회 이상 야식을 섭취하는 군의 승산비가 1.59 (OR, 1.59: 95% CI, 1.50–1.67; *P* for trend < 0.001)로 야식을 많이 섭취할수록 높은 것으로 나타났다. 치아 통증 증상은 야식을 섭취하지 않는 군에 비해 주 1–2회 야식을 섭취하는 군의 승산비가 1.25 (OR, 1.25: 95% CI, 1.19–1.32; *P* for trend < 0.001)이고, 주 3회 이상 야식을 섭취하는 군의 승산비가 1.60 (OR, 1.60: 95% CI, 1.52–1.70; *P* for trend < 0.001)으로 야식을 많이 섭취할수록 높은 것으로 나타났다. 잇몸 출혈 증상은 야식을 섭취하지 않는 군에 비해 주 1–2회 야식을 섭취하는 군의 승산비가 1.17 (OR, 1.17: 95% CI, 1.11–1.23; *P* for trend < 0.001)이고, 주 3회 이상 야식을 섭취하는 군의 승산비가 1.40 (OR, 1.40: 95% CI, 1.32–1.49; *P* for trend < 0.001)으로 야식을 많이 섭취할수록 높은 것으로 나타났다. 입 냄새 증상은 야식을 섭취하지 않는 군에 비해 주 3회 이상 야식을 섭취하는 군의 승산비가 1.51 (OR, 1.51: 95% CI, 1.43–1.60; *P* for trend < 0.001)로 야식을 많이 섭취할수록 높은 것으로 나타났다.

Table 6. Association between consuming late-night snacks and symptoms of poor oral health

	Night eating consumption	Oral health characteristic									
		Tooth fracture (yes)		Tooth pain when eating (yes)		Toothache (yes)		Gingival bleeding (yes)		Bad breath (yes)	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Model 1	Never	1.00		1.00		1.00		1.00		1.00	
	1–2 times/week	1.20***	1.12–1.30	1.26***	1.20–1.31	1.27***	1.21–1.33	1.18***	1.12–1.25	1.19***	1.13–1.25
	≥ 3 times/week	1.42***	1.31–1.53	1.54***	1.46–1.62	1.62***	1.53–1.71	1.41***	1.33–1.49	1.41***	1.33–1.49
	P for trend	< 0.001		< 0.001		< 0.001		< 0.001		< 0.001	
Model 2	Never	1.00		1.00		1.00		1.00		1.00	
	1–2 times/week	1.21***	1.12–1.29	1.27***	1.22–1.33	1.25***	1.19–1.32	1.17***	1.11–1.23	1.22***	1.16–1.28
	≥ 3 times/week	1.41***	1.30–1.53	1.59***	1.50–1.67	1.60***	1.52–1.70	1.40***	1.32–1.49	1.51***	1.43–1.60
	P for trend	< 0.001		< 0.001		< 0.001		< 0.001		< 0.001	

The reference is not consumption of late night snack.
Model 1: Unadjusted model.
Model 2: Adjusted for age, sex, residence area, type of school, academic achievement, household economic status, residential type, paternal education, maternal education, and body mass index.
P for trend was calculated using the median value of each category.
OR, odds ratio; CI, confidence interval.
***$P < 0.001$.

DISCUSSSION

본 연구는 2022년 제18차 청소년건강행태조사를 이용하여 청소년의 야식 섭취 빈도가 구강 건강에 미치는 영향을 알아보기 위하여 수행하였다. 전국의 중•고등학생을 대상으로 야식 섭취 빈도에 따른 일반적인 특성, 식습관, 구강건강 특성, 구강 증상 경험의 차이와 구강건강 특성 및 구강 증상 경험에 미치는 영향을 파악하였다. 주 1–2회 야식을 섭취하는 청소년이 36.6%이고, 주 3회 이상 섭취하는 경우는 23.0%로 약 60%의 청소년들이 일주일에 한번 이상 야식을 섭취하는 것으로 나타났다. 야식 섭취 빈도가 높을수록 아침식사 빈도와 과일, 물 섭취가 낮고, 패스트푸드, 단맛 나는 음료, 고카페인 음료 섭취가 높은 것으로 나타났다. 야식 섭취 빈도가 높을수록 하루에 3회 이상 칫솔질 및 잠자기 전 칫솔질을 적게 하였고, 실란트 경험이 높았다. 또한 야식을 많이 섭취할수록 치아 파절, 치아 통증, 잇몸 출혈, 입냄새 등 구강 증상 경험이 전체적으로 유의하게 높게 나타났다 (P for trend < 0.001). 여학생에 비해 남학생이, 중학생에 비해 고등학생이 야식 섭취 빈도가 높았다. 경기 일부지역 중학생 및 고등학생을 대상으로 한 선행연구에서 남학생이 여학생보다 야식을 더 많이 섭취하는 것으로 나타나 본 연구결과와 유사한 결과를 보였다[8, 13].

청소년을 대상으로 한 선행연구에서 고등학생은 야식을 주로 일주일에 주 1–2회 또는 일주일에 3–4회 섭취하는 빈도가 높게 나타났으며[13, 14], 중학생은 일주일에 2–3회 섭취 빈도가 높게 나타났다[8]. 본 연구에서도 청소년의 36.6%가 주 1–2회, 23.0%가 주 3회 이상 야식을 섭취하는 것으로 나타나 선행연구와 유사한 결과를 보였다. 청소년을 대상으로 한 야식을 섭취하는 이유에 대한 선행연구에서 79.1%의 중학생이 배가 고파서 야식을 섭취하였고, 다음으로 사람들과 어울리기 위해서 8.1%로 나타났다[8]. 또한 58.7%의 고등학생이 배가 고파서 야식을 섭취하였으며, 야식을 챙겨주어서가 13.0%로 나타났다[14]. 대학생을 대상으로 한 연구결과 배가 고파서가 55.9%이고 사람들과 어울리기 위해서가 35.2%로[9], 청소년들은 주로 배가 고파서 야식을 섭취하는 것으로 나타났다. 청소년들은 주로 밤 10시에서 11시 사이에 주로 야식을 섭취하였으며[8, 13, 14], 대학생은 밤 11시부터 새벽 1시 사이에 주로 야식을 섭취하였다[9]. 야식을 선택할 때 고려하는 점은 중학생의 경우 맛, 위생, 양의 순서로 중요하게 고려하였고[8], 고등학생의 경우 맛, 편리성 순서로 선택하는 것으로 나타나[14], 청소년들이 야식을 선택할 때 가장 중요하게 생각하는 것은 맛으로 나타났다. 청소년들의 야식을 선택할 때 맛에 대한 기호도 연구결과 단맛을 가장 선호하는 것으로 나타났다[12, 13]. 또 다른 연구에서는 매운맛과 짠맛에 선호도가 높아[32], 청소년들이 야식을 선택할 때 단맛, 매운맛, 짠맛을 주로 선호하는 것을 알 수 있다.

본 연구에서 야식 섭취 빈도가 높을수록 아침결식률이 높고

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패스트푸드, 단맛 나는 음료, 고카페인 음료를 많이 섭취하였다. 고등학생을 대상으로 한 선행연구에서 야식 섭취 빈도가 높을수록 아침결식률이 높고 야식 섭취 빈도가 낮을수록 아침을 섭취하는 비율이 높은 것으로 나타나, 본 연구결과와 같은 결과를 보였다[9, 14, 32]. 청소년을 대상으로 야식의 메뉴 별 기호도에 대한 연구결과 가장 선호하는 야식은 치킨이고, 빙과류, 과일류, 음료류, 피자, 햄버거, 라면 등을 선호하는 것으로 나타났다[8, 13]. 대학생을 대상으로 한 선행연구에서 가장 선호하는 야식 메뉴는 치킨, 과일류, 유제품, 분식류, 음료류 순으로 나타났다[9]. 야식의 메뉴 별 섭취빈도에 대한 선행연구에서 청소년들은 빙과류, 과일류, 라면, 치킨, 탄산음료 등을 주로 섭취하고 있는 것으로 나타나, 기호도가 높은 메뉴를 주로 섭취하는 것을 알 수 있다[12, 13]. 청소년은 야식을 주로 충동적으로 선택하여 소비하는 경향이 있어 패스트푸드나 인스턴트 식품을 선택할 가능성이 높고, 실제로 야식으로 비교적 칼로리가 높고 달거나 매운 자극적인 음식을 선호하는 것으로 보고되었다[16]. 고등학생의 야식으로부터 에너지 섭취량에 대한 선행연구에서 야식으로 인한 에너지 섭취량이 남학생은 1일 총 섭취량의 17.5%, 여학생은 15.9%를 차지하여, 간식으로 섭취할 수 있는 적정 에너지 비율인 10%–15%를 초과하여 섭취하는 것으로 나타났다[12]. 또한 청소년을 대상으로 한 선행연구에서 일주일에 3회 이상 과자, 음료 등의 군것질류 야식 섭취가 일주일에 3회 미만 섭취하는 경우에 비해 비만이 될 가능성이 4.67배 통계적으로 유의하게 높은 것으로 보고되었다[33]. 그러므로 야식 섭취 빈도가 높을수록 아침결식률이 높고, 야식으로 인한 높은 에너지 섭취량으로 인하여 건강상태에 영향을 미칠 수 있으며, 비만이 될 수 있는 바람직하지 못한 식습관을 형성할 가능성이 높다[34, 35]. 청소년기는 균형 잡힌 영양소의 섭취와 올바른 식습관 형성이 더욱 중요한 시기로 바람직한 식습관 개선을 위한 영양 교육 등 다양한 방안이 필요할 것으로 생각된다.

야식 섭취 빈도와 구강건강 특성과의 연관성을 분석한 결과, 야식 섭취 빈도가 높을수록 하루동안 칫솔질 횟수와 잠자기 전 칫솔질, 학교에서 점심식사 후 칫솔질을 통계적으로 유의하게 적게 하였다. 또한 야식 섭취 빈도가 높을수록 실란트 및 스케일링 경험이 많았다. 청소년기에 형성된 구강건강 습관은 생애에 걸쳐 지속적으로 영향을 줄 수 있어 더욱 중요하다[21]. 칫솔질은 치아우식증과 치주질환을 예방할 수 있는 가장 중요한 관리법으로, 청소년의 칫솔질 횟수가 주관적인 건강 인식에 영향을 미치는 것으로 나타났다[36, 37]. 청소년들의 식생활에 따른 구강건강 증진행위에 대한 선행연구에서 과일이나 채소를 섭취하지 않은 경우에 비해 섭취하는 경우는 하루 동안 칫솔질 횟수가 높고, 패스트푸드나 탄산음료를 섭취하는 경우는 칫솔질 횟수가 낮은 것으로 나타났다[4]. 청소년을 대상으로 한 연구결과, 칫솔질 빈도가 높고 탄산음료 섭취 빈도가 적은 그룹에 비해 칫솔질 빈도가 낮고 탄산음료 섭취 빈도가 많은 그룹이 치아우식증이 발생할 위험이 1.59배 높은 것으로 나타났다[29]. 또한 하루 동안 3회 이상 칫솔질 횟수를 기준으로 2회 이하 칫솔질은 통계적으로 유의하게 치아 통증 및 잇몸 출혈 증상이 높은 것으로 보고되었다[28]. 본 연구결과 야식을 섭취하지 않는 경우와 비교하여 일주일에 3회 이상 야식을 섭취하는 경우에 하루 동안 3회 이상 칫솔질을 22% 적게 하였고(P for trend < 0.001) 잠자기 전 칫솔질을 30% 적게 하는 것(P for trend < 0.001)으로 나타났다. 그러므로 야식의 섭취 빈도가 높으면 칫솔질 횟수가 감소하고 치아 표면, 치주조직, 혀 등에 존재하는 구강 내 세균들이 증식하여 증가하고 세균이 치아에 붙어있는 치면 세균막의 제거가 잘 되지 않아 치아 통증, 잇몸 출혈 등 구강 건강이 안 좋아질 가능성이 높을 것으로 생각된다. 아동을 대상으로 한 선행연구에서 올바른 칫솔질 교육이 치면 세균막을 억제하는 효과가 있는 것으로 보고되었다[38]. 청소년의 구강건강 행동은 성인이 되어도 지속될 수 있어 구강건강의 중요성을 이해하고 실천할 수 있는 올바른 구강관리를 위한 구강보건 교육이 필요할 것으로 생각된다.

야식 섭취 빈도가 구강 증상 경험에 미치는 영향을 분석한 결과, 야식 섭취 빈도가 높을수록 통계적으로 유의하게 치아 파절, 먹을 때 치아 통증, 치아 통증, 잇몸 출혈, 입 냄새 경험이 많았다. 청소년의 식습관이 잇몸 질환 증상에 미치는 영향에 대한 선행연구에서 패스트푸드 섭취 빈도가 높으면 통계적으로 유의하게 치아 깨짐, 치아 통증 잇몸 출혈 증상이 많은 것으로 나타났다[4, 25, 28, 30]. 또한 탄산음료와 고카페인 음료를 많이 섭취할수록 통계적으로 유의하게 구강 증상 경험이 높은 것으로 보고되었다[4, 22, 28]. 청소년을 대상으로 단맛 음료가 구강질환 증상에 미치는 선행연구 결과, 단맛 음료를 먹지 않은 경우에 비해 단맛 음료 섭취 빈도가 높을수록 치아 통증, 잇몸 출혈 등 구강 증상 경험이 높은 것으로 나타났다[25, 26, 30]. 라면 등 인스턴트 식품과 과자의 섭취가 구강 증상 경험을 증가시키는 요인으로 작용하였다[24]. 선행연구 결과, 청소년들이 야식으로 주로 섭취하는 메뉴는 당 함량이 높은 빙과류, 산도가 낮은 탄산음료, 라면, 치킨 등으로, 불건강한 구강건강에 영향을 미칠 수 있을 것으로 생각된다. 청소년들은 당 함량이 높은 야식 섭취로 인하여 치아 표면에 생성된 플라그에 있는 세균이 구강 내 남아있는 음식물이나 당을 이용하여 산(acid)을 생성하여 치아의 조직을 손상할 수 있다. 또한 청소년들이 야식으로 주로 섭취하는 탄산음료나 고카페인 음료는 산성 식품으로 세균의 관여없이 화학적으로 치아의 조직을 손상할 수 있다. 일반적으로 구강 내 산도가 pH 5.5 이하면 치아의 법랑질이 손상되는데, 시중에 유통되는 약 90% 음료가 pH 5.5 이하로 나타나, 치아 손상의 위험도가 높은 것으로 보고되었다[39]. 특히 탄산음료의 평균 산도는 pH 2.0–3.0 정도로 탄산음료를 자주 마시게 되면 치아의 손상이 더욱 심각해질 수 있다[39]. 본 연구결과, 야식 섭취 빈도가 높으면 아침 식사 빈도가 낮고 패스트푸드, 단

맛 나는 음료, 고카페인 음료 섭취가 증가하는 바람직하지 못한 식습관을 가지고 있는 것으로 나타났다. 결론적으로 야식 섭취는 청소년의 바람직하지 못한 식습관과 연관되어 있고 구강건강 특징 및 구강 증상 경험 등 구강건강에 영향을 미치는 것을 확인 할 수 있었다.

Limitations

본 연구의 제한점은 다음과 같다. 첫째, 2차 자료를 이용하여 분석한 단면연구로 야식의 섭취와 청소년의 구강건강 특성 및 구강 증상 경험의 연관성만 파악할 수 있었고, 야식의 섭취가 구강건강에 미치는 인과관계를 확인하는데 제한이 있다. 따라서 후속연구에서는 청소년의 야식 섭취가 구강건강에 어떤 영향을 미치는지 확인할 수 있는 종단연구가 필요하다. 둘째, 청소년에 대한 설문이 자기기입식으로 응답하는 방법으로 진행되어 응답자의 기억에 의존하고 있어 회상바이어스 등 자기 보고 편향(self-report bias)이 있을 수 있다. 셋째, 야식 섭취 빈도를 알아보는 조사로 제한되어 있어, 청소년의 야식 섭취 시간, 야식 메뉴, 야식 섭취량 등 야식과 관련된 구체적인 식습관을 확인할 수 없는 측정의 한계가 있다. 넷째, 청소년의 야식 섭취가 바람직하지 못한 식습관과 구강건강 특성을 통해 구강 증상에 경험에 영향을 미치는지 여부를 분석하지 못한 한계가 있다. 그럼에도 불구하고 본 연구는 전국의 청소년을 대상으로 국가가 주관하는 빅데이터 조사로 이루어진 표본을 활용하여 자료의 대표성이 높고 연구결과를 더욱 일반화할 수 있다. 또한 청소년의 야식 섭취가 구강건강 특징 및 구강 증상 경험에 미치는 영향을 파악하였다는 장점이 있다. 향후에 야식 섭취가 청소년의 구강건강에 미치는 영향을 예방하기 위한 방안을 마련할 필요가 있으며 올바른 식습관과 연계한 구강건강 증진을 위한 교육 및 정책 등에 대한 기초자료로 활용될 수 있을 것으로 생각한다.

Conclusion

야식 섭취 빈도가 높을수록 바람직하지 못한 구강건강 특성과 구강 증상 경험이 유의하게 높게 나타났다. 그러므로 청소년의 야식 섭취가 바람직하지 못한 구강건강 습관을 형성할 수 있는 가능성을 예방하고 올바른 식습관을 유지할 수 있는 체계적인 교육 프로그램 등이 필요할 것으로 생각된다.

CONFLICT OF INTEREST

There are no financial or other issues that might lead to conflict of interest.

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None.

DATA AVAILABILITY

The raw data from this study is publicly available and can be accessed from the Korea Disease Control and Prevention Agency (https://www.kdca.go.kr/yhs/).

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Research Article

유아 식사에서 어머니의 가정간편식 이용 빈도에 따른 가정간편식 이용 실태 및 태도와 유아 자녀의 가정간편식 기호도

김보연[1),*], 김미현[2),*], 연지영[3),†]

[1)]공주대학교 교육대학원 영양교육전공 석사
[2)]공주대학교 식품영양학과 교수
[3)]서원대학교 식품영양학과 부교수

Maternal home meal replacement use and attitudes, and young children's preferences by usage frequency in meals for young children: a cross-sectional study

Bo-Yeon Kim[1),*], Mi-Hyun Kim[2),*], Jee-Young Yeon[3),†]

[1)]Master Degree, Major in Nutrition Education, Graduate School of Education, Kongju National University, Yesan, Korea
[2)]Professor, Department of Food and Nutrition, Kongju National University, Yesan, Korea
[3)]Associate Professor, Department of Food and Nutrition, Seowon University, Cheongju, Korea

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†Corresponding author:
Jee-Young Yeon
Department of Food and Nutrition, Seowon University, 377-3 Musimseo-ro, Seowon-gu, Cheongju 28674, Korea
Tel: +82-43-299-8744
Fax: +82-43-299-8740
Email: yeon@seowon.ac.kr

*These authors contributed equally to this work.

Objectives: With the increase in women's workforce participation and changing family eating habits, home meal replacements (HMRs) have become more prevalent. However, research on how mothers incorporate HMR into meals of young children remains limited. This study examined mothers' attitudes toward and use of HMR, and their association with young children's HMR preferences.

Methods: A survey was conducted between June 1 and July 3, 2020, involving 337 mothers of 5-year-old children in Sejong, South Korea. The questionnaire assessed mothers' perceptions of HMR, consumption patterns, and their children's preferences for HMR.

Results: The average age of participating mothers was 38.3 years. Full-time homemakers constituted 40.1% of the respondents and showed lower HMR usage among them. HMR was primarily consumed as late-night snacks, side dishes, and dinners, with large discount stores (81.6%) being the primary purchase location. The high HMR consumption group exhibited more positive attitudes toward HMR ($P < 0.001$). HMR types varied in consumption frequency. Among ready-to-eat foods, gimbap (38.3%) was the most common, followed by meat side dishes (11.3%) and salads (11.0%). Among the ready-to-heat items, dumplings were the most frequently consumed. Simple cooking kits for Korean street food were used by 56.5% of mothers in the high-frequency HMR group, compared to 38.6% and 29.2% in the lower consumption groups ($P < 0.01$). Children's preference for HMR was significantly associated with maternal HMR consumption frequency ($P < 0.001$). The most preferred items among children were rice porridge ($P < 0.05$) and meat side dishes ($P < 0.001$).

Conclusion: Higher maternal HMR use was associated with increased acceptance by children. Mothers who frequently used HMR exhibited more positive attitudes toward its palatability, convenience, nutritional value, and variety. While HMR offers diverse and tasty meal options, overreliance on processed foods warrants caution. Importantly, high HMR consumption during early childhood may influence long-term dietary behaviors, including continued preference for HMRs.

Keywords: convenience foods; children, preschool; mothers; food preference

INTRODUCTION

식품산업의 발전과 1인 가구의 증가 등 생활양식의 변화로 인해 가정식의 편의성이 중요해지면서, 조리된 음식을 구매하여 그대로 먹거나 간단하게 조리해서 먹을 수 있는 가정간편식(home meal replacement, HMR)의 이용이 증가하고 있다[1]. HMR을 구입하는 이용자들은 여러 연령대로 소비 계층이 빠르게 확산되고 있으며 선행연구들을 통해 HMR 구입자들의 소비행동과 이용 실태를 분석하기 위한 여러 연구가 진행되어 왔다[2]. Choi 등[3]은 1인, 2인 가구와 다인 가구의 HMR의 이용 실태와 식습관을 분석한 결과 20–30대 젊은 성인 가구 형태에서 HMR 이용 및 식습관과 관련되어 있음이 나타났다. Kim 등[4]은 영유아를 둔 여성의 라이프스타일에 따라 유아용 HMR 소비행동을 군집 유형별로 분석한 결과, 모든 유형에서 안전성이 중요한 영향을 미치는 요인으로 나타났으며, 이에 따라 유아용 HMR 구매 시 위생적이고 안전한 제품이 우선적으로 선택되는 경향이 있는 것으로 확인되었다. Park 등[5]은 20–50대 일반소비자들을 대상으로 HMR 제품 선호도에 대해 알아 본 연구 결과 소비자 만족도를 높이기 위해서는 위생 및 간편한 포장, 맛, 구입 접근성뿐만 아니라 신선도를 유지하면서 가격대가 적절한 메뉴 개발이 필요하다고 제안하였다.

초등학생과 학부모를 대상으로 가공식품 선호도와 섭취빈도가 자녀의 식생활에 미치는 영향을 조사한 연구에서는 부모의 가공식품 기호도가 높은 집단의 자녀가 과일류와 유제품류는 적게 섭취하고, 씨리얼류, 면류, 분식류, 과자류, 탄산음료, 패스트푸드를 더 자주 섭취하는 걸로 나타나 부모의 가공식품에 대한 긍정적인 인식 수준이 높을수록 자녀의 식품 기호도, 섭취빈도 및 식습관에 부정적인 영향을 미친다고 하였다[1].

영·유아기에는 신체 발달과 더불어 인지적 및 정서적인 발달이 급격하게 이루어지는 시기이므로 다양한 식품을 통한 충분한 영양섭취가 매우 중요하다[6]. 영·유아시기에 형성되는 식습관은 이후의 성장과 발달에 영향을 미칠 수 있다. 유아의 가공식품섭취의 증가, 편식 등의 식생활 문제는 성장부진, 면역력 감소, 아토피성 피부염을 비롯한 알레르기 질병 등의 문제로 많이 발생하고 있음이 또한 지적되고 있다[7]. 또한 어머니가 가족의 식사에 HMR의 사용빈도가 많을수록 유아 자녀의 전체 및 절제 영역의 식사의 질이 감소되는 것으로 나타났다[8]. 코로나19를 경험하면서 HMR의 생산과 소비가 크게 확대되었고, HMR의 형태로 생산되는 식품의 종류가 매우 다양해짐에 따라 식생활에서 차지하는 HMR 비율이 급속히 증가하게 되면서 어린 아이들은 현재의 성인보다 HMR이 매우 이른 시기에 노출될 수 있는 환경에 처해 있으므로 이들의 HMR 섭취와 관련된 요인을 규명하는 연구의 필요성이 높다. 이에 본 연구에서는 유아의 주양육자인 어머니를 대상으로 유아 식사에서 어머니의 HMR 이용 빈도에 따라 HMR의 이용 실태 및 태도, 유아의 HMR 기호도를 비교하여 유아가 있는 가정에서 유아의 바람직한 식습관 형성을 위한 식생활관리의 기초 자료를 제시하고자 하였다.

METHODS

Ethics statement

The written informed consent was obtained from all participants and or/the guardians for the survey. The survey procedures and protocols were approved by the Institutional Review Board (KNU_IRB_2020-21).

1. 연구 설계

본 연구는 단면 연구로, 연구의 기술은 STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) 지침(https://www.strobe-statement.org/)에 따라 기술되었다.

2. 연구대상 및 기간

본 연구 대상자는 세종특별자치시에 있는 8개 단설유치원 재원중인 만 5세의 유아 자녀를 둔 어머니 337명이었으며, 2020년 6월 1일부터 7월 3일까지 5주에 걸쳐 설문조사를 실시하였다. 유아 학부모에게 연구 목적과 취지를 설명하는 설명서와 동의서, 설문지는 유아를 통해 가정으로 530부를 배부하였으며, 가정에서 어머니가 자기기입식으로 응답한 설문지는 다시 원아를 통해 회수하였다. 동의서와 설문지는 총 340부(회수율 64%)가 회수되었고, 답변이 부실한 설문지 3부를 제외한 총 337부(분석률 63.6%)를 최종 분석에 이용하였다.

3. 조사내용 및 방법

본 연구에 사용된 설문지는 선행연구 자료[4, 9–11]를 참고하여 연구 목적에 맞도록 문항을 재구성하였다. 예비조사로 세종특별자치시 소재 단설유치원에 다니는 자녀를 둔 영양사와 교직원 12명을 대상으로 설문을 실시하여 문항에 대한 인지타당도를 검토하여 문구 등을 수정·보완한 후 본 연구에 사용하였다. 설문 내용은 유아 어머니 및 유아 자녀의 일반적인 사항, HMR 이용 실태로 구성하였다. 어머니 및 유아 자녀의 일반적 사항은 나이, 가족 구성원의 수, 자녀 수, 가족형태, 직업, 자녀의 성별, 주관적 자녀의 건강상태 총 7문항으로 구성하여 조사하였다. HMR 이용 실태는 가족의 식사에서 HMR 이용 빈도, 유아 자녀의 식사에서 HMR 이용 빈도, HMR의 주요 사용 용도, 구입 이유, 구입 장소, 구입 시 고려 사항, HMR 구입 종류를 조사하였다. HMR의 사용에 대한 어머니의 태도는 총 9개의 문항으로 구성하였다. 9개의 문항은 'HMR은 내가 직접 조리한 음식보다 맛이 있다', 'HMR을 사용하여 조리하는 시간을 줄이고 그 시간을 아이를 위해 사용하는 것이 더 좋다', 'HMR은 우리 가족의

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영양섭취에 중요한 역할을 하고 있다', 'HMR을 먹는 것이 외식보다 바람직하다', '아이가 HMR을 잘 먹는다면 간편식을 이용해서 영양가 있는 식사를 준비하겠다', 'HMR은 우리 아이에게 더 다양한 음식을 경험할 수 있게 한다', '바쁜 현대생활에서 HMR의 사용은 선택이 아닌 필수이다', 'HMR은 영양적으로 문제가 있다', '가족의 건강을 위해 가능하면 HMR을 사용하지 않겠다'이었다. 각 문항 당 5점 척도로 평가하여 전체 45점 만점으로 하였으며, HMR에 대하여 긍정적인 태도로 묻는 문항은 '매우 그렇다' 5점에서 '매우 그렇지 않다' 1점, HMR에 대하여 부정적인 태도(HMR은 영양적으로 문제가 있다, 가족의 건강을 위해 가능하면 HMR을 사용하지 않겠다)로 묻는 문항은 '매우 그렇다' 1점에서 '매우 그렇지 않다' 5점으로 점수를 역으로 부여하여 HMR에 대하여 긍정적인 인식을 가지고 있을수록 높은 점수가 부여되도록 하였다. 유아 자녀의 HMR 기호도는 '귀하의 자녀는 가정간편식을 먹는 것을 좋아하나요?'로 질문하여 그렇지 않다, 보통이다, 그렇다 중 선택을 하도록 하였다. 유아 자녀의 HMR 종류별 선호도는 자녀가 선호하여 잘 먹는 제품을 모든 항목 중에서 복수로 선택하도록 하여 조사하였다. 선택항목은 밥·죽류, 국·찌개류, 육류반찬, 채소류반찬, 샐러드, 만두류, 기타로 구성하였다.

4. 통계분석

본 연구 자료는 SAS version 9.4 (SAS Institute Inc.) 프로그램을 이용하여 연속형 변수는 평균과 표준편차로 범주형 변수는 각 문항별 응답자 수 기준으로 빈도와 백분율로 제시하였다. 어머니의 유아 자녀의 식사에서 HMR 사용 빈도에 따른 군 간의 연속 변수들의 평균 차이는 일원분산분석(analysis of variance, ANOVA)을 실시하였고, 유의한 차이가 나타난 경우 Duncan's multiple range test로 사후검정을 실시하였다. 범주형 변수는 Chi-square test를 이용하였고, 다중응답 문항은 세부항목별로 응답 빈도와 백분율을 제시하고 Rao-Scott chi-square test를 이용하였으며, 모든 통계 분석에서 유의수준은 $P < 0.05$로 하였다.

RESULTS

1. 일반사항

유아 어머니와 유아의 일반 사항은 Table 1과 같다. 조사 대상자인 유아 어머니의 평균 나이는 38.3세였으며, 본인을 포함한 가족 수는 4명이 57.3%, 자녀 수는 2명이 63.2%로 가장 많았고, 가족형태는 핵가족이 93.2%로 가장 높게 나타났다.

조사 대상자인 어머니의 직업은 전업주부가 40.1%, 전문직 13.7%, 회사원 13.5%, 공무원 12.6%, 파트타임 11.4% 순으로 나타났고, 만 5세 유아 자녀의 성별은 남자가 53.6%로 여자 46.4%에 비해 높았으며, 어머니가 인식하는 주관적인 자녀의 건강상태는 건강한 편이 54.0%로 가장 높게 나타났다.

2. HMR의 이용 실태

HMR의 이용 실태에 관한 결과는 Table 2와 같다. 가족의 식사에서 HMR 이용 빈도는 전체적으로 1주일에 1–2회가 47.2%로 가장 많았으며, 유아의 식사에서 주 3회 이상 섭취군의 경우 가족의 식사에서는 주 3회 이상이 88.7%가 가장 높았고, 주 1회 미만 섭취군의 경우 가족의 식사에서는 주 1회 미만에서 81.6%가 가장 높은 비율을 보여 HMR 이용 빈도에 따른 세 군간에 유의적인 차이가 나타났다($P < 0.001$).

가족의 식사에서 HMR의 주요 사용 용도를 다중 선택으로 조사한 결과 전체적으로 야식용 92.6%, 간식용 49.3%, 반찬용 38.3%, 저녁식사용 32.1%, 여행용 30.6%, 아침식사용 20.8%, 점심식사용 16.6% 순으로 많이 사용하고 있었다. 주 3회 이상 섭취군에서 HMR을 아침식사용(35.5%, $P < 0.001$), 저녁식사용(51.6%, $P < 0.001$), 야식용(19.4%, $P < 0.001$), 반찬용(56.5%,

Table 1. General characteristics of the participants

Variable	Total (n = 337)
Mother's age (year)	38.3 ± 4.3
No. of family members	
3 or less	69 (20.5)
4	193 (57.3)
5	75 (22.2)
No. of children	
1	62 (18.4)
2	213 (63.2)
over 3	62 (18.4)
Type of family	
Nuclear family	314 (93.2)
Extended family	23 (6.8)
Mother's occupational status[1)]	
Professional	46 (13.7)
Office worker	45 (13.5)
Civil servant	42 (12.6)
Self-employed	29 (8.7)
Part-time	38 (11.4)
Housewife	134 (40.1)
Child's sex[1)]	
Male	180 (53.6)
Female	156 (46.4)
Subjective child's health condition	
Very weak	5 (1.5)
Weak	21 (6.2)
Normal	53 (15.7)
Healthy	182 (54.0)
Very healthy	76 (22.6)

Mean ± SD or n (%).
[1)]n differs for this item due to missing data.

Table 2. Status of home meal replacements use

Variable	Total (n = 337)	HMR use frequency for child meals			*P*-value[1]
		Over three times a week (n = 62)	One to two times a week (n = 145)	Under once a week (n = 130)	
HMR use frequency for family meals					
3 or more times a week	69 (20.5)	55 (88.7)	12 (8.3)	2 (1.5)	< 0.001[2]
Once–twice times a week	159 (47.2)	6 (9.7)	131 (90.3)	22 (16.9)	
Under once a month	109 (32.3)	1 (1.6)	2 (1.4)	106 (81.6)	
Main use purpose of HMR[3]					
Breakfast	70 (20.8)	22 (35.5)	37 (25.5)	11 (8.5)	< 0.001
Lunch	56 (16.6)	5 (8.1)	29 (20.0)	22 (16.9)	0.107
Dinner	108 (32.1)	32 (51.6)	52 (35.9)	24 (18.5)	< 0.001
Night snack	312 (92.6)	12 (19.4)	4 (2.8)	9 (6.9)	< 0.001
Side dishes	129 (38.3)	35 (56.5)	66 (45.5)	28 (21.5)	< 0.001
Packed lunches	11 (3.3)	1 (1.6)	7 (4.8)	3 (2.3)	0.362
Snacks	166 (49.3)	33 (53.2)	67 (46.2)	66 (50.8)	0.592
For travel	103 (30.6)	10 (16.1)	45 (31.0)	48 (36.9)	0.014
Reason for purchasing HMR[3]					
No time	120 (35.6)	18 (29.0)	63 (43.5)	39 (30.0)	0.033
Convenience	263 (78.0)	53 (85.5)	120 (82.8)	90 (69.2)	0.008
Taste	65 (19.3)	12 (19.4)	32 (22.1)	21 (16.2)	0.463
Lack of cooking skills	63 (18.7)	16 (25.8)	28 (19.3)	19 (14.6)	0.172
Variety to choose	87 (25.8)	21 (33.9)	36 (24.8)	30 (23.1)	0.261
Cheaper than cooking	90 (26.7)	20 (32.3)	40 (27.6)	30 (23.1)	0.385
Main place purchasing HMR[3]					
Convenient store	17 (5.0)	4 (6.5)	7 (4.8)	6 (4.6)	0.852
Major retail market	275 (81.6)	52 (83.8)	121 (83.5)	102 (78.5)	0.498
Supermarket	83 (24.6)	17 (27.4)	35 (24.1)	31 (23.9)	0.851
Internet	126 (37.4)	28 (45.2)	69 (47.6)	29 (22.3)	< 0.001
Home shopping	29 (8.6)	7 (11.3)	14 (9.7)	8 (6.2)	0.414
Important considerations when purchasing HMR[3]					
Taste	268 (79.5)	50 (80.7)	122 (84.1)	96 (73.9)	0.105
Nutrition	158 (46.9)	33 (53.2)	76 (52.4)	49 (37.7)	0.027
Price	76 (22.6)	21 (33.9)	36 (24.8)	19 (14.6)	0.008
Convenience	147 (43.6)	32 (51.6)	66 (45.5)	49 (37.7)	0.159
Hygiene	134 (39.8)	26 (41.9)	57 (39.3)	51 (39.2)	0.928
Brand	115 (34.1)	22 (35.5)	53 (36.6)	40 (30.8)	0.582

n (%).
HMR, home meal replacement.
[1]*P*-values were determined by Rao-Scott χ^2 test for categorical variables.
[2]*P*-value was derived from χ^2 test for categorical variables.
[3]Multiple choice.

P < 0.001)으로 사용하는 비율이 유의적으로 높았다. 주 1회 미만 섭취군에서는 여행용으로 사용하는 비율이 36.9% (*P* = 0.014)로 높게 나타났다.

HMR 구입 이유를 다중 선택으로 조사한 결과 전체적으로 편리해서 78.0%, 시간이 없어서 35.6%, 직접 하는 것보다 저렴해서 26.7%, 다양한 음식이 있어서 25.8% 순으로 나타났다. 시간이 없어서 HMR을 구입하는 경우는 주 1–2회 섭취군 43.5%로 주 1회 미만 섭취군(30.0%)과 주 3회 이상 섭취군(29.0%)보다 높게 나타났다(*P* = 0.033). 편리하기 때문에 HMR을 구입하는 경우에는 주 3회 이상 섭취군이 85.5%로 주 1–2회 섭취군

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(82.8%), 주 1회 미만 섭취군(69.2%)에 비해 높게 나타났다(P = 0.008).

HMR 주된 구입 장소는 다중 선택으로 조사한 결과 전체적으로 대형 할인마트 81.6%, 인터넷 37.4%, 슈퍼마켓 24.6%, 홈쇼핑 8.6% 순으로 나타났으며, HMR을 주로 인터넷에서 구입하는 비율이 주 1–2회 섭취군(47.6%)과 주 3회 이상 섭취군(45.2%)에서 주 1회 미만 섭취군의 22.3%에 비해 높게 나타났다(P < 0.001).

HMR을 구입할 때 중요한 고려 사항을 다중 선택으로 조사한 결과 전체적으로 맛 79.5%, 영양 46.9%, 편리성 43.6%, 위생 39.8%, 브랜드 34.1%, 가격 22.6% 순으로 나타났다. HMR을 구입할 때 영양을 중요하게 생각하는 비율이 주 3회 이상 섭취군 53.2%, 주 1–2회 섭취군 52.4%로 주 1회 미만 섭취군 37.7% 순으로 높아 유의적인 차이가 나타났고(P = 0.027), 가격을 중요하게 생각하는 비율은 주 3회 이상 섭취군 33.9%로 주 1–2회 섭취군(24.8%)과 주 1회 미만 섭취군(14.6%)에 비해 높았다(P = 0.008). 맛, 편리성, 위생, 브랜드는 군간 차이를 보이지 않았다.

HMR를 주로 이용하는 종류에 대해 다중 선택한 결과는 Table 3과 같다. 즉석섭취식품은 전체적으로 김밥 38.3%, 육류반찬 11.3%, 샐러드 11.0%, 채소반찬 8.6%, 도시락 5.3% 순으로 나타났으며, 주 3회 이상 섭취군에서 육류반찬(22.6%, P < 0.001), 생선반찬(14.5%, P = 0.001), 채소반찬(16.1%, P = 0.029), 샐러드(21.0%, P = 0.009)를 이용하는 비율이 높았다.

가열 후 먹는 음식은 전체적으로 만두류가 70.3%로 가장 높았고, 즉석밥 35.9%, 즉석국 16.9%, 덮밥소스 15.4% 순으로 나타났다. 즉석밥은 주 1–2회 섭취군이 44.1%로 가장 높았고(P = 0.023), 즉석국은 주 3회 이상 섭취군이 24.2%로 가장 높게 나타났다(P = 0.021).

간단 조리 후 먹는 조리키트 종류로는 전체적으로 분식키트가 38.3%로 높았고, 면류키트 27.3%, 육류키트 16.3%, 찌개키트 13.7% 순으로 나타났다. 주 3회 이상 섭취군에서 찌개키트(19.4%, P = 0.016), 분식키트(56.5%, P = 0.001), 육류키트(27.4%, P = 0.005)가 두 군에 비해 높았고, 면류키트는 주 1–2회 섭취군에서 35.9%로 높게 나타났다(P = 0.005).

Table 3. Most frequently used home meal replacements

Variable	Total (n = 337)	HMR use frequency for child meals			*P*-value
		Over three times a week (n = 62)	One to two times a week (n = 145)	Under once a week (n = 130)	
Ready to eat[1)]					
Lunch box	18 (5.3)	6 (9.7)	7 (4.8)	5 (3.9)	0.228
Gimbap	129 (38.3)	31 (50.0)	55 (37.9)	43 (33.1)	0.078
Meat side dish	38 (11.3)	14 (22.6)	20 (13.8)	4 (3.1)	< 0.001
Fish side dish	17 (5.0)	9 (14.5)	6 (4.1)	2 (1.5)	0.001
Vegetable side dish	29 (8.6)	10 (16.1)	13 (9.0)	6 (4.6)	0.029
Salad	37 (11.0)	13 (21.0)	16 (11.0)	8 (6.2)	0.009
Ready to heat[1)]					
Instant rice	121 (35.9)	19 (30.7)	64 (44.1)	38 (29.2)	0.023
Instant porridge	26 (7.7)	8 (12.9)	12 (8.3)	6 (4.6)	0.125
Instant soup	57 (16.9)	15 (24.2)	29 (20.0)	13 (10.0)	0.021
Cup rice	17 (5.0)	4 (6.5)	8 (5.5)	5 (3.9)	0.700
Sauce for rice	52 (15.4)	15 (24.2)	23 (15.9)	14 (10.8)	0.054
Dumplings	237 (70.3)	42 (67.7)	109 (75.2)	86 (66.2)	0.233
Food to eat after simple cooking[1)]					
Casserole cooking kit	46 (13.7)	12 (19.4)	25 (17.2)	9 (6.9)	0.016
Flour-based snack kit	129 (38.3)	35 (56.5)	56 (38.6)	38 (29.2)	0.001
Meat cooking kit	55 (16.3)	17 (27.4)	26 (17.9)	12 (9.2)	0.005
Noodle cooking kit	92 (27.3)	16 (25.8)	52 (35.9)	24 (18.5)	0.005
Sauce for casserole	40 (11.9)	7 (11.3)	21 (14.5)	12 (9.2)	0.400
Sauce for glazed dishes	15 (4.5)	3 (4.8)	8 (5.5)	4 (3.1)	0.611

n (%).
HMR, home meal replacement.
P-values were determined by Rao-Scott χ^2 test for categorical variables.
[1)]Multiple choice.

Table 4. Mothers' attitude towards using home meal replacements

Variable	Total (n = 337)	HMR use frequency for child meals			*P*-value
		Over three times a week (n = 62)	One to two times a week (n = 145)	Under once a week (n = 130)	
HMRs are tastier than my cooking[1)]	3.2 ± 0.9	3.4 ± 0.8[a,2)]	3.3 ± 0.8[a]	3.0 ± 0.9[b]	0.002
I like to use HMR to shorten the cooking time, and I prefer to use that time for my child[1)]	3.4 ± 1.0	3.7 ± 0.9[a]	3.5 ± 0.9[a]	3.0 ± 1.0[b]	< 0.001
HMRs play an important role for my family's nutrition intake[1)]	2.3 ± 0.9	2.7 ± 0.8[a]	2.3 ± 0.8[b]	2.1 ± 0.8[b]	< 0.001
Eating HMRs is more desirable than dining out[1)]	2.6 ± 0.8	2.9 ± 0.8[a]	2.5 ± 0.8[b]	2.5 ± 0.8[b]	0.006
If my child enjoys HMRs, I will prepare nutritious food using HMRs[1)]	2.8 ± 1.0	3.6 ± 0.9[a]	2.9 ± 1.0[b]	2.4 ± 1.0[c]	< 0.001
HMRs allows my child to experience various food[1)]	2.8 ± 0.9	3.2 ± 0.9[a]	2.9 ± 0.9[b]	2.6 ± 0.9[c]	< 0.001
Use of HMRs is not option but essential in the busy modern life[1)]	3.2 ± 0.9	3.6 ± 0.6[a]	3.4 ± 0.9[b]	2.8 ± 0.9[c]	< 0.001
HMRs are not good for nutrition[3)]	3.0 ± 0.8	3.2 ± 0.7	3.1 ± 0.8	2.9 ± 0.8	0.156
For my family health, I will try not to use HMRs if possible[3)]	2.6 ± 0.9	3.0 ± 0.9[a]	2.7 ± 0.8[b]	2.2 ± 0.9[c]	< 0.001
Total[4)]	25.8 ± 5.2	29.0 ± 4.2[a]	26.5 ± 4.7[b]	23.4 ± 5.0[c]	< 0.001

Mean ± SD.
HMR, home meal replacement.
P-values were from ANOVA, and different letters represent statistical differences determined by the Duncan post-hoc test.
[1)]Measured using a 5-point Likert scale from "strongly disagree" (scored 1) to "strongly agree" (scored 5).
[2)]a–c means with different alphabets in each row are significantly different at α = 0.05 as determined by Duncan's test (a > b > c).
[3)]Measured using a 5-point Likert scale from "strongly disagree" (scored 5) to "strongly agree" (scored 1).
[4)]Nine items were used to assess mother's attitude towards using HMR.

3. 어머니의 HMR 이용에 관한 태도

어머니의 HMR 이용에 관한 태도는 Table 4와 같다. HMR에 대한 평균 태도 점수는 45점 만점에 25.8점으로 보통 이상의 긍정적 태도를 나타냈으며 주 3회 이상 섭취군 29.0점, 주 1–2회 섭취군 26.5점, 주 1회 미만 섭취군 23.4점으로 유아 자녀 식사에서 HMR의 이용 빈도가 높은 군일수록 HMR에 대하여 긍정적 태도를 갖는 것으로 나타났다($P < 0.001$). 세부항목별로 살펴보면, 'HMR은 내가 직접 조리한 음식보다 맛이 있다' ($P = 0.002$), 'HMR을 사용하여 조리하는 시간을 줄이고 그 시간을 아이를 위해 사용하는 것이 더 좋다' ($P < 0.001$), 'HMR은 우리 가족의 영양섭취에 중요한 역할을 하고 있다' ($P < 0.001$), 'HMR을 먹는 것이 외식보다 바람직하다' ($P = 0.006$), '아이가 HMR을 잘 먹는다면 간편식을 이용해서 영양가 있는 식사를 준비하겠다' ($P < 0.001$), 'HMR은 우리 아이에게 더 다양한 음식을 경험할 수 있게 한다' ($P < 0.001$), '바쁜 현대생활에서 HMR의 사용은 선택이 아닌 필수이다' ($P < 0.001$), '가족의 건강을 위해 가능하면 HMR을 사용하지 않겠다' ($P < 0.001$)의 항목에서 주 3회 이상 섭취군이 주 1회 미만 섭취군에 비해 높은 점수를 보였다.

4. 자녀의 HMR 섭취에 대한 선호도

유아 자녀의 HMR 섭취에 대한 선호도 조사 결과는 Table 5와 같다. 자녀가 HMR를 먹는 것을 좋아하는지에 대한 질문에 전체적으로 '보통이다'라는 응답은 59.6%로 가장 높았으며, '그렇다' 27.3%, '그렇지 않다' 13.1%의 비율을 보였다. 주 3회 이상 섭취군에서 'HMR을 먹는 것을 좋아한다'는 비율이 37.1%로 주 1–2회 섭취군(26.2%)과 주 1회 미만 섭취군(23.8%)보다 유의적으로 높게 나타났다($P < 0.001$).

자녀가 좋아해서 잘 먹는 HMR을 다중 선택으로 조사한 결과, 전체적으로 만두류 59.4%로 가장 높았으며 육류반찬 30.0%, 기타 23.2%, 국·찌개류 15.7%, 밥·죽류 14.2% 순으로 나타났다. 밥·죽류의 경우 주 3회 이상 섭취군이 22.6%로 주 1–2회 섭취군 15.2%와 주 1회 미만 섭취군 9.2%보다 높았고($P = 0.043$), 육류반찬 역시 주 3회 이상 섭취군이 48.4%로 주 1–2회 섭취군 31.0%, 주 1회 미만 섭취군 20.0%에 비해 높게 나타났다($P < 0.001$).

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Table 5. Children's overall preference for home meal replacements

Variable	Total (n = 337)	HMR use frequency for child meals			*P*-value
		Over three times a week (n = 62)	One to two times a week (n = 145)	Under once a week (n = 130)	
Child's preference for HMR					< 0.001[1)]
Not preferred	44 (13.1)	5 (8.1)	9 (6.2)	30 (23.1)	
Neutral	201 (59.6)	34 (54.8)	98 (67.6)	69 (53.1)	
Preferred	92 (27.3)	23 (37.1)	38 (26.2)	31 (23.8)	
Child's preferred type of HMR[2)]					
Rice, porridges	48 (14.2)	14 (22.6)	22 (15.2)	12 (9.2)	0.043
Soup, casseroles	53 (15.7)	14 (22.6)	25 (17.2)	14 (10.8)	0.088
Meat side dish	101 (30.0)	30 (48.4)	45 (31.0)	26 (20.0)	< 0.001
Vegetable side dish	16 (4.8)	3 (4.8)	7 (4.8)	6 (4.6)	0.996
Salad	13 (3.9)	5 (8.1)	4 (2.8)	4 (3.1)	0.162
Dumplings	200 (59.4)	37 (59.7)	81 (55.9)	82 (63.1)	0.477
Others	78 (23.2)	15 (24.2)	36 (24.8)	27 (20.8)	0.711

n (%).
HMR, home meal replacement.
P-values were determined by Rao-Scott χ^2 test for categorical variables.
[1)]*P*-value was derived from χ^2 test for categorical variables.
[2)]Multiple choice.

DISCUSSION

식품가공기술의 발달, 가정 식생활에서의 편의화 추구, 코로나 19 등의 영향으로 다양한 HMR의 생산과 소비가 보편화되면서 가정에서 HMR의 섭취가 증가하고 있으나 유아 자녀의 식사에서 어머니의 HMR 이용 실태와 관련 요인, 유아 자녀의 HMR 기호도에 대한 연구는 미비한 상황이다. 이에 본 연구에서는 만 5세 자녀를 둔 유아 어머니를 대상으로 유아 자녀 식사에서 HMR 이용 빈도에 따라 어머니의 HMR 이용에 대한 태도, 유아의 HMR 섭취 빈도, 유아의 HMR 섭취에 대한 기호도 등과의 관련성을 평가하였다. 어머니의 일반 사항이나 직업, 가족의 구성원 수 등의 사회적인 요인은 어머니가 자녀의 식사에서 HMR을 이용하는 빈도와 관련성을 보이지 않은 반면에 유아 자녀 식사에서 HMR의 이용빈도가 높을수록 자녀의 식사에서 HMR의 이용빈도가 높은 관련성을 보였다. 가족의 식사에서 HMR의 주요 사용 용도는 전체적으로 야식용의 비율이 가장 높았고, 간식용, 반찬용, 저녁식사용, 여행용, 아침식사용, 점심식사용의 순서로 나타났다. 아침, 점심, 저녁으로 사용되는 식사용의 경우 69.5%로 유아 어머니의 50% 이상이 HMR을 식사나 야식의 용도로 사용하고 있음을 알 수 있다. 또한 주 3회 이상 섭취군은 아침, 저녁, 야식, 반찬용으로 사용하는 비율이 높았고, 여행용으로 사용하는 비율은 낮았다. 즉, HMR의 사용빈도가 높은 어머니 일수록 일상에서 사용을 많이 하고, 섭취빈도가 낮은 군에서는 여행 등의 특수한 상황에서 HMR을 사용하고 있음을 알 수 있었다. Kim 등[12] 주부의 가공편의식품 구매 태도에 대한 연구결과에서 구매 용도는 가정 식사용(61.1%)으로 가장 많이 구매 하였고, 간식용(29.6%), 여행용(5.4%), 도시락(2.5%)의 순으로 나타났으며, 부산지역 직장인의 편의 식품 이용 실태에 관한 조사연구에서 편의 식품 이용 시기에 대한 조사 결과 전체적으로 간식이 39.7%로 가장 높은 비율을 나타냈으며, 저녁 27.2%, 점심 18.3%, 아침 14.7% 순으로 높게 나타나 본 연구와 비슷한 결과를 보였다[13]. 대학생들 대상 연구에서 바로 먹을 수 있는 HMR 제품을 한 끼 식사를 해결하는 것으로 이용한다고 보고하였다[14]. 이상의 선행연구와 본 연구를 통해 HMR의 이용이 증가함에 따라 야식이나 간식, 반찬과 같은 부식뿐 아니라 점차 식사 대용으로의 섭취 용도가 높아지고 있음을 알 수 있다.

HMR 구입 이유에 대하여 주 1–2회 섭취군은 '시간이 없어서'가 주 1회 미만 섭취군과 주 3회 이상 섭취군보다 유의적으로 높아 HMR을 자주 이용하지 않는 어머니의 경우 시간이 없을 때 비상으로 HMR을 이용함을 알 수 있다. 편리하기 때문에 HMR을 구입하는 경우에는 주 1회 미만 섭취군보다 주 1–2회 섭취군과 주 3회 이상 섭취군이 높은 비율을 보였다. HMR 상품을 구매해본 경험이 있는 외식 소비자를 대상으로 한 연구에서 편의성 및 음식 품질이 구매의도에 모두 정(+)의 영향을 미치는 것으로 나타났다[15]. Lee & Yoon [13]은 부산지역 직장인을 대상으로 한 연구에서 편의식품 구매 행동에 영향을 미치는 요인들 중 편의식품 구입 동기로 81.3%의 조리의 간편함을 높은 비율로 선택하였고 적당한 가격 15.6%, 기타 10.7%, 맛 3.1%를 나타냈다. 이상과 같이 가족의 식사에서 HMR을 이용하는 것은 편리성, 다

양성, 맛 등의 요인에 의한 것으로 나타났다.

HMR 주된 구입 장소를 다중 선택으로 조사한 결과 전체적으로 대형 할인마트, 인터넷 순으로 나타났다. HMR을 주로 인터넷에서 구입하는 비율이 주 1–2회 섭취군과 주 3회 이상 섭취군은 주 1회 미만 섭취군의 2배 이상 높은 HMR 이용 빈도를 보였다. 부모의 가공식품 소비행태가 자녀의 식생활에 미치는 영향을 분석한 연구에서 가공식품 구매 장소는 대형 할인마트(80.8%)와 슈퍼마켓(18.9%)을 가장 많이 이용하는 것으로 나타났으며[1], 전국 20세 이상 69세 이하 남녀 성인들을 대상으로 실시한 조사에서도 대형마트가 45.8%로 가장 많아[16] 이는 HMR 주된 구입 장소로 대형 할인마트로 응답한 본 연구결과와 유사하였다.

HMR을 구입할 때 중요한 고려 사항에 대하여 전체적으로 맛, 영양, 편리성, 위생, 브랜드, 가격 순으로 나타났다. Koo 등[17]은 최근 6개월 내 HMR 제품 이용 경험이 있는 대상으로 HMR 구매 현황 및 기대 일치 정도를 분석한 연구에서 특정 HMR 상품을 선택하는 이유로는 맛이 74.9%로 가장 많았고, 가격은 57.7%였다. Seo & Kim [1]의 고학년 초등학생과 학부모를 대상으로 한 연구에서 여성 학부모는 프리미엄 가공식품을 선호하였는데, 그 이유로 좋은 원료(35.9%), 맛(21.2%), 첨가물이 적음(20.4%), 건강에 좋음(8.4%) 등을 꼽았다. 이와 같이 어머니는 HMR 구입 시 맛, 가격을 우선으로 구입하고 자녀의 건강을 위해 식재료의 안전성과 품질이 우수한 HMR 제품을 선호하는 것으로 보인다. 유아 자녀 식사에서 HMR의 이용 빈도가 높은 어머니의 경우 이용 빈도가 낮은 어머니에 비해 HMR 구입 시 영양과 가격을 고려하는 비율이 더 높았다. 이는 HMR의 이용 빈도가 높을수록 HMR이 가족의 식생활과 가정 경제에서 차지하는 비율이 높아지기 때문으로 생각된다.

본 연구에서 유아 어머니가 주로 이용하는 HMR의 종류로 즉석섭취식품은 전체적으로 30% 이상이 이용한다고 응답한 음식은 김밥이었다. 주 3회 이상 섭취군에서 육류반찬, 생선반찬, 채소반찬, 샐러드의 이용 비율이 유의적으로 높았다. 가열 후 먹는 음식의 경우 전체 대상자의 1/3 이상이 이용한 음식은 만두류와 즉석밥이었다. 즉석밥은 주 1–2회 섭취군이, 즉석국의 경우 주 3회 이상 섭취군이 가장 많이 섭취하였다. 간단 조리 후 먹는 음식의 경우 전체 대상자의 1/3 이상이 이용한 음식은 분식류였고, 주 3회 이상 섭취군에서 유의적으로 높았다. 찌개키트, 분식키트와 육류키트는 주 3회 이상 섭취군에서 유의적으로 높았던 반면, 면류키트는 주 1–2회 섭취군에서 가장 높았다, 이상의 결과를 통해 HMR을 자주 이용하는 어머니의 경우 간식, 야식뿐만 아니라 식사를 위한 사용하는 비율이 높았던 결과와 연결하여 사용하는 음식의 종류도 다양함을 알 수 있다. 한편, 주 1–2회 이용하는 어머니의 경우 즉석밥이나 면류와 같은 기본 HMR 제품의 이용이 많음을 알 수 있다. 가공식품 소비자 태도조사 기초분석 결과에서 식품 주 구입자인 주부를 대상으로 최근 1년 동안 구입한 간편식 품목은 면류(97.3%)가 가장 높았으며, 피자/만두류(97.2%), 김밥류(94.6%), 반찬류(93.1%)등의 순으로 나타났으며, 일반 소비자 성인을 대상으로 조사한 결과에서는 주로 구입하는 가공식품 품목은 육류 가공품이 16.2%로 가장 많았고, 면류(14.5%), 유가공품(10.0%), 간편식(8.7%)의 순으로 나타나[18] 본 연구결과 비슷한 결과를 보였다.

본 연구에서 HMR에 대한 태도 점수 분석 결과, 7개 항목에서 주 3회 이상 섭취군의 점수가 유의적으로 높았고, 이를 통해 유아 자녀 식사에서 HMR의 이용 빈도가 높을수록 HMR에 대하여 긍정적 태도를 갖는 것으로 나타났다. 따라서 점수가 높을수록 가족의 건강을 위해 HMR의 사용을 줄이는 것에 동의하지 않는 것을 의미한다. Ju [19]는 HMR 선택 속성에 대한 중요도와 만족도 연구에서 HMR 선택에서 중요도가 만족도보다 높은 점수를 나타내었고, 상관관계 분석 결과 신뢰, 제품품질, 편이성에 정(+)의 관계를 보였다. 본 연구에서 자녀의 식사에서 HMR 이용 빈도가 높은 어머니들은 HMR의 기호성, 편리성, 영양성, 다양성 등에 대하여 긍정적인 태도를 가지고 있었다. 이는 사회 환경과 식품환경의 변화를 고려할 때 HMR 사용빈도가 높은 유아 어머니들이 HMR에 대하여 가지고 있는 태도는 매우 중요한 시사점을 가지고 있다. 선행연구와 비교하여 HMR의 이용에 관한 태도는 유아 어머니의 식생활 관리에 긍정적으로 이용되고 있음을 간접적으로 판단할 수 있다.

자녀가 HMR를 먹는 것을 좋아하는지에 대한 조사 결과 그렇다 27.3%, 그렇지 않다 13.1%로 나타났으며, 주 3회 이상 섭취군의 그렇다는 비율이 유의적으로 높았다. Lee 등[20]은 만 4–5세 유아들을 대상으로 곡류, 고기·생선·계란·콩류, 채소류, 과일류, 우유·유제품류, 패스트푸드·슬로푸드의 6개 영역에 대해 식품 선호도가 높은 식품을 조사한 결과 밥, 생선, 돼지고기, 쇠고기의 선호도는 유의적으로 높았으나 다른 식품군에 비해 탄산음료, 햄버거, 피자 등 패스트푸드의 선호도가 낮았다. 이 연구의 대상자는 먹어본 경험은 식품 기호도에 큰 영향을 미칠 수 있다는 관련성을 제시하였다. 본 연구는 횡단연구조사로서 자녀가 HMR을 좋아하기 때문에 자녀의 식사에 HMR을 자주 이용하는 것인지 또는 자녀가 HMR에 자주 노출되었기 때문에 HMR에 대한 기호도가 증가한 것인지를 설명하기 어렵다. 그러나 어릴 때 자주 접하는 식품에 대한 기호도가 높아질 수 있음을 고려할 때 HMR에 잦은 노출로 자녀의 HMR에 대한 기호도가 높아지고, 높아진 기호도로 인해 잘 섭취하므로 자주 사용하게 되었을 가능성이 높다.

자녀가 좋아해서 잘 먹는 HMR에 대한 조사 결과 만두류, 육류반찬의 비율이 높았고, 주 3회 이상 섭취군에서 밥·죽류와 육류반찬의 비율이 유의적으로 높았다. 즉, 자녀의 식사에서 HMR의 이용 빈도가 높을수록 자녀의 HMR에 대한 기호도가 증가하는 것으로 나타났다.

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Limitations

본 연구는 횡단 연구로 인과관계의 해석이 불가능하며, 세종특별자치시 일부 단설유치원에 재원중인 유아의 어머니를 대상으로 코로나19의 확산세가 진행되는 시기에 연구를 진행하였기 때문에 이에 대한 결과를 일반화하기에는 어려운 점이 있다. 또한 가공식품시장에서 HMR의 종류와 질, 형태가 매우 빠르게 다양화되고 변화되고 있기 때문에 식품 환경의 변화를 반영하지 못한 한계를 가지고 있어 지속적인 연구의 필요성이 높다. 그럼에도 불구하고 유아기의 HMR에 노출과 유아의 HMR 기호도와의 관련성을 제시한 의미 있는 연구이다.

Conclusion

유아 자녀의 식사는 주 양육자인 어머니가 제공하는 음식에 의존하게 되므로 균형 잡힌 영양섭취를 통한 자녀의 건강 및 바람직한 식습관 형성을 위해 어머니의 올바른 식품 선택이 매우 중요하다. HMR이 다양한 식품 섭취와 맛, 영양공급에 긍정적인 요소로 작용하는 경우에도 지나친 가공식품 의존적 식생활은 주의가 필요할 것이다. 특히 유아기에 잦은 HMR 섭취는 유아의 HMR 기호도를 높여 식습관 형성에 영향을 줄 수 있음이 제시되었다.

CONFLICT OF INTEREST

There are no financial or other issues that might lead to conflict of interest.

FUNDING

None.

DATA AVAILABILITY

Research data is available after a reasonable request to the corresponding author.

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Erratum

Erratum: Effects of a multi-component program based on partially hydrolyzed guar gum (Sunfiber®) on glycemic control in South Korea: a single-arm, pre-post comparison pilot clinical trial

Hyoung Su Park[1)], A-Hyun Jeong[2)], Hyejung Hong[3)], Hana Jang[4)], Hye-Jin Kim[5),†]

[1)]Leader, R&D Group, Maeil Health Nutrition Co., Ltd, Pyeongtaek, Korea
[2)]Pro, R&D Group, Maeil Health Nutrition Co., Ltd, Pyeongtaek, Korea
[3)]Leader, Medical Food Division, Maeil Dairies Co., Ltd, Seoul, Korea
[4)]Pro, Medical Food Division, Maeil Dairies Co., Ltd, Seoul, Korea
[5)]Director, R&D Group, Maeil Health Nutrition Co., Ltd, Pyeongtaek, Korea

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†Corresponding author:
Hye-Jin Kim
R&D Group, Maeil Health Nutrition Co., Ltd, Pyeongtaek 17714, Korea
Tel: +82-31-612-3935
Fax: +82-31-668-0247
Email: hyejink@maeil.com

This corrects the article "Effects of a multi-component program based on partially hydrolyzed guar gum (Sunfiber®) on glycemic control in South Korea: a single-arm, pre-post comparison pilot clinical trial" in volume 30 on page 40.

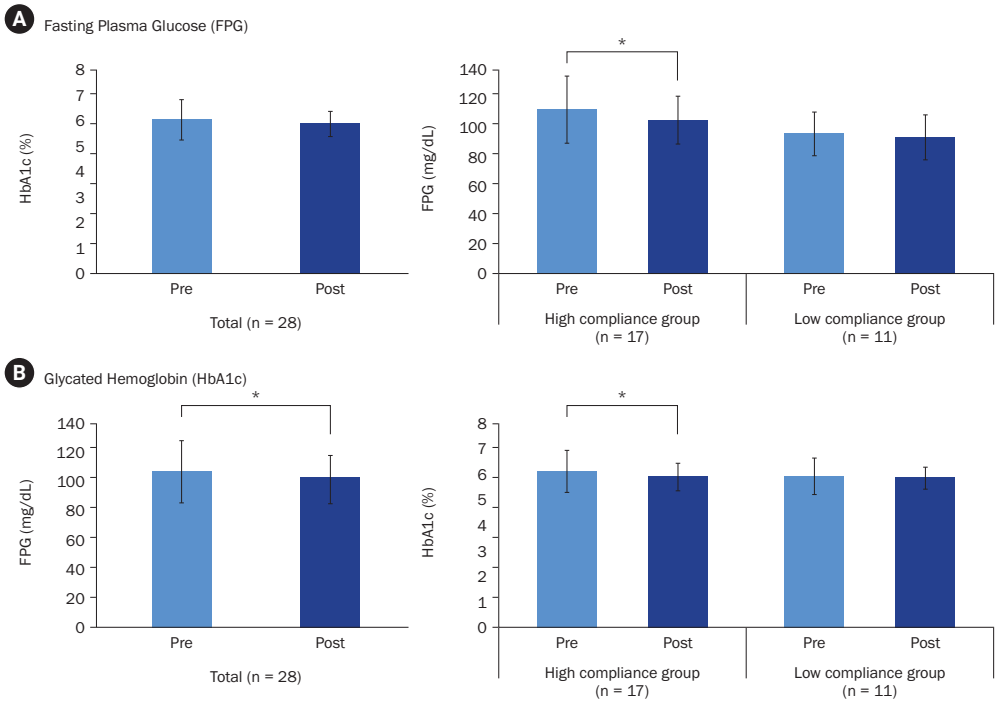
To The Editor,
We have identified an error in the published article titled "Effects of a multi-component program based on partially hydrolyzed guar gum (Sunfiber®) on glycemic control in South Korea: a single-arm, pre-post comparison pilot clinical trial" Korean Journal of Community Nutrition 2025;30(1):40-52. DOI: https://doi.org/10.5720/kjcn.2024.00276; eISSN 2951-3146.

We found that one of the subpanels in Fig. 3A and Fig. 3B were inadvertently switched in the published version of the article. Specifically, the HbA1c (%) graph (originally intended for Fig. 3B) was mistakenly placed in Fig. 3A, and the FPG (mg/dL) graph (originally intended for Fig. 3A) was mistakenly placed in Fig. 3B. The titles of Figs 3A and 3B remained correct, but one of the graphs under each figure was mismatched.

We sincerely apologize for this oversight and any confusion it may have caused.

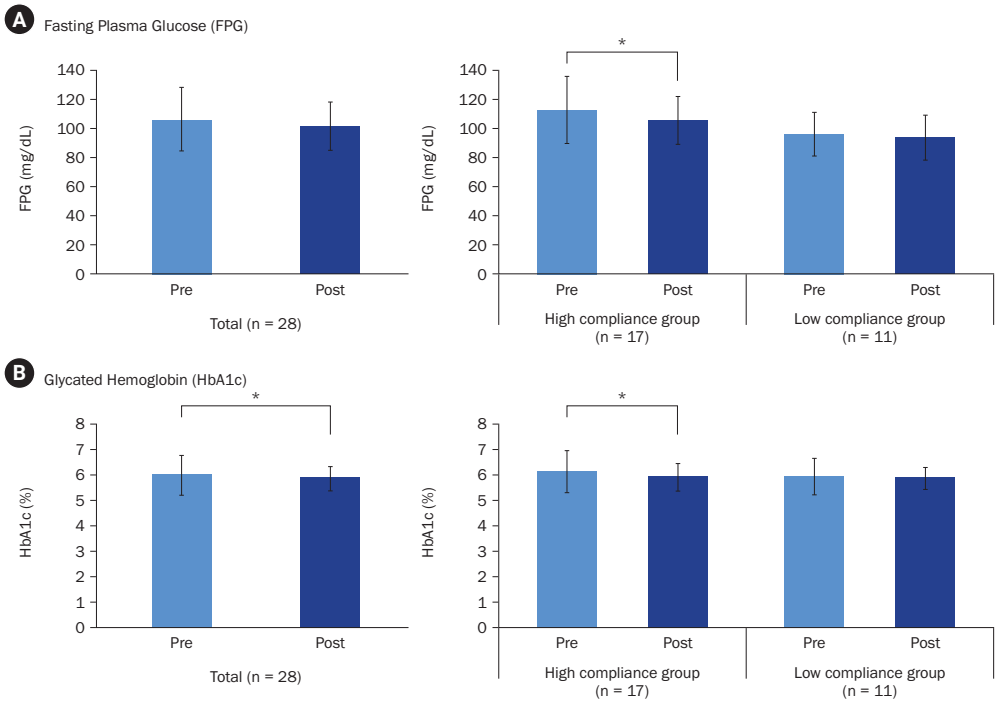
Before correction

- Fig. 3A: One panel incorrectly showed HbA1c (%) instead of FPG (mg/dL).
- Fig. 3B: One panel incorrectly showed FPG (mg/dL) instead of HbA1c (%).



After correction

- Fig. 3A: Both panels now correctly show Fasting Plasma Glucose (FPG) results.
- Fig. 3B: Both panels now correctly show Glycated Hemoglobin (HbA1c) results.



Instructions for authors

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The *Korean Journal of Community Nutrition* (KJCN), the official journal of the Korean Society of Community Nutrition, is a peer-reviewed, open access journal. It is published bimonthly in February, April, June, August, October and December. KJCN aims to publish original research articles and reviews covering all aspects of community nutrition. The journal also welcomes research notes and educational materials that provide a wide range of findings of community nutrition field. Topics of interest include nutrition throughout the life cycle, nutrition assessment, nutrition education, nutritional epidemiology, dietary behavior, clinical nutrition, international nutrition, nutrition policy, food service management, food culture and other topics related to the improvement of human nutritional status.

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   - The running head summarizing in Englisgh (50 characters or less including spaces)
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   - The names and affiliations, positions of all authors

A corresponding author should be marked with "†" at the end of the name. If some of the authors have different affiliations, superscript 1), 2), 3) should be placed at the end of each author's name in this order and the same number should be placed in front of the affiliation. 1), 2), 3) are attached in the same order, even if they belong to the same organization but have different positions.

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[3)]Student, Graduate School of Education, Keimyung University, Daegu, Korea
[4)]Student, OO High School, Daegu, Korea

- The name, address, telephone number, fax number, and email address of the corresponding author in English. Country code is also indicated for telephone and fax numbers.

<Example>
Kil-dong Hong
… … (address)
Tel: +82-2-749-0747
Fax: +82-2-749-0746
Email: kjcn45@koscom.or.kr

- ORCID (https//orcid.org/)
  All authors should register their affiliation and position at ORCID. When author identification is required, this information can be used. ORCID numbers of all authors should be indicated without blinding.

<Example>
Kil-Dong Hong https://orcid.org/****-****-****-****

• Funding
When there is no funding associated with the manuscript, “None” should be stated.

<Example>
This research was supported by a grant from the National Research Foundation of Korea (Grant No. ***).

3) Arrangement of research articles: Each manuscript should be divided into the following sections in the order: Title page, Abstract, Introduction, Methods, Results, Discussion, Conflict of Interest, Acknowledgments, References, followed by Tables and Figures. These section headings and subheadings should be written in English. In case of educational materials, the contents of the results and discussion can be composed of contents, evaluation, and implications. In the case of a review, unlike the structure of a research articles, it can be described as an introduction, body, and conclusion. However, a scoping review or a systematic review should follow the structure of the research articles.

The journal encourages authors to describe the study according to the reporting guidelines relevant to their research design, such as those outlined by the EQUATOR Network (http://www.equator-network.org/home/) and the United States National Institutes of Health/ National Library of Medicine (http://www.nlm.nih.gov/services/research_report_guide.html).

• Ethics Statement
Authors should present an “Ethics statement” immediately after the heading “Methods”. In case of reviews, research notes and educational materials, “Ethics statement” should be presented after introduction section.

<Example>
The informed written consent was obtained from each participant. The study protocol was approved by the Institutional Review Board of *** (approval number).]
<Example>
Obtainment of informed consent was exempted by the institutional review board.

• Study Design
Authors should present the study design (e.g., descriptive analysis, randomized controlled trial, cohort study, or meta-analysis) and any reporting guidelines referenced in the "Methods" section.

<Example>
This was a cross-sectional study. It was described according to the STROBE statement (https://www.strobe-statement.org/).

• Discussion
Authors should interpret the results and provide the Limitations and Conclusion in the latter part of the “Discussion” section.

• Conflict of Interest

<Example>
There are no financial or other issues that might lead to conflict of interest.
<Example>
Kildong Hong has been an editor since 2021. However, he was not involved in the review process of this manuscript. Otherwise, there was no conflict of interest.

• Acknowledgments
Describe the person who helped write the thesis or research but was not appropriate as an author.

<Example>
We thank the physicians who performed the sample collection.

• Data Availability
Authors should provide a data availability statement. Providing access to research data is optional.

<Example>
The data that support the findings of this study are openly available in [repository name e.g “KNHANES”] at http://doi.org/[doi].

4) Abstract: A structured abstract of 250~300 words must be written in English under the following headings: Objectives, Methods, Results, and Conclusion. Abstracts should be accompanied by keywords in English.

5) Keywords: A Three to five keywords are recommended with one or two words except for technical terms. The terminology should be listed, in principle, in MeSH (www.nlm.nih.gov/mesh/MBrowser.html). Keywords are written in lowercase letters except for proper nouns,

and keywords are separated by a semicolon (;).

6) **Abbreviations:** All abbreviations must be defined in parentheses at first mention in the text. Abbreviations used in a table or figure should be defined in their respective table footnote or figure legend.

7) **Numbers and measurements:** Numbers should be presented in Arabic numerals. For most measurements, the International System of Units (SI) is recommended. The unit symbol should be placed after the numerical value and a space should be left between the numerical value and the unit symbol except %, ˚C.

8) **References**

- References should be numbered consecutively in the order in which they appear in the text using Arabic numerals in brackets.
- When more than one reference is cited at the same point in the text, they are included in the same bracket as below.

<Example>
[1-3] or [4, 7]

- When the authors' names of the references are inserted in the text, the last names of the authors are given in English. When the reference has two authors, both authors' names should be joined by '&,' and when the reference has more than two authors, the first author's name should be given followed by *'et al'*.

<Example>
Kim [2], Park & Lee [5], Brown et al. [7]

- Reference list should be given in English in numerical order corresponding to the order of citation in the text.
- References should follow the National Library of Medicine (NLM) style guide (http://www.nlm.nih.gov/citingmedicine).
- Abbreviations of journal names should be written according to the international rules for the abbreviation (https://www.ncbi.nlm.nih.gov/journals) or KoreaMed (https://www.koreamed.org/JournalBrowserNew.php).
- Master's thesis and doctoral dissertation should be cited less than three.

(1) Journal articles

① *Published journal articles*

Authors. Article title. Journal title Year of publication; Volume(Issue): Start page-Last page.

<Example> Mo YJ, Kim SB. Sodium related recognition, dietary attitude and education needs of dietitians working at customized home visiting health service. Korean J Community Nutr 2014; 19(6): 558-567.

When an article has more than six authors, the names of the first six authors should be given followed by 'et al.'

<Example> Yon MY, Lee HS, Kim DH, Lee JY, Nam JW, Moon GI et al. Breast-feeding and obesity in early childhood - based on the KNHANES 2008 through 2011-. Korean J Community Nutr 2013; 18(6): 644-651.

② *Forthcoming journal articles*

Authors. Article title. Journal title Year of publication. Forthcoming.

<Example> Kim YS, Lee HM, Kim JH. Sodium-related eating behaviors of parents and its relationship to eating behaviors of their preschool children. Korean J Community Nutr 2015. Forthcoming.

(2) Books

① *Entire books*

Authors. Title. Edition. Publisher; Year of publication. p. Start page-Last page.

<Example> Park YS, Lee JW, Seo JS, Lee BK, Lee HS, Lee SK. Nutrition education and counselling. 5th ed. Kyomunsa; 2014. p. 32-55.

<Example> Ministry of Health and Welfare (KR), The Korean Nutrition Society. Dietary reference intakes for Koreans 2020: Minerals. Ministry of Health and Welfare; 2020. p. 25-46.

② *Book chapter*

Chapter authors. Chapter title. In: Editor names, editors. Book title. Edition. Publisher; Year of publication. p. Start page-Last page.

<Example> Tamura T, Picciano MF, McGuire MK. Folate in pregnancy and lactation. In: Bailey LB, editor. Folate in Health and Disease. 2nd ed. CRC press; 2010. p. 111-131.

③ *Translated books*

Translators. Translated title(translated version). Edition. Original language originally written by authors. Publisher; Year of publication. p. Start page-Last page.

<Example> Mo SM, Kwon SJ, Lee KS. Do you know dining table of children? (translated version). 1st ed. Japanese original written by Adachi M. Kyomunsa; 2000. p. 20-22.

(3) Scientific reports

Authors. Report title. Performing organization; Year of publication Month of publication. Report No. Report number.

<Example> Lee YM. A study on development of food safety and nutrition education program for preschooler. Ministry of Food and Drug Safety; 2013 Nov. Report No. 13162consumer110.

(4) Thesis and dissertaion

Author. Title. [Book type]. Publisher; Year of publication. master's thesis for master degree, dissertation for doctoral degree

<Example> Ahn SY. The perception of sugar reduction in nutrition teachers or dieticians in charge of school meals and their use of added sugar in Seoul. [master's thesis]. Sookmyung Women's University; 2014.

(5) Conference papers

Authors of paper. Title of paper. Proceedings of Conference title; Year Month Day; Place of conference: p. Start page-Last page.

<Example> Shim JE. Infant and child feeding practices for development of healthy eating habits. Proceedings of 2014 Annual Conference of the Korean Society of Community Nutrition; 2014 Nov 14; Seoul: p. 195-213.

(6) Articles in magazine or newspaper

① *Magazine articles*

Author. Article title. Magaxine title. Year Month: Page.

<Example> Lee BM. Nutrition treatment of hereditary metabolic diseases. Nutrition and Dietetics. 2013 Dec: 12-19.

② *Newspaper articles*

Author or Organization. Article title. Newspaper title. Year Month Day; Section: Page.

<Example> Lee JH. Sodium reduction need to readjust policy. Food and Beverage News. 2014 Sep 29; Sect. A: 1.

(7) Materials on the internet

① *Web sites*

Author or Organization. Title [Internet]. Publisher; Year [cited Year Month Day]. Available from: electronic address

<Example> The Korean Society of Community Nutrition. Nutrient story [Internet]. The Korean Society of Community Nutrition; 2007 [cited 2015 May 12]. Available from: http://www.dietnet.or.kr/

② *Web page*

Author or Organization. Title [Internet]. Publisher; Year [updated Year Month Day; cited Year Month Day]. Available from: electronic address

<Example> Ministry of Food and Drug Safety. Winter food poisoning, be careful of norovirus [Internet]. Ministry of Food and Drug Safety; 2014 Nov 14 [updated 2014 Dec 11; cited 2015 Feb 1]; Available from: http://www.mfds.go.kr/fm/article/view.do?articleKey=1245&searchTitleFlag=1&boardKey=4&menuKey=167&currentPageNo=1

9) Tables and Figures: Tables and Figures must be written in English, and limited to a maximum of 10 altogether. Each table and figure should be prepared on a separate page and placed at the end of the text according to the order cited in the text. Citation of tables or figures in the text is as Table 1 or Fig. 1. Vertical lines are not used in tables. A title should be placed at the top of a table or at the bottom of a figure. The footnotes of the table are presented on Arabic numerals as superscripts 1), 2), 3). In case of indicating levels of significance, *P*-values should be presented in the body of each table, and if necessary, symbols can be used as *, **, ***, etc. To indicate the result of multi-range tests, letters such as a, b, c, etc. can be used.

9. PUBLICATION

Once the review process is completed, the manuscript cannot undergo any modifications in their contents or changes of the authors. PDF page proofs will be emailed

to the corresponding author and should be returned within 3 days. The author pays the publication fee for the published paper, including manuscript editing fees, reference proofreading fees, and file processing fees. Authors who choose to withdraw a manuscript after it has undergone peer-review will be charged the review fee.

Any issues not indicated in these instructions will be reviewed and decided by the Editorial Committee. Any additional questions or information on manuscript submission and publication can be clarified by contacting the editorial office.

Address: 904 Hyundai Hyel, 213-12, Saechang-ro, Yongsan-gu, Seoul 04376, Korea
Tel: +82-2-749-0747
Fax: +82-2-749-0746
Email: kjcn45@koscom.or.kr

The code of research ethics of the Korean Society of Community Nutrition

Enactment Jan 21, 2008
1st revision April 19, 2010
2nd revision March 28, 2014
3rd revision February 28, 2020

I. GENERAL RULES

1. Title

This code is titled as 'The Code of Research Ethics of the Korean Society of Community Nutrition.'

2. Purpose

The purpose of the code is to establish the standard for the research ethics observed by the members of the Korean Society of Community Nutrition and the contributors to the Korean Journal of Community Nutrition, and determine the establishment and operation of the Committee on the Research Ethics (hereafter the 'Committee') for fair and systematic verification in the case of the scientific misconduct.

II. ETHICS CODE FOR A RESEARCHER

3. Integrity of Researcher

A researcher should conduct research and publish research results with research integrity.

4. Inclusion of Scientific Misconduct

(1) Fabrication refers to the act of creating, documenting, or reporting the data or the research results that do not exist.
(2) Falsification refers to the act of creating the documentation that do not match study results by manipulating the research materials, equipment, or procedures or changing or omitting data or research results.
(3) Plagiarism refers to steal others' ideas, procedures, results, or records without legitimate authorization.
(4) The improper authorship refers to the act which confers authorship on the person without any academic contribution due to gratitude or seniority, or does not reward with authorship without proper cause to the person who academically contributes or devotes the research contents or results.
(5) It includes the acts which seriously exceed generally accepted criteria.

5. Prohibition of Duplicate Submission or Duplicate Publication of Research Product

A researcher should not submit or publish the same research results in two different places.

6. Authorship

Contributors who have made substantive intellectual contributions to a paper are given credit as author and authorship is based on the following four criteria.
(1) Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
(2) Drafting the work or reviewing it critically for important intellectual content; AND
(3) Final approval of the version to be published; AND
(4) Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

7. Record of Published Work

(1) An author should accept the credit for only the accomplishments of the research he/she conducted or contributed to and take responsibility for them.

(2) The order of the authors (including translators) of articles or other publications should be determined with fairness according to the extent of the contribution to research regardless of relative positions. Simply being in a particular position should not guarantee a credit as a co-author, the first author, or a corresponding author. Neither the act of not crediting the sufficient contribution to research with authorship can be justified. When the contribution to research is low, a statement of appreciation is expressed in a footnote, a preface, or an acknowledgement.

8. Citation and Reference

(1) An author who cites academic materials should make efforts to describe them accurately and state their sources clearly. The materials that are obtained from personal communication can be cited with the permission from the researcher who provides information.

(2) When an author cites or makes a reference to others' words, he/she should state the fact in a footnote, and distinguish them from his/her original thoughts or results of interpretation.

9. Role and Ethics for a Journal Editor

(1) An editor should request a reviewer with expertise in the field, objectivity, and impartial judgment for the evaluation of submitted manuscripts.

(2) An editor should not disclose the information about the author or the content of the manuscript until the submitted manuscript is decided to be published.

10. Role and Ethics for a Reviewer

(1) A reviewer should evaluate the manuscript under review with commitment and impartiality within a specified period and notify a journal editor of results.

(2) A reviewer should notify a journal editor immediately of the intention to resign from reviewing a manuscript when he/she believes oneself to be unsuitable for reviewing the manuscript.

(3) A reviewer should evaluate a manuscript with objective criteria and impartiality without consideration of one's academic beliefs or personal relationship with its author. A reviewer should not reject a manuscript without logical reasons or on the reason that it is in conflict with his/her own view or interpretation, and rate a manuscript without reading it thoroughly.

(4) A reviewer should respect an author's personality and individuality as an intellectual and use comments in a polite and gentle manner as much as possible, and should not use degrading or insulting expressions.

(5) A reviewer should maintain confidentiality of a manuscript under review and should not cite the content of a manuscript prior to its publication.

III. ESTABLISHEMENT AND OPERATION OF THE COMMITTEE

11. Function of the Committee

The Committee reviews and decides the issues below related to the research ethics of the members of the Korean Society of Community Nutrition.

1. The establishment of the research ethics
2. The prevention and investigation on the scientific misconduct
3. Whistleblower protection and confidentiality
4. Verification on the violation of the research ethics, process of the verification results and follow-up measures
5. Restoration in the honor of the examinee
6. Other issues imposed by the chair of the Committee

12. Organizing Principles of the Committee

The Committee consists of 5 members. The committee is chaired by the President of the Society and the Editor-in-chief serves as the associate chair of the committee. The other three are appointed by the President of the Society with the recommendation from the Executive Board.

13. Report and Receipt of the Scientific Misconduct

The whistle-blower may provide the information to the secretariat of the editorial board in the Korean Society of Community Nutrition directly or through the telephone, written document or e-mail on the real name. However, if the contents and evidence of the misconduct are specific, the report provided by an anonymous informant is considered as the case by the real-name person.

14. Authority for Verification and Recommendation of the Committee

The Committee is authorized to conduct an investigation about the allegation of the violation of the ethics code using a wide range of evidence from informants, the person under investigation, witnesses, and reference materials. The committee reviews and decides the status of violation of the ethics code based on the results of investigation, and recommends appropriate sanctions to the president based on the decision.

15. Verification Process of the Committee

The verification process for the act of violation of research ethics proceeds in the order of preliminary inquiry, investigation, and judgment. The investigation should be completed within 6 months. However, when the investigation is unlikely to be completed within the time frame, the investigation period may be extended with the committee chair's approval. When an informant or the person under investigation disagrees with the decision, he/she may file an appeal within 30 days from receiving notification, and the Committee may conduct reinvestigation if necessary.

16. Assurance of Opportunity to Be Heard

The member who is alleged to violate the Code of Research Ethics should be given a written notice of the overview of the issue under investigation. He/she is guaranteed to have an opportunity to submit a letter of explanation, and as long as he/she whishes, an opportunity to attend one or more of the Committee meetings in the investigation procedure and provide an oral explanation.

17. Confidentiality Duty for a Member of the Committee

A member of the Committee shall not disclose the identification of the reporter and the member suspected of the research ethics violation until the final decision is confirmed by the society.

18. Disciplinary Procedures and Content

In the event of proposed disciplinary measures by the Ethics Committee, the committee chair convenes the Executive Board and makes a final decision on the status and the content of discipline. The member who is determined to have violated the Code of Research Ethics may be given disciplines including warning, ban on manuscript submission for a specified period, and suspension or cancellation of membership depending on the severity of the issue, and the article may be retracted and the results may be disclosed if necessary.

19. Revision of the Code of Research Ethics

Revision procedure of the Code of Research Ethics follows the revision procedure of the code of the Society.

Author's checklist

Revised in October 15, 2024

Authors' quick submission checklist

(※ Please include the checklist when submitting the manuscript to the submission site.)

Category		Items to review	Check
Title page	1. Title	- Spelling and typographical errors in paper titles. - Titles should be written in sentence case, with only the first word of the text and proper-nouns capitalized. The study design should be included in the title or subtitle. e.g., Development and Effectiveness Evaluation of the STEAM Education Program on Food Groups for Kindergarteners -> Development and effectiveness evaluation of the STEAM education program on food groups for kindergarteners: a non-randomized controlled study e.g., Program Evaluation using the RE-AIM Framework: A Systematic Review and Application to a Pilot Health Promotion Program for Children -> Evaluation of the pilot health promotion program for children: a systematic review	
	2. Author Information	- Include all author titles and affiliations, and indicate the position before the affiliation	
	3. Submission	- The title page, the copyright transfer agreement, and IRB approval are all included when submitting your paper to the submission site by uploading them to the 'Attachment' section. - Remove the cover page including author information from the submitted paper before submitting	
	4. ORCID	- ORCID should be stated for all authors e.g., Gildong Hong: https://orcid.org/https://orcid.org/0000-0000-0000-0000	
	5. Funding	e.g., This research was supported by a grant from the National Research Foundation of Korea (Grant No. 000). - When there is no funding associated with the manuscript, 'None.' should be stated.	
Abstract	1. Structure	- Objectives-Methods-Results-Conclusion	
	2. Keywords	- Three to five keywords are recommended with one or two words except for technical terms. - The terminology should be listed, in principle, in MeSH (www.nlm.nih.gov/mesh/MBrowser.html). - Keywords are written in lowercase letters except for proper nouns, and keywords are separated by a semicolon (;).	
	3. Abbreviations	- Abbreviations should only be used if they are repeatedly used throughout the abstract. If an abbreviation is not used after it has been defined, use the full name instead - Define an abbreviation the first time it appears in the abstract	
Main body	1. Structure	- Title page, Abstract, Introduction, Methods (including ethics statement), Results, Discussion, Conflict of Interest, Acknowledgments, Data Availability References, Tables, and Figures - Include 'Study Design' in Method, subheadings in Results, and 'Limitations' and 'Conclusion' in Discussion - Upload tables and figures as a single file and do not separate them	
	2. Statistical software	- Enter the correct type and version of statistical software e.g., IBM SPSS Statistics 25 (IBM Corp.) e.g., SAS 9.4 (SAS Institute)	
	3. Ethics Statement	- Authors should present an "Ethics Statement" immediately after the heading "Methods". In case of reviews, research notes and educational materials, "Ethics statement" should be presented after introduction section e.g., The informed written consent was obtained from each participant. The study protocol was approved by the Institutional Review Board of *** (approval number: ***). *IRB approval statement will be included in the final version, but do not include specific IRB information (e.g., institution name) when submitting. e.g., Obtainment of informed consent was exempted by the institutional review board.	

(continued to the next page)

(Continued)

Category		Items to review	Check
	4. Conflict of Interest	- Conflict of interest must be stated. e.g., There are no financial or other issues that might lead to conflict of interest. e.g., Gildong Hong has been an editor since 2021. However, he was not involved in the review process of this manuscript. Otherwise, there was no conflict of interest. *Author information will be included in the final version but do not include it when submitting.	
	5. Acknowledgments	- List individuals who contributed to the writing or research, but do not meet the criteria for authorship. e.g., We thank the physicians who performed the sample collection. *This information will be included in the final version, but do not include it when submitting.	
	6. Data Availability	- Authors should provide a data availability statement. Providing access to research data is optional. e.g., The data that support the findings of this study are openly available in [repository name e.g "KNHANES"] at http://doi.org/[doi].	
	7. References	- Notation method: [1], [2, 5], [15-20], etc. without spaces before square brackets, when adding commas between references, add a space after commas. e.g., research on something [1] or Kim & Lee's research [2, 5] - References in the text should be listed in numerical order - The number of citations for the type of dissertation should not exceed 3. - Verify that the reference adheres to the KJCN guidelines	
	8. Other indications such as units	- Write numbers and units with a space (50 kg, 600 kcal), but attach % and °C. - g/dl (X), g/dL (O) - When indicating P-value, use capital, italic P: e.g., *P*-value - Use a en-dash "–" to indicate a range of numbers: e.g., 20–25 - Use comma notation to separate thousands (this also applies to text and tables): For example, 65,450,000.	
	9. Tables, figures	- Capitalize only the first letter of table and figure titles - Capitalize only the first letter of variables in the table - Use lowercase 'n' in tables and figures. - Additional checklists for tables and figures can be found in the section below.	

*Examples shown in the tables are based on recent publication, 2024.

GUIDELINE FOR TABLES AND FIGURES

Please adhere the following guidelines for tables and figures.

1. To indicate the total number of items outside of the table's body, include it in parentheses at the end of the table's title. For example, "Sociodemographic characteristics of children (n = 80)"
2. The table heading should provide a descriptive title for the values presented, rather than simply using "Mean ± SD" as the title.
3. When describing the contents of the table in the text:
   ① To present an average value, use Mean ± SD or Mean ± SE, and be mindful of spacing (e.g., 22.0 ± 2.3, with a space before and after the '±' symbol)
   ② Units should be written in parentheses within the table (e.g., Energy (kcal/day)) instead of next to it (Energy, kcal/day)
4. Footnotes or legends explanations for tables or figures should be written in English
5. The footnotes or legends should be arranged in the following order: Values displayed as statistical outcomes, statistical analysis method, indication of significance, etc.
   ① The presentation of values of statistical outcomes, such as n (%), Mean ± SD, n (%) or Mean ± SD, etc, are displayed in the first line of the footnote without comment numbers.
   ② Statistical analysis method and significance indication - Both statistical analysis methods and significance are discussed. - Post-hoc analysis results can only be presented when the ANOVA test yields significant results.
   ③ The full name of any abbreviations used in the title or table body should be provided in the footnote.
   ④ Any other content that requires explanation should be accompanied by corresponding comment numbers, following the submission guidelines. Verify that the comment numbers match the numbers indicated in the table body.

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투고규정

KJCN
Korean Journal of Community Nutrition

(2024년 10월 15일 개정)

1. 학회지의 특성

본 학회지는 대한지역사회영양학회의 학술지로서, 전문가 심사를 거친 논문만을 게재하고, 논문 전문은 학회 홈페이지를 통해 공개된다. 학회지는 2개월마다(2월, 4월, 6월, 8월, 10월, 12월) 발행되며, 발행일은 발간월의 마지막날이다. 생애주기영양, 영양판정, 영양교육, 영양역학, 식행동, 임상영양, 국제영양, 영양정책, 급식및 외식 관리, 식문화와 기타 지역사회영양학 분야의 연구논문(research articles), 종설(reviews), 연구단보(research notes), 교육자료(educational materials) 등을 게재할 수 있다.

2. 투고 자격

저자 중 적어도 1명이 대한지역사회영양학회 회원이어야 투고할수 있으며, 비회원의 경우 편집위원회에서 위촉 또는 국외 기관에 소속된 저자가 투고할 시 가능하다.

3. 원고의 종류

1) **연구논문:** 지역사회영양학 분야의 새로운 논문
2) **종설:** 특정 주제에 대하여 간결하고 정확하게 최신문헌 및 견해를 기술한 논문, 체계적인 문헌고찰은 PRISMA 가이드라인을 따라야 함
3) **연구단보:** 지역사회영양학과 관련된 새로운 아이디어, 연구방법, 정책적 이슈 등에 대한 토의 보고
4) **교육자료:** 영양교육 프로그램의 내용과 활용, 또는 새로운 교육 접근방법 등에 관한 논문

4. 연구 및 출판윤리

1) **이중게재:** 원고는 다른 학회지에 발표되거나 투고되지 않은것이어야 한다.
2) **저자됨:** 원고의 저자는 연구설계, 자료 수집 및 분석, 원고 작성에 기여를 하고, 연구와 관련된 문제의 조사와 해결에 책임을 다할 것을 동의한 자이어야 한다.
3) **피험자 보호:** 연구의 대상이 사람인 경우 헬싱키 선언에 입각하여 피험자를 보호하여야 하며, 연구를 수행하기 전 기관생명윤리위원회(Institutional Review Board; IRB)의 승인을 받아야 한다.
4) **이해관계:** 연구를 지원하는 회사나 기관과 경제적 또는 개인적 관계가 있는 경우 이를 논문에 명백하게 기술해야 한다.
5) **윤리규정 준수:** 저자는 본 학회 연구윤리규정을 준수하여야 하며, 본 규정에 언급되지 않은 연구 및 출판윤리에 대해서는 국제표준출판윤리규정(http://publicationethics.org/international-standards-editors-and-authors)을 적용한다.
6) **저작권:** 본 학회지에 게재된 논문의 저작권은 본 학회에 귀속된다. 논문투고시 모든 저자는 저작권이전동의서에 사인하여 제출해야 한다.
7) **프리프린트(preprint):** 본 학회지는 프리프린트로 사전 공유된 연구논문을 허용하지 않는다.

5. 성(SEX)/젠더(GENDER)에 대한 고려

논문에서 결과에 영향을 줄 수 있는 인자로 생물학적 성(sex) 또는 사회문화적 성인 젠더(gender)를 인식하고 이에 대한 아래 내용을 논문에 포함하여야 한다.

- 성별 기술에서 성(sex)과 젠더(gender)를 구분하여 올바르게 기술한다.
- 연구 대상에 남성과 여성을 대상으로 포함하여 연구하고 그 결과를 비교분석하여 논문을 발표한다.
- 단일 성을 대상으로 연구한 경우는 학술적으로 타당한 근거를 제시한다.

6. 논문투고

교신저자는 온라인투고시스템(https://submit-kjcn.or.kr)으로 저자정보가 삭제된 원고파일을 제출한다. 저자정보가 포함 된 표지, 모든 저자의 서명이 작성된 IRB 승인서 사본, 저자체크리스트는 온라인 투고사이트 '첨부파일'에 업로드 한다.

7. 전문가 심사

편집위원장 또는 편집위원은 저자정보가 삭제된 투고논문을 두 명의 전문가에게 심사하도록 보내고, 심사자는 대한지역사회영양학회지의 심사규정에 따라 심사한다. 편집위원장은 심사자의 의견에 따라 첫 번째 결정을 내리고 6주 안에 교신저자에게 알린다.

두 명의 심사자의 의견이 다를 때에는 또 다른 심사자에게 심사하도록 한다.

8. 원고 작성법

1) 원고 작성: 원고는 MS 워드를 사용하여 한글 또는 영문으로 작성한다. 글자 크기는 11 point, 행간은 200% 또는 2줄 간격으로 하며, 영문 글꼴은 Times New Roman으로 한다. 영문초록을 1쪽으로 하여 쪽번호를 표기하며, 원고 왼쪽 여백에 줄 번호를 매긴다.

2) 표지: 다음의 내용을 포함한다.

- 원고의 종류(연구논문, 종설, 연구단보, 교육자료)
- 압축한 제목(Running head)은 공백 포함 50자 이내의 영문으로 기재
- 제목을 국문논문은 국문과 영문 모두 기재, 영문논문은 영문만 기재
- 영문 제목은 기본적으로 소문자로 작성(단, 문장의 첫 단어와 고유 명사는 대문자로 작성). 관찰 연구(단면조사연구, 환자-대조군 연구 또는 전향적 코호트 연구), 임상 연구, 체계적 문헌고찰 또는 메타 분석의 경우 제목 또는 부제목에 연구디자인 제시
- 저자, 소속 및 직위를 국문과 영문으로 기재, 단 영문논문의 경우 영문으로만 기재

  교신저자 이름 뒤에는 "†" 표시를 윗첨자로 하여 붙이고, 소속기관이 다를 경우는 저자이름 끝에 1), 2), 3)을 윗첨자로 하여 순서에 따라 붙이고, 해당인의 소속기관명 앞에 같은 숫자를 붙인다. 소속이 같으나, 직위가 다를 경우에도 1), 2), 3)을 윗첨자로 하여 순서에 따라 붙인다. 연구자의 직위(교수, 강사, 학생, 연구원 등)는 영문의 경우 소속 앞에 기재한다. 소속과 직위가 없는 경우에는 이름만 기재한다. 현재 소속이 없는 미성년자의 경우 최종 소속, 직위, 재학년도를 별도로 제출한다.

〈예〉

Youngok Kim[1)], Jin-Sook Yoon[2)†], Kil-dong Hong[3)], Na-ra Kim[4)]

[1)]Professor, Department of Food and Nutrition, Dongduk Women's University, Seoul, Korea

[2)]Professor, Department of Food and Nutrition, Keimyung University, Daegu, Korea

[3)]Student, Graduate School of Education, Keimyung University, Daegu, Korea

[4)]Student, OO High School, Daegu, Korea

- 교신저자의 성명, 주소 및 전화번호, 팩스번호, 전자우편주소를 영문으로 기재. 전화와 팩스번호는 국가코드도 표기

〈예〉

Kil-dong Hong

… …(주소표기)

Tel: +82-2-749-0747

Fax: +82-2-749-0746

Email: kjcn45@koscom.or.kr

- ORCID (https//orcid.org/)

  모든 저자는 ORCID 등록시 소속과 직위를 등록해야하며, 이는 추후 저자신분 확인이 필요할 경우 자료로 활용할 수 있다. 모든 저자의 ORCID 번호를 블라인드 없이 표기하며, 그 예는 다음과 같다.

〈예〉

Kil-Dong Hong https://orcid.org/****-****-****-****

- 연구지원내역(Funding)

  해당하는 내용이 없더라도 'None.' 으로 기재한다.

〈예〉

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3) 원고의 구성: 원고의 부제목은 모두 영문으로 작성하고, 구성은 다음과 같다. Title page, Abstract, Introduction, Methods, Results, Discussion, Conflict of Interest, Acknowledgments, Data Availability, References, Tables, Figures 순으로 한다. 단, 교육자료의 경우 결과와 고찰의 내용을 콘텐츠(Contents), 평가(Evaluation), 시사점(Implications) 등의 내용으로 구성할 수 있다. 종설의 경우 연구논문의 구성과 달리 서론, 본론, 결론의 구성으로 기술할 수 있다. 그러나 주제범위 고찰(scoping review)이나 체계적 고찰(systematic review)은 연구논문의 구성을 따라야 한다.

  본 학회지는 EQUATOR 네트워크(http://www.equator-network.org/home/)와 미국국립보건원/국립의학도서관(http://www.nlm.nih.gov/services/research_report_guide.html)에서 안내하는 보고지침에 따라 원고를 구성하도록 권장한다.

- 연구윤리(Ethics Statement)

저자는 "방법(Method)" 연구윤리에 관해 영문으로 기술해야 한다. 부제목 바로 아래에 제시하며 종설, 연구노트, 교육자료 등의 경우에는 서론 뒤(본론 전)에 제시한다.

〈예〉
The informed written consent was obtained from each participant. The study protocol was approved by the Institutional Review Board of *** (approval number: IRB승인번호).
〈예〉
Obtainment of informed consent was exempted by the institutional review board.

• 연구설계(Study design)
저자는 "방법(Methods)" 연구설계에 연구설계(기술분석, 무작위 대조연구, 코호트 연구 또는 메타 분석 등) 및 참고한 보고지침을 제시한다.

〈예〉 This was a cross-sectional study. It was described according to the STROBE statement (https://www.strobe-statement.org/).

• 고찰(Discussion)
저자는 결과를 해석하고 "고찰(Discussion)"의 후반부에 Limitations 및 Conclusion을 제시한다.

• 이해상충(Conflict of Interest)

〈예〉
There are no financial or other issues that might lead to conflict of interest.
〈예〉
Kildong Hong has been an editor since 2021. However, he was not involved in the review process of this manuscript. Otherwise, there was no conflict of interest.

• 감사의 글(Acknowledgments)
논문작성이나 연구를 도왔지만 저자로서 적절하지 않은 분 등을 기술한다.

〈예〉
We thank the physicians who performed the sample collection.

• 데이터가용성(Data Availability)
저자는 데이터가용성에 대한 설명을 작성해야하며, 데이터에 대해 접근을 허용하는 것은 선택사항이다.
〈예〉
The data that support the findings of this study are openly available in [repository name e.g "KNHANES"] at http://doi.org/[doi].

4) **영문초록:** 영문초록은 목적(Objectives), 연구방법(Methods), 결과(Results), 결론(Conclusion)의 소제목으로 구분하여 250~300단어로 작성한다. 초록 아래쪽에 주제어(Keywords)를 영문으로 표기한다.
5) **키워드:** 전문 용어를 제외한 1~2개의 단어로 구성된 3~5개의 키워드를 기재한다. 해당 키워드는 MeSH(https://meshb.nlm.nih.gov/search) 에 검색되는 단어로 작성한다. 키워드는 고유명사를 제외하고 모두 소문자로 표기하며, 구분 기호는 세미콜론(;)으로 작성한다.
6) **약어:** 제일 처음 나오는 곳에 완전한 이름을 먼저 표기한 후 괄호 안에 약어를 표기하며, 표 또는 그림에 사용된 약어는 각주 또는 그림 설명에서 설명한다.
7) **수량 및 단위:** 수량은 아라비아 숫자로, 도량단위는 SI 단위를 권장한다. %, ℃를 제외한 모든 단위는 숫자와 띄어쓴다.
8) **참고문헌**
• 본문 중에는 인용된 순서대로 [ ] 안에 번호로 기재한다.
• 본문의 한 문장에서 여러 개의 참고문헌을 인용할 때에는 다음과 같이 기재한다.

〈예〉 Kim [3]은, Park & Lee [5]는, Brown 등[7]은

• 본문 중에 참고문헌의 저자를 기재하는 경우 영문 last name을 표기한다. 저자가 2명일 경우에는 두 저자 사이에 &를 삽입하고, 3인 이상일 때는 제1저자만 표기하고 "등"을 쓴다.

〈예〉 Kim [3]은, Park & Lee [5]는, Brown 등[7]은

• 참고문헌 목록은 인용된 순서에 따라 아라비아 숫자와 함께 영문으로 표기한다.
• The National Library of Medicine (NLM) 표준체제(http://www.nlm.nih.gov/citingmedicine)를 따라 작성한다.
• 학회지명은 약어로 표기하되 국제 약어 관례(PubMed 등재지 검색 사이트 http://www.ncbi.nlm.nih.gov/journals) 또는 KoreaMed 등재지 검색 사이트(http://www.koreamed.org/JournalBrowserNew.php)를 참고한다.
• 학위논문은 필요한 경우 3개 이내로 인용한다.

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9) 표 또는 그림

표와 그림은 영문으로 작성하며, 합하여 10개 이내로 하고, 한 장에 하나씩 작성하여 인용된 순서대로 본문 뒤에 첨부한다. 본문에 인용할 때는 Table 1 또는 Fig. 1 등으로 표기한다. 표 작성 시에는 종선은 사용하지 않는 것을 원칙으로 하며, 표의 제목은 표의 상단에, 그림의 제목은 그림의 하단에 기재한다. 각주는 $^{1), 2), 3)}$ 등으로 나타내고 하단에 그 내용을 표시한다. 단, 통계분석의 유의성 표시는 표 본문에 *P*-values를 제시하는 것으로 하고, 필요한 경우 $^{*, **, ***}$ 등으로, 다중 범위 검정에서는 $^{a, b, c}$ 등으로 사용한다.

9. 출판

심사가 끝난 논문은 내용이나 저자를 바꿀 수 없다. 교신저자는 교정본 PDF 파일을 e-mail로 받으면 3일 이내에 교정하여 보내야 한다. 원하는 저자에 한하여 게재된 논문의 별쇄본 20부를 제공한다. 저자는 게재된 논문의 게재료로 원고 편집비, 참고문헌 교정비, 파일 가공비 등 소요되는 비용을 부담한다. 단, 심사과정이 시작된 이후 논문을 철회한 경우에는 논문의 심사 단계에서 발생한 심사료 비용을 부담한다. 본 규정에 명시되지 아니한 사항은 편집위원회의 심의를 거쳐 결정한다.

논문투고와 출판 관련 모든 문의사항은 편집사무실로 연락한다.

주소: 서울시 용산구 새창로 213-12, 현대하이엘 904호
전화: 02-749-0747
팩스: 02-749-0746
이메일: kjcn45@koscom.or.kr

대한지역사회영양학회지 연구윤리규정

제정 2008. 1. 21
1차 개정 2010. 4. 19
2차 개정 2014. 3. 28
3차 개정 2020. 2. 28

제1장 총칙

제1조 (명칭)
이 규정은 “대한지역사회영양학회 연구윤리규정”이라 한다.

제2조 (목적)
이 규정은 대한지역사회영양학회 회원 및 대한지역사회영양학회지 투고자가 지켜야 할 연구윤리의 기준을 확립하고, 연구부정행위 발생 시 공정하고 체계적인 검증을 위한 연구윤리위원회(이하 “위원회”라 한다)의 설치 및 운영에 관한 사항을 규정함을 목적으로 한다.

제2장 연구자의 윤리규정

제3조 (연구의 진실성)
연구자는 연구의 진실성을 준수하여 연구를 수행하고 그 결과를 발표하여야 한다.

제4조 (연구부정행위의 범위)
연구부정행위는 다음 각 호와 같다.
1. 위조란 존재하지 않는 데이터나 연구 결과를 만들어 내고 이를 기록하거나 보고하는 행위를 의미한다.
2. 변조란 연구자료, 장비 또는 과정을 조작하거나, 데이터나 연구 결과를 변경하거나 생략하여 연구 기록이 연구결과와 부합하지 않게 하는 행위를 의미한다.
3. 표절이란 정당한 권한 없이 타인의 아이디어, 과정, 결과 또는 기록을 도용하는 것을 의미한다.
4. 부당한 논문저자 표시란 연구내용 또는 결과에 대하여 학문적으로 공헌 또는 기여를 한 사람에게 정당한 이유없이 논문저자 자격을 부여하지 않거나, 학문적으로 공헌 또는 기여를 하지 않은 자에게 감사의 표시 또는 예우 등을 이유로 논문저자 자격을 부여하는 행위를 말한다.
5. 기타 통상적으로 용인되는 범위를 심각하게 벗어난 행위를 포함한다.

제5조 (연구물의 중복 투고 및 이중 게재금지)
연구자는 연구결과를 중복 투고 및 이중 게재 하지 않아야 한다.

제6조 (저자됨)
저자는 출판하는 논문의 연구에 지적인 공헌을 한 자로서 다음 각 호의 자격을 모두 충족하여야 한다.
1. 연구의 구상이나 설계 또는 자료의 수집이나 분석이나 해석을 하는 데 있어서 상당한 공헌을 한 자
2. 논문의 초안을 작성하거나 주요 내용을 검토한 자
3. 출간될 원고를 최종 승인한 자
4. 연구의 정확성이나 무결성과 관련된 문제를 적절히 조사하고 해결하는 것에 책임이 있음을 동의한 자

제7조 (출판 업적의 명기)

① 저자는 자신이 행하거나 기여한 연구에 대해서만 업적을 인정받으며 그에 대한 책임을 진다.

② 논문이나 기타 출판의 저자(역자 포함)의 순서는 상대적 지위에 관계없이 연구에 기여한 정도에 따라 공정하게 정해져야 한다. 단순히 특정 직책으로 인하여 공동저자, 제1저자, 또는 교신저자가 될 수 없다. 연구에 충분히 기여했음에도 저자로 인정되지 않는 행위 또한 정당화될 수 없다. 연구에 대한 기여도가 낮을 경우 각주, 서문, 사의 등에서 사사의 글로 표시한다.

제8조 (인용 및 참고 표시)

① 저자가 학술 자료를 인용할 경우에는 정확하게 기술하도록 노력해야 하고 출처를 명확히 밝혀야 한다. 개인적인 접촉으로 얻은 자료의 경우에는 정보를 제공한 연구자의 동의를 받은 후 인용할 수 있다.

② 저자가 타인의 글을 인용하거나 참고할 경우에는 각주를 통해 인용 및 참고 여부를 밝혀야 하며, 선행연구의 결과인 부분과 저자의 독창적인 견해 또는 해석의 결과인 부분이 구분될 수 있도록 하여야 한다.

제9조 (논문 편집위원회의 역할및 윤리)

① 편집위원은 투고된 논문을 해당 분야의 전문적 지식과 객관적이고 공정한 판단 능력을 지닌 심사위원에게 평가 하도록 의뢰하여야 한다.

② 편집위원은 투고된 논문의 게재가 결정될 때까지는 저자에 대한 사항이나 논문의 내용을 공개하지 않아야 한다.

제10조 (논문 심사위원의 역할및 윤리)

① 심사위원은 심사 대상 논문을 심사규정이 정한 기간 내에 성실하고 공정하게 평가하고 결과를 편집위원에게 통보하여야 한다.

② 심사위원은 자신이 논문의 내용을 평가하기에 적임자가 아니라고 판단될 경우에는 편집위원에게 즉시 사퇴의사를 통보하여야 한다.

③ 심사위원은 심사 대상 논문을 개인적인 학술적 신념이나 저자와의 사적인 친분 관계를 떠나 객관적 기준에 의해 공정하게 심사하여야 한다. 충분한 근거를 명시하지 않은 채 논문을 탈락시키거나, 심사자 본인의 관점이나 해석과 상충된다는 이유로 논문을 탈락시켜서는 안 되며, 심사 대상 논문을 제대로 읽지 않은 채 평가하지 않아야 한다.

④ 심사위원은 전문 지식인으로서의 저자의 인격과 독립성을 존중하여야 하고, 평가의견은 가급적 정중하고 부드러운 표현을 사용하며 저자를 비하하거나 모욕적인 표현을 해서는 안 된다.

⑤ 심사위원은 심사 대상 논문에 대한 비밀을 지켜야 하며, 논문이 게재된 학술지가 출판되기 전에 논문의 내용을 인용해서는 안 된다.

제3장 연구윤리위원회의 설치와 운영

제11조 (위원회의 기능)

위원회는 대한지역사회영양학회 회원의 연구윤리와 관련된 다음 각 호의 사항을 심의, 의결한다.

1. 연구윤리 확립에 관한 사항
2. 연구부정행위의 예방, 조사에 관한 사항
3. 제보자 보호와 비밀유지에 관한 사항
4. 연구윤리 위반 검증 및 검증결과 처리와 후속조차에 관한 사항
5. 피조사자 명예회복 조치에 관한 사항
6. 기타 위원회 위원장이 부여하는 사항

제12조 (위원회의 구성)

위원회는 위원 5인 이상으로 구성하며, 위원장은 학회장으로 하고 부위원장은 편집위원장으로 하며 그 외 3인은 상임 이사회의 추천을 받아 학회장이 임명한다.

제13조 (연구부정행위의 제보 및 접수)

제보자는 대한지역사회영양학회 편집위원회 사무국에 직접 또는 전화, 서면, 전자우편 등으로 제보할 수 있으며 실명으로 제보해야 한다. 단, 익명제보라 하더라도 구체적인 연구부정행위의 내용과 증거를 포함하여 제보한 경우 이를 실명제보에 준한다.

제14조 (위원회의 검증 및 심의 권한)
위원회는 윤리규정 위반으로 보고된 사안에 대하여 제보자, 피조사자, 증인, 참고인 및 증거자료 등을 통하여 폭넓게 조사를 실시할 수 있고, 그러한 조사 결과에 따라 윤리규정 위반여부를 심의·판정한다.

제15조 (위원회의 검증 절차)
연구윤리 위반행위에 대한 검증절차는 예비조사, 본조사, 판정의 단계로 진행하며 모든 조사 일정은 6개월 이내에 종료되어야 한다. 단, 이 기간 내에 조사가 이루어지기 어렵다고 판단될 경우에는 위원장의 승인을 거쳐 조사 기간을 연장할 수 있다. 제보자 또는 피조사자가 판정에 불복할 경우에는 통보를 받은 날로부터 30일 이내에 이의신청을 할 수 있으며, 윤리위원회에서 이를 검토하여 필요한 경우 재조사를 실시할 수 있다.

제16조 (소명기회의 보장)
연구윤리규정 위반으로 보고된 회원에게는 조사대상이 된 사안의 개요를 서면 통지하고 정해진 기간 내에 소명서를 제출할 기회를 보장하고 본인이 희망하는 경우 본 조사 절차 중 1회 이상 윤리위원회의 회의에 출석하여 구술로 해명할 수 있는 기회를 주는 등 충분한 소명 기회를 주어야 한다.

제17조 (연구윤리위원의 비밀 보호 의무)
연구윤리위원은 제보자의 신원을 노출시켜서는 안 되며, 학회의 최종 결정이 내려질 때까지 연구윤리규정 위반으로 보고된 회원의 신분을 공개해서도 안 된다.

제18조 (징계의 절차 및 내용)
위원회의 징계 건의가 있을 경우, 위원장은 상임이사회를 소집하여 징계 여부 및 징계 내용을 최종적으로 결정한다. 연구윤리규정을 위반했다고 판정된 회원에 대해서는 사안의 경중을 고려하여 경고, 일정기간의 논문투고금지, 회원자격의 정지 또는 박탈 등의 징계를 할 수 있으며, 필요한 경우 논문 게재 취소와 그 결과를 공개할 수 있다.

제19조 (연구윤리규정의 개정)
연구윤리규정의 개정 절차는 본 학회의 규정 개정절차에 준한다.

자가점검표

(2024년 10월 15일 개정)

[논문 투고 전 저자 확인사항]
(※ Check 후 투고사이트에 함께 제출합니다.)

구분		확인사항	Check
논문표지	1. 제목	- 논문제목 철자 및 오타 - 영문 제목은 기본적으로 소문자로 작성(단, 문장의 첫 단어와 고유 명사는 대문자로 작성) 관찰 연구(단면조사연구, 환자-대조군 연구 또는 전향적 코호트 연구), 임상 연구, 체계적 문헌고찰 또는 메타 분석의 경우; 제목 또는 부제목에 연구디자인 제시 예) Development and Effectiveness Evaluation of the STEAM Education Program on Food Groups for Kindergarteners -〉 Development and effectiveness evaluation of the STEAM education program on food groups for kindergarteners: a non-randomized controlled study 예) Program Evaluation using the RE-AIM Framework: A Systematic Review and Application to a Pilot Health Promotion Program for Children -〉 Evaluation of the pilot health promotion program for children: a systematic review	
	2. 저자정보	- 저자, 소속 및 직위를 국문과 영문으로 기재, 단 영문논문의 경우 영문으로만 기재, 영문 기재시 소속 앞으로 직위 표기 - 저자 중 1인 이상은 학회 회원일 것. 단, 비회원의 경우 편집위원회에서 위촉 또는 국외 기관에 소속된 저자가 투고할 시 가능	
	3. 제출	- 논문표지는 본 체크리스트 및 저작권이전동의서, IRB승인서와 함께 투고사이트 '첨부파일'에 업로드 (투고사이트에 논문 제출시 동시 제출, 투고논문에는 표지부분 삭제)	
	4. ORCID	- 모든 저자의 ORCID 기술 예) Gildong Hong: https://orcid.org/0000-0000-0000-0000	
	5. Funding (연구지원내역)	예) This research was supported by a grant from the National Research Foundation of Korea (Grant No. 000). - 해당하는 내용이 없더라도 'None.' 으로 기재	
영문초록	1. 작성순서	- Objectives-Methods-Results-Conclusion 의 순서	
	2. 키워드	- 전문 용어를 제외한 1~2개의 단어로 구성된 3~5개의 키워드 기재 - 키워드는 MeSH (https://meshb.nlm.nih.gov/search)에 검색되는 단어로 작성 - 키워드는 고유명사를 제외하고 모두 소문자로 표기하며, 구분 기호는 세미콜론(;)으로 작성	
	3. 약어사용	- 약어를 정의하고, 그 약어가 논문에서 더 이상 사용되지 않는다면 약어 사용할 필요 없음. 전체 명칭 (full name)으로 작성 - 약어를 두 번 이상 본문에서 사용할 경우, 맨 처음 약어가 등장할 때 전체 명칭에 대해 약어 정의	
논문본문	1. 작성순서	- 원고의 부제목은 모두 영문으로 작성 Title page, Abstract, Introduction, Methods, Results, Discussion, Conflict of Interest, Acknowledgments, Data Availability, References, Tables, Figures 순서로 작성 - Method의 Study design, Results의 소제목, Discussion의 Limitations, Conclusion 반드시 작성 - 투고 시 표, 그림을 포함하여 하나의 파일로 업로드	
	2. 통계 패키지 정보 기입	- 종류 및 버전 정확히 기입 예) IBM SPSS Statistics 25 (IBM Corp.) 예) SAS 9.4 (SAS Institute)	
	3. Ethics Statement (연구윤리)	- 저자는 "방법(Method)" 부제목 바로 아래에 연구윤리에 관해 영문으로 기술. 종설, 연구노트, 교육자료 등의 경우에는 서론 뒤(본론 전)에 영문으로 제시. 예) The informed written consent was obtained from each participant. The study protocol was approved by the Institutional Review Board of *** (approval number: ***). *IRB 기관표시는 최종본에 기재(투고시 내용 삭제후 업로드) 예) Obtainment of informed consent was exempted by the institutional review board.	
	4. Conflict of Interest (이해상충)	예) There are no financial or other issues that might lead to conflict of interest. 예) Gildong Hong has been an editor since 2021. However, he was not involved in the review process of this manuscript. Otherwise, there was no conflict of interest. *저자정보는 최종본에 기재(투고시 내용 삭제후 업로드)	

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구분		확인사항	Check
	5. Acknowledgments (감사의 글)	– 논문작성이나 연구를 도왔지만 저자로서 적절하지 않은 분 등을 기술. 예) We thank the physicians who performed the sample collection. *관련내용은 최종본에 기재(투고시 내용 삭제후 업로드)	
	6. Data Availability (데이터가용성)	– 저자는 데이터가용성에 대한 설명을 작성해야하며, 데이터에 대해 접근을 허용하는 것은 선택사항 예) The data that support the findings of this study are openly available in [repository name e.g "KNHANES"] at http://doi.org/[doi].	
	7. 참고문헌	– 표기방법: 대괄호[ ] 앞 띄어쓰기 없이 [1], [2, 5], [15–20] 등 표기, 문헌 사이 쉼표 추가시, 쉼표 뒤 띄어쓰기 예) ~에 관한 연구[1] 또는 Kim & Lee의 연구[2, 5] – 본문 내 참고문헌의 인용이 번호순으로 되어 있는지 확인 – 학위 논문 인용은 3개 이내로 제한 – 참고문헌 표기 규정에 맞는지 확인	
	8. 단위 등 기타 표시	– 숫자와 단위 띄어쓰기(50 kg, 600 kcal), 단, %, ℃ 붙임 – g/dl(X), g/dL(O) – P값 표기 시 : P 대문자, 기울임체 : 예) *P*–value – 숫자 등의 범위 표기 시 '–'를 사용: 예) 20–25 – 천 단위 쉼표 표기(본문, 표에도 적용): 예) 65,450,000	
	9. 표, 그림	– 표와 그림 제목: 첫 글자만 대문자 – 표에서 변수들 영문 표기시 : 첫 글자만 대문자 – 표와 그림에서 n을 소문자로 표기 – 투고규정에 따르며 그 외 형식은 별첨한 가이드라인에 따름	

*예시는 2024년도 최근 게재논문을 참고.

[논문 투고 전 저자 확인사항_표와 그림]

표와 그림 작성 시 다음의 사항을 유의하여 주시기 바랍니다.

1. 자료의 전체 수를 표 본문의 내용 밖으로 표시하고자 할 때는 표 제목 끝의 괄호 안에 제시
   예) Sociodemographic characteristics of children (n = 80)

2. 표 본문의 제목줄(table head)은 가능하면 제시된 값을 설명하는 것으로 하고, 단순히 Mean ± SD 등 만을 제목으로 하는 것을 지양함

3. 표 본문의 내용 작성 시
- 평균값을 제시하는 경우 Mean ± SD, Mean ± SE 으로 사용, 띄어쓰기 확인
  예) 22.0 ± 2.3 : ' ± ' 앞뒤로 띄어쓰기
- 표에서 단위는 괄호 안에 넣어서 표기
  예) Energy (kcal/day) (O)
  Energy, kcal/day (X)

4. 표와 그림을 설명하는 주석은 모두 영문으로 표기

5. 주석의 기술 순서는 가능하면 자료의 형태, 통계분석 방법 및 유의성 표시, 기타의 순서로 작성함
   1) 자료의 형태 제시
      예) n (%), Mean ± SD, n (%) or Mean ± SD 등 주석 번호 없이 첫줄에 제시
   2) 통계분석 방법 및 유의성 표시
      ① 통계적 유의성 뿐 아니라 통계분석 방법도 함께 제시함
      ② 사후검정 결과는 분산분석 등의 유의확률 제시가 선행되어야 함
   3) 약어를 사용한 경우 전체 명칭(full name)을 주석으로 제시함
   4) 기타 설명이 필요한 내용은 이후 투고규정에 따라 순서대로 번호를 달고 각주로 제시하며 표 본문에 표기한 번호와의 일치여부 확인