



Research Article

Understanding the characteristics and types of single-person households based on food purchase frequencies in Korea: a cross-sectional study using the 2023 Consumer Behavior Survey for Foods

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Objectives: This study investigated the differences in food purchase frequency among single-person households by gender and age group and explored the characteristics of single-person household groups according to their food purchase patterns.

Methods: Utilizing data from the 2023 Consumer Behavior Survey for Foods conducted by the Korea Rural Economic Institute, this study examined food purchase frequencies among 966 single-person households. Data were analyzed using Rao-Scott chi-square tests, ANCOVA, ANOVA, and K-modes hierarchical cluster analysis.

Results: Significant differences were observed in the food purchase frequencies of single-person households for fresh and convenient food. Women displayed higher purchase frequencies for fish, vegetables, and fruits, whereas men showed higher purchase frequencies for convenient foods ($P < 0.01$). Single-person households aged 39 years and younger exhibited lower purchase frequencies for vegetables ($P < 0.005$) and fish ($P < 0.001$) and substantially higher frequencies of convenient food purchases ($P < 0.001$). Additionally, this study identified three distinct single-person household groups based on food purchase pattern: the “nutrition-conscious” group, which exhibited high purchase frequency for fresh foods; the “convenience-seeking” group, which showed high purchase frequency for all types of convenient foods; and the “passive food consumer” group, which displayed relatively low purchase frequency for both fresh foods and convenient foods. The socio-demographic characteristics of single-person households differed significantly across these three groups, with the “passive food consumer” group and “convenience-seeking” group exhibiting lower healthy eating competency ($M_{N(\text{nutrition-conscious group})} = 3.68$, $M_{P(\text{passive-food-consumer group})} = 3.40$, $M_{C(\text{convenience-seeking group})} = 3.52$, $P < 0.001$), safe eating competency ($M_N = 3.87$, $M_P = 3.57$, $M_C = 3.77$, $P < 0.001$), and satisfaction ($M_N = 3.36$, $M_P = 3.23$, $M_C = 3.25$, $P = 0.04$) than the “nutrition-conscious” group.

Conclusion: This study underscores the need for targeted nutrition programs to address the unique needs of single-person households depending on their characteristics. Specifically, this study highlights the importance of targeted interventions for “convenience-seeking” and “passive food consumer” to promote dietary competency and encourage healthy dietary behavior.

Keywords: family characteristics; foods; dietary habit; consumer behavior

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INTRODUCTION

The proportion of single-person households in South Korea has steadily increased, reaching 35.5% of all households in 2023, making these the most prevalent type of household [1]. The country has experienced a continuous rise in the number of single-person households largely due to rapid aging and an increasing number of young people delaying marriage. In the past, single-person households primarily comprised the elderly. Recently, the age composition of single-person households has become more diverse, with those aged 70 and over accounting for the largest share of single-person households at 19.1%, followed closely by individuals in their 20s at 18.6%, those in their 60s at 17.3%, and those in their 30s at 17.3% by 2023 [1].

The increase in single-person households has triggered new trends in dietary behaviors [2]. In terms of dietary behavior, single-person households are more likely to consume home meal replacements (HMRs), processed/instant foods, frozen foods, and delivery/takeout foods than multiple-member households [3-6]. Furthermore, their dietary habits exhibit a high propensity for skipping meals and eating alone [7-9]. The unhealthy dietary behaviors observed among single-person households are primarily attributed to their convenience-seeking lifestyle [4, 10]. However, this may also stem from structural issues within the food market environment that make it challenging for single-person households to purchase fresh food in small quantities [11, 12].

The reliance of single-person households on HMRs, processed/instant foods, fast foods, and delivery/takeout foods hinders their ability to maintain a balanced diet, leading to significant disparities in nutrient intake, including excessive caloric intake and high consumption of fats and sodium [7, 11, 13-15]. Single-person households are known to experience a lack of nutrients, such as calcium, vitamin A, vitamin B2, thiamine, riboflavin, niacin, and vitamin C [7, 16, 17], and excessive sodium intake [18, 19]. In addition, assessments of dietary quality based on nutrient adequacy ratios, average nutrient adequacy ratios, and the nutritional quality index indicate that the quality of meals in single-person households was significantly lower than those in multi-

ple-member households in a recent study [16]. Furthermore, previous studies have shown that poor dietary patterns and imbalanced nutrient intake significantly increase the risk of prevalence of diseases. Wang *et al.* [20] demonstrated that adherence to a healthy diet is generally associated with a lower risk of major chronic diseases, including cardiovascular disease, type 2 diabetes, and cancer, whereas the consumption of foods with lower dietary salt has been shown to help reduce blood pressure and decrease the risk of cardiovascular diseases [21]. Additionally, research indicates that a healthy diet is linked to lower levels of depressive symptoms [22] and various mental health issues [23-25]. Therefore, promoting a healthy diet among single-person households is important for improving their health.

In single-person households, it can be reasonably assumed that any food that is purchased or acquired is consumed by the household. Therefore, by investigating the food purchase frequencies of single-person households across various food groups, this study aims to understand the food consumption patterns of these households and derive insights targeting those who engage in unhealthy food consumption practices. According to previous studies, the dietary behaviors and disparities in nutrient intake may vary by the characteristics of single-person households [16, 26-30]. In a comprehensive literature review, Hanna & Collins [31] identified significant differences in food and nutrient intake between adults living alone and those cohabiting with others. Notably, their findings indicated that men living alone are more susceptible to poor dietary intake than their women counterparts. Jae *et al.* [26] and Hong & Kim [27] have demonstrated that differences exist across age groups in single-person households' dietary behaviors of eating out, delivery/take-out, and meal skipping. Lee [16] also showed that nutrient intake disparities manifest differently depending on the age of the single-person households. Thus, as the characteristics of single-person households become increasingly diverse, it is essential to consider these characteristics to effectively understand their needs and behaviors.

The specific research objectives are as follows: First, this study aimed to investigate the differences in food purchase frequencies for fresh and convenient food groups among single-person households by gender and

age group. Second, by clustering single-person households according to their food purchase frequencies, this study aimed to identify the food purchase types of single-person households and explore sociodemographic characteristics, dietary competency, and dietary satisfaction across these groups.

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. Study design

This cross-sectional study was conducted using national panel data and was described with reference to the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) reporting guidelines (<https://www.strobe-statement.org/>).

2. Data and subjects

This study used raw data from the 2023 Food Consumption Behavior Survey conducted by the Korea Rural Economic Institute. The Food Consumption Behavior Survey, conducted annually, comprises responses from the main purchasers, adult household members, and youth household members. An interview survey is conducted with the main food purchasers of the sampled households and with all the adult household members who are aged 19 or older. The Food Consumption Behavior Survey collects information regarding households' purchasing and consumption behaviors for diverse food categories, dietary habits and lifestyles, consumer dietary competency index, consumer dietary satisfaction, and consumers' perceptions of food-related policies and programs. This study analyzed the responses of 966 single-person households out of the 3,176 households that participated in the survey.

3. Food purchase frequency

To examine the food purchase behaviors of single-person households, this study analyzed the purchase frequency of fresh food and the purchase frequency of

convenient food. For the purchase frequencies of fresh food groups, data were collected on how often specific food items were purchased or obtained from other sources. Specifically, the study focused on the frequency of purchase of meat (beef, pork, and chicken), fish, eggs, vegetables, fruits, and milk. The purchase frequency of convenient foods, such as fresh-cut products, ready-to-eat foods, ready-to-cook foods, and meal kits, was measured based on how often the primary purchaser purchased these items directly.

The purchase frequencies of fresh food and the purchase frequencies for convenient foods were measured using eight categories: 1 = daily, 2 = 4–6 times a week, 3 = 2–3 times a week, 4 = once a week, 5 = once every two weeks, 6 = once a month, 7 = less often than once a month, and 8 = none. The frequency variables were categorized into two levels based on the 50th percentile response of the frequency distribution of food items. According to this criterion, the variables were classified as follows: the purchase frequencies of meat (beef, pork, and chicken) and fish were categorized as 0 for “one a month or less” and 1 for “once every two weeks or more.” For egg, vegetables, fruits, and milk, the frequencies were categorized as 0 for “once every two weeks or less,” and 1 for “once a week or more.” Additionally, the purchase frequencies of convenient foods were classified as 0 for “less often than once a month,” and 1 for “once a month or more.”

4. Dietary competency and satisfaction

To examine the dietary competency and satisfaction of single-person households, this study utilized the “healthy eating competency” and “safe eating competency” components from the agri-food consumer competency index. Each competency measurement consisted of 10 detailed items, and the average score of the responses to these 10 items was used for the analysis. Respondents rated their level of agreement with the 10 items in each competency component using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The specific dietary competency items are presented in [Appendix 1](#). Dietary satisfaction is a single-item scale that was measured on a 5-point Likert scale (1 = very dissatisfied, 5 = very satisfied), where respondents rated their level of satisfaction with their dietary behaviors.

5. Statistical analysis

The survey data were analyzed using R version 2023.06.1. All the analyses accounted for the complex sample design of the Consumer Behavior Survey for Food 2023, including stratification variables, cluster variables, and weights.

Descriptive statistical analysis was conducted to explore respondents' characteristics. Rao-Scott chi-square tests were performed to examine the differences in food purchase frequencies among single-person households based on gender and age. To examine whether there exists a significant difference in dietary competency and satisfaction by age group, an analysis of covariance (ANCOVA) was conducted. The confounding effect associated with gender was controlled for by including gender as a covariate. Similarly, to explore the differences in dietary competency and dietary satisfaction by gender, an ANCOVA was conducted with a covariate of age group, and Scheffe's method was used for multiple comparisons. Next, K-modes hierarchical cluster analysis was applied to classify single-person households based on their food purchase frequencies. This method is particularly suitable for categorical variables such as the frequency of fresh and convenient food purchases. Chi-square tests and analysis of variance (ANOVA) were conducted to explore the profile of each group of single-person households and assess the differences in dietary competency and satisfaction across these groups. Statistical significance was determined at a threshold of $P < 0.05$.

RESULTS

1. Descriptive statistics of the sample

Among the heads of single-person households analyzed in this study, 40.9% were men and 59.1% were women (Table 1). In terms of age groups, 39.5% of the sample were aged 20–39 years, 24.3% were aged 40–59 years, and 36.2% were aged 60 years or older. A total of 281 single-person households reported a household income higher than KRW 3 million, which was the average monthly income of single-person households in South Korea in 2023 [32], corresponding to 40.3% of the study sample. Conversely, 685 households reported a household income of KRW 3 million or less, accounting

for 59.7% of the sample. Additionally, 394 single-person households reported their average monthly food expenditure as less than KRW 400,000, which was the average monthly food expenditure of single-person households in South Korea in 2023 [32]. In addition, 572 households reported a monthly average food expenditure of KRW 400,000 or higher, representing 60.2% of the sample population. Among the study sample, 16.6% had completed middle school or lower, 33.2% had completed high school, and 50.2% had completed college or higher. In terms of residence, 334 households (63.3%) resided in urban areas, while 38.7% of the sample resided in rural areas.

2. Food purchase frequency among single-person households

1) Differences in food purchase frequency among single-person households by gender and age group

The differences in the food purchase frequencies of food groups in single-person households by gender

Table 1. Socio-demographic characteristics of respondents

Characteristic	Single-person households (n = 966)
Gender	
Men	203 (40.9)
Women	763 (59.1)
Age group (year)	
20–39	189 (39.5)
40–59	323 (24.3)
≥ 60	454 (36.2)
Average monthly income (10,000 KRW)	
< 300	685 (59.7)
≥ 300	281 (40.3)
Average monthly food expenses (10,000 KRW)	
< 40	394 (39.8)
≥ 40	572 (60.2)
Education	
Middle school or below	227 (16.6)
High school	410 (33.2)
College or higher	329 (50.2)
Residence	
Urban	334 (63.3)
Rural	632 (38.7)

n (%).

All weighted models accounted for the complex sampling design of the Consumer Behavior Survey for Food 2023.

are shown in [Table 2](#). The analysis found significant differences in the purchase frequencies of fish, vegetables, and fruits as well as the purchase frequencies of convenient foods by gender ($P < 0.01$). Regarding the purchase frequency of fish, a higher proportion of “once every two weeks or more” responses was found among women while a higher proportion of “once a month or less” responses was reported among men. In terms of the purchase frequencies of vegetables and fruits, a higher proportion of “once a week or more” was reported among women while “once every two weeks or less” was more frequently reported among men. Regarding convenient foods including fresh-cut products, ready-to-eat foods, ready-to-cook foods, and meal kits, men were more likely to report purchasing convenient food “once a month or more,” while women are more likely to answer “less often than once a month” across all sub-categories. These findings suggest that women tend to consume more fish, vegetables, and fruit than men, whereas men tend to consume more convenient foods than women.

The differences in the food purchase frequencies of various food groups by age group among single-person households are also presented in [Table 2](#). Significant differences were observed in the purchase frequencies of fish and vegetables as well as the purchase frequency of convenient food, across different age groups. For fish, the proportion of “once every two weeks or more” was highly reported in the 60 and older age group, while the proportion of “once a month or less” was higher in the 20–39 age group ($P < 0.001$). In the case of vegetables, the proportion of “once every two weeks or less” was higher in the 20–39 age group, whereas the proportion of “once a week or more” was higher in the 40–59 and 60 and older age groups ($P < 0.05$). All four types of convenient foods, including fresh-cut products, ready-to-eat foods, ready-to-cook foods, and meal kits, the 20–39 age group showed a higher proportion of “once a month or more” responses than other age groups ($P < 0.001$).

2) Differences in dietary competency and satisfaction among single-person households by gender and age group
A comparison of dietary competency and satisfaction by gender and age group are presented in [Table 3](#). Neither dietary competency and satisfaction were significantly

different by gender or age group. For all respondents of the study sample, the average score for healthy eating competency was 3.56 ± 0.52 , and the average score for safe eating competency was 3.76 ± 0.52 . The respondents’ mean dietary satisfaction score was 3.29 ± 0.52 .

3. Characteristics of single-person household groups based on food purchase frequency

1) Single-person household groups based on food purchase frequency

Single-person households were classified into three clusters based on food purchase frequency ([Table 4](#)). Cluster 1, named the “nutrition-conscious” group, exhibited higher fresh food purchase frequency and lower convenient food purchase frequency compared to other groups. Cluster 2, named the “passive food consumer” group, showed a relatively low purchase frequency for both fresh and convenient foods. In cluster 3, the purchase frequencies for all four types of convenient foods were high compared to the other clusters. A single-person household in this cluster showed higher purchase frequencies of pork, vegetables, fruits, and milk but lower purchase frequencies of beef, chicken, fish, and eggs compared to other groups. Based on these characteristics, cluster 3 was named the “convenience-seeking” group.

2) Socio-demographic characteristics across single-person household groups

Significant differences in demographic characteristics were observed across the three different groups in terms of gender, age, average monthly income and average monthly food expenses, education level ($P < 0.001$), and place of residence ($P = 0.03$) ([Table 5](#)). The demographic characteristics of the “nutrition-conscious” and the “passive food consumer” groups are highly similar, with the exception of differences observed in their residential areas. Specifically, both groups had a higher proportion of women aged 60 years and older and individuals with an education level of middle school or below. Also, individuals in both groups are more likely to have relatively lower average monthly income and lower average monthly food expenses compared to “convenience-seeking” group. With regard to residence, indi-

Table 2. Food purchase frequency among single-person households by gender and age group

Food group	Frequency	Gender		Total (n = 966)	P-value ¹⁾	Age group (year)			P-value ¹⁾
		Men (n = 203)	Women (n = 763)			20-39 (n = 189)	40-59 (n = 323)	60 or more (n = 454)	
Beef	Once a month or less	140 (65.6)	513 (67.3)	653 (66.6)	0.738	130 (65.3)	210 (67.2)	313 (67.6)	0.858
	Once every two weeks or more	63 (34.4)	250 (32.7)	313 (33.4)		59 (34.7)	113 (32.8)	141 (32.4)	
Pork	Once a month or less	69 (36.0)	263 (38.2)	332 (37.3)	0.656	76(40.5)	116 (40.0)	140 (31.9)	0.161
	Once every two weeks or more	134 (64.0)	500 (61.8)	634 (62.7)		113 (59.5)	207 (60.0)	314 (68.1)	
Chicken	Once a month or less	134 (67.4)	514 (69.7)	648 (68.7)	0.620	127 (66.8)	205 (68.1)	316 (71.2)	0.625
	Once every two weeks or more	69 (32.6)	249 (30.3)	318 (31.3)		62 (33.2)	118 (31.9)	138 (28.8)	
Fish	Once a month or less	135 (70.8)	401 (54.7)	536 (61.3)	0.001	143 (75.1)	198 (65.2)	195 (43.6)	< 0.001
	Once every two weeks or more	68 (29.2)	362 (45.3)	430 (38.7)		46 (24.9)	125 (34.8)	259 (56.4)	
Egg	Once every two weeks or less	117 (59.7)	455 (60.4)	572 (60.1)	0.888	111 (59.7)	172 (56.2)	289 (63.1)	0.463
	Once a week or more	86 (40.3)	308 (39.6)	394 (39.9)		78 (40.3)	151 (43.8)	165 (36.9)	
Vegetable	Once every two weeks or less	88 (45.8)	214 (31.5)	302 (37.4)	0.004	80 (45.5)	87 (32.8)	135 (31.6)	0.018
	Once a week or more	115 (54.2)	549 (68.5)	664 (62.6)		109 (54.5)	236 (67.2)	319 (68.4)	
Fruit	Once every two weeks or less	121 (60.8)	307 (41.0)	428 (49.1)	< 0.001	93 (51.5)	119 (45.2)	216 (49.1)	0.557
	Once a week or more	82 (39.0)	456 (59.0)	538 (50.9)		96 (48.5)	204 (54.8)	238 (50.9)	
Milk	Once every two weeks or less	109 (51.1)	352 (44.0)	461 (46.9)	0.174	82 (44.6)	140 (45.1)	239 (50.6)	0.402
	Once a week or more	94 (48.9)	411 (56.0)	505 (53.1)		107 (55.4)	183 (54.9)	215 (49.4)	
Convenient food									
Fresh-cut product	Less often than once a month	95 (38.8)	475 (45.4)	570 (48.0)	0.001	61 (25.7)	161 (46.1)	348 (73.5)	< 0.001
	Once a month or more	108 (61.2)	288 (45.6)	396 (52.0)		128 (74.3)	162 (53.9)	106 (26.5)	
Ready-to-eat food	Less often than once a month	65 (22.7)	427 (49.7)	492 (38.7)	< 0.001	38 (15.5)	138 (36.3)	316 (65.6)	< 0.001
	Once a month or more	138 (77.3)	336 (50.3)	474 (61.3)		151 (84.5)	185 (63.7)	138 (34.4)	
Ready-to-cook food	Less often than once a month	64 (24.8)	454 (54.9)	518 (42.6)	< 0.001	46 (19.4)	145 (41.2)	327 (68.7)	< 0.001
	Once a month or more	139 (75.2)	309 (45.1)	448 (57.4)		143 (80.6)	178 (58.8)	127 (31.3)	
Meal kit	Less often than once a month	89 (33.5)	468 (57.0)	557 (47.4)	< 0.001	55 (25.5)	166 (43.3)	356 (74.0)	< 0.001
	Once a month or more	114 (66.5)	275 (43.0)	389 (52.6)		134 (74.5)	157 (56.7)	98 (20.0)	

n (%).

All weighted models accounted for the complex sampling design of the Consumer Behavior Survey for Food 2023.

¹⁾The P-values were estimated using χ^2 -test.

Table 3. Dietary competency and satisfaction among single-person households by gender and age group

Dietary competency & satisfaction	Total (n = 966)	Gender			Age group (year)			P-value ²⁾
		Men (n = 203)	Women (n = 763)	P-value ¹⁾	20–39 (n = 189)	40–59 (n = 323)	60 or more (n = 454)	
Healthy eating competency ³⁾	3.56 ± 0.52	3.46 ± 0.06 ²⁾	3.55 ± 0.03	0.221	3.46 ± 0.08	3.54 ± 0.05	3.55 ± 0.03	0.375
Safe eating competency ⁴⁾	3.76 ± 0.52	3.71 ± 0.58	3.75 ± 0.03	0.343	3.73 ± 0.07	3.78 ± 0.04	3.70 ± 0.04	0.611
Dietary satisfaction ⁵⁾	3.29 ± 0.52	3.28 ± 0.05	3.25 ± 0.03	0.444	3.24 ± 0.05	3.28 ± 0.04	3.28 ± 0.03	0.300

Mean ± SE.

¹⁾The P-values were estimated using ANCOVA with gender as a covariate.

²⁾The P-values were estimated using ANCOVA with age groups as a covariate.

³⁾Calculated as the average score of 10 items, including balanced nutrient intake and portion size control, measured on a 5-point Likert scale (1 = strongly disagree, 3 = neutral, 5 = strongly agree).

⁴⁾Calculated as the average score of 10 items, including safe food storage methods and checking for food safety incidents, measured on a 5-point Likert scale (1 = strongly disagree, 3 = neutral, 5 = strongly agree).

⁵⁾Respondents rated their level of satisfaction with their dietary behaviors on a 5-point Likert scale (1 = very dissatisfied, 3 = neutral, 5 = very satisfied).

Table 4. Typology of single-person households based on food purchase frequency

Food group	Nutrition-conscious group (n = 223)	Passive food consumer group (n = 296)	Convenience-seeking group (n = 447)
Beef	Once a month or less	Once a month or less	Once a month or less
Pork	Once every two weeks or more	Once a month or less	Once every two weeks or more
Chicken	Once every two weeks or more	Once a month or less	Once a month or less
Fish	Once every two weeks or more	Once a month or less	Once a month or less
Egg	Once a week or more	Once every two weeks or less	Once every two weeks or less
Vegetable	Once a week or more	Once every two weeks or less	Once a week or more
Fruit	Once a week or more	Once every two weeks or less	Once a week or more
Milk	Once a week or more	Once every two weeks or less	Once a week or more
Convenient food			
Fresh-cut product	Less often than once a month	Less often than once a month	Once a month or more
Ready-to-eat	Less often than once a month	Less often than once a month	Once a month or more
Ready-to-cook	Less often than once a month	Less often than once a month	Once a month or more
Meal kit	Less often than once a month	Less often than once a month	Once a month or more

The frequency of purchase of food group.

viduals in the “passive food consumers” group are more likely to reside in urban areas compared to the “nutrition-conscious” and “convenience-seeking” groups. The “convenience-seeking” group showed a higher proportion of men and individuals aged 39 or younger. This group also had a higher percentage of individuals with college degree education and exhibited a relatively higher average monthly income and food expenses compared to the other groups.

3) Dietary competency and satisfaction across single-person household groups

The results of the analysis of the differences in dietary competency and satisfaction across the three different groups of single-person households by food purchase frequency are presented in Table 6. The analysis revealed significant differences in healthy and safe eating competencies across the three groups. The levels of healthy eating competency ($M_{N(\text{nutrition-conscious group})} = 3.68 \pm 0.04$, $M_{P(\text{passive-food consumer group})} = 3.40 \pm 0.03$, $M_{C(\text{convenience-seeking group})} = 3.52 \pm 0.04$, $P < 0.001$) and safe eating competen-

Table 5. Socio-demographic characteristics across single-person household groups

Characteristics	Nutrition-conscious group (n = 223)	Passive food consumer group (n = 296)	Convenience-seeking group (n = 447)	P-value ¹⁾
Gender				< 0.001
Men	26 (23.3)	42 (26.4)	135 (52.1)	
Women	197 (76.7)	254 (73.6)	312 (47.9)	
Age group (year)				< 0.001
20–39	14 (14.2)	26 (18.0)	149 (55.8)	
30–59	75 (24.3)	72 (22.4)	176 (25.2)	
≥ 60	134 (61.5)	198 (60.0)	122 (19.0)	
Average monthly income (10,000 KRW)				< 0.001
< 300	177 (78.8)	242 (74.1)	266 (48.1)	
≥ 300	46 (21.2)	54 (25.8)	181 (51.9)	
Average monthly food expenses (10,000 KRW)				< 0.001
< 40	116 (56.4)	163 (52.8)	115 (29.4)	
≥ 40	107 (43.6)	133 (47.2)	332 (70.6)	
Education				< 0.001
Middle school or below	66 (32.6)	124 (33.6)	37 (4.8)	
High school	118 (45.9)	125 (40.3)	167 (26.6)	
College or higher	39 (21.4)	47 (26.1)	243 (68.6)	
Residence				0.030
Urban	145 (57.8)	211 (69.6)	273 (58.6)	
Rural	78 (42.2)	85 (30.4)	174 (41.4)	

n (%).

All weighted models accounted for the complex sampling design of the Consumer Behavior Survey for Food 2023.

¹⁾The P-values were estimated using χ^2 -test.**Table 6.** Dietary competency and satisfaction across single-person household groups

Group	Nutrition-conscious group (n = 223)	Passive food consumer group (n = 296)	Convenience-seeking group (n = 447)	P-value ¹⁾
Healthy eating competency ²⁾	3.68 ± 0.04 ^b	3.40 ± 0.03 ^a	3.52 ± 0.04 ^{ab}	< 0.001
Safe eating competency ³⁾	3.87 ± 0.04 ^c	3.57 ± 0.04 ^a	3.77 ± 0.03 ^b	< 0.001
Dietary satisfaction ⁴⁾	3.36 ± 0.04 ^c	3.23 ± 0.03 ^a	3.25 ± 0.04 ^b	0.042

Mean ± SE.

All weighted models accounted for the complex sampling design of the Consumer Behavior Survey for Food 2023.

¹⁾The P-values were estimated using ANOVA with age group as a covariate.²⁾Calculated as the average score of ten items, including balanced nutrient intake and portion size control, measured on a five-point Likert scale (1 = strongly disagree, 3 = neutral, 5 = strongly agree).³⁾Calculated as the average score of ten items, including safe food storage methods and checking for food safety incidents, measured on a five-point Likert scale (1 = strongly disagree, 3 = neutral, 5 = strongly agree).⁴⁾Respondents rated their level of satisfaction with their dietary behaviors on a 5-point Likert scale (1 = very dissatisfied, 3 = neutral, 5 = very satisfied).^{a, b, c}a < b < c: Scheffe.

cy ($M_N = 3.87 \pm 0.04$, $M_P = 3.57 \pm 0.04$, $M_C = 3.77 \pm 0.03$, $P < 0.001$) were lowest in the “passive food consumer” group and those were highest in the “nutrition-conscious” group. Also, significant differences were found in dietary satisfaction ($M_N = 3.36 \pm 0.04$, $M_P = 3.23 \pm 0.03$, $M_C = 3.25 \pm 0.04$, $P = 0.04$), which was low in the “pas-

sive food consumer” group and the high in the “nutrition-conscious” group.

DISCUSSION

Understanding the challenges faced by single-person

households is critical for developing policies that address unique imbalances in dietary practices and promote healthy eating habits. In the context of single-person households, it can be assumed that the primary purpose of food purchase is personal consumption; thus, the food purchased or acquired by the household is ultimately consumed by the individual. Therefore, this study considers the food purchase patterns of single-person households as a blueprint for their food consumption patterns with the aim of deriving insights into their dietary behaviors.

Previous research has indicated that single-person households tend to consume fewer fruits [7, 11] and vegetables [7, 11] and less fish [11], whole grains [33], and milk [7] than multiple-person households. Additionally, they prefer eating out, eating alone, and eating takeout and convenient foods [7, 14, 33] compared to multiple-person households. Preparing meals for eating alone is often perceived as cumbersome, which possibly results in single-person households' propensity for simpler meal options [17]. Moreover, the lack of family members makes single-person households less informed about nutritional and dietary information [15]. Sometimes, the need to purchase fresh food in small quantities or the high cost of individually packaged fresh products present barriers for single-person households in acquiring fresh food [11, 12]. Unbalanced dietary practices in single-person households may also lead to unbalanced nutrition.

Furthermore, this study found significant differences in the purchase frequencies of fish, vegetables, fruit, and convenient foods among the groups. Specifically, women procured fish, vegetables, and fruits more frequently than men, whereas men purchased all types of convenient foods more frequently than women. This finding suggests that men exhibit a higher propensity for convenient dietary habits than women do. Furthermore, fresh-cut products such as salads and washed fruits were more frequently purchased by men than by women, which is an interesting observation considering that women generally consume more fresh fruits and vegetables than their men counterparts. Lee & Shin's [34] interpretation that women-headed households dine out less frequently than men-headed households because of their lower income raises important questions re-

garding this finding. Specifically, it may also be possible that economic constraints faced by women-headed single person households may limit the affordability of convenient foods. Additionally, this study identified significant differences in food purchase frequency across age groups.

Taken together, these findings suggest that even single-person households, particularly younger men, exhibited a lower purchase frequency of fish and vegetables, demonstrating a pronounced inclination toward purchasing convenient foods more often than other age groups. While there is strong awareness regarding the importance of fruit and vegetable intake, it has been reported that very few countries achieve adequate intake levels of fruits and vegetables for a healthy diet [35]. Previous studies have linked insufficient fruit and vegetable intake to an increased risk of cardiovascular diseases, type 2 diabetes, and various mental health conditions [35]. Thus, it is essential to develop strategies to promote the consumption of vegetables and fruit among single-person households headed by younger men. In addition, fish contain high-quality protein, as well as other essential nutrients of metabolic and hormonal importance and is usually recommended as part of a healthy balanced diet in most dietary guidelines. However, only 18.9% of the global population meets the recommended intake of at least 250 mg per day [36]. According to this study, young men in single-person households are less likely to eat a sufficient amount of fish, indicating the need for initiatives to promote the consumption of fish for these demographics. The risks associated with reliance on convenient foods should be noted. Choi *et al.* [10] reported a positive correlation between the consumption of instant foods and salty eating habits. Thus, a strong preference for convenient food among younger men in single-person households indicates a potential risk of elevated sodium intake, warranting the need to improve their dietary habits.

This study revealed that while single-person households headed by young men utilized fewer fresh vegetables and fish and relied substantially more on convenient foods than other groups, they responded to healthy eating competency items, such as consumption of the five basic food groups for nutritional balance, knowledge of healthy food choices, and consumption

of ample vegetables, fruits, and whole grains, as high as other gender or age groups. This observation may indicate that these individuals undervalue the importance of balanced nutrient intake and healthy dietary habits or subjectively overestimate the nutritional quality of their dietary practices. These speculations raise the need for a comprehensive examination of the perceptions and behaviors related to dietary habits among young men in single-person households. Structured and targeted nutrition education interventions that can provide meaningful support in promoting healthier eating patterns within this demographic are needed.

In addition, this study found no differences in food consumption regarding beef, pork, and chicken according to the gender and age group of single-person households. Kang & Jung [7] indicated that single-person households are more likely to consume pork, whereas multiple-person households consume diverse types of meat. Given the differences in the nutrient composition of beef, pork, and poultry, diversifying the meat consumption patterns of single-person households is helpful in promoting a healthy diet.

Based on variations in food purchase frequency among single-person households, this study identified three distinct single-person household groups based on their food purchase patterns. The three groups are as follows: the “nutrition-conscious” group, characterized by a high frequency of fresh food purchase; the second group identified is the “passive food consumer” group, which demonstrated low frequency for both fresh food purchase and convenient food purchase; and the “convenience-seeking” group demonstrated a strong preference for convenient foods and exhibited the lowest consumption of beef, chicken, fish, and eggs compared to other groups. Significant differences in socio-demographics were found across these three groups in terms of gender, age, educational attainment, region, income level, and food expense level. This finding highlights the diversity within single-person households and underscores the need for further research to explore this diversity in the context of promoting healthy dietary behaviors.

The “nutrition-conscious” and “passive food consumer” groups were very similar in terms of socio-demographics, except for region. They are notably characterized by a higher proportion of women aged 60 years and

older with low education levels and lower household income and food expenditure. Those in the “passive food consumer” group are more likely to reside in urban areas compared to those in the “nutrition-conscious” group. However, significant differences were observed between the two groups in dietary competency and satisfaction. While the “nutrition-conscious” group showed the highest level of dietary competency and satisfaction, the “passive food consumer” group showed the lowest level of dietary competency and satisfaction. These findings support the positive relationship between healthy dietary behaviors and competency in single-person households. Thus, educational initiatives aimed at increasing the dietary competency of the “passive food consumer” group would provide opportunities to improve their dietary behaviors and satisfaction.

The “convenience-seeking” group primarily consisted of men, with a significant proportion aged 39 years and younger. In addition, this group demonstrated higher levels of educational attainment as well as higher average household income and average monthly food expenditure. Single-person households headed by younger individuals often lack knowledge related to grocery shopping, meal preparation, and food storage, leading to an increased reliance on dining out, delivery services, and convenient foods [7]. This study also indicated a pronounced inclination toward convenience-oriented dietary habits, particularly among men aged 39 years and younger with higher educational and income levels. At the same time, this group reported lower levels of dietary competency and satisfaction compared to the “nutrition-conscious” group. Although they engaged in a convenient dietary lifestyle, the low levels of dietary satisfaction observed suggest that there is an opportunity to enhance their knowledge and skills related to healthy and safe eating to facilitate a healthier diet through education.

Limitations

This study examined the food consumption behaviors of single-person households by measuring the frequency of fresh and convenient food purchases. This study is limited because it did not employ direct food intake data. It is generally assumed in this study that the food acquired in a single-person household is ultimately

consumed by that household itself. However, dietary recommendations based solely on the frequency of food purchases have limited efficacy. Second, this study did not consider eating out or takeout as options for various dietary behaviors, which limits a holistic understanding of the comprehensive picture of single-person households' food consumption patterns. Finally, the study was unable to directly address whether the differences in the consumption of convenient or fresh food were influenced by individual preferences or determined by constrained economic resources.

Conclusion

Educational initiatives aimed at enhancing knowledge about nutrient intake and healthy dietary behaviors are suggested as essential steps towards improving overall dietary health within single-person households. This study highlighted the diverse food consumption behaviors and nutrient intake among single-person households in South Korea. Single-person households showed distinct food purchase frequencies of fresh and convenient food based on their characteristics, including gender and age group. Based on these findings, there is a need for tailored nutritional policies and interventions to address the unique needs of different single-person households. This study underscored the necessity for the tailored interventions to promote healthier dietary behaviors and dietary competency especially for the "convenience-seeking" and "passive food consumer" group.

CONFLICT OF INTEREST

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

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DATA AVAILABILITY

Data supporting the findings of this study are available upon request from the Consumer Behavior Survey for Food 2023 at <https://www.krei.re.kr/foodSurvey/index.do>.

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Appendix 1. Measurement of dietary competency

Healthy eating competency

1. Breakfast helps you stay healthy and avoid overeating.
2. I tend to eat breakfast and eat regularly.
3. Eating with family members is an important part of diet.
4. I eat with my family (some or all of my family) at least once a day.
(For single-person households, respond about meals with immediate family members who do not live with you)
5. You must control your portion sizes because you need to maintain a healthy weight to be healthy.
6. I eat the amount of food I need without overeating.
7. I try to eat the five basic food groups at every meal for nutritional balance.
*Basic food groups: grains, vegetables, fruits, meat/fish/eggs, and milk and dairy products
8. I eat a variety of foods for adequate nutrition.
9. I know healthy food choices, such as vegetables, fruits, and whole grains.
10. I usually eat a lot of vegetables, fruits, and whole grains.

Safe eating competency

1. When purchasing food, it is necessary to check the expiration date on the packaging.
2. I throw away frozen food after the expiration date.
3. It is important to know how to safely store each type of agricultural food product.
4. I check the packaging and expiration dates when buying food.
5. Sanitizing cookware is important when preparing food.
6. I clean my utensils before cooking food and sanitize them often.
7. It is important to have the information to avoid risk in the event of a food safety incident, such as bird flu.
8. I identify hazardous information and act accordingly in the event of a food safety incident.
9. It is necessary to avoid eating food that appears to be spoiled to prevent foodborne illness.
10. I do not eat food that is suspected to be spoiled or otherwise potentially harmful even if I am reluctant to do so.

Source: The Consumer Behavior Survey for Food 2023.