



■ Original Article

The Association between Family Mealtime and Depression in Elderly Koreans

Yunhwa Kang¹, Soyeon Kang¹, Kyung Jung Kim¹, Hyunyoung Ko², Jinyoung Shin³, Yun-Mi Song^{1*}

¹Department of Family Medicine, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea

²Health Screening Center, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Seoul, Korea

³Department of Family Medicine, Konkuk University Medical Center, Konkuk University School of Medicine, Seoul, Korea

Background: Several studies have revealed the frequency of family mealtimes to be inversely associated with depressive symptoms in adolescents. However, there have been few studies in older populations. This cross-sectional study investigated the association between family mealtime frequency and depressive symptoms in elderly Koreans.

Methods: This study analyzed 4,959 elderly men and women (aged 65 years or older) who participated in the Korea National Health and Nutrition Examination Survey. Self-administered questionnaires were used to assess depressive status, family mealtime frequency, and covariates. Multiple logistic regression analysis was performed to evaluate the association using the eating alone group as a reference.

Results: After adjusting for all covariates, participants who had family meals 3 times a day had fewer depressive symptoms than the eating alone group; adjusted odds ratios (ORs) (95% confidence intervals [CIs]) were 0.72 (0.58–0.89) for point depressiveness/anxiety and 0.73 (0.56–0.94) for depressiveness lasting for at least 2 weeks. In suicidal ideation, the OR (95% CI) of eating with family twice a day was significant after full adjusting for covariates at 0.67 (0.50–0.88).

Conclusion: Family mealtimes were closely associated with depressive symptoms in elderly Koreans, which suggests that maintaining intrafamilial bonding is important for mental health in an older population.

Keywords: Aged; Depression; Family Relations; Meals; Koreans

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*Corresponding Author: Yun-Mi Song <https://orcid.org/0000-0001-9232-5563>

Tel: +82-2-3410-2449, Fax: +82-2-3410-0388, E-mail: yunmisong@skku.edu

INTRODUCTION

Although the prevalence of late-life depression reported by several studies varies from lower than 1% to more than 35%,¹⁻³⁾ depression is one of the major health problems in the elderly, and the burden of inadequately treated late-life depression is substantial.^{2,4)} The World Health Organization predicted that depression would be the second greatest cause of disease burden by the year 2020,^{5,6)} probably due to the remarkably accelerating rate of population aging.⁷⁾ Studies among elderly Koreans also found that the prevalence of overall late-life depression was higher than 10% and tended to increase with age.⁸⁾

Depression lowers quality of life and increases the risk of disability and morbidity.^{6,9,10)} In addition, depression in the elderly frequently coexists with medical illnesses and may be a risk factor for other diseases such as dementia.^{11,12)} However, late-life depression is often overlooked during clinical evaluation of an older population because it is mistakenly assumed to be a normal response to aging, physical loss, or other life events.¹²⁻¹⁴⁾ Thus, prevention of the development of depression in the elderly by promoting healthy aging and modifying risk factors for late-life depression would be desirable to the older population.

Several factors associated with depression in the elderly have been suggested, such as sex, employment status, income level, smoking, alcohol consumption, and physical activities.^{3,11,12,15)} Among the many risk factors, loneliness, sometimes combined with other physical and mental problems, is found to be a major risk factor increasing depressive symptoms in the elderly.¹⁶⁾ Therefore, it is found that most of the

elderly prefer remaining engaged in social interactions.¹⁶⁾

Family mealtimes are when family members sit down and enjoy meals together. During the family mealtime, people may have a good opportunity to interact and communicate with each other, thus increasing intimacy and emotional bonding among family members.^{17,18)} However, the busy personal lives of people living in the rapidly changing modern society have reduced the opportunity for family mealtimes over the last several decades, which may have a deteriorating influence on the emotional health of modern people.^{19,20)} Several studies on adolescents have revealed that frequency of family mealtimes was inversely associated with substance use, depression, and suicide involvement, even after controlling for family connectedness.^{19,20)} However, the effect of family mealtimes on depression in the elderly has not been extensively evaluated.^{21,22)}

In this regard, we specifically explored the association between family mealtime frequency and depressive symptoms in elderly Koreans using the data from a nationally representative sample after controlling for a range of confounding variables. We hypothesized that the elderly who frequently share their mealtimes with family would have fewer depressive symptoms than those who have fewer family meals.

METHODS

1. Study Participants

This study used data from the fifth and sixth Korea National Health and Nutrition Examination Survey collected from 2010 to 2014 by the

Table 1. Characteristics of study participants

Characteristic	Men (n=2,148)	Women (n=2,811)	All (n=4,959)	P-value
Age (y)	72.3±0.15	73.3±0.14	72.9±0.10	<0.001
Married	2,110 (98.0)	2,763 (98.3)	4,873 (98.1)	0.557
Employed	887 (41.5)	547 (19.7)	1,434 (28.8)	<0.001
Income				0.339
Low	530 (25.1)	724 (26.4)	1,254 (25.8)	
Intermediate	1,088 (51.1)	1,431 (51.5)	2,519 (51.3)	
High	530 (23.8)	656 (22.2)	1,186 (22.9)	
Drinking	1,210 (56.5)	487 (17.6)	1,697 (33.8)	<0.001
Smoking				<0.001
Never	355 (16.4)	2,595 (91.4)	2,950 (60.2)	
Ex	1,293 (59.8)	123 (5.1)	1,416 (27.9)	
Current	500 (23.8)	93 (3.5)	593 (11.9)	
Comorbidities				
Cardiovascular disease	316 (14.4)	301 (10.7)	617 (12.2)	0.001
Arthritis	284 (13.3)	1,297 (46.2)	1,581 (32.5)	<0.001
Asthma	102 (4.5)	165 (6.4)	267 (5.6)	0.017
Family mealtime* (/d)				<0.001
None	274 (13.1)	928 (33.5)	1,202 (25.0)	
1 Mealtime	218 (10.5)	321 (12.7)	539 (11.8)	
2 Mealtimes	455 (20.8)	494 (17.1)	949 (18.7)	
3 Mealtimes	1,201 (55.5)	1,068 (36.7)	2,269 (44.5)	
Point depressiveness/anxiety [†]	280 (13.8)	621 (22.0)	901 (18.6)	<0.001
Depressiveness that had lasted for at least 2 wk	220 (10.2)	515 (18.7)	735 (15.2)	<0.001
Ever had suicidal ideation during the last 1 y	275 (12.9)	629 (23.4)	904 (19.0)	<0.001

Values are presented as mean±standard deviation or number (%). P-values were estimated by chi-square test and t-test.

*Family mealtime was frequency defined as the average number of meals eaten together per day for the last 1 year. [†]Feeling of depressiveness or anxiety at the time of survey.

Korea Centers for Disease Control and Prevention. The Korea National Health and Nutrition Examination Survey was conducted among a representative sample of the Korean population, which was selected for the survey through a complex, multistage probability sample design on a nationwide basis. The survey consisted of a health survey, a nutrition survey, and medical examinations to provide statistics for evaluating public health policies. Among the 41,102 survey participants, we selected people who were aged 65 and older and had no missing values for all variables. Therefore, 4,959 people were included in this study. This study was reviewed and approved by the institutional review board of Samsung Medical Center (SMC 2016-04-008). The data used in this study do not include any identifiable personal identifiable personal information. Thus, the institutional review board exempted acquisition of informed consent form for the current study.

2. Study Variables

The main independent variable was family mealtime frequency per day during the past 1 year, which was assessed using the following question: "During the last year, did you usually have a meal with any family members? Please check for each meal: breakfast, lunch, or dinner." Using responses to the above question, we categorized study participants into four groups: 'eating alone,' 'eating with family once a day,' 'eating with family twice a day,' or 'eating with family 3 times a day.'

The dependent variables were depressive symptoms, which were assessed in three ways: point depressiveness/anxiety, depressiveness lasting for at least 2 weeks, and ever having had suicidal ideation during the last 1 year. For point depressiveness/anxiety, participants were categorized into two groups according to their responses to the self-assessment question, "How much do you feel depressed or anxious?" If a participant selected "I do not feel depressed or anxious," then he/she was categorized into the 'no point depressiveness/anxiety' group while one who selected other items ("I feel a little depressed or anxious" or "I

extremely feel depressed or anxious") was categorized into the 'point depressiveness/anxiety' group. Participants were assessed for depressiveness lasting for at least 2 weeks by the question "Have you been bothered by feeling sadness or hopelessness for 2 successive weeks in the last year?" The answers were categorized as "yes" or "no." Suicidal ideation was assessed by the question "Have you thought that you would be better off dead, or have you thought of hurting yourself in some way in the last year?" The answers were categorized as "yes" or "no."

We considered various sociodemographic and self-reported comorbidities as covariates given that these factors have been found to be associated with depression or quality of life in the elderly.^{3,12,18,21} The sociodemographic variables comprised age, sex, marital status, employment status, income level, current alcohol consumption, and smoking behavior (i.e., never-smoker, former smoker, or current smoker). Current alcohol consumption was defined when participants drank alcohol at least once a month for the last year. Comorbid diseases comprised cardiovascular diseases including coronary artery disease and stroke, arthritis, and asthma.

3. Statistical Analysis

We performed a chi-square test for categorical variables and t-test for continuous variables to examine the differences in the distribution of each variable according to the presence of depressive symptoms. Multivariable-adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were estimated by multiple logistic regression analysis to evaluate an independent association between depressive symptoms and family mealtime frequency after adjusting for covariates. The covariates were selected considering the findings of the univariate analysis in our study or previous studies^{3,12,18,21} as follows: age, sex, marital status, employment status, and income level were adjusted in model 1. In model 2, current alcohol consumption and smoking were additionally

Table 2. Association* of depressive symptoms with sociodemographic and clinical characteristics

Variable	Point depressiveness/anxiety		Depressiveness lasting for at least 2 wk		Ever had suicidal ideation during the last 1 y	
	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value
Married	0.52 (0.36–0.77)	0.001	0.45 (0.27–0.76)	0.002	0.62 (0.37–1.01)	0.056
Employed	0.73 (0.61–0.86)	<0.001	0.73 (0.59–0.90)	0.003	0.71 (0.58–0.86)	0.001
Income						
Low	1.00		1.00		1.00	
Intermediate	0.75 (0.63–0.88)	0.001	0.70 (0.57–0.86)	0.001	0.82 (0.68–0.99)	0.035
High	0.54 (0.44–0.68)	<0.001	0.49 (0.37–0.63)	<0.001	0.49 (0.39–0.62)	<0.001
Drinking	0.63 (0.54–0.75)	<0.001	0.62 (0.51–0.76)	<0.001	0.69 (0.58–0.83)	<0.001
Smoking						
Never	1.00		1.00		1.00	
Ex	0.63 (0.53–0.75)	<0.001	0.56 (0.45–0.70)	<0.001	0.68 (0.55–0.83)	<0.001
Current	0.66 (0.52–0.85)	0.001	0.87 (0.67–1.12)	0.277	1.05 (0.83–1.34)	0.696
Cardiovascular disease	1.72 (1.41–2.10)	<0.001	1.18 (0.93–1.51)	0.179	1.29 (1.01–1.63)	0.036
Arthritis	1.91 (1.64–2.22)	<0.001	1.77 (1.48–2.12)	<0.001	1.70 (1.43–2.02)	<0.001
Asthma	1.84 (1.39–2.44)	<0.001	1.20 (0.82–1.75)	0.349	1.48 (1.05–2.10)	0.026

OR, odds ratio; CI, confidence interval.

*Estimated by logistic regression analysis without adjustment for covariates.

adjusted. In model 3, comorbidities with cardiovascular diseases, arthritis, and asthma were further adjusted.

Furthermore, we performed a stratified analysis to examine whether the association differed by sex; sex was not adjusted. The effect of sex on the association between depressive symptoms and family mealtime frequency was tested by including an interaction term (sex×family mealtime frequency) in the multiple logistic regression analysis. Statistical analyses were performed using PASW SPSS ver. 18.0 (SPSS Inc., Chicago, IL, USA). The statistical significance of each result was assessed based on $P < 0.05$.

RESULTS

Table 1 presents the demographic characteristics of study participants. The mean age was 72.3 years old for men and 73.3 years old for women. The prevalence of marital status and income level was similar between men and women. The prevalence of employment status, alcohol consumption, and smoking status was higher in men than in women. Among comorbidities, the prevalence of arthritis was significantly higher in women than in men. For family mealtimes, 75% of participants were found to have at least one family mealtime per day. The elderly who had less frequent family mealtimes (≤ 1) were more commonly women (46.2%) than men (23.6%) while more frequent family mealtimes (≥ 2) were more common in men (76.3%) than in women (53.8%). The prevalence of depressiveness was significantly higher in women than in men across all three variables assessing depressive symptoms.

Table 2 shows the association of depressive symptoms with sociodemographic and clinical characteristics. Sociodemographic variables except marital status and current smoking were inversely related with all three depressive variables. Among comorbidities, only arthritis was significantly associated with an increased risk of depressive symptoms across all three depressive variables.

Age-adjusted association between depressive symptoms and family

mealtime frequency is presented in Table 3. Compared to eating alone, eating with family at least once a day was significantly associated with a decreased risk of depressive symptoms in all study participants.

Table 4 shows the multivariable adjusted association of depressive symptoms with family mealtime frequency. After full adjustment for covariates, participants who had family meals 3 times a day had fewer depressive symptoms than the eating alone group: adjusted ORs (95% CIs) were 0.72 (0.58–0.89) for point depressiveness/anxiety and 0.73 (0.56–0.94) for depressiveness lasting for at least 2 weeks. In suicidal ideation, the OR (95% CI) of eating with family twice a day was significant after full adjusting for covariates at 0.67 (0.50–0.88). In the analysis stratified by sex, participants having family meals 3 times a day showed a decreased risk of point depressiveness/anxiety after adjusting for all covariates regardless of sex; the OR (95% CI) was 0.58 (0.39–0.88) for men and 0.76 (0.59–0.97) for women. However, the association between family mealtimes and two other depressive variables was significant only in men ($P < 0.05$). There was no significant effect of sex on the association between depressive symptoms and family mealtime (P interaction > 0.05).

DISCUSSION

In this cross-sectional study conducted with a representative sample of elderly Koreans, we found that the frequency of family mealtimes was inversely associated with depressiveness as well as suicidal ideation, and the correlation was more evident in men than in women. This association persisted even after controlling for a range of sociodemographic factors and comorbid conditions. In addition, with increasing frequency of family mealtimes, ORs of point depressiveness/anxiety were decreased in a dose-response pattern.

The findings of our study are in accordance with those of previous studies, and they show that having regular family mealtimes serves as a protective factor against depressive mood, anger, and other psychological problems by enhancing family communication and building

Table 3. Age-adjusted association* between depressive symptoms and family mealtime frequency

Variable	Family mealtime (/d)	Point depressiveness/anxiety		Depressiveness lasting for at least 2 wk		Ever had suicidal ideation during the last 1 yr	
		OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value
Men	1 Mealtime	0.71 (0.43–1.18)	0.185	0.58 (0.30–1.12)	0.103	0.50 (0.27–0.92)	0.025
	2 Mealtimes	0.52 (0.33–0.82)	0.005	0.54 (0.32–0.91)	0.021	0.43 (0.25–0.71)	0.001
	3 Mealtimes	0.51 (0.36–0.74)	<0.001	0.52 (0.33–0.82)	0.005	0.44 (0.29–0.67)	<0.001
	P for trend	0.003		0.040		0.001	
Women	1 Mealtime	0.79 (0.57–1.10)	0.168	0.81 (0.57–1.16)	0.244	0.99 (0.69–1.42)	0.953
	2 Mealtimes	0.64 (0.48–0.86)	0.003	0.68 (0.48–0.96)	0.028	0.62 (0.45–0.84)	0.002
	3 Mealtimes	0.72 (0.57–0.91)	0.007	0.68 (0.51–0.89)	0.006	0.80 (0.62–1.01)	0.063
	P for trend	0.019		0.031		0.011	
All	1 Mealtime	0.73 (0.56–0.96)	0.026	0.71 (0.52–0.96)	0.027	0.80 (0.59–1.10)	0.166
	2 Mealtimes	0.56 (0.44–0.71)	<0.001	0.57 (0.43–0.76)	<0.001	0.52 (0.40–0.67)	<0.001
	3 Mealtimes	0.59 (0.49–0.71)	<0.001	0.55 (0.43–0.69)	<0.001	0.59 (0.48–0.72)	<0.001
	P for trend	0.000		0.000		0.000	

OR, odds ratio; CI, confidence interval.

*Estimated by logistic regression analysis after adjusting for age.

Table 4. Multivariable adjusted association of depressive symptoms with family mealtime frequency

Variable	Family mealtime (d)	Point depressiveness/anxiety			Depressiveness lasting for at least 2 wk			Ever had suicidal ideation during the last 1 y		
		Model 1*	Model 2†	Model 3‡	Model 1*	Model 2†	Model 3‡	Model 1*	Model 2†	Model 3‡
Men	1 Mealtime	0.78 (0.45-1.33)	0.76 (0.45-1.31)	0.78 (0.45-1.36)	0.67 (0.34-1.32)	0.67 (0.34-1.30)	0.68 (0.34-1.33)	0.55 (0.30-0.99) [§]	0.58 (0.32-1.05)	0.56 (0.32-1.09)
	2 Mealtimes	0.60 (0.37-0.98) [§]	0.61 (0.38-0.98) [§]	0.65 (0.40-1.05)	0.61 (0.36-1.05)	0.61 (0.36-1.04)	0.63 (0.37-1.07)	0.46 (0.27-0.78) [§]	0.47 (0.28-0.80) [§]	0.49 (0.28-0.84) [§]
	3 Mealtimes	0.57 (0.38-0.85) [§]	0.57 (0.38-0.85) [§]	0.58 (0.39-0.88) [§]	0.58 (0.35-0.95) [§]	0.60 (0.36-0.97) [§]	0.61 (0.38-0.99) [§]	0.48 (0.31-0.75) [§]	0.51 (0.33-0.79) [§]	0.52 (0.33-0.81) [§]
	P _{trend}	0.021	0.021	0.036	0.124	0.125	0.137	0.005	0.008	0.013
Women	1 Mealtime	0.85 (0.60-1.20)	0.86 (0.61-1.22)	0.83 (0.59-1.16)	0.87 (0.59-1.28)	0.88 (0.60-1.29)	0.84 (0.57-1.24)	1.07 (0.73-1.56)	1.08 (0.74-1.57)	1.06 (0.73-1.53)
	2 Mealtimes	0.71 (0.52-0.96) [§]	0.68 (0.50-0.92) [§]	0.70 (0.51-0.95) [§]	0.82 (0.57-1.18)	0.81 (0.57-1.17)	0.83 (0.58-1.19)	0.77 (0.56-1.07)	0.77 (0.56-1.06)	0.78 (0.56-1.07)
	3 Mealtimes	0.74 (0.68-0.95) [§]	0.74 (0.58-0.95) [§]	0.76 (0.59-0.97) [§]	0.74 (0.55-0.99) [§]	0.76 (0.56-1.02)	0.76 (0.56-1.03)	0.87 (0.68-1.12)	0.91 (0.70-1.18)	0.92 (0.71-1.19)
	P _{trend}	0.053	0.033	0.059	0.221	0.253	0.262	0.172	0.208	0.280
All	1 Mealtime	0.83 (0.62-1.11)	0.83 (0.62-1.14)	0.80 (0.60-1.07)	0.82 (0.59-1.15)	0.83 (0.59-1.16)	0.80 (0.57-1.12)	0.90 (0.65-1.25)	0.91 (0.66-1.26)	0.89 (0.64-1.22)
	2 Mealtimes	0.70 (0.54-0.90) [§]	0.68 (0.53-0.88) [§]	0.70 (0.54-0.91) [§]	0.74 (0.55-0.99) [§]	0.74 (0.55-0.99) [§]	0.75 (0.56-1.01)	0.65 (0.49-0.86) [§]	0.66 (0.50-0.87) [§]	0.67 (0.50-0.88) [§]
	3 Mealtimes	0.71 (0.57-0.88) [§]	0.70 (0.57-0.87) [§]	0.72 (0.58-0.89) [§]	0.70 (0.54-0.91) [§]	0.72 (0.56-0.93) [§]	0.73 (0.56-0.94) [§]	0.77 (0.62-0.96) [§]	0.81 (0.65-1.02)	0.82 (0.65-1.03)
	P _{trend}	0.006	0.003	0.008	0.034	0.037	0.043	0.017	0.039	0.064
	P _{interaction}	0.546	0.574	0.616	0.768	0.775	0.815	0.061	0.055	0.065

OR, odds ratio; CI, confidence interval.

*In model 1, age, sex (analysis for all), marital status, employment status, and income level were adjusted. †In model 2, current alcohol consumption and smoking were additionally adjusted. ‡In model 3, comorbidities with cardiovascular diseases, arthritis, and asthma were further adjusted. §P-value estimated by multiple logistic regression analysis <0.05. ||Obtained by adding the interaction term (between sex and family mealtimes) in the multiple logistic regression models.

greater structure and stability in family relationships.^{17,19,23,24} Family mealtimes, which allow family members to get together, communicate, and share emotions, could be helpful in alleviating negative effects of stressful experiences as well as depressive mood.^{14,17,22} Family mealtimes on a regular basis also promote intimacy among family members by creating a sense of unity.¹⁷ On the other hand, those who have meals alone tend to have relatively less interaction and lower social support compared to those who have meals with their family members.²⁵ The lack of communication and silence during mealtimes may result in feelings of loneliness and depressive mood.²⁶ Therefore, it may be necessary to emphasize the importance of participating in family mealtimes given the modern trend of living alone and the decreasing number of get-togethers within the family.

Interestingly, we found that elderly men were more likely to experience a beneficial effect on their mood by having family mealtimes compared to elderly women. According to previous studies on depression in men, sharing feelings or thoughts with others including family members has a more therapeutic effect on depression in men than in women.^{18,27} In addition, having supportive relationships, such as discussing problems with trusted family members, contributes a lot to men's ability to cope with stress or depression.²⁷ Therefore, men who have meals alone may feel greater loneliness than those who usually have meals with their families, because they do not get an opportunity to discuss their stressful situations with family members.

In this study, the prevalence of having meals alone was 25.0%. A previous study reported that the prevalence of having meals alone was 12.9%,²² which was much lower than in our study. Our study was conducted among elderly individuals aged 65 and older with a median age of 72.9 years old while the other study included participants younger than 65 years old (median age, 67 years old).²² This difference in the age distribution of study participants could explain the discrepancy between the studies. Although further studies are necessary, we assume that the prevalence of having meals alone might increase with age. In our study, the frequency of family mealtimes was higher in men than in women, which was compatible with the finding of the other study.²¹

The prevalence of depressive disorders in the elderly varies markedly across the studies, even in the same ethnic population. In our study, the prevalence of point depressiveness was 18.6%, and the prevalence of depressiveness lasting for at least 2 weeks was 15.2%. According to previous studies, the prevalence of major depression was reported to range from 4.6% to 9.3%, and, for depressive disorder, the prevalence ranged from 4.5% to 37.4%.^{1,28} Chong et al.²⁹ reported that the prevalence of depressive neurosis and major depression in the elderly in Taiwan was 15.3% and 5.9%, respectively. Another study in Taiwan reported that the 1-month prevalence of clinically significant non-major depression in community-dwelling elderly (65 years of age or older) was 8.8%.³⁰ This variation in depression across studies could have resulted from varying cultural sensitivity to the diagnosis of depression, the psychometric tool, or innate biologic variation.

This study had certain strengths. First, we conducted this study us-

ing a large representative sample of the Korean population. Second, we considered depressive mood in three ways: point depressiveness/anxiety, depressiveness lasting for at least 2 weeks, and suicidal ideation during the last 1 year. In addition, we checked a wide range of covariates, including a number of clinical conditions that may have adverse effects on mood.

However, the findings of the present study should be viewed in light of several limitations. First, as it was a cross-sectional study, it was unable to explain a causal relationship between family mealtime frequency and depressive symptoms, and further longitudinal research is required. Second, we could not apply the diagnostic criteria for depressive disorder because the Korea National Health and Nutrition Examination Survey data lacked detailed questions needed for diagnosing clinical depression. Instead, we considered depressive symptoms in three ways including suicidal ideation to avoid hasty generalization. Third, we asked about depressiveness lasting for at least 2 weeks and suicidal ideation experienced during the last 1 year, which might have caused recall bias. Finally, we only assessed mealtimes with family because the Korea National Health and Nutrition Examination Survey data lacked detailed questions about mealtimes, so the eating alone group could include mealtimes with friends, which could cause underestimation in our conclusion. Despite these limitations, the present study provides significant outcomes as this was the first study to investigate the association between frequency of family meals and depressive symptoms in elderly Koreans.

In conclusion, this cross-sectional study revealed that family mealtimes were closely associated with depressive symptoms in elderly Koreans, which suggests that maintaining intrafamilial bonding is important for mental health in an older population.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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