

The Relationship Between Breakfast Patterns and Suicide Ideation: Based on Korean National Health and Nutrition Examination Survey

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ABSTRACT

In this study, the data from Korea National Health and Nutrition Examination Survey (KNHANES) was used to find out the relationship between breakfast patterns and suicide ideation of Koreans. This study used data from the 6th (2013-2015) and 7th (2016) of the Korea National Health and Nutrition Examination Survey (KNHANES) to analyze 8,508 participants, excluding those without information on breakfast frequency, age, gender, region, income levels, education levels, marital status, subjective health status, and drinking frequency for one year. The frequency of breakfast is classified as “5 to 7 times a week”, “3 to 4 times a week”, “1 to 2 times a week”, and “Rarely” (0 time a week). Whether breakfast accompanied by family members and non-family members was classified as “Yes” or “No” through a self-reported response to the question, “Did you eat with other people for most of the time when having breakfast during the past year?” When asked if he had seriously considered suicide in the past year, the answers were “Yes” or “No” through self-reported response and analyzed it through a chi-square test and multiple logistic regression. Analyses of associations after adjusting the correction parameters such as age, gender and income levels showed that the risk of suicide ideation was statistically significantly 1.41 times higher (OR: 1.41 95% CI 1.09-1.84) in the unaccompanied group, compared to those accompanied family and non-family members at breakfast. Also, the analysis of stratification by age showed that the risk of suicide was 1.45 times higher (OR: 1.45 95% CI 1.04-2.03) in the unaccompanied group, compared to those accompanied family and non-family members at breakfast. With the results of this study, it is necessary to seek ways to ensure that breakfast can be accompanied by family and non-family members, as well as efforts to reduce the rate of skipping breakfast.

1. Introduction

Among the three essential elements for human life, food, clothing, and shelter, it is very important to supply sufficient nutrients through meals, especially for maintaining health and promoting metabolism (Lim & Son, 2006). In particular, regular breakfast intake has a positive effect on appetite control, metabolism, and the composition of the total daily meal, thereby reducing the prevalence of obesity and chronic diseases (Jung, 2010), in addition to mental health such as anxiety symptoms by reducing the release of stress hormones related to stimulation on the pituitary gland-hypothalamus (Park & Ahn, 2016). Vitamins and minerals consumed through breakfast intake can act on neurotransmitters related to mood and are associated with depression (O'Sullivan et al., 2008). Despite these advantages of having breakfast, many Koreans tend to overlook the necessity of breakfast and skip it more often than lunch and dinner (Chang, 1997). In the traditional life of Korea, breakfast was more important than lunch and dinner, but in modern times, the rate of skipping breakfast is very high (Jung, 2010). According to the 4th Korea National Health and Nutrition Examination Survey, the rate of skipping breakfast increased from 21.4% in 2011 to 23.9% in 2013 (Control and Prevention, 2012).

According to Kostat, the number of single-person households in Korea exceeded 5 million in 2016, making it a common type of household in Korea, accounting for 27.2% of all households (Kostat, 2016). In this regard, the rate of shared meals with family members and non-family members is decreasing compared to the past, and recently, the “Hon-bab” culture, which is eating alone, has emerged as a new trend with simplicity as a priority (Control and Prevention, 2012). In addition, according to the 2013 Korea National Health and Nutrition Examination Survey, the rate of family meals among Korean adolescents at breakfast decreased by 13.7% from 59.3% in 2005 to 45.6% in 2013 (Welfare, 2014). Considering the previous study that states eating with family or non-family members can make people eat more deliciously and in large quantities, whether to eat together with someone else affects physical health (Herman, 2015). It is known that family meals have a positive function in psychological aspects by reinforcing the function of the family (Cason, 2006). In addition, people who ate breakfast alone had a lower overall health condition and a higher risk of suicide ideation than those who ate with their families (Oh, 2017). In other words, the “Hon-bab” culture can have a negative effect on both physical health and mental health related to the formation of new relationships (Control and Prevention, 2012). Especially for children, family meals provide an opportunity to directly observe social interactions that are deeply related to the child's mental health (Dickstein et al., 1999). Early adulthood (20-39 years old) is a period when mature personality, good interpersonal relationship, and a sense of responsibility for oneself and family are developed. Because it is a very important period to form a psychological bond in relationships with people, eating with others is especially important (Ericson, 1968).

The prevalence of mental illness is increasing along with the change in breakfast type due to rapid changes in our modern society and busy daily life (Christensen, 2009). Depression, which has the highest prevalence of mental disorders, is closely related to suicide ideation in all age groups (Jeon et al., 2015), and it is an early determinant of suicidal behavior and an important

predictor of suicide attempt (Christensen, 2009). The suicide rate in Korea has been steadily increasing since the late 1990s, contrary to the declining trend of average suicide rates in OECD countries. According to OECD statistics, the frequency of suicide in Korea from 9.4 per 100,000 in 1994 increased year by year, reaching 24.8 per 100,000 in 2010. This figure is the highest compared to the average suicide frequency of OECD countries with a population of 11.9 per 100,000 people (Office, 2012), and it causes serious socioeconomic losses in Korea, therefore, studies on suicide are needed (Lee, 2017). However, prior studies related to suicide mainly focused on suicidal behaviors and suicide attempts, and the need for research on suicide ideation is increasing because studies on suicide ideation are insufficient (Christensen, 2009).

Previous studies on the association between breakfast and health have mainly focused on the relationship between breakfast and physical health. This study focuses on the fact that breakfast affects mental health as well as physical health and attempts to investigate the relationship between breakfast patterns and suicide ideation.

2. Methodology

2.1 Research Material

This study was conducted to investigate the relationship between breakfast patterns and suicide ideation by using the data from the 6th (2013-2015) and 7th (2016) edition of the Korea National Health and Nutrition Examination Survey, which was approved by the Korea Centers for Disease Control and Prevention (KCDC) Institutional Review Board. The Korea National Health and Nutrition Examination Survey is a national health and nutrition survey conducted in accordance with Article 16 of the National Health Promotion Act. The subjects of the Korea National Health and Nutrition Examination Survey are citizens over the age of 1 residing in Korea, and it was conducted every three years from the 1st (1998) to the 3rd (2005). In order to improve the timeliness of national statistics, it has been implemented every year since 2007. The data of the Korea National Health and Nutrition Examination Survey were stratified by the city/province, dong/eup-myeon, and housing type (general housing, apartment). In addition, samples were extracted and investigated based on immanent stratification, such as the ratio of region and education level of household heads. In this study, among the participants in the 6th and 7th Korea National Health and Nutrition Examination Survey, data of 8508 people were used, excluding those who do not have information about the frequency of breakfast, whether they are accompanied by family or non-family members at breakfast, age, gender, region, income level, education level, marital status, subjective health status, and drinking frequency for one year.

2.2 Variable

2.2.1 Independent Variable

1) Frequency of breakfast

As for the breakfast frequency, self-reported response to the question "How many times a week did you eat breakfast in the past year?" was used. Responses were classified into 4 categories: "① 5~7 times a week ② 3~4 times a week ③ 1~2 times a week ④ Rarely (0 time a week)"

2) Whether accompanied by family members or other people at breakfast

Self-reported response to the question "Did you eat with other people for most of the time when having breakfast during the past year?" were used. Responses were classified into two categories: "① Yes ② No"

2.2.2 Dependent variable

1) Suicide ideation

The suicide ideation used a self-reported response to the question "Have you ever seriously considered suicide in the past year?" Responses were classified into two categories: "① Yes ② No"

2.2.3 Correction parameter

1) Sociodemographic variable

Age, gender, region, income level, education level, and marital status were included as sociodemographic variables in statistical analysis. The "age" variable was classified into six categories: " ≤ 29 ", "30~39", "40~49", "50~59", "60~69", and " ≥ 70 ". The "gender" variable was classified into "male" and "female", and the "region" variable was classified into "Seoul", "Metropolitan City", and "Others". "Income level" variable was classified into four categories: "lower (monthly income ≤ 1 million won)", "middle-low (monthly income 1.1-2.0 million won)", "middle-high (monthly income 2.1-3.0 million won)", "high (monthly income ≥ 3.1 million won)". "Educational level" variables were classified into four categories: "below elementary school graduate", "middle school graduate", "high school graduate", and "university graduate" and above, and "marital status" variables were classified as "married" and "single".

2) Physical condition variable

Subjective health status was included as a physical condition variable in statistical analysis. The subjective health status used a self-reported response to the question "How do you consider your health to be?" Responses were classified into three categories: "good", "average", and "bad".

3) Health behavior variable

The drinking frequency for one year was included as a health behavior variable in statistical

analysis. For the frequency of alcohol consumption for one year, a self-reported response to the question “How often do you drink alcohol? Responses were categorized into four categories: “Not at all”, “1-4 times a month”, “2-3 times a week”, and “4 times a week”.

2.3 Statistical analysis

A chi-square test and multiple logistic regression analysis were used to analyze the association between breakfast patterns and suicide ideation. Statistical significance was tested with P-value ≤ 0.05 .

In this study, the results are shown through three tables.

Table 1 shows the number and ratio of each respondent to the variables used in the study (breakfast frequency, family and non-family members at breakfast, age, gender, region, income level, education level, marital status, subjective health status, drinking frequency for one year). In addition, it is the result of a complex sample design in which the number and ratio of suicide ideation for each variable were investigated and the ratio was weighted.

Table 1. General characteristics of subjects included for analysis

	Total		Suicide Ideation				P-value
			Yes		No		
	N	%	N	%*	N	%*	
Frequency of breakfast per week during the past year							0.379
5-7 times a week	5,625	60.2	292	4.7	5,333	95.3	
3-4 times a week	975	13.2	47	4.5	928	95.5	
1-2 times a week	852	11.8	52	5.6	800	94.4	
Rarely	1,056	14.8	68	5.9	988	94.1	
Whether accompanied breakfast with family or non-family members in the past year							0.000
Yes	4,131	45.1	181	3.9	3,950	96.1	
No	4,377	54.9	278	5.9	4,099	94.1	
Age							<.0001
≤ 29	1,632	25.9	88	5.1	1,544	94.9	
30-39	1,381	19.0	48	3.0	1,333	97.0	
40-49	1,563	19.8	64	4.1	1,499	95.9	
50-59	1,565	17.6	93	6.2	1,472	93.8	
60-69	1,327	10.2	86	5.4	1,241	94.6	
≥ 70	1,040	7.5	80	8.2	960	91.8	
Gender							0.001
Male	3,895	50.8	181	4.1	3,714	95.9	
Female	4,613	49.2	278	5.8	4,335	94.2	
Region							0.818
Seoul	1,747	21.0	85	4.7	1,662	95.3	
Metropolitan city	2,156	26.1	116	4.8	2,040	95.2	
Others	4,605	52.9	258	5.1	4,347	94.9	

	Total		Suicide Ideation				P-value
			Yes		No		
	N	%	N	%*	N	%*	
Income Level							<.0001
Low (≤ 100)	1,459	14.3	160	10.9	1,299	89.1	
Middle-low (101-200)	2,182	25.1	133	5.5	2,049	94.5	
Middle-high (201-300)	2,336	29.5	83	3.4	2,253	96.6	
High (>301)	2,531	31.2	83	3.3	2,448	96.7	
Education Level							<.0001
Below Elementary school graduate	1,734	14.8	162	10.0	1,572	90.0	
Middle school graduate	1,159	12.8	78	7.3	1,081	92.7	
High school graduate	2,920	37.3	144	4.7	2,776	95.3	
University graduate	2,695	35.2	75	2.4	2,620	97.6	
Marital Status							0.865
Married	6,650	71.0	361	4.9	6,289	95.1	
Single	1,858	29.0	98	5.0	1,760	95.0	
Subjective Health Status							<.0001
Good	2,834	35.0	90	2.7	2,744	97.3	
Average	4,181	49.0	167	3.8	4,014	96.2	
Bad	1,493	16.0	202	13.5	1,291	86.5	
Frequency of alcohol consumption for one year							<.0001
Not at all	1,688	17.2	125	7.0	1,563	93.0	
1-4 times a month	4,980	60.2	233	4.3	4,747	95.7	
2-3 times a week	1,295	16.3	55	3.9	1,240	96.1	
More than 4 times a week	545	6.3	46	8.5	499	91.5	
Total	8,508	100.0	459	5.0	8,049	95.0	

Table 2 is the result of analyzing the association between breakfast type and suicide ideation after adjusting the variables used in the study (breakfast frequency, family and non-family members at breakfast, age, gender, region, income level, education level, marital status, subjective health status, drinking frequency for one year).

Table 2. Adjusted effect between breakfast patterns and suicide ideation

	Suicide Ideation			P-value
	OR	95% CI		
Frequency of breakfast per week during the past year				
5-7 times a week	1.00			
3-4 times a week	1.05	0.71	1.55	0.80
1-2 times a week	1.16	0.78	1.72	0.46
Rarely	1.09	0.74	1.60	0.68
Whether accompanied breakfast with family or non-family members in the past year				
Yes	1.00			
No	1.41	1.09	1.84	0.01

	Suicide Ideation			
	OR	95% CI		P-value
Age				
≤ 29	1.77	0.90	3.48	0.10
30-39	1.47	0.81	2.68	0.21
40-49	1.56	0.94	2.59	0.08
50-59	1.58	1.02	2.45	0.04
60-69	0.94	0.64	1.37	0.74
≥ 70	1.00			
Gender				
Male	1.00			
Female	1.38	1.07	1.77	0.01
Region				
Seoul	1.00			
Metropolitan city	0.93	0.64	1.33	0.68
Others	1.01	0.74	1.38	0.95
Income Level				
Low (≤ 100)	1.93	1.32	2.81	0.00
Middle-low (101-200)	1.23	0.88	1.72	0.22
Middle-high (201-300)	0.85	0.59	1.21	0.37
High (>301)	1.00			
Education Level				
Below Elementary school graduate	3.26	2.02	5.28	<.0001
Middle school graduate	2.50	1.62	3.85	<.0001
High school graduate	1.75	1.24	2.46	0.00
University graduate	1.00			
Marital Status				
Married	0.90	0.56	1.44	0.66
Single	1.00			
Subjective Health Status				
Good	1.00			
Average	1.33	0.95	1.85	0.09
Bad	4.30	3.08	6.01	<.0001
Frequency of alcohol consumption for one year				
Not at all	1.00			
1-4 times a month	0.82	0.61	1.10	0.19
2-3 times a week	0.87	0.56	1.35	0.54
More than 4 times a week	1.69	1.08	2.63	0.02

Table 3 shows the results of analyzing the relationship between breakfast patterns and suicide ideation after adjusting the variables used in the study (breakfast frequency, breakfast with family and non-family members, age, gender, region, income level, education level, marital status, subjective health status, drinking frequency for one year) according to the age group one belongs which are under 60 years old and over 60 years old.

SAS version 9.4 was used for statistical analysis.

Table 3. Adjusted effect between breakfast patterns and suicide ideation by age group

	Suicide Ideation							
	60세 미만				60세 이상			
	OR	95% CI	P-value	OR	95% CI	P-value	P-value	
Frequency of breakfast per week during the past year								
5-7 times a week	1.00			1.00				
3-4 times a week	1.04	0.69	1.58	0.85	1.04	0.44	2.50	0.92
1-2 times a week	1.09	0.71	1.69	0.69	2.08	0.74	5.82	0.16
Rarely	1.03	0.66	1.60	0.90	1.39	0.62	3.09	0.43
Whether accompanied breakfast with family or non-family members in the past year								
Yes	1.00			1.00				
No	1.45	1.04	2.03	0.03	1.36	0.91	2.02	0.13
Age								
≤29	1.31	0.73	2.35	0.37				
30-39	1.12	0.68	1.85	0.66				
40-49	1.14	0.73	1.77	0.57				
50-59	1.00							
60-69					0.88	0.60	1.28	0.49
≥70					1.00			
Gender								
Male	1.00			1.00				
Female	1.45	1.07	1.98	0.02	1.41	0.92	2.17	0.12
Region								
Seoul	1.00			1.00				
Metropolitan city	0.81	0.53	1.26	0.35	1.68	0.92	3.09	0.09
Others	0.90	0.63	1.27	0.53	1.77	0.99	3.18	0.06
Income Level								
Low (≤100)	1.76	1.15	2.70	0.01	2.04	0.90	4.67	0.09
Middle-low (101-200)	1.25	0.88	1.78	0.21	1.03	0.46	2.29	0.95
Middle-high (201-300)	0.87	0.60	1.27	0.47	0.57	0.23	1.43	0.23
High (>301)	1.00			1.00				
Education Level								
Below Elementary school graduate	5.11	3.05	8.57	<.0001	1.05	0.47	2.33	0.91
Middle school graduate	2.83	1.78	4.51	<.0001	1.15	0.46	2.85	0.77
High school graduate	1.71	1.18	2.48	0.00	1.69	0.74	3.87	0.21
University graduate	1.00			1.00				
Marital Status								
Married	0.89	0.55	1.45	0.65	0.54	0.09	3.14	0.49
Single	1.00			1.00				
Subjective Health Status								
Good	1.00			1.00				
Average	1.40	0.96	2.04	0.08	1.04	0.59	1.84	0.89
Bad	4.64	3.11	6.93	<.0001	3.29	1.88	5.77	<.0001
Frequency of alcohol consumption for one year								
Not at all	1.00			1.00				
1-4 times a month	0.87	0.58	1.28	0.47	0.86	0.55	1.35	0.52
2-3 times a week	1.05	0.62	1.77	0.86	0.46	0.20	1.06	0.07
More than 4 times a week	2.24	1.25	4.00	0.01	0.94	0.49	1.78	0.85

3. Results

3.1 General characteristics of participants

This study was conducted with 8,508 people who participated in the 6th (2013~2015) and 7th (2016) Korea National Health and Nutrition Examination Survey. The relationship between the frequency of breakfast per week in the past year, the presence of family and non-family members at breakfast, and suicide ideation was analyzed.

The 5,625 subjects who eat breakfast 5-7 times a week accounted for 60.2% of the total 8,508 subjects, of which 292 (4.7%) have suicide ideation. The 975 subjects who eat breakfast 3-4 times a week accounted for 13.2% of the total subjects, of which 47 (4.5%) have suicide ideation. 852 people who eat breakfast 1-2 times a week accounted for 11.8% of the total subjects, of which 52 people (5.6%) have suicide ideation, and 1,056 people who rarely eat breakfast were 14.8% of the total subjects, of which 68 (5.9%) have suicide ideation.

In the past year, 4,131 people who answered “Yes” to the question of whether to bring family or non-family members at breakfast were 45.1% of the total. Of these, 181 people (3.9%) thought of suicide. On the other hand, 4,377 people who answered “no” were 54.9% of the total, and 278 (5.9%) thought of suicide.

3.2 Association between breakfast pattern and suicide ideation

In Table 2, there was no statistically significant association between the frequency of breakfast per week and suicide ideation during the past year. On the other hand, the risk of suicide ideation was significantly higher in the unaccompanied group by 1.41 times (OR: 1.41 95% CI 1.09-1.84) compared to the group accompanying family and non-family members at breakfast in the last 1 year.

3.3 Association between breakfast pattern and suicide ideation according to age

When stratified into two groups under the age of 60 and over 60 years of age in Table 3, there was no statistically significant association between the frequency of breakfast per week for the past year and the risk of suicidal thoughts in both groups. In addition, there was no statistically significant association between family and non-family members at breakfast and suicide ideation in the age group of over 60 years old. However, in the group under the age of 60, the risk of suicide ideation was statistically significantly higher in the unaccompanied group by 1.45 times (OR: 1.45 95% CI 1.04-2.03) compared to the group accompanied by family and non-family members at breakfast during the last 1 year.

4. Consideration

This study used data from the 6th (2013~2015) and 7th (2016) Korea National Health and Nutrition Examination Survey and aims to find out the relationship between the breakfast pattern and suicide ideation of Koreans. Breakfast pattern was defined as the frequency of breakfast per week during the past year and whether the breakfast was accompanied by family members or other people.

To find out the relationship between breakfast pattern and suicide ideation, variables of age, gender, region, income level, education level, marital status, subjective health status, and drinking frequency in a year were adjusted and analyzed. As a result, there was no statistically significant association between suicide ideation and breakfast frequency per week during the past year. However, the risk of suicide ideation was statistically higher in the group that did not accompany family members or non-family members at breakfast. In addition, when stratified analysis was performed into two groups under the age of 60 and over the age of 60, the risk of suicide ideation was statistically higher in the group that did not accompany family members or non-family members at breakfast in the age group of under 60 years old.

The result of this study is the same as the results of the study showing that eating with family improved overall physical and mental health by lowering stress and increasing life satisfaction (Oh, 2017), eating with family improves satisfaction with leisure time (Eisenberg et al., 2004), and a prior study showing that people can feel happiness in daily life through meals with others (Yiengprugsawan et al., 2015). However, in adolescence, family meals are important not only to eat together, but to share eating habits within the family with emotional sympathy (Bae, 2017). Early adulthood (20-39 years old) is a time when responsibility for oneself and family and a psychological bond in new family relationships are established (Ericson, 1968). Considering that family meals are very important (Jung et al., 2018), it is necessary to conduct a thorough study through more subdivided age groups in future studies.

In particular, in the case of the age group over 60 years old in the results of this study, there was no statistically significant association between breakfast type and suicide ideation, so it is necessary to consider the elderly living alone included in the age group. According to Kostat, the proportion of elderly households living alone out of the total elderly households has continuously increased, from 8.9% in 1990 to 19.3% in 2017 (Kostat, 2016), and these are low-income groups and often belong to the socially disadvantaged. (Kim, 2009). Because the rate of skipping breakfast was more than 10 times higher in the elderly living alone compared to the elderly living together (Kim, 1997), the importance of breakfast in their lives was so low that breakfast had little effect on suicide ideation. In addition, the elderly living alone tend to have physical and mental difficulties and do not want to receive help from others or even their children (Kim et al., 1999). Therefore, in the case of the elderly living alone, even if loneliness decreases through meals with others, it is difficult to consider it to directly have positive influence in suicide ideation. In addition to living alone, Suicide ideation are not caused by one reason, but a number of complex factors (Choi, et al., 2008; Choi & Kim, 2008). Therefore, in the analysis of the age group over 60 years old, it is necessary to conduct a more in-depth study after additionally adjusting various psychosocial variables that have a special effect on the elderly compared to other age groups.

Socialization and communication skills can be learned through family meals (Eisenberg et al., 2004). Communication can be said to be an important factor in establishing, developing, and maintaining smooth interpersonal relationships, in terms of being a medium that influences each other's actions through verbal and non-verbal means (Jung, 2011). People with interpersonal problems are more likely to have reduced social support (Eun, 2017). Social support is one of the protective factors against suicide, and when experiencing stress or loss, suicide rates may decrease in people with sufficient social support (Leo & Ormskerk, 1991), but a decrease in social support may negatively affect depression, which can negatively affect quality of life and mental health, increasing the risk of suicide ideation (Seo, 2004).

This study has the following limitations. First, because this study is a cross-sectional analysis using data from the 6th (2013-2015) and 7th (2016) Korea National Health and Nutrition Examination Survey, it is difficult to understand the causal relationship between the variables. Second, since the self-reported response was used as a variable, there is a possibility that the result may be affected by recall bias. Third, the breakfast pattern was associated with depression, an important predictor of suicide ideation (Jeon et al., 2015), but there was no statistically significant association in this study. In this regard, not only the frequency of breakfast but also the quality of breakfast can be seen as an important variable for mental health. Because this study uses secondary data, it is necessary to pay attention to interpretation as it has not been able to proceed with the study considering the factors. In spite of these limitations, this study used large-scale samples using data from Korea National Health and Nutrition Examination Survey representing Korea, so the results can be generalized. In addition, after adjusting the frequency of breakfast, it is significant because the association between family and non-family members and suicide ideation at breakfast was able to be identified and different aspects of the study results could be confirmed by stratifying analysis according to age group.

5. Conclusion

According to this study, there was a statistically significant relationship between the risk of suicide ideation and whether to eat with others in breakfast. Therefore, since the meal with others has a positive effect on mental health, the necessity of the meal with others should be actively promoted. In particular, in the group under the age of 60, eating with others is strongly related to suicide ideation, so active management will be required.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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