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Association Between Employment Status and Suicidal Ideation in Korean Adults

Sun Mi Kim[1], Jae Won Oh[2,3], Nak-Hoon Son[4], and San Lee[5,6] ✉

[1]Department of Nursing, Andong Science College, Andong, Republic of Korea
[2]Department of Psychology, University of Utah Asia Campus, Incheon, Republic of Korea
[3]Department of Psychology, University of Utah, Salt Lake City, UT, USA
[4]Department of Statistics, Keimyung University, Daegu, Republic of Korea
[5]Working Mind Institute, Seongnam, Republic of Korea
[6]Department of Psychiatry and the Institute of Behavioral Science in Medicine, Yonsei University College of Medicine, Seoul, Republic of Korea

Objective Employment status is a key indicator of socioeconomic status, and unstable employment conditions can cause various social problems. However, research in Asian populations on the association between employment status and mental health, particularly suicidal ideation, remains relatively limited. This study investigated the association between employment status and suicidal ideation in general population in South Korea.

Methods Using data from the 2015, 2017, and 2019 Korea National Health and Nutrition Examination Survey (KNHANES), 6,509 participants aged ≥20 years were analyzed. Suicidal ideation was characterized by individuals considering suicide seriously within the past year. Covariates were adjusted to account for factors such as sociodemographic, health behavior, and mental health factors. Multivariable logistic regression was performed, along with stratified analyses by subgroups of sociodemographic, health behavior, and mental health factors to assess effect modification.

Results In our KNHANES data analysis, unemployed individuals had 1.85 times higher odds of reporting suicidal ideation compared to employed individuals (adjusted odds ratio, 1.85; 95% confidence interval, 1.41−2.44; p<0.001). In subgroup analysis, all covariates—except women and low body mass index—showed effect modification on the association between employment status and suicidal ideation.

Conclusion This study demonstrated that unemployed status was significantly associated with increased suicidal ideation. These findings suggest that further research and policy attention are warranted to better understand and address the mental health needs of unemployed individuals.

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Keywords Employment status; Suicidal ideation; Mental health; KNHANES.

INTRODUCTION

Suicide is an important public health issue worldwide because it has various direct and indirect effects at both the individual and the societal level. South Korea (hereafter, Korea) has the highest suicide rate among the Organization for Economic Cooperation and Development (OECD) member countries,[1,2] so social intervention is necessary for suicide prevention.[3] Suicide has been viewed as a continuum of suicidal ideation, suicidal planning, and suicidal behavior.[4] Suicidal ideations are intricately associated with a variety of risk factors, including biological, psychological, and environmental factors, so a focus on preventing suicidal ideations is necessary and those preventing measures can also prevent suicidal behavior.

Employment is an important factor influencing work performance.[5,6] Korea has seen difficulties in economic development due to the global economic downturn for the past few years. Economic downturns can exacerbate anxiety by appealing to feelings of isolation and uncertainty about the future due to corporate restructuring, early retirement, and job loss.[7] Employment-related studies in some countries have shown that precarious employment patterns increase suicide rates two- or

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✉ **Correspondence:** San Lee, MD, MPH
Department of Psychiatry, Yonsei University College of Medicine, 50-1 Yonsei-ro, Seodaemun-gu, Seoul 03722, Republic of Korea
Tel: +82-2-2228-1620, **Fax:** +82-2-313-0891, **E-mail:** sanlee@yonsei.ac.kr

three-fold at least, and even up to five-fold in certain countries.[8] The accelerated pace of social change in Korea, compared to many other countries, can contribute to psychological challenges, including suicidal ideation, triggered by precarious employment situations.[9] The status of being unemployed is also a problem related to suicidal ideation. An irregular lifestyle after dismissal can lead to a strong tendency toward substance abuse, including alcohol consumption and smoking.[10] Unemployed people are also at risk of experiencing depression, anxiety, irritability, and aggression[11] which are important risk factors for suicidal ideation.

Previous studies found factors such as older age, female gender, low income, low education, and other sociodemographic aspects to be related to suicidal ideation.[8,11-16] Health behaviors such as smoking, physical activity, sleep, and chronic diseases have also been presented as factors related to suicidal ideation.[17-20] Furthermore, stress recognition, depression, and the lack of a sense of belonging are mental health factors related to suicidal ideation.[21] Unemployment and financial problems caused by the economic crisis were also studied.[22] But these studies, while numerous studies have explored the link between employment status and suicidal ideation, few have dissected the association between unemployment and suicidal ideation in relation to sociodemographic factors, health behaviors, and mental health conditions.[23] To address these gaps, our study utilized recent nationally representative data from the 2015, 2017, and 2019 waves of the Korea National Health and Nutrition Examination Survey (KNHANES). We aimed to examine the association between employment status and suicidal ideation while adjusting for a broad range of relevant covariates. Additionally, we explored effect modification through subgroup analyses, which allowed us to identify vulnerable populations for targeted intervention.

METHODS

Study design and participants

KNHANES is conducted on a national scale to monitor trends in health risk factors along with the prevalence of major chronic diseases. Details on the sampling design of the KNHANES are available on the KNHANES webpage (https://knhanes.kdca.go.kr/knhanes/sub03/sub03_01.do). KNHANES employs a stratified, multistage probability sampling design based on sex, age, and geographic region to select a representative sample of the non-institutionalized Korean population. Our study focused on the 2015, 2017, and 2019 waves of the KNHANES, as these were the only years that included assessments of suicidal ideation in the adult population at the time of data analysis. From a total of 23,617 people, participants without a valid answer for employment status (n=5,940), without a valid answer for suicidal ideation (n=1,401), and missing covariates (n=9,767) were excluded. To reduce potential bias and maintain internal validity, we applied a complete-case analysis approach. Hence, 6,509 participants aged ≥20 years were included in this study (Figure 1). All participants signed an informed consent form, and the KNHANES was conducted according to the Declaration of Helsinki. This study was approved by the Institutional Review Board of Yongin Severance Hospital (No. 9-2021-0161).

Assessment

Employment status

Participants were asked about their current employment status and classified into two groups. "Have you recently worked more than an hour per week for income?" Responses of "Yes" and "No" were selected for analysis, and other answers were excluded.

Suicidal ideation

The participants were asked about their suicidal ideation. "Have you ever considered serious suicide in the past year?" The responses of "Yes" or "No" were selected, while other responses including "Not applicable" and "Don't know, no answer" were excluded from the analysis.

Covariates

Sociodemographic factors included five variables: gender, age, education attainment, equalized household income, and living status. There were seven health behavior factors: alcohol use, smoking, physical activity, chronic medical disease, sub-

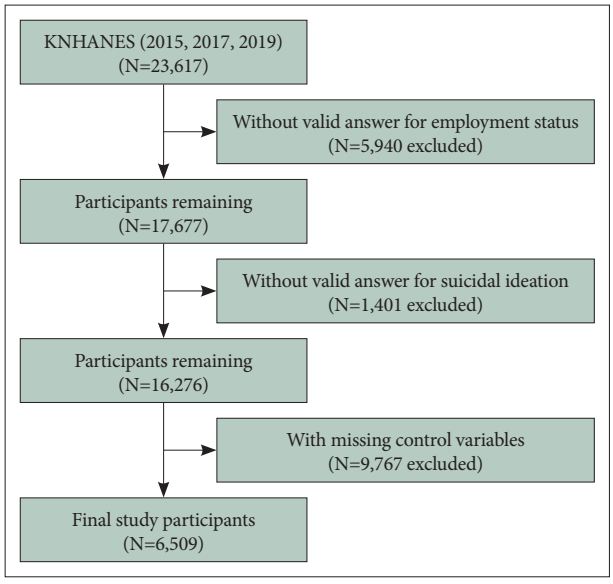

Figure 1. Flow diagram of the study participants. KNHANES, Korean National Health and Nutrition Examination Survey.

jective health conditions, body mass index (BMI), and sleep. Alcohol use and smoking were classified as "Yes" or "No" depending on the current status. Physical activity was classified as "Yes" if the respondent reported engaging in medium-intensity physical activity for at least 2.5 hours per week or a combination of moderate- and vigorous-intensity activities meeting the equivalent standard; otherwise, it was classified as "No."[24] In the case of chronic diseases, the number of diagnoses for hypertension, diabetes mellitus, dyslipidemia, stroke, and angina pectoris was classified into "none," "one," or "two or more," regardless of ongoing treatment status. Subjective health condition was assessed by self-rated health and classified as "Good" or "Poor." BMI was classified as under 18.5, between 18.5 and 22.9, between 23.0 and 24.9, and 25 kg/m² or higher, according to the criteria of the Korean Society for the Study of Obesity. Sleep duration was categorized into three groups: less than 6 hours, 6 to less than 8 hours, and 8 hours or more per day. Stress recognition was classified as "No" for "I hardly ever feel it" and "Yes" for the remaining responses, and depression was classified based on whether or not the patient felt depressed for more than 2 consecutive weeks.

Statistical analysis

SAS software (version 9.4; SAS Institute) was used for analysis. General characteristics of the participants were assessed using the chi-square test. Multivariable logistic regression, adjusting for all covariates, was applied to investigate the association between employment status and suicidal ideation, with results presented as adjusted odds ratios (ORs) and 95% confidence intervals (CIs). Subgroup analyses were conducted to explore potential effect modification by examining whether the association between employment status and suicidal ideation differed across categories of covariates (e.g., gender, income level, depression). These analyses were stratified by covariate levels, and results were presented as ORs and 95% CIs. Statistical significance was set at $p<0.05$.

RESULTS

Descriptive statistics

Descriptive statistics of the study participants are presented in Table 1. Suicidal ideation was reported more frequently among unemployed participants (10.4%) compared to those employed (3.9%) ($p<0.001$). Regarding other covariates, suicidal ideation was more prevalent among women, participants aged 60 years or older, individuals with lower educational attainment, and those in the lowest income quartile (all $p<0.01$). Health-related and mental health factors such as smoking, physical inactivity, poor subjective health, presence of chronic disease, stress recognition, and depression also showed significant associations with suicidal ideation. However, living status and sleep duration were not significantly associated with suicidal ideation.

Association between employment status and suicidal ideation

Results of the multivariable logistic regression analysis are presented in Table 2. After adjusting for sociodemographic, health behavior, and mental health covariates, unemployment was significantly associated with higher odds of suicidal ideation compared to employment (OR, 1.85; 95% CI, 1.41–2.44; $p<0.001$).

While other covariates were included in the model primarily for adjustment, several factors also showed significant associations with suicidal ideation. Specifically, lower educational attainment, lower income, poor subjective health, perceived stress, and depression were all significantly associated with increased odds of suicidal ideation (all $p<0.001$). In contrast, no significant associations were observed for alcohol use, smoking, physical activity, chronic medical conditions, BMI, or sleep duration.

Effect modification by individual covariates on the association between employment status and suicidal ideation

Subgroup analyses were conducted to explore whether the association between employment status and suicidal ideation varied across levels of individual covariates (Table 3). Unemployed status was significantly associated with increased odds of suicidal ideation in specific subgroups, including men (OR, 3.22; 95% CI, 2.51–4.12), individuals aged 40–59 years (OR, 5.24; 95% CI, 3.67–7.49), those with a university education or higher (OR, 2.75; 95% CI, 1.60–4.75), and participants in the lowest income quartile (OR, 2.31; 95% CI, 1.78–3.00).

Stronger associations were also observed among individuals who reported alcohol use, current smoking, physical inactivity, poor subjective health, one chronic condition, obesity, and those who reported 6–8 hours of sleep. Among mental health factors, the association between unemployment and suicidal ideation was notably stronger in participants with perceived stress (OR, 4.30; 95% CI, 3.27–5.65) and depression (OR, 2.61; 95% CI, 1.82–3.74).

In contrast, the association between employment status and suicidal ideation was not statistically significant among women, non-drinkers, or those with underweight BMI. These results suggest possible effect modification across population subgroups, though no formal interaction terms were included in the regression models.

Table 1. Sociodemographic characteristics of study participants and suicidal ideation

Variables	Suicidal ideation		p
	Yes (N=384)	No (N=6,125)	
Employment status			<0.001
Employed	178 (3.9)	4,350 (96.0)	
Unemployed	206 (10.4)	1,775 (98.6)	
Sociodemographic factors			
Gender			<0.001
Men	270 (4.9)	5,245 (95.1)	
Women	114 (11.5)	880 (88.5)	
Age (yr)			0.005
20–39	84 (5.0)	1,573 (94.9)	
40–59	137 (5.3)	2,448 (94.7)	
60 or over	163 (7.1)	2,104 (92.8)	
Educational attainment			<0.001
High school or below	328 (8.0)	3,765 (91.9)	
University or above	56 (2.3)	2,360 (97.6)	
Equalized household income			<0.001
Low	118 (9.3)	2,568 (90.6)	
High	266 (3.2)	3,557 (96.7)	
Living status			0.079
Living together	305 (5.6)	5,079 (94.3)	
Living alone	79 (7.0)	1,046 (92.9)	
Health behavior factors			
Alcohol use			0.022
No	20 (9.5)	189 (90.4)	
Yes	364 (5.7)	5,936 (94.2)	
Smoking			<0.001
No	180 (4.9)	3,481 (95.0)	
Yes	204 (7.1)	2,644 (92.8)	
Physical activity			<0.001
No	239 (6.7)	3,291 (93.2)	
Yes	145 (4.8)	2,834 (95.1)	
Chronic medical disease			0.024
None	312 (5.5)	5,281 (94.4)	
One	54 (7.7)	646 (92.2)	
Two or more	18 (8.3)	198 (91.6)	
Subjective health conditions			<0.001
Good	202 (3.8)	5,109 (96.2)	
Poor	182 (15.1)	1,016 (84.4)	
BMI			0.004
Underweight	24 (6.2)	180 (88.2)	
Normal weight	149 (5.6)	2,484 (94.3)	
Overweight	110 (5.8)	1,778 (94.1)	
Obesity	101 (5.6)	1,683 (94.3)	
Sleep (hr/day)			0.079
Less than 6	230 (6.5)	3,308 (93.5)	
6 to less than 8	92 (5.1)	1,707 (94.8)	
8 or more	62 (5.2)	1,110 (94.7)	
Mental health factors			
Stress recognition			<0.001
No	125 (2.6)	4,561 (94.3)	
Yes	259 (14.2)	1,564 (85.7)	
Depression			<0.001
No	122 (2.1)	5,644 (97.8)	
Yes	262 (35.2)	481 (64.7)	

Categorical variables are presented as numbers and percentages.
BMI, body mass index.

DISCUSSION

This study aimed to examine the association between employment status and suicidal ideation using cross-sectional survey data. The findings showed that unemployment is associated more likely to have suicidal ideation than the employed. The associations of covariates with suicidal ideation were also found to be pronounced across specific sociodemographic, health behavioral, and mental health factors.

This was consistent with the findings of an American study by Kposowa et al.[11] (2019), indicating that unemployment was significantly associated with suicidal ideation. Employment status is a means of securing economic power, which is a resource that can satisfy various needs. Kposowa et al.[11] also found that employed persons have a higher quality of life than the unemployed. It can be interpreted that suicidal ideation increases when quality of life is not satisfied by their unemployment status. In this study, we attempted to consider the influence of various covariates and subgroups when employment status is related with suicidal ideation and what kind of support should be provided accordingly.

We showed that suicidal ideation is a complex element associated with a variety of factors, including sociodemographic, health behavior, and mental health factors. Consistent with the findings of Liu et al.[25] (2017) that educational attainment is associated with suicidal ideation, our results indicated that low educational attainment (high school or below) had higher likelihood of suicidal ideation than high educational attainment. This could be explained by lower education levels leading to income inequality, which, in turn, can lead to suicidal ideation. One possible explanation is that lower educational

Table 2. Results of the multivariable logistic regression analysis for the association between employment status and suicidal ideation

Variables	Suicidal ideation		p
	OR	95% CI	
Employment status			
Employed (Ref.)	1.00		
Unemployed	1.85	1.41–2.44	<0.001
Sociodemographic factors			
Gender			
Men (Ref.)	1.00		
Women	1.24	0.92–1.24	0.160
Age (yr)			
20–39 (Ref.)	1.00		
40–59	1.30	0.89–1.32	0.164
60 or over	1.40	0.89–2.21	0.142
Educational attainment			
High school or below	2.12	1.51–2.98	<0.001
University or above (Ref.)	1.00		
Equalized household income			
Low	1.61	1.22–2.14	<0.001
High (Ref.)	1.00		
Living status			
Living together (Ref.)	1.00		
Living alone	1.13	0.76–1.66	0.545
Health behavior factors			
Alcohol use			
No (Ref.)	1.00		
Yes	1.79	1.23–2.33	0.478
Smoking			
No (Ref.)	1.00		
Yes	1.21	0.93–1.56	0.151
Physical activity			
No (Ref.)	1.00		
Yes	1.20	0.92–1.55	0.176
Chronic medical disease			
None (Ref.)	1.00		
One	0.94	0.64–1.37	0.749
Two or more	0.74	0.40–1.38	0.347
Subjective health conditions			
Good (Ref.)	1.00		
Poor	1.79	1.37–2.33	<0.001
BMI			
Underweight	1.19	0.68–2.10	0.546
Normal weight (Ref.)	1.00		
Overweight	1.14	0.84–1.54	0.398
Obesity	1.06	0.77–1.45	0.729
Sleep (hr/day)			
Less than 6	1.25	0.93–1.68	0.145
6 to less than 8 (Ref.)	1.00		
8 or more	0.92	0.63–1.36	0.678
Mental health factors			
Stress recognition			
No (Ref.)	1.00		
Yes	3.06	2.33–4.02	<0.001
Depression			
No (Ref.)	1.00		
Yes	13.00	10.00–16.90	<0.001

BMI, body mass index; OR, odds ratio; CI, confidence interval.

attainment may be associated with limited access to stable employment and lower income, which in turn can contribute to increased psychosocial stress and vulnerability to suicidal ideation. This interpretation is supported by prior research highlighting education as a key social determinant of mental health outcomes.[26] Furthermore, although our study does not establish causality, previous studies suggest that lower educational attainment may contribute to poverty and related psychosocial stress, which are known risk factors for suicidal ideation.[27,28] Given that subjective health conditions are closely linked to overall well-being and perceived quality of life, our results showed that participants with poor subjective health had 1.79 times higher odds of suicidal ideation than those with good subjective health. Our findings align with previous research, such as Arria et al.[18] (2009), which emphasized the significant role of mental health conditions—particularly perceived stress and depressive symptoms—in the context of suicidal ideation. Among mental health factors, stress recognition was associated with higher odds of suicidal ideation, and depression was similarly associated with increased odds, after adjusting for covariates. Previous research has noted the important effects of mental health on suicidal ideation.[1,15] Taken together with our findings on employment status and other socioeconomic and health-related factors, suicide prevention strategies should comprehensively address individuals' unemployment, low educational attainment, low income, poor subjective health status, and mental health conditions such as stress and depression.

The subgroup analysis presented how individual covariates modified the association between employment status and suicidal ideation. Except the categories of women, no alcohol use, and underweight, all other covariates showed significant association with suicidal ideation when unemployed. In com-

Table 3. Subgroup analysis of the association between employment status and the presence of suicidal ideation stratified by sociodemographic, health behavior, and mental health factors

Variable	Employed (Ref.)	Unemployed		p
	OR	OR	95% CI	
Sociodemographic factors				
Gender				
Men	1.00	3.22	2.51–4.12	<0.001
Women	1.00	1.38	0.94–2.05	0.104
Age (yr)				
20–39	1.00	1.95	1.23–3.07	0.004
40–59	1.00	5.24	3.67–7.49	<0.001
60 or over	1.00	2.18	1.54–3.07	<0.001
Educational attainment				
High school or below	1.00	2.35	1.87–2.95	<0.001
University or above	1.00	2.75	1.60–4.75	<0.001
Equalized household income				
Low	1.00	2.31	1.78–3.00	<0.001
High	1.00	1.92	1.29–2.87	0.001
Living status				
Living together	1.00	2.98	2.36–3.76	<0.001
Living alone	1.00	2.33	1.47–3.69	<0.001
Health behavior factors				
Alcohol use				
No	1.00	2.12	0.78–5.76	0.140
Yes	1.00	2.84	2.29–3.51	<0.001
Smoking				
No	1.00	2.54	1.88–3.43	<0.001
Yes	1.00	3.49	2.61–4.66	<0.001
Physical activity				
No	1.00	3.07	2.35–4.01	<0.001
Yes	1.00	2.41	1.72–3.37	<0.001
Chronic medical disease	1.00	2.69	2.14–3.39	<0.001
None				
One	1.00	3.39	1.85–6.21	<0.001
Two or more	1.00	3.16	1.01–9.95	0.049
Subjective health conditions				
Good	1.00	1.72	1.31–2.33	<0.001
Poor	1.00	3.16	2.24–4.45	<0.001
BMI				
Underweight	1.00	2.29	0.93–5.61	0.071
Normal weight	1.00	2.30	1.65–3.21	<0.001
Overweight	1.00	2.60	1.77–3.84	<0.001
Obesity	1.00	4.21	2.79–6.35	<0.001
Sleep (hr/day)				
Less than 6	1.00	2.86	2.19–3.75	<0.001
6 to less than 8	1.00	3.13	2.05–4.78	<0.001
8 or more	1.00	2.51	1.49–4.23	<0.001
Mental health factors				
Stress recognition				
No	1.00	2.72	1.90–3.89	<0.001
Yes	1.00	4.30	3.27–5.65	<0.001
Depression				
No	1.00	2.15	1.59–2.93	<0.001
Yes	1.00	2.61	1.82–3.74	<0.001

BMI, body mass index; OR, odds ratio; CI, confidence interval.

paring the ORs, men, aged between 40 and 50 years, currently smoking, obese, and with stress recognition showed much more higher odds for suicidal ideation. These findings are in line with Kposowa et al.[11] (2019) work noting that middle-aged people had a high association with suicidal ideation. This may reflect that unemployment-related stressors—such as financial strain and disrupted social relationships—are associated with increased psychosocial burden, which has been linked to suicidal ideation in prior studies. The finding that occupation and socioeconomic status are related to suicidal ideation is particularly notable in Korea, where an environment in which social and financial resources cannot be secured or situations in which social inclusion is interrupted can lead to loss of self-esteem and chronic stress, which in turn leads to behaviors closely related to suicide.[29] Moreover, middle-aged individuals are likely to have considerable responsibilities as the center of the family economy, such as supporting children's education and retirement preparation. Under these circumstances, any unemployment environment threatening the family economy might be related with suicidal ideation.

In the current smoking subgroup, the association between unemployment and suicidal ideation was notably stronger. One possible explanation is that smoking is often associated with heightened impulsivity and emotion regulation difficulties, which may compound the psychological burden of unemployment and increase vulnerability to suicidal thoughts.[30] Similarly, among individuals with high levels of perceived stress, the impact of unemployment on suicidal ideation was amplified. While the mechanism is not fully clear, it is possible that the

additional strain of unemployment may exacerbate existing psychological stress, contributing to elevated risk for suicidal ideation.

Dutton et al.[31] (2013) explored the association between obesity and suicidal ideation. Rather than being a direct cause, obesity may be associated with suicidal ideation through its links to chronic disease burden, body dissatisfaction, and increased psychosocial stress—all of which have been reported as correlates of suicidal ideation in prior research. Obesity is associated with metabolic syndrome, which often entails ongoing medical costs and financial burden—particularly for socioeconomically disadvantaged individuals. This added strain may contribute to psychosocial stress, a known risk factor for suicidal ideation.[32,33]

Our study has several strengths. First, the study is composed of nationally representative sample data, and it can be used to identify vulnerable subgroups that could benefit from targeted mental health and employment support strategies. Second, the study examined data from three separate years (2015, 2017, and 2019) within the same nationally representative survey framework, allowing for temporal robustness in findings and ensuring that observed associations are not limited to a single year's data. This design enhances the reliability of the results despite the cross-sectional nature of each wave. However, this study also has several limitations. Although the association between employment status and suicidal ideation is shown in this cross-sectional study, the causal association cannot be confirmed. In addition, because the institutionalized population was excluded, severe psychological symptoms related with suicidal ideation might not have been addressed adequately. Moreover, even if participants are categorized in the same employment status, there can be differences in the mental state of workers depending on factors such as their occupation, working environment, and social position. Lastly, while the KNHANES is nationally representative, the exclusion of individuals with missing data may affect the representativeness of the analytic sample. Subsequent research should consider a more detailed approach, incorporating a detailed examination of the nature and characteristics of individual occupations.

Based on these findings, targeted support strategies—such as job training programs, mental health counseling, and public education on health behaviors—may help address the elevated risk of suicidal ideation among unemployed individuals. In order to alleviate the problem of suicidal ideation among unemployed individuals, professional technical training is needed to enable them to enter the labor market, and the impact of health behaviors such as smoking and alcohol drinking needs to be emphasized through public service announcements. In addition, since obesity is related to mental problems such as stress and will to work, community-level attention will be needed to manage the health of unemployed obese individuals.

This study demonstrated a significant association between employment status and suicidal ideation using nationally representative data from the 2015, 2017, and 2019 KNHANES. While unemployment was associated with increased odds of suicidal ideation, our findings also suggest that multiple sociodemographic, health behavior, and mental health factors are involved. These results highlight the need for a better understanding of the relationship between employment and mental health. Further research and policy consideration are warranted to better support the mental well-being of unemployed individuals.

Availability of Data and Material

The data that support the findings of this study are available in Korea National Health and Nutrition Examination Survey at https://knhanes.kdca.go.kr/knhanes/. These data were derived from the following resources available in the public domain: Korea National Health and Nutrition Examination Survey, https://knhanes.kdca.go.kr/knhanes/eng/index.do.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Sun Mi Kim, San Lee. Formal analysis: Sun Mi Kim, San Lee. Methodology: Sun Mi Kim, San Lee. Software: Sun Mi Kim, San Lee. Supervision: San Lee. Validation: Sun Mi Kim, San Lee. Writing—original draft: Sun Mi Kim, San Lee. Writing—review & editing: Sun Mi Kim, Jae Won Oh, Nak-Hoon Son.

ORCID iDs

Sun Mi Kim	https://orcid.org/0000-0001-5365-4196
Jae Won Oh	https://orcid.org/0000-0002-5379-9907
Nak-Hoon Son	https://orcid.org/0000-0002-6192-8852
San Lee	https://orcid.org/0000-0003-4834-8463

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