

Research paper

Association between hikikomori (social withdrawal) and depression in Korean young adults

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ABSTRACT

Background: Major depressive disorder (MDD) is a prevalent mental illness, particularly affecting women. The World Health Organization projects that by 2030, MDD will be the leading cause of disease burden. The phenomenon of hikikomori—initially observed in Japan—is increasingly associated with depression, a key risk factor for which is social isolation. This study analyzed the impact of social withdrawal on depression among South Korean young adults, focusing on (1) the relation between withdrawal duration and causes, and (2) its effect on depression severity.

Methods: Data from the 2022 Korean Youth Survey, including 14,966 participants aged 19–34, were used. Depression levels were assessed using the Patient Health Questionnaire-9 (PHQ-9), and multiple logistic regression was conducted to examine the association between hikikomori behavior and depression.

Results: The reference group for all analyses was youth who were not socially withdrawn. The association between hikikomori and depression was statistically significant for the two sexes (males: OR: 2.25, 95 % CI: 1.60–3.19; females: OR: 2.34, 95 % CI: 1.63–3.36). Household size influenced depression risk among hikikomori, and sex differences were observed in social withdrawal's effect on suicide risk.

Conclusion: This study highlights the link between hikikomori and depression in South Korean youth, with sex-specific differences in depression and suicide risk, suggesting the need for tailored mental health programs. Future research should explore the long-term effects of prolonged social withdrawal through longitudinal studies and conduct cross-cultural comparisons of hikikomori.

1. Introduction

Major depressive disorder (MDD) is a debilitating illness characterized by abnormalities in mood and affect, cognitive dysfunction, and vegetative symptoms, such as sleep disturbances and loss of appetite (Otte et al., 2016). Depression is not a rare mental illness, as the lifetime prevalence of MDD is estimated to be 16.2 % worldwide, with women being twice as likely as men to experience the condition (Brody et al., 2018; Kupfer et al., 2012). Since 2008, depression has been listed as the third leading cause of global disease burden by the World Health Organization (WHO) and is projected to become the leading cause by 2030

(Li et al., 2021; The, 2022). Given the significant disability that often accompanies MDD, it is recognized as a major public health concern (Baune et al., 2010). As the current understanding of depression is becoming increasingly complex, research is identifying multiple factors that interact to influence depression onset and progression (Lynch et al., 2020; Moreh and O'Lawrence, 2016). Social isolation, in particular, is recognized as a key factor that can contribute to depression.

One form of social isolation is *hikikomori*, a phenomenon first identified in Japan. Hikikomori refers to a form of prolonged social withdrawal. It is characterized by a combination of physical isolation, social avoidance, and psychological distress, manifesting as a complex

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psychosocial and psychopathological phenomenon (Kato et al., 2019; Malagón-Amor et al., 2014). Since being introduced in the late 1990s, the concept of hikikomori has received growing social interest (Koyama et al., 2010). In Japan, the prevalence of hikikomori is estimated to range from 0.87 % to 1.2 %, with up to 26.66 % of cases occurring among the student population, indicating the seriousness of the issue within Japanese society (Eckardt, 2023). Research conducted in the Americas, Europe, and Asia suggests that hikikomori is not confined to East Asia but rather observed across various cultures (Takefuji, 2023). Hikikomori is particularly prevalent in urban areas and high-income developed countries, such as the US, France, South Korea, Taiwan, and Spain (Hamasaki et al., 2021; Malagón-Amor et al., 2014).

The growing concern over hikikomori can be understood from a psychopathological perspective, particularly owing to its close association with depression (Kondo et al., 2013; Teo et al., 2020). This relationship is believed to arise from the social isolation, a defining characteristic of hikikomori, which exacerbates vulnerability to mental health issues. Individuals experiencing hikikomori are at a higher risk of developing mental health disorders compared with the general population (Teo, 2013). Prolonged social withdrawal leads to isolation, which is a major risk factor for the onset of depression. Despite the growing interest in understanding the link between depression or social isolation and hikikomori, existing research remains insufficient. Given that depression can be triggered by complex factors, the relation between social isolation and depression remains underexplored. Social isolation, in particular, is recognized as a key factor that can contribute to depression. Therefore, the purpose of our study is to investigate the association between hikikomori behavior and depression among young adults in South Korea. Specifically, we aim to analyze (1) how the duration of hikikomori and the main reasons for social withdrawal are related to depression, and (2) how hikikomori behavior correlates with the severity of depression and suicide risk.

2. Methods

2.1. Data

The data for this cross-sectional study were obtained from the 2022 Korean Youth Survey, which surveyed young household members aged 19–34 years across South Korea. The 2022 Korean Youth Survey covered approximately 15,000 households nationwide, addressing eight domains and 20 items, including general information, housing, health, education and training, employment, relationships and participation, social perceptions and future planning, and economic factors. This is the first nationally approved statistical survey in South Korea focusing on young adults (aged 19–34 years).

2.2. Study population

Out of the 14,966 participants in the 2022 Korean Youth Survey, 14,870 participants were included in our final analysis. Participants were excluded if both household and individual (youth) annual incomes were missing or if either income value was left blank. Additionally, participants with missing values for any of the independent variables were excluded. Among the 14,870 final participants, 7129 were male and 7741 were female. Among the sample, 4280 (60 %) of the males and 5231 (67.6 %) of the females reported experiencing depression (as shown in Fig. 1).

2.3. Variables

The dependent variable, depressive symptoms, was measured using the Korean version of the Patient Health Questionnaire (PHQ-9). The PHQ-9 is known for its high sensitivity (ranging from 0.37 to 0.98) and specificity (ranging from 0.42 to 0.99) (Costantini et al., 2021). A cut-off score of 10 was used to define depression, where a score of 9 or below

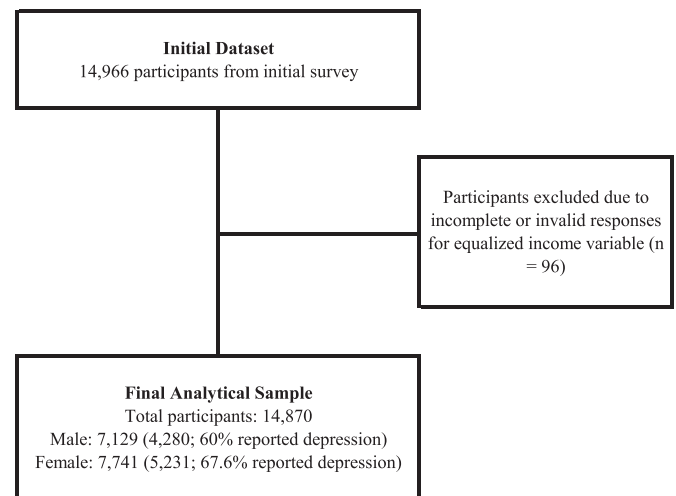


Fig. 1. Flow chart for data processing and analysis.

indicated the absence of depression, and a score of 10 or above indicated the presence of depression (Kroenke et al., 2001; Manea et al., 2015). This tool has been validated as a reliable and valid method for screening depression (Kroenke et al., 2001). The total score categories were as follows: no depression (<10), moderate depression (10 to <15), moderately severe depression (15 to <20), and severe depression (20 or higher) (Cha et al., 2022; Costantini et al., 2021; Kroenke et al., 2010). Additionally, scores on the ninth item of the PHQ-9, which screens for suicidal ideation, was extracted for subgroup analysis, and the relation between social withdrawal and suicidal thoughts was analyzed by sex (Flores et al., 2024; Simon et al., 2013).

We defined hikikomori (social withdrawal), the key variable of interest, based on the guidelines of the Korean Youth Survey, categorizing individuals who primarily stayed at home or in their rooms and did not engage in work, school, leisure, or social activities. Specifically, the survey included the question: “How often do you go out of your home?” Responses were categorized as follows: (1) individuals who regularly went out for work, school, or other normal activities were classified as non-hikikomori, while (2) individuals who selected one of the following options were classified as hikikomori: “I usually stay at home but go out for hobbies only,” “I usually stay at home but go out to nearby locations (e.g., convenience stores),” “I stay in my room and rarely go out of the house,” and “I rarely leave my room.” However, some individuals classified as hikikomori may have engaged in minimal or irregular employment that did not require regular social interaction, which was not explicitly captured in the survey. We categorized the duration of social withdrawal into four groups: normal (less than six months), short-term (less than six months), mid-term (six months to less than three years), and long-term (three years or more). This categorization was based on the survey question: “How long has your current state lasted?” with the following response options: (1) less than six months, (2) six months to less than one year, (3) one year to less than three years, (4) three years to less than five years, (5) five years to less than seven years, and (6) seven years or more. To account for the distribution of participants and simplify the analysis, the responses were grouped as follows: Option 1 was categorized as normal, Options 2 and 3 as short-term, Options 4, 5, and 6 as long-term. The classification was adapted and expanded based on the findings in the literature, which provided a broad framework for understanding the duration of hikikomori across different populations (Li and Wong, 2015). This approach included individuals at potential risk of hikikomori. We also analyzed and categorized the main reasons for social withdrawal into academic/employment challenges, personal/health challenges, and other reasons to determine their relation with depression. Specifically, the survey asked participants to identify the primary cause of their social withdrawal, offering options

such as academic discontinuation, interpersonal issues, and physical discomfort. These responses were then grouped into three categories to facilitate analysis and ensure consistency with existing literature.

Covariates included demographic (sex, age group, region of residence, and education level), economic (employment status and income level), health-related (smoking status, alcohol consumption, and physical activity), and household characteristics (household size and type). To appropriately compare income levels across households with different household sizes, we used household equivalized income, which adjusts household income by dividing it by the square root of the number of household members (Förster and Mira D'Ercole, 2005).

2.4. Statistical analysis

We conducted chi-squared tests to examine and compare the general characteristics of the study participants. To assess factors influencing depression, we performed multiple logistic regression analysis with hikikomori (social withdrawal) status as the key variable of interest. Furthermore, we conducted heterogeneous subgroup analysis by subdividing the hikikomori group based on the duration and primary cause of social withdrawal. Lastly, we ran a multinomial regression analysis to investigate whether individuals with hikikomori behavior exhibited a

worsening trend in depression and suicidal ideation compared with those without social withdrawal. The logistic regression model with categorical covariates required no assumptions of linearity or normality, and multicollinearity was confirmed to be negligible with all VIF values below 10.

3. Results

Table 1 shows the general characteristics of the study population. Of the 14,870 participants, 9511 (63.96 % of the total) exhibited depressive symptoms, with PHQ-9 scores of 10 or higher. Specifically, 133 males and 174 females classified as hikikomori reported experiencing depression.

Table 2 presents the results of the analysis on the association between hikikomori and individual depressive symptoms. Among participants classified as hikikomori, males and females showed a significantly higher risk of depression compared with those without social withdrawal (males: OR: 2.25, 95 % CI: 1.60–3.19; females: OR: 2.34, 95 % CI: 1.63–3.36). Additionally, the results revealed a trend where the risk of depression increased with age in both males and females.

Table 3 gives the results of the independent subgroup analysis, highlighting the variable of household size. Hikikomori individuals

Table 1
General characteristics of the study population.

Variables	Depression (PHQ-9)													
	Male						P-value	Female						
	Total		Depressive		Not-depressive			Total		Depressive		Not-depressive		P-value
	N	%	N	%	N	%		N	%	N	%	N	%	
Total (N = 14,870)	7129	100.0	4280	60.0	2849	40.0	0.0001	7741	100.0	5231	67.6	2510	32.4	<0.0001
Hikikomori Behavior														
No	6950	97.5	4147	59.7	2803	40.3		7527	97.2	5057	67.2	2470	32.8	
Yes	179	2.5	133	74.3	46	25.7		214	2.8	174	81.3	40	18.7	
Age (year)							<0.0001							<0.0001
19–24	3469	48.7	1905	54.9	1564	45.1		3683	47.6	2284	62.0	1399	38.0	
25–29	2213	31.0	1388	62.7	825	37.3		2302	29.7	1676	72.8	626	27.2	
30–34	1447	20.3	987	68.2	460	31.8		1756	22.7	1271	72.4	485	27.6	
Income Level							0.1404							0.6502
Low	1793	25.2	1099	61.3	694	38.7		1924	24.9	1309	68.0	615	32.0	
Middle	3376	47.4	2039	60.4	1337	39.6		4021	51.9	2724	67.7	1297	32.3	
High	1960	27.5	1142	58.3	818	41.7		1796	23.2	1198	66.7	598	33.3	
Region							0.192							0.8586
Urban	3502	49.1	2075	59.3	1427	40.7		3578	46.2	2422	67.7	1156	32.3	
Rural	3627	50.9	2205	60.8	1422	39.2		4163	53.8	2809	67.5	1354	32.5	
Education Level							<0.0001							<0.0001
High school graduate or less	1179	16.5	781	66.2	398	33.8		894	11.5	626	70.0	268	30.0	
Some University Education	2558	35.9	1347	52.7	1211	47.3		2153	27.8	1265	58.8	888	41.2	
University graduate or higher	3392	47.6	2152	63.4	1240	36.6		4694	60.6	3340	71.2	1354	28.8	
Employment Status							<0.0001							<0.0001
Employed	4254	59.7	2727	64.1	1527	35.9		4981	64.3	3538	71.0	1443	29.0	
Unemployed	295	4.1	176	59.7	119	40.3		277	3.6	218	78.7	59	21.3	
Economically Inactive	2580	36.2	1377	53.4	1203	46.6		2483	32.1	1475	59.4	1008	40.6	
Physical Activity							0.8119							0.7958
No	1608	22.6	970	60.3	638	39.7		2395	30.9	1613	67.3	782	32.7	
Yes	5521	77.4	3310	60.0	2211	40.0		5346	69.1	3618	67.7	1728	32.3	
Smoking Status							<0.0001							<0.0001
Current smoker	2399	33.7	1489	62.1	910	37.9		455	5.9	344	75.6	111	24.4	
Former smoker	926	13.0	617	66.6	309	33.4		372	4.8	310	83.3	62	16.7	
Never smoker	3804	53.4	2174	57.2	1630	42.8		6914	89.3	4577	66.2	2337	33.8	
Alcohol Consumption Frequency							0.0004							<0.0001
No	1182	16.6	655	55.4	527	44.6		1878	24.3	1136	60.5	742	39.5	
Yes	5947	83.4	3625	61.0	2322	39.0		5863	75.7	4095	69.8	1768	30.2	
Household Size							<0.0001							0.0041
4+	1453	20.4	861	59.3	592	40.7		1908	24.6	1291	67.7	617	32.3	
3	1990	27.9	1115	56.0	875	44.0		2168	28.0	1408	64.9	760	35.1	
2	933	13.1	567	60.8	366	39.2		1075	13.9	722	67.2	353	32.8	
1	2753	38.6	1737	63.1	1016	36.9		2590	33.5	1810	69.9	780	30.1	
Household Type							<0.0001							0.0001
Young Adult Households	3253	45.6	2069	63.6	1184	36.4		3385	43.7	2374	70.1	1011	29.9	
Parental and Young Adult Households	3834	53.8	2187	57.0	1647	43.0		3903	50.4	2555	65.5	1348	34.5	
Non-Young Adult Households	42	0.6	24	57.1	18	42.9		453	5.9	302	66.7	151	33.3	

Table 2
Results of factors associated hikikomori behavior seclusion and depression.

Variables ^a	Depression (PHQ-9)					
	Male			Female		
	OR	95% CI		OR	95% CI	
Hikikomori Behavior						
No	1.00			1.00		
Yes	2.25	(1.60 - 3.19)		2.34	(1.63 - 3.36)	
Age (year)						
19-24	1.00			1.00		
25-29	1.15	(0.99 - 1.32)		1.39	(1.20 - 1.59)	
30-34	1.43	(1.20 - 1.70)		1.50	(1.26 - 1.76)	
Income Level						
High	1.00			1.00		
Middle	1.05	(0.93 - 1.17)		0.98	(0.86 - 1.10)	
Low	1.28	(1.10 - 1.48)		1.19	(1.01 - 1.38)	
Region						
Urban	1.00			1.00		
Rural	1.04	(0.94 - 1.14)		1.01	(0.91 - 1.11)	
Education Level						
University graduate or higher	1.00			1.00		
Some University Education	0.82	(0.70 - 0.96)		0.81	(0.69 - 0.94)	
High school graduate or less	1.18	(1.02 - 1.36)		0.94	(0.79 - 1.10)	
Employment Status						
Employed	1.00			1.00		
Unemployed	0.73	(0.56 - 0.93)		1.43	(1.06 - 1.92)	
Economically Inactive	0.81	(0.71 - 0.93)		0.72	(0.63 - 0.81)	
Physical Activity						
Yes	1.00			1.00		
No	1.20	(1.04 - 1.38)		1.01	(0.91 - 1.12)	
Smoking Status						
Never smoker	1.00			1.00		
Former smoker	1.32	(1.12 - 1.54)		2.27	(1.70 - 3.01)	
Current smoker	1.09	(0.97 - 1.21)		1.48	(1.17 - 1.85)	
Alcohol Consumption						
No	1.00			1.00		
Yes	1.20	(1.05 - 1.37)		1.47	(1.31 - 1.64)	
Household Size						
4+	1.00			1.00		
3	0.78	(0.68 - 0.90)		0.82	(0.71 - 0.93)	
2	0.82	(0.67 - 0.98)		0.77	(0.64 - 0.91)	
1	0.91	(0.70 - 1.16)		0.87	(0.69 - 1.09)	
Household Type						
Young Adult Households	1.00			1.00		
Parental and Young Adult Households	1.00	(0.79 - 1.25)		1.03	(0.83 - 1.25)	
Non-Young Adult Households	0.90	(0.46 - 1.74)		0.80	(0.61 - 1.03)	

^a Adjusted for all covariates.

living in households with one to two members showed a higher risk of depression compared with non-hikikomori individuals, regardless of sex. This was a common characteristic among male and female hikikomori. However, an important finding was that, for females, even those in households with four or more members demonstrated a higher risk of depression (males in 4+ member households: OR: 1.84, 95 % CI: 0.93–3.62; females in 4+ member households: OR: 3.48, 95 % CI: 1.51–7.99).

Table 4 presents the results of the heterogeneous subgroup analysis, with social withdrawal categorized into three levels. The impact of social withdrawal duration on depression showed sex differences. For males, the long-term group showed the highest risk of depression (long-term males: OR: 3.83, 95 % CI: 1.28–11.43; females: OR: 2.07, 95 % CI: 0.76–5.60). However, for females, the mid-term group exhibited the highest risk, with a decrease in risk observed in the long-term group

(mid-term males: OR: 3.42, 95 % CI: 1.99–5.91; females: OR: 2.45, 95 % CI: 1.49–4.04). Regarding the main reasons for social withdrawal, male and female hikikomori showed higher risks in the personal/health challenges category (males: OR: 5.14, 95 % CI: 1.78–14.79; females: OR: 2.44, 95 % CI: 1.27–4.69), although females also exhibited a higher risk in the “other reasons” category.

Fig. 2 illustrates the results of the multinomial regression analysis based on the severity of depression and suicidal ideation. The participants were divided into four groups based on their PHQ-9 scores and scores for item 9. This figure shows the relation between hikikomori status and depression by sex. For depression, participants were classified into the following: no, moderate, moderately severe, and severe depression groups. Both males and females exhibited a clear trend of increasing depression severity. However, suicidal ideation showed a distinct sex difference, with a marked increase in suicide risk observed only among females, although the difference was not statistically significant.

4. Discussion

This study found that Korean young adults exhibiting hikikomori behavior were more likely to develop depression compared with those who did not engage in social withdrawal, even after adjusting for potential covariates. Our study yielded three key findings that warrant attention. First, we found a notable difference in depression risk among hikikomori youth depending on the number of members in their households. Specifically, hikikomori youth living in households with one to two members exhibited similar trends in depression risk (Park et al., 2024). However, an important observation is that females, compared with males, showed a higher risk of depression even in households with four or more members, which is a distinctive characteristic. This may be attributed to the influence of South Korea's socio-cultural context regarding family size (Blake, 1981; Wong et al., 2019). Second, while the likelihood of developing depression increased with the duration of hikikomori behavior in males, females exhibited a trend where depression risk initially increased and then decreased. This may suggest that females either adapt to depression over time or that the mechanisms of mental health differ between the sexes (Nettle, 2004). Third, our study found a higher prevalence of depression based on PHQ-9 compared to the general population (Levis et al., 2020), which may be attributed to the unique characteristics of our sample. Young adults (19–34 years) are exposed to socioeconomic stressors such as job insecurity and financial instability, which have been linked to increased psychological distress (Kaiwak et al., 2024). Furthermore, although our study did not impose selection restrictions based on the severity of social withdrawal, the sample may have overrepresented individuals prone to social isolation, potentially contributing to the elevated depression prevalence. Fourth, we noted a significant sex difference in suicide risk among hikikomori youth. This finding implies that female hikikomori may be experiencing more severe psychological distress (Yong et al., 2020a).

Research has shown a more negative impact on mental health among hikikomori compared with non-hikikomori individuals, particularly focusing on the epidemiological aspects and the surrounding environment of hikikomori (Rooksby et al., 2020). Our study aligns with this previous research, showing an increased risk of depression among hikikomori individuals. However, our study differs from previous studies in certain respects. Notably, our findings contrast with earlier research that suggested male hikikomori are more likely to have suicidal thoughts compared with females (Yong et al., 2020b). In our study, female hikikomori in South Korea had a higher risk of suicide than their male counterparts. This may be due to cultural differences, as in Japan, economic failure and social pressure are major factors, whereas in South Korea, the failure to fulfill traditional gender roles and social stigma may contribute to the increased suicide risk among girls (Min, 2001).

An important new finding from our independent subgroup analysis is

Table 3

Results of subgroup analysis stratified by independent variables.

Variables ^a	Non-Hikikomori vs. Hikikomori									
	Depression (PHQ-9)									
	Male					Female				
	Non-Hikikomori	Hikikomori				Non-Hikikomori	Hikikomori			
	OR	OR	95 % CI			OR	OR	95 % CI		
Age (year)										
19–24	1.00	1.83	(1.18	–	2.85)	1.00	3.15	(1.74	–	5.71)
25–29	1.00	2.52	(1.38	–	4.60)	1.00	1.93	(1.02	–	3.65)
30–34	1.00	^b	^b	–	^b	1.00	1.87	(0.98	–	3.58)
Income Level										
High	1.00	1.69	(0.82	–	3.48)	1.00	2.21	(0.97	–	5.02)
Middle	1.00	2.40	(1.36	–	4.22)	1.00	2.81	(1.60	–	4.95)
Low	1.00	2.43	(1.37	–	4.32)	1.00	1.94	(1.09	–	3.45)
Region										
Urban	1.00	3.86	(2.09	–	7.12)	1.00	2.76	(1.51	–	5.07)
Rural	1.00	1.56	(1.01	–	2.41)	1.00	2.10	(1.33	–	3.32)
Education Level										
University graduate or higher	1.00	2.62	(1.43	–	4.78)	1.00	2.19	(1.38	–	3.49)
Some University Education	1.00	1.75	(1.02	–	2.97)	1.00	6.00	(2.09	–	17.27)
High school graduate or less	1.00	2.63	(1.23	–	5.62)	1.00	1.48	(0.71	–	3.09)
Employment Status										
Employed	1.00	1.29	(0.54	–	3.08)	1.00	2.25	(0.99	–	5.10)
Unemployed	1.00	3.40	(1.32	–	8.77)	1.00	2.25	(0.64	–	7.89)
Economically Inactive	1.00	2.37	(1.55	–	3.62)	1.00	2.54	(1.64	–	3.94)
Physical Activity										
Yes	1.00	2.47	(1.62	–	3.75)	1.00	2.42	(1.50	–	3.91)
No	1.00	1.78	(0.94	–	3.37)	1.00	2.28	(1.29	–	4.01)
Smoking Status										
Never smoker	1.00	1.79	(1.19	–	2.69)	1.00	2.43	(1.66	–	3.54)
Former smoker	1.00	3.83	(1.12	–	13.09)	1.00	0.44	(0.12	–	1.63)
Current smoker	1.00	5.46	(2.04	–	14.61)	1.00	^b	^b	–	^b
Alcohol Consumption										
No	1.00	1.83	(0.98	–	3.41)	1.00	2.22	(1.28	–	3.84)
Yes	1.00	2.52	(1.64	–	3.86)	1.00	2.60	(1.56	–	4.32)
Household Size										
4+	1.00	1.84	(0.93	–	3.62)	1.00	3.48	(1.51	–	7.99)
3	1.00	1.83	(1.03	–	3.26)	1.00	1.48	(0.80	–	2.72)
2	1.00	4.11	(1.58	–	10.68)	1.00	3.37	(1.44	–	7.91)
1	1.00	2.49	(1.16	–	5.33)	1.00	2.28	(1.09	–	4.76)
Household Type										
Young Adult Households	1.00	2.71	(1.32	–	5.55)	1.00	2.79	(1.53	–	5.10)
Parental and Young Adult Households	1.00	2.13	(1.42	–	3.19)	1.00	2.96	(1.68	–	5.21)
Non-Young Adult Households	1.00	^b	^b	–	^b	1.00	0.89	(0.36	–	2.19)

^a Adjusted for all covariates.^b OR and 95 % CI could not be calculated due to insufficient sample size or zero cases in specific subgroups.**Table 4**

The result of subgroup analysis stratified by hikikomori-related factors.

Variables ^a	Depression (PHQ-9)							
	Male				Female			
	OR	95 % CI			OR	95 % CI		
Hikikomori Behavior duration ^a								
Normal social engagement	1.00				1.00			
Short-term	1.28	(0.78	–	2.12)	2.28	(1.26	–	4.11)
Mid-term	3.42	(1.99	–	5.91)	2.45	(1.49	–	4.04)
Long-term	3.83	(1.28	–	11.43)	2.07	(0.76	–	5.60)
Etiological factors of Hikikomori Behavior								
Normal social engagement	1.00				1.00			
Academic/Employment challenges ^b	2.66	(1.57	–	4.53)	2.18	(1.20	–	3.95)
Personal/Health challenges ^c	5.14	(1.78	–	14.79)	2.44	(1.27	–	4.69)
Other reasons	1.46	(0.87	–	2.42)	2.43	(1.32	–	4.46)

^a Short-term: <6 months; Mid-term: 6 months to 3 years; Long-term: >3 years.^b Combine discontinuation of studies and failure to enter university.^c Combine interpersonal relationship issues, disability or physical discomfort, and pregnancy or childbirth.^d Adjusted for all covariates.

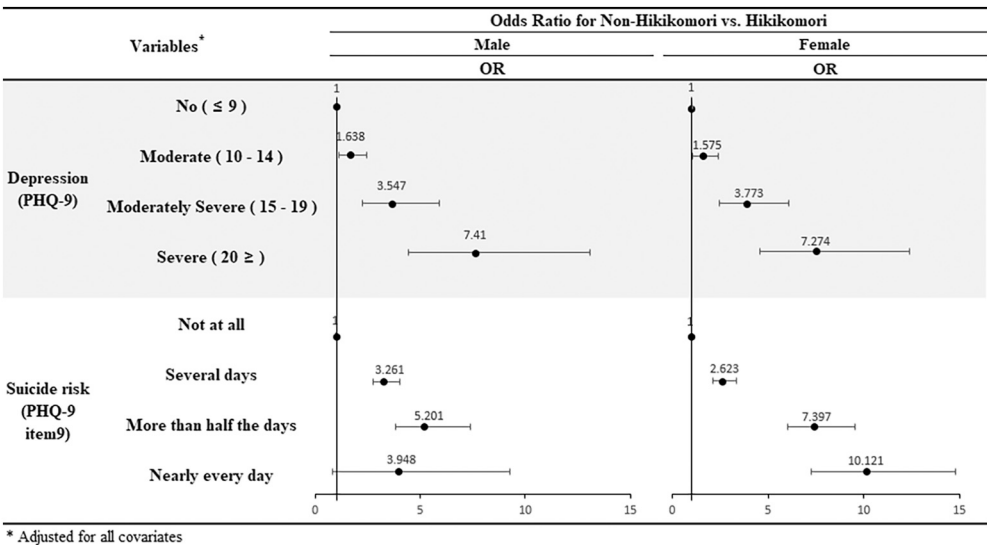


Fig. 2. Multinomial regression findings for levels of depression (PHQ-9) and suicide risk (PHQ-9 item9).

the relation between household size and depression trends among hikikomori individuals. Specifically, it suggests that household size can affect mental health, particularly depression, in Korean women. Additionally, other covariates, such as Region, Education Level, and Smoking Status, also showed notable associations with depression risk. These findings highlight the multifactorial nature of depression among hikikomori individuals, warranting further exploration of the broader social and behavioral determinants influencing mental health. Historically, South Korea's cultural norms have emphasized familial responsibilities, particularly for women, often prioritizing their role in maintaining household harmony and caregiving. This expectation may have a negative impact on women's mental health, particularly when living in larger households, a phenomenon that could be explored in the broader context of traditional Asian cultural norms. This finding underscores the sociocultural context of South Korea, where family size and roles are intricately linked to societal expectations, potentially exacerbating the mental health impact of household size among hikikomori individuals. Furthermore, the finding that the risk of depression varies with the duration of hikikomori behavior in Korean youth indicates a sex difference in how depression is experienced (Hays et al., 1997; Hölzel et al., 2011). Women are generally more vulnerable to mental health issues than men, as previously reported. However, our study revealed an unusual pattern in which the risk of depression increased initially but then decreased, irrespective of the duration of social withdrawal. This contrasts with the established view that prolonged social withdrawal typically leads to a deepening of depression. This pattern suggests that female hikikomori may eventually adapt to depression or experience a psychological numbing effect after a certain point. Such adaptation may involve the development of psychological resilience, allowing individuals to alleviate depressive symptoms associated with prolonged social withdrawal (Edward, 2005). Finally, the fact that female hikikomori are at greater risk of suicide suggests that their depression may escalate into suicidal behavior. This could be due to feelings of despair arising from their perceived failure to meet societal expectations or the social stigma attached to their condition (Kim et al., 2016; Yong and Nomura, 2019). This highlights the importance of mental health interventions that go beyond a one-size-fits-all approach. Gender-specific programs should be designed to address the distinct challenges faced by hikikomori individuals, such as social stigma, familial expectations, and cultural norms. Examples of such targeted interventions could include community-based counseling programs tailored to women experiencing familial pressures, as well as vocational training initiatives aimed at facilitating the social reintegration of socially withdrawn individuals.

This study has several limitations. First, because we used cross-sectional data from the Korean Youth Survey, we could only infer correlations, not causal relations. Further longitudinal studies are needed to explore causal relations. Second, the Korean Youth Survey is a relatively new dataset, with less than two years since its inception; as such, the data may not be fully comprehensive. Additionally, we encountered challenges in performing subgroup analyses owing to extreme values in the covariate variables related to hikikomori behavior, particularly in the age and household type variables for males, which resulted in a limited number of participants in certain subgroups (as shown in Table 3). Third, the generalizability of our findings may be limited due to the specific characteristics of our study sample. Since our sample consisted of young adults aged 19–34 years, the observed associations may not extend to other age groups or individuals with different sociocultural backgrounds.

Despite these limitations, our study has several strengths. First, it is the first study to examine social withdrawal in Korean youth using data from a nationally approved survey, providing a representative sample of the Korean youth population. Second, it allows for the comparison of depression and suicide risk among hikikomori and non-hikikomori youth, offering potential insights for preventive approaches to depression and suicide (Ferrara et al., 2020). Third, it connects hikikomori behavior to household size, incorporating cultural perspectives unique to Korea.

5. Conclusion

Our study revealed a significant association between hikikomori behavior and depression among Korean young adults. Specifically, we found sex differences in the relation between hikikomori and depression, influenced by household size, as well as in the duration of social withdrawal and suicide risk. These findings suggest that rather than a one-size-fits-all approach, sex- and gender-specific, targeted mental health support programs that intervene early in the hikikomori process need to be developed.

Future research should focus on longitudinal studies examining the impact of social withdrawal duration, particularly to clarify why prolonged hikikomori behavior appears to decrease depression in females. Additionally, comparative studies involving hikikomori individuals from various cultural backgrounds are necessary to elucidate hikikomori as a global phenomenon.

CRediT authorship contribution statement

Su Min Park: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Min Jeong Joo:** Writing – review & editing, Methodology, Investigation. **Jae Hyeok Lim:** Writing – review & editing, Methodology, Investigation. **Suk-Yong Jang:** Supervision, Conceptualization. **Eun-Cheol Park:** Writing – review & editing, Supervision. **Min Jin Ha:** Writing – review & editing, Supervision.

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Declaration of competing interest

The authors declare no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jad.2025.03.125>.

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