Perceived social support and depressive symptoms during the COVID-19 pandemic: A nationally-representative study

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Abstract

Background: The COVID-19 pandemic and the associated containment policies have led to negative mental health consequences in the general population.
Aims: This study investigated the association between perceived social support and depressive symptoms in Korea.
Methods: Data from the Korea Community Health Survey conducted from August to November 2020 was used for this cross-sectional study. Depressive symptoms were measured using the Patient Health Questionnaire-9 (PHQ-9) and perceived social support was assessed based on the number of contacts that participants had identified as being available in case participants needed isolation due to COVID-19 exposure. This study included the general adult populations aged 19 years and older. The relationship between the perceived social support and depressive symptoms was analyzed using multivariable liner regression analysis. Subgroup analysis was conducted based on income.
Results: Analysis of the data obtained from 225,453 participants indicated that PHQ-9 scores were highest in the group with 'no' perceived social support, followed by 'low', 'middle', and 'high' perceived levels of social support. Compared to individuals with 'high' perceived social support, those with 'middle' (β: .10, *p*-value <.001), 'low (β: .07, *p*-value .010), and 'no' (β: .34, *p*-value <.001) perceived levels of social support showed poorer depression scores. The magnitude of the relationship found was particularly strong in the low-income group.
Conclusions: During the COVID-19 pandemic, individuals' depression scores varied according to their perceived level of social support. Strategies that address the need of vulnerable individuals are required to reduce the potentially negative mental health consequences of the pandemic.

Keywords

COVID-19, social support, depressive symptoms

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has been declared a public health emergency of global concern by the World Health Organization (Qi et al., 2020). As the COVID-19 is characterized by rapid transmission and is known to cause varying degrees of illness, many countries have implemented different measures to protect public health (Li et al., 2021). Contact tracing, case isolation, and quarantine have been reported as effective measures to control the spread of infectious diseases and have been adopted internationally (Guan et al., 2020). Similarly, to manage the pandemic, Korea has implemented a comprehensive containment policy characterized by rapid case testing, isolation, examination of large clusters of confirmed cases, and tailored social distancing measures (Dighe et al., 2020).

Although social distancing is effective in reducing the physical spread of the disease, it has led to adverse mental health effects in previous epidemics (Brooks et al., 2020; Holmes et al., 2020; Nussbaumer-Streit et al., 2020).

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Management measures for pandemics are known to disrupt social interconnectedness, which can escalate the risk of psychological difficulties (Grey et al., 2020). Furthermore, individuals exposed to the ongoing risk and uncertainty of infectious diseases are more vulnerable to various mental health issues, such as depression, anxiety, and panic attacks, and suicide (Qi et al., 2020). Previous studies report elevated levels of anxiety and depression in patients as well as in the general population (Grey et al., 2020). As South Korea ranks first among the Organization for Economic Cooperation and Development (OECD) countries in suicide, in which depression is a major risk factor, the potential increase in the risk for depression during the COVID-19 pandemic needs to be addressed (Kim et al., 2020).

Under such circumstances, social support may be an important influencing factor as better social relationships are associated with better mental health (Sommerlad et al., 2021). Social support is classified into perceived social support and received social support (Eagle et al., 2019). Perceived social support refers to an individual's subjective assessment of support from friends or family members during periods of need, whereas received social support denotes the actual amount of support received (Grey et al., 2020). Specifically, previous findings have shown that individuals with perceived support have a decreased risk of depression and depressive symptoms (Gariépy et al., 2016). Likewise, having social networks was also positively associated with a lower risk of depression (Santini et al., 2015). As a pandemic can exert stress due to the unpredictability of disease, loss of personal freedom or control, and concerns for health, investigating the potential effect of social support on depressive symptoms during the COVID-19 outbreak is important (Bueno-Notivol et al., 2021).

The present study aimed to investigate the association between depressive symptoms and social support during the COVID-19 outbreak in Korea. Subgroup analysis was performed based on income. We hypothesized that individuals with social support would be less vulnerable to depressive symptoms and that this association would be particularly pronounced in the lower income groups.

Methods

Study population and data

For this study, we used raw data from the 2020 Korea Community Health Survey (KCHS), which was conducted by the Korea Centers for Disease Control and Prevention. The KCHS is a cross-sectional survey, with a study population drawn from multistage, stratified area probability samples of civilian, non-institutionalized Korean households categorized according to geographic area, age, and sex. The survey is conducted annually, and it collects data through in-person (one-on-one) interviews. As the population sample is extracted from national survey data, the samples are considered representative of the Korean population (Kang et al., 2015).

This study included individuals aged ≥19 years. From an initial total of 229,269 potential participants, those with missing data on the relevant variables were excluded from the study, leaving a total of 225,453 participants eligible for inclusion in the present study.

Dependent variable

The dependent variable of this study was depressive symptoms, which was measured using the Patient Health Questionnaire-9 (PHQ-9). The PHQ-9 is used to screen and measure depression based on questions that measure the frequency of depressive symptoms in the last 2 weeks (Shin et al., 2017). The validity and reliability of the Korean version of the PHQ-9 has been verified in a prior study (Han et al., 2008). Higher scores on the scale indicate more severe symptoms.

The variable of interest

The variable of interest in this study was social support, measured based on the self-reported question: 'How many individuals can you request for help (apart from family members) if you are required to receive isolated treatment after COVID-19 exposure or commence home isolation for contacting a COVID-19 infected individual?' Available responses included 0 people, 1 to 2 people, 3 to 5 people, and 6 or more people. The responses were categorized into 'none' (0 people), 'low' (1–2 people), 'middle' (3–5 people), and 'high' (6 or more people) groups.

Covariates

Various demographic, socioeconomic, and health related variables were included as covariates in the analysis. The covariates were sex (male or female), age (19–29, 30–39, 40–49, 50–59, 60–69, or 70 years or above), education (none, elementary school, middle school, high school, or college or above), income (quartiles), job (professional or administrative work, office work, sales and service, agriculture and fishery, blue collar work or simple labor, or unemployed), household composition (one, two, or three generation household), area of residence (rural or urban), monthly drinking status (no or yes), smoking status (no or yes), physical exercise (no or yes), perceived stress (no or yes), and subjective health status (poor or fair). Physical exercise included moderate to vigorous exercise.

Statistical analyses

The study population's general characteristics were examined using *t*-test. Further, an analysis of variance was used to compare the mean and standard deviations in PHQ-9

scores by characteristics. Next, a multivariable linear regression analysis was used to examine the association between perceived social support and depressive symptoms while controlling for potential confounding variables such as sex, age, education, income, occupation, household composition, area of residence, monthly drinking status, smoking status, physical exercise, perceived stress, and subjective health status. A subgroup analysis was performed to evaluate possible associations between perceived social support and depressive symptoms by income. All analyses were conducted using the SAS 9.4 (SAS Institute, Cary, NC, USA) software; p-values were two-sided and considered significant at $p < .05$.

Results

Table 1 shows that 225,453 individuals were included in this study. Moreover, the mean PHQ-9 score of the study population, which is a reflection of participants' depressive symptoms, was 1.96 ± 2.95. Among individuals with perceived social support, 23,082 (10.2%) participants were in the high group, 64,035 (28.4%) in the middle group, and 98,578 (43.7%) in the low group. In contrast, 39,758 (17.6%) participants had no perceived social support, which refers to having no contact to request for help in the case of COVID-19 related isolation. PHQ-9 scores were highest in the none group, followed by the low, middle, and high group.

Table 2 presents the regression analysis results regarding the association between depressive symptoms and perceived social support. Compared to individuals with high perceived social support, those in the middle (β: .10, p-value <.001), low (β: .07, p-value .010), and none (β: .34, p-value <.001) groups showed higher PHQ-9 scores.

Figure 1 presents the results of the subgroup analysis of the main association investigated. The trends of the main findings were generally maintained regardless of income level. However, the magnitude of the relationship between perceived social support and depressive symptoms was particularly strong and significant in the 'low' (middle support: β: .22, p-value .006; low support: β: .29, p-value <.001; no support: β: .72, p-value <.001) income group compared to the 'middle low' (no support: β: .25, p-value <.001), 'middle high' (no support: β: .23, p-value <.001), and 'high' (middle: β: .09, p-value .021; no support: β: .21, p-value <.001) income group.

Discussion

This study examined perceived social support and its association with depressive symptoms during the COVID-19 pandemic in South Korea using a large, nationally representative sample of the general population. The analysis revealed that varying levels of perceived social support are significantly related to depressive symptoms. Individuals with high perceived social support showed the fairest scores, followed by those with middle, low, and no support. These findings are noteworthy because perceived social support was measured based on the number of contacts that participants had identified as being available in case participants needed isolation (isolation at home or medical institutions) due to COVID-19 exposure. This indicated that the availability of social support in times of crisis and uncertainty is important, and the lack of such support can have a negative impact on mental health. Moreover, the correlation between depressive symptoms and perceived social support was noticeably stronger in participants with low income.

Previous findings have reported that social support can promote mental health because it allows individuals to feel valued and connected (Alsubaie et al., 2019). A previous study demonstrated that low positive support is related to increased odds of poor mental health in individuals and vice versa (Croezen et al., 2012). As feelings of support can decrease the risk of several mental health issues, poor social support has also been identified as a predictor of depressive symptoms (Camara et al., 2017; Lee et al., 2019). The significant correlations found between social support and depressive symptoms have been demonstrated across a wide range of age groups (Santini et al., 2015). Several prospective studies have also revealed that poor perceived social support at baseline can serve as a predictor for high depressive symptoms at follow up (Wang et al., 2018). Additionally, participants with low perceived social support at baseline also often reported poor recovery from depressive disorders at one-year follow up (Bosworth et al., 2002). Similar trends were also found in the Korean population, in which social support was correlated with depressive symptoms scores in adults (Lee et al., 2019). At the same time, it is also possible that depressed individuals may perceive lower levels of social support. Depressed individuals, often characterized by qualities such as negative self-statements, social inadequacy, and complaints, may experience disruptions in social relationships (Ren et al., 2018). Hence, social support and depressive symptoms may have a reciprocal association (Ren et al., 2018).

The association found in the present study is noteworthy because depression rates are known to increase in times of pandemics or epidemics (Hawryluck et al., 2004). As case isolation and quarantining are adopted globally as effective measures to manage COVID-19, the pandemic has inevitably altered the lifestyles of numerous individuals while increasing uncertainty in daily routines, including the probability of needing to undergo social isolation (Li et al., 2021). Prior studies have demonstrated that various infectious diseases, such as influenza increased the fear of illness and death (Elizarrarás-Rivas et al., 2010). Under such circumstances, the protective effects of perceived social support may be particularly pronounced in the ability to exhibit resilience. In fact, evidence shows

Table 1. General characteristics of subjects.

Variables	Total		Depressive symptoms (PHQ-9)	p-Value
	N	%	Mean ± SD	
Perceived social support				
High	23,082	10.2	1.57 ± 2.51	<.001
Middle	64,035	28.4	1.79 ± 2.66	
Low	98,578	43.7	1.96 ± 2.94	
None	39,758	17.6	2.45 ± 3.54	
Sex				
Male	102,280	45.4	1.60 ± 2.63	<.001
Female	123,173	54.6	2.25 ± 3.16	
Age				
19–29 years	25,801	11.4	1.98 ± 3.10	<.001
30–39 years	24,975	11.1	2.12 ± 3.01	
40–49 years	35,435	15.7	1.81 ± 2.72	
50–59 years	43,903	19.5	1.71 ± 2.67	
60–69 years	44,310	19.7	1.74 ± 2.75	
70+ years	51,029	22.6	2.36 ± 3.33	
Education				
None	20,112	8.9	2.87 ± 3.69	<.001
Elementary school	32,574	14.5	2.19 ± 3.16	
Middle school	24,612	10.9	1.96 ± 3.01	
High school	77,120	34.2	1.80 ± 2.82	
College and over	71,035	31.5	1.76 ± 2.66	
Income				
Low	56,008	24.8	2.54 ± 3.56	<.001
Middle-low	51,073	22.7	1.96 ± 2.91	
Middle-high	55,574	24.6	1.76 ± 2.70	
High	62,798	27.9	1.62 ± 2.49	
Occupation				
Professional or administrative position	23,026	10.2	1.74 ± 2.55	<.001
Office work	19,687	8.7	1.73 ± 2.59	
Sales and service	28,763	12.8	1.88 ± 2.76	
Agriculture and fishery	22,143	9.8	1.53 ± 2.39	
Blue collar work or simple labor	42,923	19.0	1.67 ± 2.51	
Unemployed	88,911	39.4	2.33 ± 3.43	
Household composition				
1 generation	107,187	47.5	2.05 ± 3.08	<.001
2 generation	103,447	45.9	1.88 ± 2.82	
3 generation	14,819	6.6	1.85 ± 2.89	
Area of residence				
Rural	98,449	43.7	1.81 ± 2.87	<.001
Urban	127,004	56.3	2.07 ± 3.01	
Monthly drinking status				
No	124,204	55.1	2.08 ± 3.09	<.001
Yes	101,249	44.9	1.81 ± 2.76	
Smoking status				
No	188,990	83.8	1.95 ± 2.92	<.001
Yes	36,463	16.2	2.02 ± 3.13	
Physical exercise				
No	181,846	80.7	2.02 ± 3.02	<.001
Yes	43,607	19.3	1.71 ± 2.64	
Perceived stress				
No	175,599	77.9	1.39 ± 2.17	<.001
Yes	49,854	22.1	3.94 ± 4.20	

(Continued)

Table 1. (Continued)

Variables	Total		Depressive symptoms (PHQ-9)	p-Value
	N	%	Mean ± SD	
Subjective health status				
Poor	117,106	51.9	2.60 ± 3.43	<.001
Fair	108,347	48.1	1.26 ± 2.11	
Total	225,453	100.0	1.96 ± 2.95	

Table 2. Results of the multivariable linear regression analysis of the association between perceived social support and depressive symptoms.
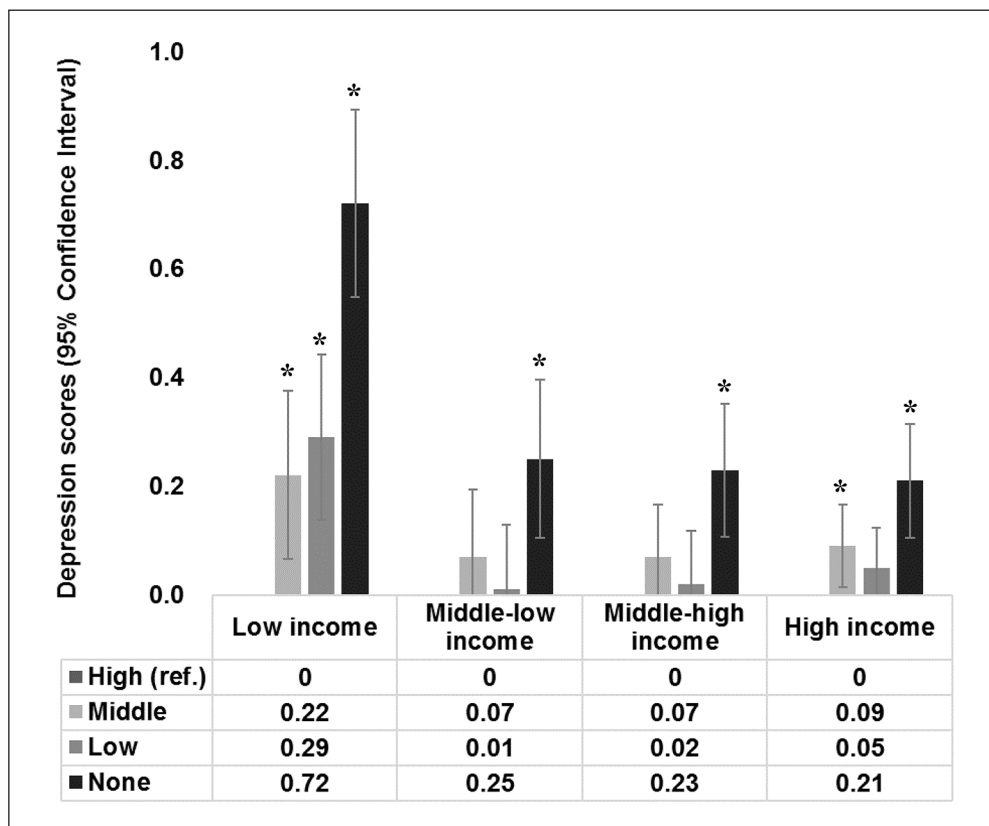
Variables	Depressive symptoms (PHQ-9)		
	Adjusted-B*	SE	p-Value
Perceived social support			
High	Ref.		
Middle	0.10	0.03	<.001
Low	0.07	0.03	.010
None	0.34	0.03	<.001
Sex			
Male	Ref.		
Female	0.51	0.02	<.001
Age			
19–29 years	Ref.		
30–39 years	−0.05	0.03	.101
40–49 years	−0.36	0.03	<.001
50–59 years	−0.42	0.03	<.001
60–69 years	−0.57	0.03	<.001
70+ years	−0.39	0.04	<.001
Education			
None	Ref.		
Elementary school	−0.36	0.05	<.001
Middle school	−0.44	0.05	<.001
High school	−0.62	0.05	<.001
College and over	−0.70	0.06	<.001
Income			
Low	Ref.		
Middle-low	−0.53	0.04	<.001
Middle-high	−0.77	0.04	<.001
High	−0.89	0.04	.119
Occupation			
Professional or administrative position	Ref.		
Office work	−0.02	0.03	.536
Sales and service	0.04	0.03	.225
Agriculture and fishery	−0.23	0.04	<.001
Blue collar work or simple labor	−0.05	0.03	.098
Unemployed	0.19	0.03	<.001
Household composition			
1 generation	Ref.		
2 generation	−0.07	0.02	<.001
3 generation	−0.07	0.04	.054
Area of residence			
Rural	Ref.		
Urban	0.27	0.03	<.001

(Continued)

Table 2. (Continued)

Variables	Depressive symptoms (PHQ-9)		
	Adjusted-*B**	*SE*	*p*-Value
Monthly drinking status			
No	Ref.		
Yes	0.08	0.02	<.001
Smoking status			
No	Ref.		
Yes	0.28	0.02	<.001
Physical exercise			
No	Ref.		
Yes	0.03	0.02	.128
Perceived stress			
No	Ref.		
Yes	2.34	0.02	<.001
Subjective health status			
Poor	Ref.		
Fair	−1.02	0.02	<.001

*Adjusted for sex, age, education, income, occupation, household composition, area of residence, monthly drinking status, smoking status, physical exercise, perceived stress, subjective health status.

Figure 1. Results of subgroup analysis of the multivariable linear regression analysis of the association between perceived social support and depressive symptoms by income. Depression scores (PHQ-9) were calculated using linear regression analysis and adjusted for sex, age, education, income, occupation, household composition, area of residence, monthly drinking status, smoking status, physical exercise, perceived stress, subjective health status. *Indicates a value of $p < .05$.

that perceived social support can provide protection against loneliness during unexpected crises (Xu et al., 2020). The results of this study support the importance of monitoring and managing depressive symptoms in the general population during COVID-19, particularly because persons with depression are less likely to seek help for mental and physical symptoms (Lei et al., 2020; Pfefferbaum & North, 2020).

The relationship between social support and depressive symptoms established in this study was particularly strong among individuals from low income groups compared to those from other income groups. This result is in line with a prior study indicating the strong correlation between social support and reduced risk of depression in individuals with lower income (Brummett et al., 2003). The associations revealed are particularly important because individuals with a disadvantaged socioeconomic status experience disproportionately dire conditions that can increase the risk of depression (Silver et al., 2002). In fact, a greater risk of mental illness has been reported in individuals with low income and less financial assets (Ettman et al., 2021). Considering that individuals with a higher risk of mental illness are more likely to be susceptible to life disruptions after traumatic events, perceived social support may be an important factor influencing the development of depressive symptoms in individuals with low income groups (Tracy et al., 2011).

There are several limitations to this study. First, causal inferences should be made with caution as this study employed a cross-sectional design. Second, perceived social support was measured based on an inquiry of the number of contacts that participants had identified as being available in case participants needed isolation due to COVID-19 exposure. Future studies utilizing a more comprehensive measurement of social support are needed to provide further insights on how social support can affect depressive symptoms. Third, although the data used in this study were collected during the pandemic, participants may have not necessarily responded at the peak of COVID-19 because the Korean government declared varying levels of public health emergency depending on the severity of the situation. Despite the limitations stated above, this study is unique because it investigated the relationship between perceived social support and depressive symptoms using a large, nationally representative sample of the general population during the COVID-19 crisis. The findings reveal that the adverse mental health consequences of the pandemic may be pronounced in individuals with less social support, and particularly among individuals from low income groups.

In conclusion, during the COVID-19 pandemic, individuals with no perceived social support had the poorest depression scores, followed by those with low, middle, and high support. The degree of differences found in depression scores between individuals with dissimilar levels of perceived social support was particularly significant in the low-income group. The results of the present study suggest that strategies to manage the mental health of vulnerable individuals are required to reduce the potential mental health consequences of COVID-19.

Data availability statement

Data will be made available on request. The dataset is available on the Korea Community Health Survey website (https://chs.cdc.go.kr/chs/rdr/rdrInfoProcessMain.do).

Ethical approval

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. In addition, the Korea Community Health Survey (KCHS) data are openly published. Participants' data were fully anonymized prior to release. Our study was excluded from the review list pursuant to Article 2.2 of the Enforcement Rule of Bioethics and Safety Act in Korea, since the data was exempted from IRB review. All procedures performed in studies involving human participants were in accordance with the ethical standards of the national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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