Psychiatry Research 314 (2022) 114663

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

The impact of the COVID-19 pandemic on suicides: A population study

Agnus M. Kim

Department of Health Policy and Management, Seoul National University College of Medicine, 103 Daehangno, Jongno-gu, Seoul, 03080, Korea

ARTICLE INFO

Keywords:
Suicide
COVID-19
Pandemic
Social distancing
Depression
Unemployment
Employment
Consumer Price Index
Consumer Sentiment Index

ABSTRACT

This study examines the factors associated with the change in the number of suicides per month during the COVID-19 pandemic from 2019 to 2021. For economic indicators, employment and unemployment rates, Consumer Price Index, and Consumer Sentiment Index were used. As inverse indicators of social distancing, the numbers of overseas departures, domestic trips, and movie audience were used. The monthly numbers of inpatients and outpatients for depression were included to consider the effect of the prevalence of depression. Pearson's correlation coefficient analysis and a linear regression were conducted. There was a continued decrease in the number of suicides of 1.7% in 2021 from 2020 following the 4.4% decrease in the previous year. The employment rate was positively associated with the number of suicides for males, while the consumer price index was negatively associated with the number of suicides for females. While the inverse social distancing measures were positively correlated with the number of suicides, no significant association was observed in the regression analysis. Commonly shared thoughts that the pandemic would lead to an increase in suicides by its direct negative impact on mental health or indirect impact through the aggravation of economic conditions and social distancing need to be re-examined.

1. Introduction

Since the beginning of the COVID-19 pandemic, suicide has been considered one of its most feared sequela. For several months following the outbreak of COVID-19, articles expressing concern for suicide increase have been churned out with an increase in calls for suicide prevention (Kim, 2021). Contrary to expectations, however, subsequent studies showed a modest reduction or no significant change in suicide rates worldwide (Curtin et al., 2021; Tandon, 2021). These unanticipated findings are received with some reservation as the current positive effect of the COVID-19 on suicide is considered to be temporary. Given its pervasively negative effects on the economy and restrictions in social relationships, the pandemic is still believed to work negatively on mental health and lead to an increase in suicides in the long run.

Despite the reasonable concern for the negative effect, the pacifying effect of the pandemic on suicides needs to be further investigated. The relationship between suicide and social crisis was mainly studied in the context of economic crises. Increased mortality rates during economic and financial crises have been reported in many countries (Rachiotis et al., 2015; Thomas and Gunnell, 2010), most of which are thought to be related to unemployment (Fu et al., 2013; Santana et al., 2015). Concerning the effect of the social crisis on suicides, while a few studies reported an increase in the suicide rate during social crises including pandemics and war (Bosnar et al., 2004; Cheung et al., 2008), a decrease in suicide rates during wars was also reported (Lester, 1993; Rojcewicz Jr, 1971). Given the paucity of studies concerning the relationship between suicide rate and social crisis other than with unemployment or economic crises, examining suicide rates during the pandemic may provide us with a new perspective on crises concerning the mental health of human beings as well as suicide.

The supposedly "temporary" impact of the pandemic on suicides needs to be examined in several aspects. First, it should be examined whether the impact was really transient by investigating the change in the number of suicides in the second year of the pandemic. Second, given that apprehension for a suicide increase during the pandemic is based on the concern for aggravating economic conditions to a considerable extent (Reger et al., 2020), the association between the number of suicides and economic conditions during the pandemic needs to be examined. Third, social distancing, which restricts physical contacts among people, has been strongly suspected to have an adverse impact on mental health (Venkatesh and Edirappuli, 2020). However, the decrease in suicides observed during the early period of the pandemic suggests that the effect of social distancing may be different. The examination of the relationship between the change in the number of suicides and the implementation of social distancing measures may provide new insight into the impact of social distancing on mental health.

E-mail address: agnus@snu.ac.kr.

https://doi.org/10.1016/j.psychres.2022.114663
Received 8 February 2022; Received in revised form 26 May 2022; Accepted 31 May 2022
Available online 9 June 2022
0165-1781/© 2022 Elsevier B.V. All rights reserved.

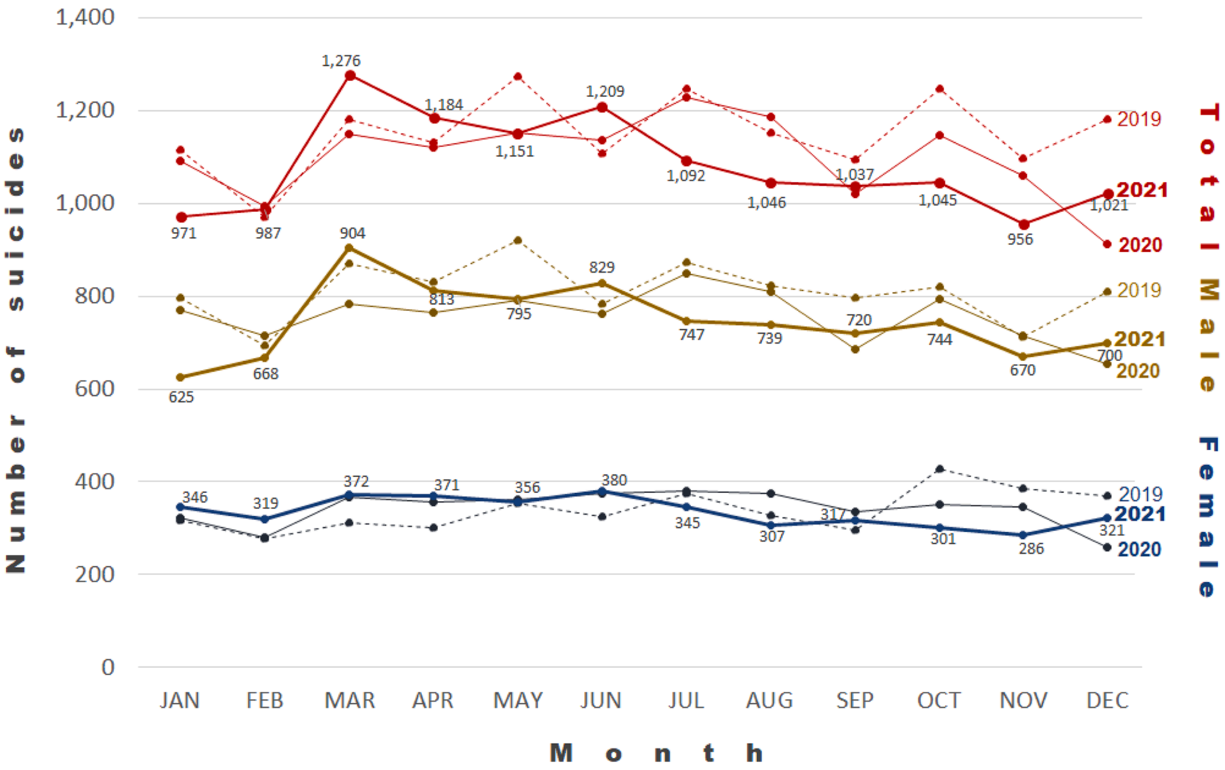

Fig. 1. The number of suicides per month in Korea 2019–2021.

Lastly, the rise in the number of suicides can be considered to reflect the aggravation of mental health (Brådvik, 2018). However, despite reports which show an increase in depressive moods and other negative effects on mental health during the pandemic, a decrease in the number of suicides during the pandemic was documented in many countries (Deisenhammer and Kemmler, 2020; Kim, 2021; Lin et al., 2021; Tandon, 2021). This phenomenon requires two examinations. First, whether the prevalence of depression really increased as is commonly thought. Second, if the prevalence of depression really increased, whether the association between the prevalence of depression and that of suicide held during the pandemic as conventionally believed.

This study was conducted to examine the factors associated with change in the number of monthly suicides during the COVID-19 pandemic. The monthly number of suicides in Korea in 2021 was compared with those in 2020 and 2019. The relationships between the number of suicides with the rates of employment and unemployment, the degree of social distancing, and health care utilization for depression were assessed with the monthly data during the period.

2. Methods

2.1. Procedure and data collection

The monthly number of suicides from January 2019 to December 2021 was acquired from cause of death statistics of Statistics Korea (KOSIS, 2021c). For economic indicators, monthly employment and unemployment rates were acquired from Economically Active Population Survey by Statistics Korea (KOSIS, 2021b), and Consumer Price Index from Consumer Price Survey by Statistics Korea (KOSIS, 2021a). In addition, in order to estimate the effect of the subjective measure of how people perceive economic conditions, the Consumer Sentiment Index (Bank of Korea, 2022) was included as a variable. Regarding social distancing, three indices were used as inverse indicators of social distancing, which were highly likely to be affected by the pandemic related restrictions. The monthly numbers of overseas departures (Korea Tourism Organization, 2021), domestic trips (Ministry of Culture Sports and Tourism, 2021), and movie audience (koficKOBIS, 2022) were acquired from the official statistics of the related departments. Lastly, to assess the relationship between the prevalence of depression and the number of suicides, the monthly numbers of inpatients and outpatients for depression were acquired from the database provided by the Health Insurance Review & Assessment Service (Health Insurance Review and Assessment Service, 2021). For defining depression, the International Classification of Diseases codes F32 and F33 were used. All variables, except for the Consumer Price Index, the Economic Sentiment Index, and the number of movie audience, were acquired for males and females. All data were from January 2019 to December 2021 except for health care utilization for depression (January 2019–October 2021) and the number of domestic trips (January 2019–December 2020). The measures used in this study were for the entire Korean population. Concerning the economic indicators, the target population was the entire adult population of Korea.

2.2. Statistical analysis

First, the monthly number of suicides and other variables during 2019 and 2021 were compared to the corresponding months in the previous year. Second, correlation between the number of suicides and other variables including financial indices, social distancing, and health care utilization for depression was examined with Pearson's correlation coefficient analysis. Third, a linear regression was used to examine the relationships between suicides and variables which were significant in the correlation analysis. For data acquisition and analysis, IBM SPSS Statistics (version 26) were used.

3. Results

The monthly change in the number of suicides during 2019 and 2021 is presented in Fig. 1. The number of suicides in 2020 decreased by 4.4% from 2019 with males showing a 6.5% decrease and females a 0.8%

Table 1
Correlation matrix of the number of suicides and explanatory variables.

			Economic indicators				Inverse indicators of social distancing			Health care utilization for depression	
		N of suicides	Unemployment rate	Employment rate	Consumer Price Index	Consumer Sentiment Index	N of overseas departures	N of domestic trips	N of movie audience	N of outpatients for depression	N of inpatients for depression
N of suicides		1									
Economic indicators	Unemployment rate	−0.024	1								
	Employment rate	0.381*	−0.777**	1							
	Consumer Price Index	−0.430**	−0.401*	0.147	1						
	Consumer Sentiment Index	−0.185	−0.317	0.338*	0.604**	1					
Inverse indicators of social distancing	N of overseas departures	0.299	0.050	0.243	−0.595**	0.136	1				
	N of domestic trips	0.255	−0.183	0.485*	−0.422*	0.681**	0.848**	1			
	N of movie audience	0.286	−0.145	0.389*	−0.459*	0.228	0.935**	0.856**	1		
Health care utilization for depression	N of outpatients for depression	−0.160	−0.362*	0.142	0.908**	0.391*	−0.729**	−0.507*	−0.607**	1	
	N of inpatients for depression	0.459**	−0.239	0.561**	−0.433*	0.294	0.871**	0.806**	0.879**	−0.428*	1

* $p < 0.05$, ** $p < 0.01$.

Table 2
Correlation matrix of the number of male suicides and explanatory variables.

			Economic indicators				Inverse indicators of social distancing			Health care utilization for depression	
		N of male suicides	Male unemployment rate	Male employment rate	Consumer Price Index	Consumer Sentiment Index	N of overseas departures of males	N of domestic trips of males	N of movie audience	N of male outpatients for depression	N of male inpatients for depression
N of male suicides		1									
Economic indicators	Male unemployment rate	0.151	1								
	Male employment rate	0.463**	−0.591**	1							
	Consumer Price Index	−0.429**	−0.521**	0.067	1						
	Consumer Sentiment Index	−0.081	−0.368*	0.295	0.604**	1					
Inverse indicators of social distancing	N of overseas /departures of males	0.402*	0.142	0.337*	−0.594**	0.135	1				
	N of domestic trips of males	0.364	−0.127	0.552**	−0.397	0.685**	0.848**	1			
	N of movie audience	0.374*	−0.063	0.475**	−0.459*	0.228	0.936**	0.856**	1		
Health care utilization for depression	N of male outpatients for depression	−0.192	−0.473**	0.051	0.897**	0.394*	−0.705**	−0.435*	−0.581**	1	
	N of male inpatients for depression	0.503**	0.021	0.545**	−0.556**	0.206	0.934**	0.805**	0.901**	−0.561**	1

* $p < 0.05$, ** $p < 0.01$.

Table 3
Correlation matrix of the number of female suicides and explanatory variables.

			Economic indicators				Inverse indicators of social distancing			Health care utilization for depression	
		N of female suicides	Female unemployment rate	Female employment rate	Consumer Price Index	Consumer Sentiment Index	N of overseas departures of females	N of domestic trips of females	N of movie audience	N of female outpatients for depression	N of female inpatients for depression
N of female suicides		1									
Economic indicators	Female unemployment rate	−0.079	1								
	Female employment rate	0.211	−0.863**	1							
	Consumer Price Index	−0.283	−0.252	0.208	1						
	Consumer Sentiment Index	−0.324	−0.267	0.357*	0.604**	1					
Inverse indicators of social distancing	N of overseas departures of females	−0.023	−0.072	0.152	−0.596**	0.135	1				
	N of domestic trips of females	−0.034	−0.256	0.409*	−0.444*	0.675**	0.847**	1			
	N of movie audience	0.015	−0.244	0.305	−0.459**	0.228	0.934**	0.852**	1		
Health care utilization for depression	N of female outpatients for depression	0.036	−0.234	0.231	0.911**	0.389*	−0.738**	−0.544**	−0.616**	1	
	N of female inpatients for depression	0.224	−0.417*	0.563**	−0.320	0.350*	0.783**	0.778**	0.826**	−0.296	1

* $p < 0.05$, ** $p < 0.01$.

increase. Based on the provisional number of suicides in 2021, the number of suicides in 2021 decreased by 1.7% from 2020 with a 1.5% decrease in males and a 2.0% decrease in females.

The correlation between the number of suicides and other variables is presented in Tables 1-3. For the total population (Table 1), the employment rate and the number of inpatients for depression showed a positive correlation with the number of suicides, and the consumer price index was negatively correlated with the suicide rate. The pattern of correlation for males was similar to that for the total population except for the significant positive association of monthly numbers of overseas departures and movie audience with the number of suicides (Table 2). For females, no significant correlation with the number of suicides was observed (Table 3).

The regression analysis for the number of suicides was performed with employment rate, consumer price index, the number of movie audience, and the number of inpatients for depression (Table 4). The employment rate was positively associated with the number of suicides, and the consumer price index was negatively associated with the number of suicides. In males, only the former association was statistically significant, and in females only the latter.

4. Discussion

This study investigated the change in the monthly number of suicides from 2019 through 2021. The annual number of suicides continued to decrease during 2019 and 2021. In the correlation analysis, the number of suicides for males was positively correlated with the employment rate, numbers of overseas departures and movie audience, and the number of inpatients for depression. The correlation between the number of suicides for males and the consumer price index was negative. Female suicide showed no significant correlation. In the regression analysis, the employment rate was positively associated with the number of suicides for males, and the consumer price index was negatively associated with the number of suicides for females.

The decrease in the number of suicides during the first year after the outbreak of COVID-19 was reported in a number of prior studies. The continued decrease during the second year of the pandemic in 2021 in this study suggests that the suicide decrease during the pandemic may not be a temporary phenomenon. Furthermore, the female suicides, which showed a slight increase between 2019 and 2020, declined between 2020 and 2021.

As much as the initial decrease in suicides during the first year of the pandemic was unexpected, the prolonged decrease in the second year indicates that the effect of the pandemic on suicides has become more significant. This phenomenon can be explained in two ways. First, it can be due to the direct impact of the pandemic. An increased awareness of imminent crisis shared by community members and raised solidarity, which is needed to cope with the crisis (Tomasini, 2021), could have worked to decrease suicides. Second, the decrease in suicides during the pandemic could be an indirect effect of the pandemic due to the changes involved with it such as changes in economic situation or the effect of social distancing. This study primarily examined the second hypothesis and intended to give insight into assessing the first hypothesis. In terms of economic indicators, suicide rate was positively correlated with employment rate. The association of suicide rate with unemployment rate was negative although not statistically significant. This finding is in contrast with those found in the studies which were performed before the pandemic. Rises in suicide rates associated with an increase in unemployment were reported in many countries (Chang et al., 2013), and the unemployment rate is generally known to be positively associated with the suicide rate (Blakely et al., 2003) though some reports showed no association (Hintikka et al., 1999).

The finding concerning suicide and unemployment in this study suggests two points. First, it demonstrates that the positive association between unemployment and suicide does not always hold and can be reversed in some circumstances. Many studies found that

Table 4
Regression analysis predicting the number of suicides.

Dependent variable: number of suicides			Dependent variable: number of male suicides			Dependent variable: number of female suicides		
Independent variables	Coefficient	SE	Independent variables	Coefficient	SE	Independent variables	Coefficient	SE
Employment rate	41.258*	18.142	Male employment rate	44.294**	15.419	Female employment rate	8.940	6.751
Consumer Price Index	−31.796*	13.426	Consumer Price Index	−15.706	10.196	Consumer Price Index	−13.470*	5.901
N of movie audience	0.000	0.000	N of movie audience	0.000	0.000	N of movie audience	0.000*	0.000
N of inpatients for depression	0.174	0.103	N of male inpatients for depression	0.252	0.183	N of female inpatients for depression	0.122	0.069
R^2	0.544		R^2	0.587		R^2	0.279	

* $p < 0.05$, ** $p < 0.01$.

unemployment was positively associated with suicide at both the individual and population levels, and stress was said to be associated with it (Elbogen et al., 2020). In a society where a certain level of economic conditions is secured for individuals, however, unemployment may not be a stressor as significant as in a society where having a job is a prerequisite for sustaining a living. In addition, during the pandemic, the Korean government provided a series of supplementary budgets to support employment and benefits to help sustain household income levels (Ministry of Economy and Finance, 2021). Governmental financial supports during the pandemic could have reduced the burden of unemployment. The positive association between employment and suicide rates also supports that having a job can be a more significant stressor than losing it in certain conditions given that work-related stress is a significant predictor of suicide attempts (Kim et al., 2021). Second, the concern for suicide during the COVID-19, which is largely based on the possible increase in unemployment, needs to be reconsidered. The results in this study cast questions about the core premises of this concern: whether unemployment really increased after the COVID-19 and whether suicide really increased following the increase in unemployment, if it occurred. This study demonstrates that the concern for suicide initially raised and still being raised regarding the pandemic needs to be examined based on an accurate assessment of the economic effect of the pandemic and its aftermath on suicides.

The negative association between the consumer price index and the number of suicides also contradicts the general concern about the increase in suicides due to aggravating economic conditions during COVID-19. The association between the consumer price index and suicide rate was dealt with in only a few studies, which presented rather inconsistent findings: negative ones in UK females, Australian males and the US and positive ones in Australian females and India (Berk et al., 2006; Ceccherini-Nelli and Priebe, 2011; Rajkumar et al., 2015). These results suggest that the negative association between the consumer price index and suicide rate is predominant in developed countries. Considering that the association was also negative in the cross-sectional analysis with the latest data of 2005 in the above-mentioned study in India, it is likely that the effect of economic pressure on suicide may become small in developed economies. Consumer sentiment index was reported to be negatively associated with suicide rates (Berk et al., 2006; Botha and Nguyen, 2021; Collins et al., 2021). The absence of their association in this study suggests also that the economic impact on suicide was not like as had been expected.

The inverse social distancing measures, the numbers of overseas departures and movie audience, were positively correlated with the number of suicides, and no significant association was observed in the regression analysis. This finding suggests that social distancing was not positively associated with the number of suicides, contrary to common expectation. This could be explained in a number of ways such as a decrease in stress from job or social activity, a decrease in drinking at social gatherings, which had been a common practice in Korea before the pandemic, and an increase in family contact, which is known to be effective in preventing suicide. The possible positive effect of social distancing on mental health needs to be further investigated in future studies.

Concerning the prevalence of depression, the numbers of inpatients and outpatients for depression increased for males and females compared by month and year. Although the monthly number of inpatients decreased during the first year of the pandemic, which is considered to be due to the overall decrease in inpatient utilization during the pandemic, the outpatient numbers continued to increase during the period. However, the absence of a significant association between the number of patients with depression and the number of suicides demonstrates that their relationship during the pandemic was not as had been generally expected. Despite the known explicit correlation between suicide and depression, the study finding suggests that more elements can intervene in suicides. Investigating those elements which, as suggested in this study, could be controllable at the society level would be important in future studies.

There are some caveats in this study. First, the occurrence of suicide has a seasonal variation, and this original variation can make it difficult to measure the impact of economic and social distancing measures on a monthly basis. Due to the relatively short length of time since the beginning of the COVID-19 pandemic, it was impossible to apply commonly used year-based analyses. However, given that the social distancing measures have changed a number of times within one year, a month-based analysis could be more appropriate to assess the influence of those measures. Although the suicide rate has a seasonal variation, monthly data of three consecutive years could have adjusted the seasonal variation of suicide rates. Second, this study is population-based, and the associations between variables may not hold true for individuals. Therefore, a simple application of the association to each individual should be avoided. Third, the impact of deaths from COVID-19 on the number of suicides was not considered in this study. Although the number of deaths due to COVID-19 in Korea was stably low during most of the study period, it began to increase sharply after September 2021. Considering that 90% of the deaths due to COVID-19 in Korea were among those over age 60, the possible change in the number of suicides among the aged population due to the increase in deaths due to COVID-19 needs to be considered. Future studies covering the period after the increase in deaths due to COVID-19 should consider this. Lastly, the association demonstrated in this study is different from causality but should be understood as a guide to future studies identifying the causes of suicide decrease during the COVID-19 pandemic. Despite those caveats, the significance of this study would be the demonstration that the decrease in the number of suicides during the pandemic may not be short-term as commonly expected, and the influence of economic conditions and social distancing on suicides was also contrary to general expectations.

This study showed that there was a continued decrease in the number of suicides during the second year of the pandemic. This suggests that the decrease in suicide during the COVID-19 pandemic may not be temporary and that the pandemic may have a substantial effect on decreasing suicide. This study also showed that unemployment and social distancing were not found to be associated with suicides during the COVID-19. On the contrary, the employment rate was positively associated with the number of suicides. Commonly shared thoughts that the pandemic would lead to an increase in suicides by its direct negative impact on mental health or indirect impact through the aggravation of economic conditions and social distancing need to be re-examined. Investigating the positive effects of crisis on mental health and positive reorganization of social relationships by social distancing would shed light on developing strategies for suicide.

References

Bank of Korea, 2022. Consumer Sentiment Index. https://kosis.kr/statHtml/statHtml.do?orgId=301&tblId=DT_513Y001&conn_path=I3.

Berk, M., Dodd, S., Henry, M., 2006. The effect of macroeconomic variables on suicide. Psychol. Med. 36 (2), 181–189.

Blakely, T.A., Collings, S.C., Atkinson, J., 2003. Unemployment and suicide. Evidence for a causal association? J. Epidemiol. Community Health 57 (8), 594–600.

Bosnar, A., Stemberga, V., Cuculic, D., Zamolo, G., Stifter, S., Coklo, M., 2004. Suicide rate after the 1991–1995 War in Southwestern Croatia. Arch. Med. Res. 35 (4), 344–347.

Botha, F., Nguyen, V.H., 2021. Opposite nonlinear effects of unemployment and sentiment on male and female suicide rates: evidence from Australia. Soc. Sci. Med., 114536

Brådvik, L., 2018. Suicide Risk and Mental Disorders. Int. J. Environ. Res. Public Health 15 (9), 2028.

Ceccherini-Nelli, A., Priebe, S., 2011. Economic factors and suicide rates: associations over time in four countries. Soc. Psychiatry Psychiatr. Epidemiol. 46 (10), 975–982.

Chang, S.-S., Stuckler, D., Yip, P., Gunnell, D., 2013. Impact of 2008 global economic crisis on suicide: time trend study in 54 countries. BMJ: British Med. J. 347, f5239.

Cheung, Y., Chau, P.H., Yip, P.S., 2008. A revisit on older adults suicides and Severe Acute Respiratory Syndrome (SARS) epidemic in Hong Kong. Int. J. Geriatric Psychiatry: J. Psychiatry Late Life Allied Sci. 23 (12), 1231–1238.

Collins, A., Cox, A., Kizys, R., Haynes, F., Machin, S., Sampson, B., 2021. Suicide, sentiment and crisis. Soc. Sci. J. 58 (2), 206–223.

Curtin, S.C., Hedegaard, H., Ahmad, F.B., 2021. Provisional numbers and rates of suicide by month and demographic characteristics: united States, 2020. NVSS-Vital Statistics Rapid Release.

Deisenhammer, E.A., Kemmler, G., 2020. Decreased suicide numbers during the first 6 months of the COVID-19 pandemic. Psychiatry Res. 295 e113623-e113623.

Elbogen, E.B., Lanier, M., Montgomery, A.E., Strickland, S., Wagner, H.R., Tsai, J., 2020. Financial Strain and Suicide Attempts in a Nationally Representative Sample of US Adults. Am. J. Epidemiol. 189 (11), 1266–1274.

Fu, T.S.-T., Lee, C.-S., Gunnell, D., Lee, W.-C., Cheng, A.T.-A., 2013. Changing trends in the prevalence of common mental disorders in Taiwan: a 20-year repeated cross-sectional survey. Lancet North Am. Ed. 381 (9862), 235–241.

Health Insurance Review and Assessment Service, 2021. Statistics for classification of diseases (three-digit codes). http://opendata.hira.or.kr/op/opc/olap3thDsInfo.do.

Hintikka, J., Saarinen, P.I., Viinamäki, H., 1999. Suicide mortality in Finland during an economic cycle, 1985-1995. Scand. J. Public Health 27 (2), 85–88.

Kim, A.M., 2021. The short-term impact of the COVID-19 outbreak on suicides in Korea. Psychiatry Res. 295, 113632.

Kim, A.M., Jeon, S.-W., Cho, S.J., Shin, Y.C., Park, J.-H., 2021. Comparison of the factors for suicidal ideation and suicide attempt: a comprehensive examination of stress, view of life, mental health, and alcohol use. Asian J. Psychiatr. 65, 102844.

Korea Tourism Organization, 2021. Tourism Statistics. https://kosis.kr/statHtml/statHtml.do?orgId=314&tblId=DT_SEX_DEP_AGG_MONTH&conn_path=I3.

KOSIS, 2021a. Consumer price index. https://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT_1J20003&vw_cd=MT_ZTITLE3&list_id=P2_63&seqNo=3&lang_mode=ko3&language=kor3&obj_var_id=3&itm_id=3&conn_path=MT_ZTITLE.

KOSIS, 2021b. Economically Active Population Survey. https://kosis.kr/statisticsList/statisticsListIndex.do?vwcd=MT_ZTITLE&menuId=M_01_01#content-group.

KOSIS, 2021c. Number of suicides by month. https://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT_1B34E17&conn_path=I3.

koficKOBIS, 2021. Monthly number of movie audience and sales. https://www.kobis.or.kr/kobis/business/stat/them/findMonthlyTotalList.do.

Lester, D., 1993. The effect of war on suicide rates. Eur. Arch. Psychiatry Clin. Neurosci. 242 (4), 248–249.

Lin, C.-Y., Chang, S.-S., Shen, L.-J., 2021. Decrease in suicide during the first year of the COVID-19 pandemic in Taiwan. J. Clin. Psychiatry 82 (6), 37990.

Ministry of Culture Sports and Tourism, 2021. Korea national tourism survey. https://kosis.kr/statHtml/statHtml.do?orgId=113&tblId=DT_113_STBL_1029207&conn_path=I3.

Rachiotis, G., Stuckler, D., McKee, M., Hadjichristodoulou, C., 2015. What has happened to suicides during the Greek economic crisis? Findings from an ecological study of suicides and their determinants (2003–2012). BMJ Open 5 (3), e007295.

Rajkumar, A.P., Senthilkumar, P., Gayathri, K., Shyamsundar, G., Jacob, K.S., 2015. Associations Between the Macroeconomic Indicators and Suicide Rates in India: two Ecological Studies. Indian J. Psychol. Med. 37 (3), 277–281.

Reger, M.A., Stanley, I.H., Joiner, T.E., 2020. Suicide Mortality and Coronavirus Disease 2019—A Perfect Storm? JAMA Psychiatry.

Rojcewicz Jr, S.J., 1971. War and suicide. Suicide Life Threat. Behav. 1 (1), 46–54.

Santana, P., Costa, C., Cardoso, G., Loureiro, A., Ferrão, J., 2015. Suicide in Portugal: spatial determinants in a context of economic crisis. Health Place 35, 85–94.

Tandon, R., 2021. COVID-19 and suicide: just the facts. Key learnings and guidance for action. Asian J. Psychiatr. 60, 102695-102695.

Thomas, K., Gunnell, D., 2010. Suicide in England and Wales 1861–2007: a time-trends analysis. Int. J. Epidemiol. 39 (6), 1464–1475.

Tomasini, F., 2021. Solidarity in the Time of COVID-19? Camb. Q. Healthc. Ethics 30 (2), 234–247.

Venkatesh, A., Edirappuli, S., 2020. Social distancing in covid-19: what are the mental health implications? BMJ 369.

Ministry of Economy and Finance, 2021. Recovery for All: Korea's Fiscal Response to COVID-19.