

Mental Health Outcomes during the COVID-19 Pandemic: Mortality, Insomnia, and Mental Disorders in South Korea

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ABSTRACT: We conducted a literature review by searching the KNHIS database for articles published before April, 2023, to review the association between COVID-19 and mental health and death. Among the 97 eligible study articles, 9 were included in the final review. The findings were divided into two subgroups—(A) death with mental illness during the COVID-19 pandemic and (B) association between COVID-19 and mental illness. Studies on severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection and mental illness have consistent findings. The risk of developing COVID-19 and other mental disorders increases in patients with severe mental disorders. During the COVID-19 pandemic, Koreans' mental health weakened. The findings can serve as a foundation for developing strategies to address mental illness and improve mental health services within the community.

KEYWORDS: mental health, mental illness, Coronavirus, COVID-19, SARS-CoV-2

INTRODCUTION

Republic of Korea has successfully controlled the coronavirus disease (COVID-19) pandemic however, lifestyle changes, mental health, and quality of life have been affected. Particularly, social distancing has altered the South Korean lifestyle and healthcare system [1, 2]. The COVID-19 pandemic has reduced the continuity and accessibility of healthcare services for individuals with mental disorders [3, 4]. Mental health studies have highlighted the link between the COVID-19 pandemic and mental health issues through various methodologies. Previous South Korean studies have reported mental health outcomes among healthcare workers and professionals, children or adolescents, or students at high risk for mental health issues due to SARS-CoV-2 infection [4-8]. Other studies have reported COVID-19 and mental health problems or mental health services in the community for the general population, patients with mental disorders, athletes, pregnant women, and older adults. A review of previous studies would be helpful in understanding mental health in the South Korean population. In this study, we aimed to investigate the mental health of South Koreans by reviewing studies reported based on the Korean National Health Insurance Service (KNHIS) database. KNHIS studies with large sample sizes provide insights into comprehensive mental health patterns. This study aimed to provide recent evidence regarding the association between COVID-19 and mental health in the South Korean population.

METHODS

2.1 Study design

Observational studies (cross-sectional, retrospective cohort, or longitudinal) were eligible for this review. In addition, studies were required to meet the following criteria: (1) include Korean study population (2) published in English and Korean, (3) include the general population and patients who participated in COVID-19 testing, (4) report mental disorders and mental illness-related topics, and (5) utilize the national population data from the KNHIS database related to COVID-19. All age groups were included in the inclusion criteria. Two researchers reviewed the titles and abstracts of 97 eligible articles, of these, the full text of 16 articles was reviewed, and 9 articles were finally selected (Fig 1).

2.2 Data sources and searches

The search was conducted on PubMed, Medline, EMBASE, Web of Science, and Korea-Med from inception to April 2023. A manual search on Google Scholar was performed to identify additional relevant studies. The search was performed using the following terms: ('COVID-19' OR 'Coronavirus' OR 'SARS-CoV-2') AND ('National cohort' OR 'Health Insurance' OR 'National Population' OR 'Claim') AND ('Korea' OR 'Korean' OR 'South Korea' OR 'Republic of Korea') AND ('Mental health' OR 'Mental disorder' OR 'Mental service' OR 'Psychiatric' OR 'Psychology'). These terms were searched in the titles and abstracts.

2.3 Study selection

Observational studies (cross-sectional, retrospective cohort, or longitudinal) were eligible for this review. In addition, studies were required to meet the following criteria: (1) include South Korean study population (2) published in English and Korean, (3) include the general population and patients who participated in COVID-19 testing, (4) report mental disorders and mental illness-related topics, and (5) utilize the national population data from the KNHIS database related to COVID-19. All age groups were included in the inclusion criteria. Two researchers reviewed the titles and abstracts of 97 eligible articles, of these, the full text of 16 articles was reviewed, and 9 articles were finally selected (Fig 1).

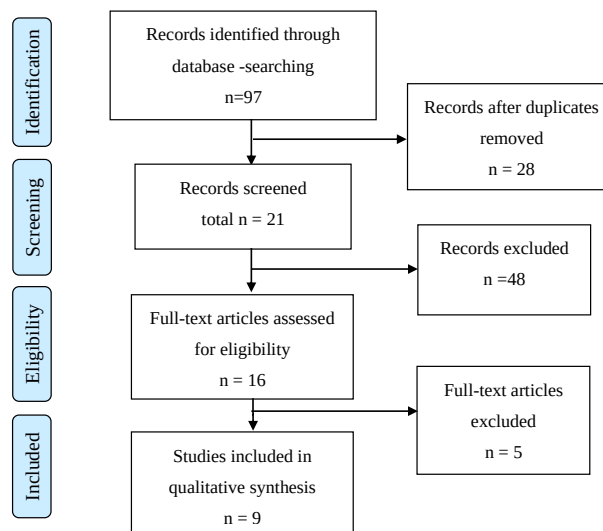


Figure 1 The flow chart of literature selection process

2.4 Data extraction and synthesis of findings

Data extraction was performed by one author. Data extracted included study information (author, year of publication, aim or purpose of the studies, dataset period), participant characteristics (target population, sample size), methods, outcomes, and main findings. The final selected articles were reviewed and discussed by two researchers.

2.5 Quality assessment

The risk of bias was independently assessed by two researchers (Kim, Ph.D., and Lee, Ph.D.) using the Newcastle–Ottawa Scale, adapted for case-control and cohort studies. Any discrepancies between the reviewers were resolved through discussion.

RESULTS

3.1 Studies of SARS-CoV-2 positive and death with mental illness

Five studies reported on the association between COVID-19 and mental disorders or death [9-13], two reported on the association between COVID-19 and insomnia [14] and self-injurious behavior [15]. Two studies [11, 12] reported mental illness and death due to COVID-19; however, the study population only included adults and older adults. In two studies, patients with mental illness diagnosed with COVID-19 had increased mortality rates [10, 11]. Particularly, patients with schizophrenia and delusional disorders had increased risk of death from COVID-19 [11]. Older patients with mild mental illness did not show an increased risk of death from COVID-19. However, older patients with severe mental illness were at an increased risk of contracting COVID-19 [10, 12]. The results differed for adults with mental illness. Mental illness was not related with COVID-19 positive test results [11]. Patients with severe symptoms of mental illness reported an association with COVID-19 positive test results and increased COVID-19 positive diagnosis in inpatients compared to psychiatric outpatients [11]. In particular, during the COVID-19 pandemic, there have been high levels of depression and suicidal behavior [15]. Interestingly, one study reported that the rate of suicidal behavior also increased in individuals with mental illness who tested

negative for COVID-19 [15]. In addition, the rate of suicidal behaviors has increased among people with preexisting mental illnesses. Since 2020, the suicide rate of Koreans has increased annually [16] (Table 1).

Table1 Characteristics of studies on relationship between SARS-CoV-2 test and mental illness

Author	Published year	Study design	Study population					Follow-up period
			Age (years)	Target population	Total(n)	Case (n)	Control (n)	
Lee et al. [9]	2020	Cohort	≥20	Tested RT-PCR of SARS-CoV-2	216418	7160	209258	2020.1.-2020.5.15
Jeon et al. [10]	2021	Cohort	≥20	Tested RT-PCR of SARS-CoV-2	7077	928	6149	2019.12.1.-2020.5.15
Seon et al. [11]	2021	Cohort	≥20	Tested RT-PCR of SARS-CoV-2	123480	7713	115695	2020.1.1.-2020.5.30.
Lee et al. [12]	2020	Cohort	≥65	Positive tested RT-PCR of SARS-CoV-2	814	559	255	2020.1.1.-2020.4.10.
Oh et al. [13]	2021	Cohort	≥20	Positive tested RT-PCR of SARS-CoV-2	99742	5879	93863	2020.1.1.-2020.6.4.
Park et al. [14]	2021	Cohort	≥20	Tested RT-PCR of SARS-CoV-2	299968	6934	292764	2020.1.1.-2020.6.4.
Park et al. [15]	2022	Cohort	≥20	Tested RT-PCR of SARS-CoV-2	328373	7713	115965	2020.1.1.-2020.5.31.
Park et al. [21]	2021	Cohort	≥21	Tested RT-PCR of SARS-CoV-2	306577	7133	299444	2020.1.1.-2020.6.4.
Kim et al. [26]	2022	Cohort	≥20	Tested RT-PCR of SARS-CoV-2	288917	7426	81519	2020.2.1.-2020.5.31

3.2 Study of SARS-CoV-2 positive and insomnia

The COVID-19 pandemic has resulted in sleep problems related to mental disorders in South Korea. One study reported on insomnia in COVID-19 survivors [14]. Insomnia increased in COVID-19 survivors, and high insomnia rates were observed among patients who received COVID-19 treatments (5.4%). Interestingly, insomnia prevalence has increased even in survivors with mild or no SARS-CoV-2 symptoms [14]. The findings show that the COVID-19 pandemic impacted not only severe mental illness but also mild mental health-related symptoms (Table 2).

Table2 SARS-CoV-2 positive and mental illness and death with mental illness

Study author	Aim or purpose	Diagnosed disease code	Analysis	Key findings
Lee et al. [9]	Association between any mental illness and COVID-19 susceptibility and clinical outcome	Mental illness	Odds ratio	Mental illness patients had more severe clinical outcomes (2.27, 1.50-3.41) of SARS-CoV-2 than the control.

Jeon et al. [10]	Association between mental disorders and the risk of SARS-CoV-2 infection	Mental and behavioral disorder Death with mental illness	Odds ratio	Risk of severe event of SARS-CoV-2 infection was higher in patients with schizophrenia-related disorders (1.27, 0.37-4.37), mood disorders (0.71, 0.32-1.58) Risk of death from SARS-CoV-2 infection was higher in patients with schizophrenia-related disorders (2.25, 0.36-14.03), mood disorders (2.33, 0.96-5.66)
Seon et al. [11]	Comparison of SARS-CoV-2 infection and COVID-19 related death in patients with mental illness	Mental illness	Odds ratio	Patients with severe mental illness (2.60, 2.21-3.06) and dementia (1.90, 1.62-2.22) had a high risk of SARS-CoV-2 infection and COVID-19 related death (3.53, 1.82-6.83).
Lee et al. [12]	Risk of death from COVID-19 in elderly patients with mental disorder.	Death with mental illness	Hazard ratio	Elderly COVID-19 patients with mental disorders (1.57, 0.95-2.56) have death a higher risk than control.
Oh et al. [13]	Risk of psychological diseases among COVID-19 survivors	Psychological disease	Odds ratio	COVID-19 survivors showed a higher incidence of depression (3.34, 2.88-3.87), psychosis (2.49, 1.15-5.43), and alcohol abuse (0.92, 0.56-1.51) compared with the control group.
Park et al. [14]	Investigated the prevalence of insomnia and related factors in COVID-19 survivors	Insomnia disorder	Odds ratio	COVID-19 survivors showed insomnia disorder (3.33, 2.98-3.73), mental disorder (2.85, 2.41-3.37) higher than the control group.
Park et al. [15]	To investigate the impact of the COVID-19 pandemic on self-injurious behavior of the COVID-19 risk group	Self-injury	Odds ratio	People who tested negative for SARS-CoV-2 have seen a significant increase in self-injurious behavior
Park et al. [21]	To investigate risk of diagnosis of dementia in COVID-19 survivors and controls	Dementia	Hazard ratio	People who survived COVID-19 had a higher incidence of dementia (1.39, 1.04-1.85), ≥ 60 years old dementia (1.38, 1.02-1.87) than the control group.
Kim et al. [26]	Evaluation of the incidence of new dementia in patients tested for SARS-CoV-2	Dementia	Hazard ratio	Positive group for SARS-CoV-2 test had a higher incidence of dementia (2.72, 1.64-6.52) and psychiatric disorder (4.67, 3.17-6.86) than the control

DISCUSSION

This study identified trends in the topics of COVID-19 and mental health in South Korea by reviewing articles that utilized the KNHIS database, published between January 2019 and April 2023. We searched national and international literature databases and reviewed full texts of the 16 articles; Of these articles, we evaluated nine articles by combining the data extracted and the results of the final selected article. The results indicated that adults with mental illness have an increased risk of COVID-19 death and self-injury [10, 12,15]. Patients with severe mental illness exhibited severe clinical serious COVID-19 symptoms, ultimately leading to death. According to a French study, patients with schizophrenia have a high mortality rate within 90 days of confirming COVID-19. In addition, the COVID-19 pandemic has weakened the accessibility, safety, and effectiveness of treatment for patients with schizophrenia [17]. SARS-CoV-2 infection, severe clinical symptoms, and mortality risk are similar to those in patients with severe mental illness in South Korea. A systematic review of mental health disorders and deaths among patients with COVID-19 in seven countries found that COVID-19 mortality increases the risk of mental illness. Furthermore, a study has shown that the risk of mortality in patients with severe mental disorders has increased [18]. Insomnia is a common mental health problem associated with the COVID-19 pandemic. A systematic literature review on COVID-19 and insomnia reported that the spread of COVID-19 had a mental and psychological impact on the population, leading to increased insomnia occurrence [11, 19, 20]. The incidence of insomnia increased in COVID-19 survivors and in those with no or mild COVID-19 symptoms [21]. Systematic reviews on COVID-19 and mental health have reported depression, anxiety, sleep, and stress. Previous studies have reported varying results depending on individuals' mental health [22, 23]. Patients with severe mental illness experience higher levels of anxiety and sleep disorders than those in the control group [24]. Older individuals have low psychological severity of depression and stress symptoms [25]. The COVID-19 pandemic has caused mental and psychological problems. Many studies have demonstrated an association between COVID-19 and mental health.

CONCLUSION

This review highlights that the COVID-19 pandemic significantly exacerbated mental health challenges among South Koreans, mirroring global trends. Our findings underscore that individuals with severe mental illnesses face disproportionately higher risks of COVID-19 infection, clinical severity, and mortality. Furthermore, the pandemic has been associated with a notable increase in insomnia across the population, affecting not only COVID-19 survivors but also those with no or mild symptoms. This review has several limitations that should be acknowledged. First, we set the literature search period up to April 2023, as one of the identified key studies reported a significant mortality rate within 90 days following a COVID-19 diagnosis, marking a critical clinical milestone in the pandemic. However, this timeframe may not fully reflect the long-term sequelae of later virus variants. Second, the number of studies included in this review is relatively small, which may limit the generalizability of our findings to the broader population of individuals with mental illness. Third, this review relies on secondary data from previously published articles, which introduces heterogeneity in study designs and outcome measures among the selected studies. Despite these limitations, this study provides a foundational evidence base for understanding the mental health landscape during the pandemic, it also identifies an urgent need for targeted, long-term protective strategies for high-risk groups.

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