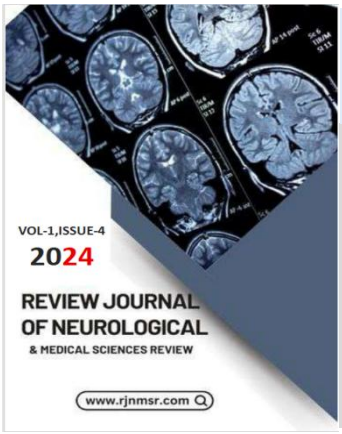

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Frequency of Depression in Indoor Patients of Covid-19 in Khyber Teaching Hospital

Abdul Shakoor
consultant psychiatrist at- drshakoor11066@gmail.com
Aamir Aziz
consultant psychiatrist at- amirkth13@gmail.com
Dr. Daim Ali
Current position: postgraduate resident in Hayatabad medical complex, Peshawar at- daimali183@gmail.com
Sajid Usman Shah
Postgraduate resident in psychiatry department Khyber teaching hospital Peshawar at- sajidusman252@gmail.com

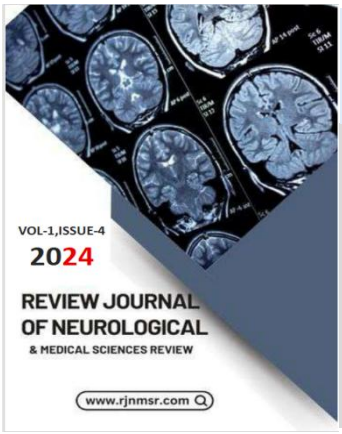
Abstract

The rapidly evolving situation has drastically altered people's lives, as well as multiple aspects of the global, public, and private economy. Declines in tourism, aviation, agriculture, and the finance industry owing to the COVID-19 outbreak are reported as massive reductions in both supply and demand aspects of the economy were mandated by governments internationally.To determine the frequency of depression in indoor patients of COVID-19 in Khyber teaching hospital, Peshawar. Study Design:Cross Sectional Study. COVID Isolation Unit, Khyber Teaching Hospital Peshawar. Duration of Study: This study was conducted from 10th June 2021 to 10th December 2021.A total of 148 patients of both gender with COVID-19 infection were included in the study. Basic demographics like age, gender and duration of hospital stay were noted. Data was collected for depression as per operational definition.Age range in this study was from 20 to 80 years with mean age of 44.418±9.64 years and mean duration of hospital stay was 12.114±4.27 days. Male patients were 72.3% and females were 27.7%. Depression was observed in 32.4% patients.The prevalence rates of depression in our study are significantly high than previous studies from various parts of the world.

Keywords: COVID-19 infection, Depression, Frequency

Introduction

In December 2019, a cluster of atypical cases of pneumonia was reported in Wuhan, China, which was later designated as Coronavirus disease 2019



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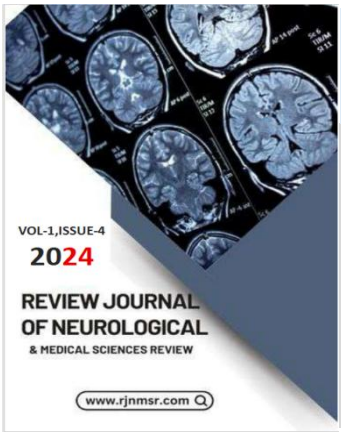
(COVID-19) by the World Health Organization (WHO) on 11 Feb 2020.1 The causative virus, SARS-CoV-2, was identified as a novel strain of corona viruses that shares 79% genetic similarity with SARS-CoV from the 2003 SARS outbreak.[1] On 11 Mar 2020, the WHO declared the outbreak a global pandemic.[1] The rapidly evolving situation has drastically altered people's lives, as well as multiple aspects of the global, public, and private economy. Declines in tourism, aviation, agriculture, and the finance industry owing to the COVID-19 outbreak are reported as massive reductions in both supply and demand aspects of the economy were mandated by governments internationally.[2] The uncertainties and fears associated with the virus outbreak, along with mass lockdowns and economic recession are predicted to lead to increases in suicide as well as mental disorders associated with suicide. For example,[3] have reported a projected increase in suicide from 418 to 2114 in Canadian suicide cases associated with joblessness. The foregoing result (i.e., rising trajectory of suicide) was also reported in the USA, Pakistan, India, France, Germany, and Italy.[4,5] Separate lines of research have also reported an increase in psychological distress in the general population, persons with pre-existing mental disorders, as well as in healthcare workers.[6-8] Taken together, there is an urgent call for more attention given to public mental health and policies to assist people through this challenging time.

In a study by Samrah SM, et al. has shown that frequency of depression was 44% in indoor patients of COVID-19.[9] In another study by Hasan MJ, et al. has shown that frequency of depression was 87.3% in indoor patients of COVID-19.[10] To date, this is the first study that aims to evaluate depression among individuals with confirmed COVID-19 infection during their obligatory and prolonged in-hospital stay. The mental health aspect of coronavirus disease-19 (COVID-19) patients in Pakistan has remained less focused and has not been addressed properly. Therefore I had planned to determine the frequency of depression in indoor patients of COVID-19 in Khyber teaching hospital, Peshawar.

Review Of Literature

Coronavirus disease 2019 (COVID-19), the highly contagious viral illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has had a catastrophic effect on the world's demographics resulting in more than 6 million deaths worldwide as of March 2022, emerging as the most consequential global health crisis since the era of the influenza pandemic of 1918. After the first cases of this predominantly respiratory viral illness were first reported in Wuhan, Hubei Province, China, in late December 2019, SARS-CoV-2 rapidly disseminated across the world in a short span of time, compelling the World Health Organization (WHO) to declare it as a global pandemic on March 11, 2020. Since being declared a global pandemic, COVID-19 has ravaged many countries worldwide and has overwhelmed many healthcare systems. The pandemic has also resulted in the loss of livelihoods due to prolonged shutdowns, which have had a rippling effect on the global



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economy. Even though substantial progress in clinical research has led to a better understanding of SARS-CoV-2 and the management of COVID-19, limiting the continuing spread of this virus and its variants has become an issue of increasing concern, as SARS-CoV-2 continues to wreak havoc across the world, with many countries enduring a second or third wave of outbreaks of this viral illness attributed mainly due to the emergence of mutant variants of the virus.

SARS-CoV-2 Variants

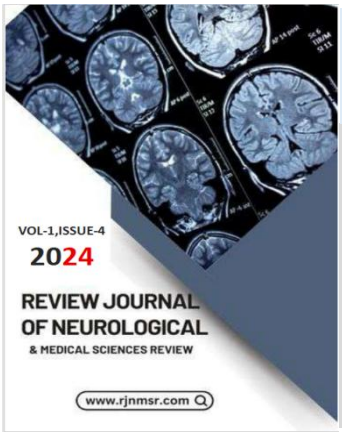
As mentioned earlier, SARS-CoV-2 is prone to genetic evolution resulting in multiple variants that may have different characteristics compared to its ancestral strains. Periodic genomic sequencing of viral samples is of fundamental importance, especially in a global pandemic setting, as it helps detect any new genetic variants of SARS-CoV-2. Notably, the genetic evolution was minimal initially with the emergence of the globally dominant D614G variant, which was associated with increased transmissibility but without the ability to cause severe illness. Another variant was identified in humans, attributed to transmission from infected farmed mink in Denmark, which was not associated with increased transmissibility. Since then, multiple variants of SARS-CoV-2 have been described, of which a few are considered variants of concern (VOCs) due to their potential to cause enhanced transmissibility or virulence, reduction in neutralization by antibodies obtained through natural infection or vaccination, the ability to evade detection, or a decrease in therapeutics or vaccination effectiveness. With the continued emergence of multiple variants, the CDC and the WHO have independently established a classification system for distinguishing the emerging variants of SARS-CoV-2 into variants of concern(VOCs) and variants of interest(VOIs).

SARS-CoV-2 Variants of Interest (VOIs)

VOIs are defined as variants with specific genetic markers that have been associated with changes that may cause enhanced transmissibility or virulence, reduction in neutralization by antibodies obtained through natural infection or vaccination, the ability to evade detection, or a decrease in the effectiveness of therapeutics or vaccination. So far since the beginning of the pandemic, WHO has described eight variants of interest (VOIs), namely Epsilon (B.1.427 and B.1.429); Zeta (P.2); Eta (B.1.525); Theta (P.3); Iota (B.1.526); Kappa(B.1.617.1); Lambda(C.37) and Mu (B.1.621)

Transmission of SARS-CoV-2

- The primary mode of transmission of SARS-CoV-2 is via exposure to respiratory droplets carrying the infectious virus from close contact or droplet transmission from presymptomatic, asymptomatic, or symptomatic individuals harboring the virus.
- Airborne transmission with aerosol-generating procedures has also been implicated in the spread of COVID-19. However, data implicating airborne transmission of SARS-CoV-2 in the absence of aerosol-generating



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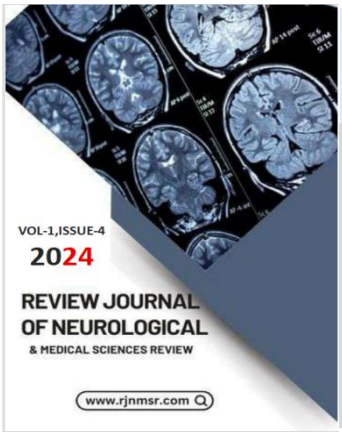
procedures are emerging and being evaluated. However, this mode of transmission has not been universally acknowledged.

- Fomite transmission from contamination of inanimate surfaces with SARS-CoV-2 has been well characterized based on many studies reporting the viability of SARS-CoV-2 on various porous and nonporous surfaces.
- Under experimental conditions, SARS-CoV-2 was noted to be stable on stainless steel and plastic surfaces compared to copper and cardboard surfaces, with the viable virus being detected up to 72 hours after inoculating the surfaces with the virus.[11]
- Viable virus was isolated for up to 28 days at 20 degrees C from nonporous surfaces such as glass, stainless steel. Conversely, recovery of SARS-CoV-2 on porous materials was reduced compared with nonporous surfaces.[12]
- A study evaluating the duration of the viability of the virus on objects and surfaces showed that SARS-CoV-2 can be found on plastic and stainless steel for up to 2-3 days, cardboard for up to 1 day, copper for up to 4 hours. Moreover, it seems that contamination was higher in intensive care units (ICUs) than in general wards, and SARS-CoV-2 can be found on floors, computer mice, trash cans, and sickbed handrails as well as in the air up to 4 meters from patients implicating nosocomial transmission as well in addition to fomite transmission.[13].
- The Centers for Disease Control and Prevention(CDC) recently released an update stating that individuals can be infected with SARS-CoV-2 via contact with surfaces contaminated by the virus, but the risk is low and is not the main route of transmission of this virus.
- Epidemiologic data from several case studies have reported that patients with SARS-CoV-2 infection have the live virus present in feces implying possible fecal-oral transmission.[14].
- A meta-analysis that included 936 neonates from mothers with COVID-19 showed vertical transmission is possible but occurs in a minority of cases.[15].

Epidemiology

According to the World Health Organization (WHO), the emergence of viral diseases represents a serious public health risk. In the past two decades, several epidemics caused by viruses such as the severe acute respiratory syndrome coronavirus (SARS-CoV) from 2002 to 2003, and H1N1 influenza in 2009, and the Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012 have been described which have had a significant impact on global health. Since being declared a global pandemic by the WHO, SARS-CoV-2, the virus responsible for COVID-19 has spread to 223 countries with more than 472 million cases, and more than 6 million deaths reported globally as of March of 2022. A recent epidemiological update by WHO reported that more than 200 countries around the world have reported SARS-Co-V-2 variants of concern of which the newer VOC, Omicron has been reported by 76 countries



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so far since first being reported in November 2021. The U.S. has experienced the highest number of SARS-CoV-2 infections and COVID-19 related deaths followed by Brazil and India. In fact, COVID-19 was the third leading cause of death in the U.S. in 2020 after heart disease and cancer, with approximately 375,000 death reported.[16] The WHO's current estimate of the global case fatality rate for COVID-19 is 2.2%. However, the case fatality rate is affected by factors that include age, underlying preexisting conditions, and severity of illness and significantly varies between countries.

Age, Gender-based Differences And The Impact Of Medical Comorbidities in COVID-19

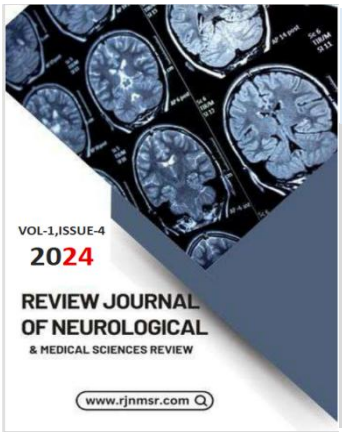
Individuals of all ages are at risk of contracting this infection and severe disease. However, patients aged ≥60 years and patients with underlying medical comorbidities (obesity, cardiovascular disease, chronic kidney disease, diabetes, chronic lung disease, smoking, cancer, solid organ or hematopoietic stem cell transplant patients) have an increased risk of developing severe COVID-19 infection. The percentage of COVID-19 patients requiring hospitalization was six times higher in those with preexisting medical conditions than those without medical conditions (45.4% vs. 7.6%) based on an analysis by Stokes et al. of confirmed cases reported to the CDC during January 22 to May 30, 2020.

Racial and Ethnic Disparities in COVID-19

The severity of infection and mortality related to COVID-19 also varies between different ethnic groups.[13] Racial and ethnic minority groups were reported to have a higher percentage of COVID-19 related hospitalizations than White patients based on a recent CDC analysis of hospitalizations from a large administrative database that included approximately 300,000 COVID-19 patients hospitalized from March 2020 to December 2020. This high percentage of COVID-19 related hospitalizations among racial and ethnic groups was driven by a higher risk for exposure to SARS-CoV-2 and an increased risk for developing severe COVID-19 disease.[17] The results of a meta-analysis of 50 studies from the US and UK researchers noted that people of Black, Hispanic, and Asian ethnic minority groups are at increased risk of contracting and dying from COVID-19 infection.

Effect of SARS-CoV-2 on the Respiratory System/ Pathogenesis of SARS-CoV-2-induced Pneumonia

COVID-19 is primarily considered a viral respiratory and vascular illness as its causative agent, SARS-CoV-2, predominantly targets the respiratory and vascular systems. The pathogenesis of SARS-CoV-2 induced pneumonia is best explained by two stages, an early and a late phase. The early phase is characterized by viral replication resulting in direct virus-mediated tissue damage, which is followed by a late phase when the infected host cells trigger an immune response with the recruitment of T lymphocytes, monocytes, and neutrophil recruitment which releases cytokines such as tumor necrosis factor-α (TNF α), granulocyte-macrophage colony-stimulating factor (GM-



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CSF), interleukin-1 (IL-1), interleukin-6 (IL-6),), IL-1β, IL-8, IL-12 and interferon (IFN)-γ. In severe COVID-19, the immune system's overactivation results in a 'cytokine storm' characterized by the release of high levels of cytokines, especially IL-6 and TNF-α, into the circulation, causing a local and systemic inflammatory response.[18][19] The increased vascular permeability and subsequent development of pulmonary edema in patients with severe COVID-19 are explained by multiple mechanisms, which includes a) endotheliitis as a result of direct viral injury and perivascular inflammation leading to microvascular and microthrombi deposition b) dysregulation of the RAAS due to increased binding of the virus to the ACE2 receptors and c)activation of the kallikrein- bradykinin pathway, the activation of which enhances vascular permeability, d)enhanced epithelial cell contraction causing swelling of cells and disturbance of intercellular junctions.[20][21][22] Besides IL-6 and TNF-α, the binding of SARS-CoV-2 to the Toll-Like Receptor (TLR) induces the release of pro-IL-1β, which is cleaved into the active mature IL-1β that mediates lung inflammation, until fibrosis.[23].

Impact of the Pandemic on Mental Health

Worldwide mental health has been significantly impacted by the coronavirus pandemic. The years 2020 and 2021 continue to be marked by the COVID-19 pandemic. The coronavirus-related disease caused by the SARS-CoV-2 virus has been spreading worldwide for the last 1.5 years. According to WHO data, over 187 million cases have been diagnosed globally, including over 4 million fatalities. Its many negative effects in the form of mental disorders are becoming more frequent, and this tendency looks set to continue in the coming months. Along with the next wave of the coronavirus, depression or anxiety will be the most frequent accompanying factors. According to a document from the World Health Organization entitled “The Mental Health Action Plan 2013–2020”, depression now accounts for 4.3% of the global burden of all diseases. It is also worth emphasizing that depression is on the list of the 20 most important causes of disability ,.

Objective

To determine the frequency of depression in indoor patients of COVID-19 in Khyber teaching hospital, Peshawar.

Material And Methods

Study Design

Cross Sectional Study.

Setting

COVID Isolation Unit, Khyber Teaching Hospital, Peshawar.

Duration of Study

This study was conducted from 10th June 2021 to 10th December 2021.

Sample Size: 148

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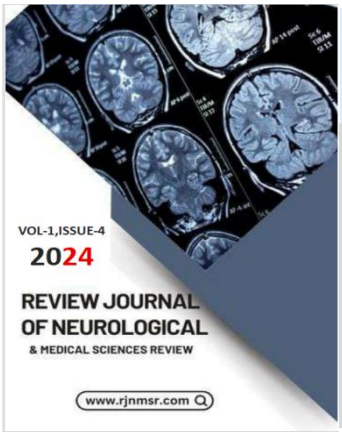
Sample size was calculated with WHO sample size software with 95% confidence interval, 8% margin of error and expected frequency of depression by 44% in indoor patients of COVID-19.



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Sampling Technique

Non-probability consecutive sampling

Inclusion Criteria

- Age 20 to 80 years
- Both gender
- COVID-19 infection as per operational definition for duration > 5 days

Exclusion Criteria

- H/o head trauma
- H/o Cognitive disease
- Unable to attend an interview

Data Collection Procedure

Patients fulfilling the inclusion criteria from COVID Isolation Unit of Khyber Teaching Hospital, Peshawar, were included in the study after permission from ethical committee. Informed consent was taken from patient or its attendant. Basic demographics like age, gender and duration of hospital stay were noted.

Data was collected for depression as per operational definition by researcher himself on especially designed proforma (Annexure-I).

Data Analysis

Data was analyzed with statistical analysis program (SPSS 22). Frequency and percentage was computed for categorical variables like gender and depression. Mean ±SD was presented for quantitative variables like age and duration of hospital stay. Depression was stratified to age, gender and duration of hospital stay. Post stratification using the chi-square test was applied, $p \leq 0.05$ was considered statistically significant.

Results

Age range in this study was from 20 to 80 years with mean age of 44.418±9.64 years and mean duration of hospital stay was 12.114±4.27 days as shown in Table-I.

Male patients were 72.3% and females were 27.7% as shown in Table-II.

Depression was observed in 32.4% patients as shown in Table-III.

Stratification of depression with respect to a age, gender and duration of hospital stay are shown in Tables-IV, V and VI respectively.

Table- I: Mean±SD of patients according to age and duration of hospital stay n=148

	Demographics	Mean±SD
1	Age (years)	44.418±9.64
2	Duration of hospital stay (days)	12.114±4.27

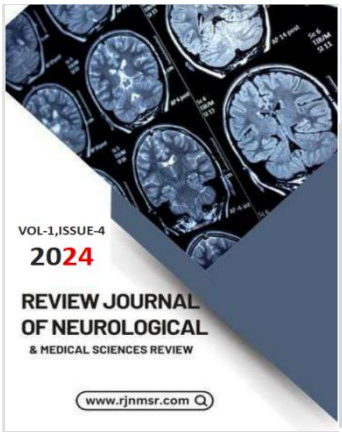

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Table- II: Frequency and %age of patients according to gender n=148

Gender	Frequency	%age
Male	107	72.3%
Female	41	27.7%
Total	148	100%

Table- III: Frequency and %age of patients according to depression n=148

Depression	Frequency	%age
Yes	48	32.4%
No	100	67.6%
Total	148	100%

Table-IV: Stratification of Depression with respect to age.

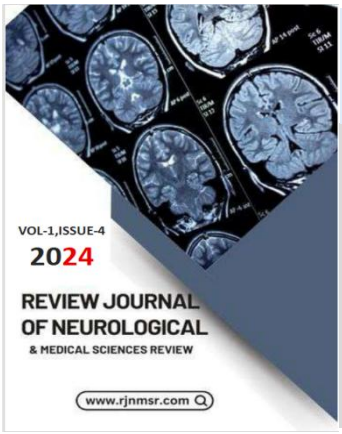
Age (years)	Depression		p-value
	Yes	No	
20-50	33(33.3%)	66(66.7%)	
51-80	15(30.6%)	34(69.4%)	0.739
Total	48(32.4%)	100(67.6%)	

Table-V: Stratification of depression with respect to gender.

Gender	Depression		p-value
	Yes	No	
Male	35(32.7%)	72(67.3%)	
Female	13(31.7%)	28(68.3%)	0.907
Total	48(32.4%)	100(67.6%)	

Table-VI: Stratification of depression with respect to duration of hospital stay.

Duration of hospital stay (days)	Depression		p-value
	Yes	No	
5-15	8(7.9%)	93(92.1%)	0.000



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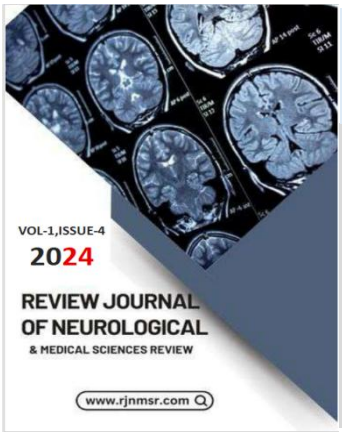
>15	40(85.1%)	7(14.9%)
Total	48(32.4%)	100(67.6%)

Discussion

This cross-sectional study explored the prevalence of depression among 148 patients admitted to a COVID-19–designated hospital in KTH, Peshawar. The questionnaire was applied face to face by trained staff after taking proper safety precautions. The results showed that 32.4% had clinically significant depression. The rates of depression found in our study are higher than those of previous published studies. Dai et al[112] conducted a cross-sectional study of depression and anxiety among COVID-19–positive patients in Wuhan, China and found that the prevalence of anxiety and depressive symptoms was 18.6% and 13.4%, respectively. Another study from China by Chen et al[113] also found that the prevalence of depression and anxiety was 21.0 and 16.4%, respectively. However, another study[114] from Iran found that 97.2% of patients with COVID-19 had some degree of depression. The higher prevalence of depression in our sample could be due to the following. Most of the previous studies employed an online survey design to study the prevalence of anxiety and depression among active patients with COVID-19 due to the pandemic disease prevention and control measures. Online survey studies were found to have serious methodological limitations, and respondents with biases may select themselves into the sample resulting in higher prevalence.[115] A recent meta-analysis[116] exploring the prevalence of anxiety and depression in South Asia during the COVID-19 pandemic among the general population reported that the pooled prevalence of anxiety and depression was relatively higher in Pakistan compared to other South Asian countries. Moreover, 38.8% of our study sample was asymptomatic, and they were admitted according to the government protocol at that point in time.

During the pandemic, several preventive measures were implemented to minimize infection transmission, such as social distancing, isolation, and lockdowns. These measures, combined with the continuous spread of the virus and growing death rates could have negatively affected the community's mental health. Therefore, the relatively high prevalence rates of depression and anxiety among the participants, all of whom had been infected with COVID-19, were expected during the infection period, due to the disease process. The preventive measures that were taken during the pandemic had some significant effects on the physical and psychological health and social life of humans worldwide. A nationwide study of the general population of Saudi Arabia revealed similar levels of depression (70.3%), but a much higher rate of anxiety symptoms (mild=73.5%, moderate=19.3%, and severe=7.3%).[117] However, that study was conducted between March and April 2020, which was the early phase of the COVID-19 outbreak in Saudi Arabia. As result, a higher prevalence of anxiety was predicted because that period was associated



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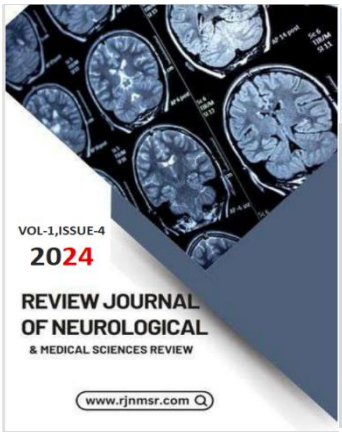
with a nationwide lockdown and poor understanding of the virus. However, Joseph et al found a comparable level of moderate to severe anxiety symptoms among the general population (17.8%).[118] Importantly, the result of the current study showed that higher stigma scores were positively correlated with depression and anxiety levels. These possible associations of depression and anxiety with stigma were also reported in the literature in different settings and patient populations.[119] However, no studies have examined the associations of depression and anxiety with stigma among patients with COVID-19. In addition, a significant association was found between being female and having increased mean scores for depression (β=3.071) and anxiety β=1.86), which is similar to the findings reported in local and international studies.[120-122]

Compared to other previously published studies, the participants in this study were less likely to experience depression and anxiety symptoms. For example, a study that evaluated the general population's mental health in Brazil during the COVID-19 outbreak indicated that 67.7% of participants had moderate to severe depression and 84.7% had anxiety symptoms.[123] Another study that assessed depression and anxiety among the general population of China found that 4.3% of participants suffered from severe depression while 8.4% experienced severe anxiety.[122] Furthermore, the prevalence of severe anxiety among the general Iranian population during the COVID-19 outbreak was 19.1%.[124] Nevertheless, a study conducted in Vietnam reported much lower rates of anxiety (4.9%) and depression (7.0%), compared to our estimates.[125] Many factors may explain the wide range of reported prevalence rates of depression and anxiety in different countries. This can be due to variation in the measures used to assess depression and anxiety in these studies, which were conducted during the COVID-19 outbreak. Furthermore, different approaches to categorizing levels of depression and anxiety were used in the different studies, which might have increased the variability of the results between the studies. Moreover, the timing of the study and the stage of the pandemic are other critical factors. It is expected that the psychological symptoms would be more prevalent during the early stages of the pandemic, as little information was known about the virus and the disease. For instance, in a study that evaluated depression and anxiety symptoms among 58 hospitalized COVID-19 patients in a university-affiliated hospital in New York city, the prevalence of depression and anxiety upon admission were 29% and 36%, respectively. However, the prevalence of depression and anxiety symptoms dropped to 20% and 9%, respectively, after two weeks of follow-up.[126] Therefore, it would be interesting to know the impact of time on the symptoms of depression, anxiety, and stigma among the participants in this study couple of months or a year later. The findings of the present study highlight the adverse psychological effects of the COVID-19 pandemic among patients who recovered from COVID-19. Our results emphasize the need to adopt strategies that can address and alleviate these



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adverse consequences. For instance, psychiatric screening should be implemented regularly to detect depression and anxiety in the early stages, which could lead to the use of interventions that are more effective. Moreover, a global collaborative effort is required to develop a preparedness plan that can promote, protect, and address mental health during the current and future health crises.

Conclusion

In conclusion, our study assessed the prevalence rates of clinically significant depression among active hospitalized COVID-19 patients in KPK, Pakistan. The prevalence rates of depression in our study are significantly high than previous studies from various parts of the world. Our findings show that a significant portion of patients with active COVID-19 infection has clinically significant depression, which can persist or aggravate during the course of the illness. There is an urgent need to address the psychological needs of the COVID-19 patient population from the active phase of the illness itself.

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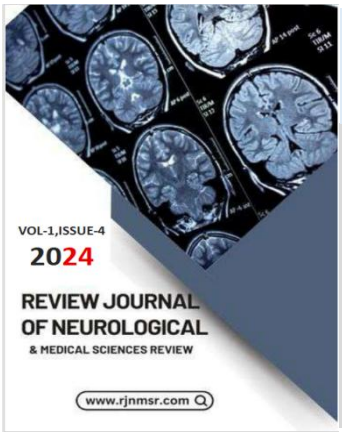

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