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Occurrence and determinants of psychiatric disorders during COVID-19 pandemic among subjects in Jeddah city, Saudi Arabia

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ABSTRACT

Objectives: This study aimed to evaluate COVID-19 that has an impact on the incident of psychiatric manifestations among the subjects in Jeddah city. *Methodology:* A cross sectional study conducted among general population of Jeddah, and the participants were selected by using convenient sampling method from June 2021 till July 2021. *Results:* This study included 1501 subjects, males (47.2%) and females (52.8%). Most of the people who participated were 40 years (66.8%). Participants who got infected with COVID-19 were (24.9%). The severity of the symptoms of COVID-19 infection was mild in those aged 19 – 41 years, moderate in those aged 12 – 18 years, and sever in those aged 41 – 60 years. Greater proportion of those who were infected with COVID-19 was non-health care workers Suffered from change in the rate of sleep and appetite compared to the controls (p value < 0.05). Greater proportion of patients who had COVID-19 infection underwent improvement of psychological symptoms after quarantine compared to those who did not catch the disease (p<0.05). *Conclusions:* We found that participants who got infected with COVID-19 the majority had a score between moderate to extremely severe score in stress, anxiety and depression categories. We encourage patients who got infected with COVID-19 consider seeking psychological assessment and checkup.

Keywords: COVID-19, vaccination, psychological disorders.

1. INTRODUCTION

Females are more infected with COVID-19; however mortality is higher for males (Bambra et al., 2021). Higher prevalence of the disease is reported in individuals above 60 years of age (Dhama et al., 2020). Participants with a high school degree were more likely to have higher scores on all scales: for having COVID-19, while employment was only significantly associated with

lower scores. However, monthly income was not a significant contributor to infection (Alkhamees et al., 2020). Makkah region has the highest incidence of COVID-19 infection, in Saudi Arabia (Elhessewi et al., 2021; Nkire et al., 2021). In general, healthcare, specifically dentists, have the greatest risk job. Though many non-healthcare jobs are susceptible too (Zhang et al., 2021; Psychiatria Danubina, 2021; Kale et al., 2021).

Studies showed equivocal results about the relation between chronic morbidities and risk of serious illness with COVID-19 through (Riddle et al., 2020; Banerjee et al., 2021; Li et al., 2021). Disorders like post-traumatic stress, depression, anxiety, as well as grief-related symptoms are increased in the pandemic (Shah et al., 2021; Almalki et al., 2022). Many members that had comorbid conditions were not changing routines or plans and they lacked knowledge about COVID-19 (Wolf et al., 2020). Stress, anxiety and depression were common among patients with COVID-19 infection (Shah et al., 2021). This infection tends to cluster in families, which spares children (Lorenzo et al., 2020; Weinberger et al., 2020; Moore et al., 2020; Martínez-de-Quel et al., 2021). The use of the quarantine method has a significant impact on mental health status (Mechili et al., 2021; Chen et al., 2020; Siddiqui et al., 2020; Weinberger et al., 2020).

Vaccines are one of the most essential and cost-effective public health interventions ever implemented that are saving millions of lives every year (Li et al., 2021; Guessoum et al., 2020; Wolf et al., 2020; El-Elimat et al., 2021). Current scientific evidence indicates that elderly have a major danger from severe diseases and death due to COVID- 19, particularly those with comorbidities (Unim et al., 2021; Palmer et al., 2021). Most of the anticipated direct consequences of quarantine and associated social and physical distancing, including financial insecurity, frustration, boredom, feeling a burden, fear and loneliness, are risk factors for mental health issues including depression, anxiety, suicide, and self-harm (Wang et al., 2021; Thai et al., 2021; Zhang et al., 2020; Wilson et al., 2021). This study aims to determine the effect of COVID-19 crisis and its vaccine on the psychological aspects of the population of Jeddah city, Saudi Arabia.

2. METHODOLOGY

This study was approved by Ibn Sina National College Research Center (No. H-04-09062021, approval date: 9 – 6- 2021). This study, which is cross sectional, was supervised in Jeddah region of Saudi Arabia, from June 2021 till July 2021, where the non-probability convenient sampling method was used to collect data through online-Google forms. The minimal sample size required for the present study, according to effect size =0.1, alpha= 0.05, Power = 80%%, and 5 degrees of freedom is 1283 (Faul et al., 2007). Thus a total of 1504 subjects were included.

Information on the participants was collected using the following: Personal and sociodemographic characteristics questionnaire; clinical history about COVID-19 infection and COVID-19 vaccination, and information about the possible mental distress in the time of COVID-19 pandemic. The DASS21- Depression Anxiety Stress Scales (Lovibond et al., 1995) was also asked by every participant. Depression, anxiety and stress in the population are measured by a 21-item self-report called DASS-21. Each seven-item scale has four response options ranging from 0 (did not apply to me at all) till 3 (applied to me much, or most of the time). The maximum score is 42 (each score is doubled to compare scores to DASS-42). Each scale indicates increased depression, anxiety, or stress.

Statistical analysis

Data was analyzed using SPSS version 23.The type one error was 0.05.

3. RESULTS

This study included 1501 subjects, 710 males (47.2%), and 794 females (52.8%). Those who are younger than 40 years were 66.8%, while those who were 40 years or older were 34.2%. Those who suffered from COVID-19 infection were 375 subjects (24.9%) out of all the studied subjects. Gender was irrelevant to COVID-19 infection, while educational level was significantly associated with this infection where the highest proportion of those with this infection were intermediate level of education ($p < 0.001$). Area of residence and nationality of the subjects were not significantly associated with CVID-19 Infection ($p > 0.05$).

Majority of those who were infected with COVID-19 were married compared to the single or divorced subjects ($p < 0.001$). Greater percentage of those who were infected with COVID-19 were housewives compared to those who work ($p < 0.001$). Greater proportion of those who were infected with COVID-19 were non-health care workers, compared to compared to those who worked in the health care sector ($p < 0.001$). Monthly Income of the subjects, and watching the news about COVID-19 infection on the media, were irrelevant to COVID-19 infection, where the p values were more than 0.05 (Table 1).

Table 1 Distribution of the studied subjects according to having COVID-19 infection and socio-demographic characteristics

Variable	Categories	Having COVID-19 infection		Total	X^2 (p- value)
		Yes	No	N %	
		N %	N %		
Gender	Male	176 24.8%	534 75.2%	710 100.0%	.015[a] (.902)
	Female	199 25.1%	595 74.9%	794 100.0%	
Educational level	University	261 23.3%	858 76.7%	1119 100.0%	10.897[a] (.001)
	< University	113 29.8%	266 70.2%	379 100.0%	
	Illiterate	1 16.7%	5 83.3%	6 100.0%	
Residency of Makkah region	Yes	300 24.7%	917 75.3%	1217 100.0%	.272[a] (.602)
	No	74 26.1%	212 73.9%	287 100.0%	
Nationality	Saudi	242 23.7%	788 76.3%	1020 100.0%	2.471[a] (.116)
	Non-Saudi	133 27.5%	351 72.5%	484 100.0%	
Marital status	Single	151 20.5%	584 79.5%	575 100.0%	17.396[a] (.001)
	Married	215 29.6%	511 70.4%	726 100.0%	
	Divorced	5 16.7%	25 83.3%	30 100.0%	
	Widower	4 30.8%	9 69.2%	13 100.0%	
Occupation	Student	123 21.4%	452 78.6%	575 100.0%	25.111[a] (.000)
	Employee	142 26.4%	396 73.6%	538 100.0%	
	Unemployed	30 26.5%	83 73.5%	113 100.0%	
	Retired	15 14.4%	89 85.6%	104 100.0%	
	House wife	65 37.4%	109 62.6%	174 100.0%	
Health worker	Yes	64 18.2%	288 81.8%	352 100.0%	10.897[a] (.001)
	No	309 26.9%	841 73.1%	1503 100.0%	
Income level	Low	78 23.9%	249 76.1%	327 100.0%	5.439[a] (.246)
	Middle	275 26.2%	773 73.8%	1048 100.0%	
	High	22 17.1%	107 82.9%	129 100.0%	
Watching the COVID-19 news	Sometimes	243 24.6%	764 75.4%	989 100.0%	4.151[a] (.246)
	whenever time permits	211 72.3%	211 72.3%	299 100.0%	
	most of the time	14 31.8%	30 68.2%	44 100.0%	
	No, not at all	37 20.7%	142 79.3%	179 100.0%	

Table 2 is showing the studied subjects' distribution according to whether they have COVID-19 infection or not, and their history of chronic conditions and categories scores of stress, anxiety, and depression. History of having chronic diseases such as hypertension, endocrine disorders, autoimmune disorders and mental disorders were irrelevant to getting infection with the COVID-19 virus ($p > 0.05$). Greatest proportions of subjects with COVID-19 infection had extremely severe stress and anxiety scores in comparison to those with no history of COVID-19 infection ($p < 0.01$, 0.000 respectively. However, depression score is irrelevant to the infection ($p > 0.05$) (figure 1).

Table 2 Distribution of studied subjects according to having COVID-19 infection and medical conditions and categories of Anxiety depression score

Variable	Categories	Having COVID-19 infection		Total	X^2 (p- value)
		Yes	No	N %	
		N %	N %		
History of hypertension	Yes	28 23.7%	90 76.3%	118 100.0%	.108 (.743)
	No	347 25.1%	1036 74.9%	1383 100.0%	
History of diabetes	Yes	32 24.6%	98 75.4%	130 100.0%	.010 (.919)
	No	343 25.0%	1028 75.0%	1371 100.0%	
History of endocrine disease	Yes	17 29.3%	41 70.7%	58 100.0%	.618 (.432)
	No	357 24.8%	1085 75.2%	1442 100.0%	
History of autoimmune disease	Yes	10 30.3%	23 69.7%	33 100.0%	.509 (.475)
	No	365 24.9%	1103 75.1%	1468 100.0%	
Other history chronic disease	Yes	33 27.7%	86 72.3%	119 100.0%	.835 (.659)
	No	342 24.8%	1037 75.2%	1379 100.0%	
History of mental illness	Depression	25 34.2%	48 65.8%	73 100.0%	4.058 (.398)
	Anxiety	13 23.6%	42 76.4%	55 100.0%	
	Obsessive compulsive disorder	11 28.9%	27 71.1%	38 100.0%	
	Other	6 22.2%	21 77.8%	27 100.0%	
	Never been diagnosed with any mental illness	320 24.4%	991 75.6%	1311 100.0%	
Categories of stress score	Normal	219 23.2%	724 76.8%	943 100.0%	11.904 (.018)
	Mild	66 25.9%	189 74.1%	255 100.0%	
	Moderate	49 32.9%	100 67.1%	149 100.0%	
	Severe	20 19.8%	81 80.2%	101 100.0%	
	Extremely severe	20 36.4%	35 63.6%	55 100.0%	
Categories of anxiety score	Normal	195 20.1%	776 79.9%	971 100.0%	42.431 (.000)
	Mild	18 23.4%	59 76.6%	77 100.0%	
	Moderate	65 36.3%	114 63.7%	179 100.0%	
	Severe	28 29.2%	68 70.8%	96 100.0%	
	Extremely severe	69 38.1%	112 61.9%	181 100.0%	
Categories of depression score	Normal	195 23.2%	646 76.8%	841 100.0%	5.246 (.263)
	Mild	41 26.5%	114 73.5%	155 100.0%	
	Moderate	69 27.9%	178 72.1%	247 100.0%	
	Severe	31 23.1%	103 76.9%	134 100.0%	
	Extremely severe	39 30.7%	88 69.3%	127 100.0%	

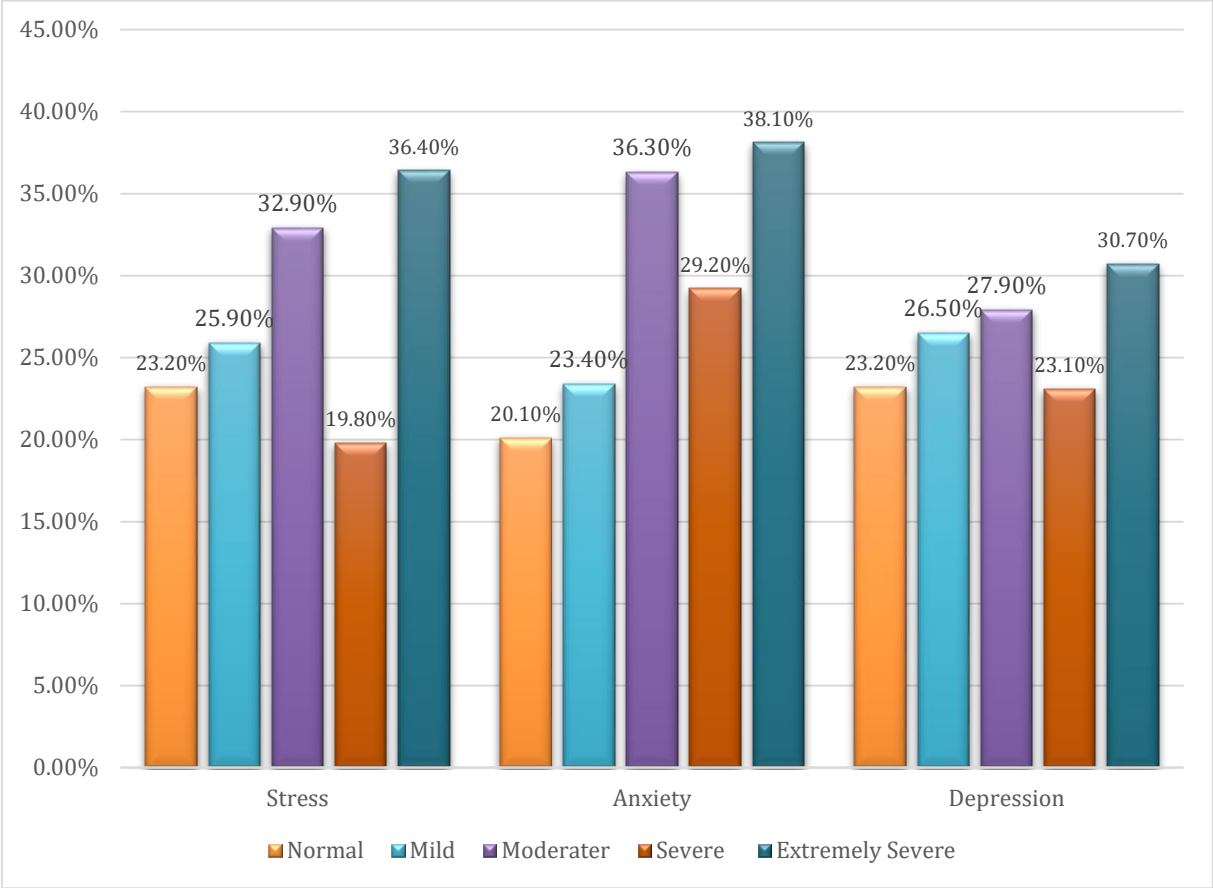

Figure 1 Having COVID-19 and Mental Health Category

Table 3 displays the distribution of studied subjects according to COVID-19 infection and COVID-19 pandemic clinical aspects. Greater proportions of patients who had COVID-19 infection had members of their families, infected with the disease, or died because of the disease compared to the controls (p value < 0.05). Greater proportions of patients who had COVID-19 infection suffered from loss of enthusiasm and entertainment of previous hobbies, suffered from change in the rate of sleep and appetite compared to the controls (p value < 0.05). Greater proportion of patients who had COVID-19 infection underwent improvement of psychological symptoms after quarantine in comparison to those who did not catch the disease (p<0.05). Hand washing during the crisis and knowledge about the epidemic was similar in both groups (p>0.5). A large proportion of the subjects who did not take the vaccine were encountered among the infected group compared to the non-infected subjects who received two doses of the vaccine (p <0.000).

Table 4 reveals the relationship between age and some clinical aspects of the COVID-19 infected subjects. Mild symptoms were encountered among those aged 61 and older years, moderate symptoms were common among those aged 12 to 18 years, while severe symptoms were more common among those aged 41 to 60 years (p <0.028). Majority of the infected subjects were quarantined at home, however, isolation of the patients at home or at hospital and improvement of psychological symptoms after quarantine were irrelevant to age groups (p >0.05). Age groups of the infected patient were irrelevant of stress, anxiety or depression scores (p >0.05).

Table 3 Distribution of studied subjects according to COVID-19 infection and clinical aspects of COVID-19 crisis

Variable	categories	Having COVID-19 infection				Total		X^2 (p- value)
		Yes		No				
		N	%	N	%	N	%	
Infected family member with COVID-19	Yes	353	29.0%	863	71.0%	1216	100.0%	56.925[a] (.000)
	No	22	7.6%	266	92.4%	288	100.0%	
Loss of family member due to COVID-19	Yes	146	34.7%	275	65.3%	421	100.0%	29.669[a] (.000)
	No	229	21.1%	854	78.9%	1083	100.0%	
Loss of enthusiasm and entertainment of previous hobbies	Yes	137	29.4%	327	70.6%	464	100.0%	10.220[a] (.006)
	No	238	22.9%	802	77.1%	1040	100.0%	
Change in the rate of sleep and appetite	Yes	187	36.5%	323	63.5%	510	100.0%	58.906[a] (.000)
	No	188	18.9%	806	81.1%	994	100.0%	
Improvement of psychological symptoms after quarantine	Yes	231	33.3%	462	66.7%	693	100.0%	48.515[a] (.000)
	No	43	18.4%	191	81.6%	234	100.0%	
	I didn't have any symptoms	101	17.5%	476	82.5%	577	100.0%	
Hand washing from the start of COVID-19; as per MOH instructions	as before the Corona crisis	142	26.3%	397	73.7%	539	100.0%	4.814[a] (.090)
	Increased	223	24.9%	672	75.1%	895	100.0%	
	exaggerated	10	14.3%	60	85.7%	70	100.0%	
Knowledge for prevention of COVID-19	Yes	363	25.3%	1072	74.7%	1435	100.0%	2.198[a] (.138)
	No	12	17.4%	57	82.6%	69	100.0%	
Knowledge for complication of COVID-19	Yes	290	24.2%	909	75.8%	1199	100.0%	1.761[a] (.184)
	No	85	27.9%	220	72.1%	305	100.0%	
Receive of COVID-19	One dose	188	22.1%	661	77.9%	849	100.0%	61.288[a] (.000)
	Two dose	65	17.7%	303	82.3%	368	100.0%	
	No	122	42.5%	165	57.5%	287	100.0%	

Table 4 Distribution of subjects who had COVID-19 infection according to age groups and clinical and psychological aspects

Variables	Age groups (years)										X2 (p)
	<12		12–18		19–40		41–60		>61		
	No	%	No	%	No	%	No	%	No	%	
Symptoms severity of COVID-19 disease											
Mild	0	0%	8	28.6%	96	42.9%	34	29.6%	5	100.0%	17.245 0.028
Moderate	2	100.0%	17	60.7%	102	45.5%	65	56.5%	0	0%	
Severe	0	0%	3	10.7%	26	11.6%	16	13.9%	0	0%	
Hospital admission											
No, quarantine only	1	50.0%	26	92.9%	209	93.3%	105	91.3%	5	100.0%	9.295 0.318

Yes, in the isolation room in hospital	1 50.0%	2 7.1%	13 5.8%	7 6.1%	0 0.0%	
Yes, in the intensive care unit	0 0.0%	0 0.0%	2 0.9%	3 2.6%	0 0.0%	
Improvement of psychological symptoms after quarantine						
Yes	1 50.0%	14 50.0%	135 60.3%	77 67.0%	3 60.0%	13.877 0.085
No	0 0.0%	5 17.9%	34 15.2%	4 3.5%	0 0.0%	
I didn't have any symptoms	1 50.0%	9 32.1%	55 24.6%	34 29.6%	2 40.0%	
Categories of stress score						
Normal	1 100.0%	13 46.4%	123 54.9%	78 67.8%	4 80.0%	15.790 0.468
Mild	0 0.0%	4 14.3%	40 17.9%	20 17.4%	1 20.0%	
Moderate	0 0.0%	7 25.0%	32 14.3%	10 8.7%	0 0.0%	
Severe	0 0.0%	1 3.6%	16 7.1%	3 2.6%	0 0.0%	
Extremely Severe	0 0.0%	3 10.7%	13 5.8%	4 3.5%	0 0.0%	
Categories of anxiety score						
Normal	1 50.0%	10 35.7%	113 50.4%	68 59.1%	3 60.0%	15.482 0.490
Mild	0 0.0%	1 3.6%	11 4.9%	6 5.2%	0 0.0%	
Moderate	1 50.0%	8 28.6%	33 14.7%	20 17.4%	2 40.0%	
Severe	0 0.0%	3 10.7%	18 8.0%	7 6.1%	0 0.0%	
Extremely Severe	0 0.0%	6 21.4%	49 21.9%	14 12.2%	0 0.0%	
Categories of depression score						
Normal	1 50.0%	12 42.9%	105 46.9%	74 64.3%	3 60.0%	22.383 0.131
Mild	1 50.0%	4 14.3%	23 10.3%	12 10.4%	1 20.0%	
Moderate	0 0.0%	8 28.6%	45 20.1%	14 12.2%	1 20.0%	
Severe	0 0.0%	0 0.0%	22 9.8%	9 7.8%	0 0.0%	
Extremely Severe	0 0.0%	4 14.3%	29 12.9%	6 5.2%	0 0.0%	

4. DISCUSSION

This study included 1501 subjects, 710 males (47.2%), and 794 females (52.8%). Previous reports found that females are more infected than males (Bambra et al., 2021). Similar findings were reported in the present study; however, this finding was not statistically significant. Those who are younger than 40 years were 66.8%, while those who were 40 years or older were 34.2%. Those who suffered from COVID-19 infection were 375 subjects (24.9%) out of all the studied subjects. Previous studies reported higher prevalence of the disease among those older than 60 years (Dhama et al., 2020). However in the present study between different age groups there is no remarkable difference found.

The present study revealed that Gender was irrelevant to COVID-19 infection, while educational level was significantly associated with this infection where the highest proportion of those with this infection were intermediate level of education, or unemployed. Similar findings were reported by other studies (Alkhamees et al., 2020). In Saudi Arabia, the Makkah region had 57,548 cases than the Riyadh region that had 52,936 cases in total (Elhessewi, 2021). This is not the same as with the present study, where no such differences were found. Most were infected with COVID-19 were married compared to the single or divorced subjects. This is consistent with a previous study (Nkire et al., 2021). Healthcare (specifically dental care) has the highest occupational risk, while many non-health care occupations are also vulnerable (Zhang et al., 2021).

However, in the present study Greater proportion of those who were infected with COVID-19 were non-health care workers. It was found in this study that participants who do have a history of having chronic diseases such as hypertension, endocrine disorders, autoimmune disorders, and mental disorders were irrelevant to getting infection with the COVID-19 virus ($p > 0.05$). It is obedient with results from previous studies (Riddle et al., 2020; Banerjee et al., 2021; Li et al., 2021). The pandemic could result in increasing psychiatric (Guessoum et al., 2020). In the present study the greatest proportions of subjects with COVID-19 infection had extremely severe stress and anxiety scores compared to those with no history of COVID-19 infection. However, depression score was irrelevant to the infection. Greater proportions of patients who had COVID-19 infection had members of their families, infected with the disease, or died because of the disease compared to the controls. It is obedient with results from previous studies (Lorenzo et al., 2020).

Greater proportions of patients who had COVID-19 infection suffered from loss of enthusiasm and entertainment of previous hobbies, suffered from change in the rate of sleep and appetite compared to the controls (p value < 0.05). It is obedient with results from previous studies (Moore et al., 2020; Martínez-de-Quel et al., 2021). The use of the quarantine method has a significant impact on mental health status (Mechili et al., 2021). In the present study, a greater proportion of patients who had COVID-19 infection underwent improvement of psychological symptoms after quarantine compared to those who did not catch the disease. By hand washing and mask wearing to control infectious disease it has the benefit of simple operation, high health benefits, and good health, and economic benefits (Alkhamees et al., 2020; Elhessewi et al., 2021; Nkire et al., 2021; Zhang et al., 2021; Chen et al., 2020).

Hand washing during the crisis and knowledge about the epidemic was similar in both groups. It is known that α-CoV and β-CoV are known to cause diseases in mammals. Terrible life-threatening respiratory syndrome (SARS) in 2003 and the Middle East respiratory syndrome (MERS) in 2012 were known to be caused by β-CoV (Alkhamees et al., 2020; Weinberger et al., 2020). One of the most dependable and low cost public health interventions that saves millions of lives is vaccines (Li et al., 2021; Guessoum et al., 2020; Wolf et al., 2020; El-Elimat et al., 2021). In the present study, a large proportion of the subjects that refused to take the vaccine were encountered among the infected group compared to the non-infected subjects who received two doses of the vaccine. Previous reports found that the COVID-19 infection was more severe in those over 65 years old and also having other chronic diseases as a risk factor for severe disease (Weinberger et al., 2020; Unim et al., 2021). However, in the present study, mild symptoms were encountered among those aged 61 and older years, moderate symptoms were common among those aged 12 to 18 years, while severe symptoms were more common among those aged 41 to 60 years.

The number of COVID-19 hospitalizations is doubling each 16 years of age in some countries (Palmer et al., 2021). However, in our study Majority of the infected subjects was quarantined at home, however, isolation of the patients at home or at hospital and improvement of psychological symptoms after quarantine were irrelevant to age groups. In the present study age groups of the infected patient were irrelevant of stress, anxiety or depression scores. This was not in line with another study, which reported that older age (60+ years) increases the risk of contract and death from COVID-19, which might suggest worse mental health for those in this age range during the pandemic (Wilson et al., 2021).

5. CONCLUSION

COVID-19 infection is common and imposes great pressure on the community. It is associated with severe psychological distress particularly in the infected persons. Vaccination seems to be an important preventive measure to control this pandemic.

Limitations

There are some limitations to this study: as this study was cross-sectional, the causal relationship remains unknown, and we do not know if the effects of these variables on mental health during the COVID-19 pandemic will persist in the long term. It is also a non-probability convenience sample, and its generalization to the population may be defective; however, it is an exploratory study, and using logistic regression allowed for the confounding variables and effects, which led to the controversial findings reported in the literature.

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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