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Depression and Anxiety among COVID-19 Survivors: A Cross-sectional Analytical Study in Jeddah, Kingdom of Saudi Arabia

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ABSTRACT

Background and Aim: *Limited research has focused on the follow-up status of COVID-19 survivors, particularly in terms of their psychological status. Hence, this work sought to assess the depression and anxiety levels of COVID-19 survivors in Jeddah, Saudi Arabia.* ***Methodology:*** *This cross-sectional analytical study included COVID-19 survivors from the Jeddah region of Saudi Arabia from December 2020 to March 2021. Data on recovery of patients were obtained from the Health Electronic Service Network (HESN) portal, and patients were contacted to answer the validated General Anxiety Disorder-7 (GAD-7) and Patient Health Questionnaire-9 (PHQ-9) questionnaires (English and Arabic) for anxiety and depression assessment. Descriptive statistics, Chi-square test, reliability analysis, and regression analyses were used to analyze and present the data.* ***Results:*** *GAD-7 anxiety and PHQ-9 depression scores of 215 participants were shown to be 7.00 ± 5.6 (min=0, max=21) and 8.96 ± 6.9 (min=0, max=27), with three-fourths of patients exhibiting mild-to-moderate anxiety (75.3%, n=162), while two-thirds experienced mild-to-moderate depression (65.1%, n=140). The Chi-square test revealed significant differences in the GAD-7 anxiety levels of participants relative to nationality (p=0.004) and marital status (p=0.007). Significant differences in the PHQ-9 depression levels relative to age (p=0.043), gender (p=0.001), and marital status (p=0.002) were also observed. Regression analysis revealed nationality (p=0.002) and marital status (p=0.001) as the most significant predictors for anxiety, while gender (p=0.016) and marital status (p=0.002) were the most significant for depression.* ***Conclusion:*** *A large proportion of survivors only experienced mild-to-moderate anxiety and depression. Though not moderately severe-to-severe, mental health care attention from a clinician, psychiatrists, and family members is still needed.*

Keywords: Anxiety, Depression, COVID-19 Survivors, Patients, Prevalence

INTRODUCTION

The name Coronavirus Disease (COVID-19) is currently salient in the minds of the majority of people around the world [1]. The World Health Organization (WHO) reported pneumonia cases in Wuhan City, China on December 31, 2019. The cases were increasing as of January 2020 with seven confirmed cases in Thailand, South Korea, and Japan. Virus isolation was performed on January 7th while identification was done on January 12th, 2020 [2]. SARV-CoV-2 was identified as the virus causing this condition [1]. However, the history of the coronavirus pandemic is constantly being rewritten: as of April 22nd, 2021, there have been 144,472,687 cases, 3,072,276 deaths, and 122,660,283 who have recovered from COVID-19 worldwide [3]. The global pandemic includes Saudi Arabia as one of the affected countries, reporting its first verified case by the Ministry of Health on March 2nd, 2020, and as of writing KSA has experienced 408,038 cases, 6,858 deaths, and 391,362 recoveries [4,5].

COVID-19 has had an enormous impact on people's daily routines. The pandemic is a health crisis that significantly affects the society and economy at their core, and even regarding the psychological state of citizens. Fear, depression, and anxiety about a novel infectious condition and its possible negative effects can trigger extreme emotions, implying that it is necessary to conduct many studies to help return to normal life. However, the ongoing or previously published

works on COVID-19 primarily focus on the radiological, clinical, and epidemiological aspects of infected patients. Limited works have focused on the follow-up of COVID-19 survivors, particularly their anxiety and depression status. Thus, this research aimed to evaluate the prevalence, levels, and factors affecting the depression and anxiety of patients who have recovered from COVID-19 in Jeddah, Saudi Arabia.

Contribution to Literature

This study primarily investigates anxiety and depression scores, determining the severity of the psychological conditions. It also determines which age, gender, and marital status group were most greatly affected by the psychological effects brought by COVID-19. Lastly, it suggests that these outcomes from COVID-19 survivors must be addressed and paid attention to regardless of severity.

METHODOLOGY

Study Design and Population

This cross-sectional analytic study included patients who have recovered from COVID-19 whose test samples were sent to a facility and received by a laboratory within the Jeddah region, Kingdom of Saudi Arabia, from December 2020 to March 2021. Patients were excluded if their test samples were sent to facilities outside the Jeddah region, or if the samples were received by the national laboratory. The sample size was determined to be 215 using the Raosoft calculator, considering 7% margin error, 95% confidence interval, 32,693 estimated population size (MOH statistics, August 11, 2020), and 50% hypothesized frequency of outcome [6]. The systematic sampling technique was utilized.

Data Collection Tools and Techniques

The Health Electronic Service Network (HESN), which acts as a one-stop platform that encompasses all public health aspects and enables monitoring a population's health status by providing timely, useful, high-quality data, was utilized. Patient recovery data were extracted in abstract form (excel spreadsheet) from the HESN portal, a platform that provides access to COVID-19 positive cases and all the information regarding these patients. Phone numbers of eligible patients were obtained and patients were contacted to answer the validated GAD-7 and PHQ-9 questionnaires to assess anxiety and depression levels [7,8]. A telephone call follow-up was conducted. Translation of the questionnaire into the Arabic version was also performed. Data collection was performed by exporting all recovery patients' data to an excel spreadsheet from the HESN portal, and the necessary data and cases were then filtered. The status, summary, laboratory summary, signs, symptoms, risk factors, and associated diseases were collected by HESN. Finally, patients were called to ask about GAD-7 and PHQ-9.

Statistical Analysis

The collected data were processed using IBM SPSS version 23 (IBM Corp., Armonk, NY) and visually presented by using GraphPad Prism version 8. Simple descriptive statistics were used to present the data in the form of counts, percentages, means, and standard deviations. A two-scoring method was used in the study by using the GAD-7 Anxiety and PHQ-9 Depression questionnaires. The responses were converted to scores; equivalent scores of the responses 0, 1, 2, and 3 are "not at all," "several days," "more than half the days," and "nearly every day," respectively. A simple additive method was used to obtain the total score. After calculating the total score, it was represented using the following method: For GAD-7 Anxiety, scores 0-5 refer to mild, 6-10 as moderate, 11-15 as moderately severe anxiety, and 15-21 as severe anxiety. For PHQ-9 Depression, scores 0-5 refer to mild, 6-10 to moderate, 11-15 to moderately severe, and 16-27 refer to severe depression. Reliability Analysis was utilized with a model of Alpha (Cronbach) to study the properties of measurement scales and the items that compose the scores and the average inter-item correlation. Chi-square test analysis was utilized to compare the relationships between categorical variables. A General Linear Model was used to identify significant predictors using the Main Effect as a model. Additionally, to model the dependence of a polytomous ordinal response on a set of predictors, Ordinal Regression was used. A p-value of <0.05 was set as the criteria to reject the null hypothesis.

Ethical Considerations

Approval from the Research Committee of the Joint Program for Preventive Medicine, Jeddah Research Ethical and Scientific Committee was obtained for this study (Ethical Approval No. H-02-J-002). Consent (informed) was also

secured from the participants after explaining the study objectives and health benefits, stressing the anonymity of the collected data. The collected data was then kept confidential by ensuring anonymity of the participants and stored in a personal computer secured by a password.

RESULTS

In this study, the prevalence, levels, and factors affecting the depression and anxiety of 215 patients who recovered from COVID-19 in Jeddah, Saudi Arabia from 2020-2021 were evaluated. Demographic profiles demonstrated that the patients had an average age of 36.84 ± 14.6 years old (min=17, max=99), with nearly one-third belonging to 20-30 age group (31.6%, n=68), and one-fourth belonging to 31-40 years old age group (26.5%, n=57) (Table 1). The majority of patients were female (54.9%, n=118), Saudi nationals (78.1%, n=168), had university-level educational degree (57.7%, n=124), non-smokers (69.3%, n=149), and had no chronic disease (76.7%, n=165). Marital status revealed the majority of them to be married (57.7%, n=124) and in particular married at least once (64.7%, n=139), while about one-third were single (35.3%, n=76). In terms of job profile, approximately one-third of patients were working in the private sector (31.6%, n=68), while one-fourth worked in the government sector (25.6%, n=55).

Table 1 Socio-demographic characteristics of the patients (N=215)

Demographics	N	Min	Max	Mean	SD
Age	215	17	99	36.84	14.6
		Count		%	
	<20 years old	19		8.8	
	20-30 years old	68		31.6	
	31-40 years old	57		26.5	
	41-50 years old	34		15.8	
	51-60 years old	22		10.2	
	>60 years old	15		7.0	
Total		215		100.0	
Gender	Male	97		45.1	
	Female	118		54.9	
Nationality	Saudi	168		78.1	
	Non-Saudi	47		21.9	
Marital Status	Single	76		35.3	
	Married at least once	139		64.7	
Educational Level	Primary and below	9		4.2	
	Secondary to Secondary	47		21.9	
	University	124		57.7	
	Post-graduate	35		16.3	
Job	Not working	48		22.3	
	Student	30		14.0	
	Private sector	68		31.6	
	Government sector	55		25.6	
	Retired	14		6.5	
Smoking status	Non-smoker	149		69.3	
	Smoker	47		21.9	
	Ex-smoker	19		8.8	
Chronic disease	Yes	50		23.3	
	No	165		76.7	

Table 2 depicts the average GAD-7 anxiety and PHQ-9 depression scores of 215 participants to be 7.00 ± 5.6 (min=0, max=21) and 8.96 ± 6.9 (min=0, max=27). Moreover, nearly three-fourths had mild to moderate anxiety (75.3%, n=162), while roughly two-thirds experienced mild to moderate depression (65.1%, n=140).

The association between GAD-7 anxiety levels of patients and socio-demographic characteristics was evaluated, as

depicted in Table 3. The chi-square test revealed significant differences in the GAD-7 anxiety levels of the participants relative to the nationality (p=0.004) and marital status (p=0.007) factors. More specifically, a significantly higher proportion of non-Saudi patients had mild anxiety (68.1%, n=32) compared to those with moderate to severe degrees of anxiety. Moreover, a significantly higher number of married (at least once) participants had mild anxiety (53.2%, n=74) in comparison to those with a moderate-to-severe degree of anxiety. The rest of the socio-demographic factors exhibited no significant differences (p>0.005).

Table 2 Average GAD-7 anxiety and PHQ-9 depression scores of participants (N=215)

Scores	N	Min	Max	Mean	SD
GAD-7 Anxiety	215	0	21	7	5.6
PHQ-9 Depression	215	0	27	8.96	6.9
		Count		%	
Total		215		100.0	
GAD-7 Anxiety	Mild	99		46.0	
	Moderate	63		29.3	
	Moderately Severe	27		12.6	
	Severe	26		12.1	
PHQ-9 Depression	Mild	79		36.7	
	Moderate	61		28.4	
	Moderately Severe	35		16.3	
	Severe	40		18.6	

Table 3 Association between GAD-7 anxiety levels of patients and socio-demographic characteristics

Demographics		Total	GAD-7 Anxiety				p-value
			Mild	Moderate	Moderately Severe	Severe	
Total		215	99 (46.0%)	63 (29.3%)	27 (12.6%)	26 (12.1%)	-
Age	<20 years old	19	8 (42.1%)	7 (36.8%)	3 (15.8%)	1 (5.3%)	0.41
	20-30 years old	68	26 (38.2%)	19 (27.9%)	11 (16.2%)	12 (17.6%)	
	31-40 years old	57	31 (54.4%)	15 (26.3%)	5 (8.8%)	6 (10.5%)	
	41-50 years old	34	15 (44.1%)	12 (35.3%)	3 (8.8%)	4 (11.8%)	
	51-60 years old	22	10 (45.5%)	7 (31.8%)	5 (22.7%)	0 (0.0%)	
	>60 years old	15	9 (60.0%)	3 (20.0%)	0 (0.0%)	3 (20.0%)	
Gender	Male	97	53 (54.6%)	24 (24.7%)	11 (11.3%)	9 (9.3%)	0.141
	Female	118	46 (39.0%)	39 (33.1%)	16 (13.6%)	17 (14.4%)	
Nationality	Saudi	168	67 (39.9%)	54 (32.1%)	22 (13.1%)	25 (14.9%)	0.004[a]
	Non-Saudi	47	32 (68.1%)	9 (19.1%)	5 (10.6%)	1 (2.1%)	
Marital Status	Single	76	25 (32.9%)	23 (30.3%)	13 (17.1%)	15 (19.7%)	0.007[a]
	Married at least once	139	74 (53.2%)	40 (28.8%)	14 (10.1%)	11 (7.9%)	
Educational Level	Primary and below	9	5 (55.6%)	2 (22.2%)	2 (22.2%)	0 (0.0%)	0.202
	Secondary to Secondary	47	24 (51.1%)	9 (19.1%)	10 (21.3%)	4 (8.5%)	
	University	124	52 (41.9%)	44 (35.5%)	12 (9.7%)	16 (12.9%)	
	Post-graduate	35	18 (51.4%)	8 (22.9%)	3 (8.6%)	6 (17.1%)	
Job	Not working	48	22 (45.8%)	15 (31.3%)	6 (12.5%)	5 (10.4%)	0.448
	Student	30	8 (26.7%)	11 (36.7%)	5 (16.7%)	6 (20.0%)	
	Private sector	68	38 (55.9%)	16 (23.5%)	6 (8.8%)	8 (11.8%)	
	Government sector	55	22 (40.0%)	18 (32.7%)	8 (14.5%)	7 (12.7%)	
	Retired	14	9 (64.3%)	3 (21.4%)	2 (14.3%)	0 (0.0%)	

Smoking status	Non-smoker	149	67 (45.0%)	48 (32.2%)	20 (13.4%)	14 (9.4%)	0.163
	Smoker	47	25 (53.2%)	8 (17.0%)	4 (8.5%)	10 (21.3%)	
	Ex-smoker	19	7 (36.8%)	7 (36.8%)	3 (15.8%)	2 (10.5%)	
Chronic disease	Yes	50	23 (46.0%)	15 (30.0%)	7 (14.0%)	5 (10.0%)	0.949
	No	165	76 (46.1%)	48 (29.1%)	20 (12.1%)	21 (12.7%)	
[a]: significant using Chi-Square test <0.05 level.							

After the GAD-7 anxiety analysis, the association between the PHQ-9 depression levels of patients and socio-demographic characteristics was then assessed (Table 4). Findings revealed significant differences in the PHQ-9 depression levels of participants concerning factors such as age (p=0.043), gender (p=0.001), and marital status (p=0.002) according to chi-square analysis. More specifically, a significantly higher proportion of patients belonging to 31-40 years old age (43.9%, n=25) and 41-50 years old (44.1%, n=15) age groups had mild depression compared to those with moderate to severe type in the age group. Also, a significantly higher number of those belonging to the <20 years old age group had moderate depression (52.6%, n=10) in comparison to those who had mild, moderately severe, and severe types. For the 51-60 years old age group, a significantly higher portion of them had mild (36.4%, n=8) to moderate (36.4%, n=8) depression compared to those with moderately severe to severe levels. In terms of gender, a significantly higher proportion of male patients had mild depression (33.1%, n=39), while the female had moderate type (33.1%, n=39). About the marital status factor, the analysis revealed there were a significantly higher number of single patients who had moderate depression (31.6%, n=24), and married participants (at least once) who had mild type (43.9%, n=61). The rest of the socio-demographic factors exhibited no significant differences (p>0.005).

Table 4 Association between the PHQ-9 depression levels of patients and socio-demographic characteristics (N=215)

Demographics		Total	PHQ-9 Depression				p-value
			Mild	Moderate	Moderately Severe	Severe	
Total		215	79 (36.7%)	61 (28.4%)	35 (16.3%)	40 (18.6%)	-
Age	<20 years old	19	4 (21.1%)	10 (52.6%)	2 (10.5%)	3 (15.8%)	0.043[a]
	20-30 years old	68	20 (29.4%)	19 (27.9%)	8 (11.8%)	21 (30.9%)	
	31-40 years old	57	25 (43.9%)	11 (19.3%)	13 (22.8%)	8 (14.0%)	
	41-50 years old	34	15 (44.1%)	9 (26.5%)	4 (11.8%)	6 (17.6%)	
	51-60 years old	22	8 (36.4%)	8 (36.4%)	6 (27.3%)	0 (0.0%)	
	>60 years old	15	7 (46.7%)	4 (26.7%)	2 (13.3%)	2 (13.3%)	
Gender	Male	97	47 (48.5%)	22 (22.7%)	8 (8.2%)	20 (20.6%)	0.001[a]
	Female	118	32 (27.1%)	39 (33.1%)	27 (22.9%)	20 (16.9%)	
Nationality	Saudi	168	57 (33.9%)	49 (29.2%)	29 (17.3%)	33 (19.6%)	0.435
	Non-Saudi	47	22 (46.8%)	12 (25.5%)	6 (12.8%)	7 (14.9%)	
Marital status	Single	76	18 (23.7%)	24 (31.6%)	11 (14.5%)	23 (30.3%)	0.002[a]
	Married at least once	139	61 (43.9%)	37 (26.6%)	24 (17.3%)	17 (12.2%)	
Educational level	Primary and below	9	4 (44.4%)	1 (11.1%)	3 (33.3%)	1 (11.1%)	0.316
	Secondary to Secondary	47	18 (38.3%)	8 (17.0%)	12 (25.5%)	9 (19.1%)	
	University	124	44 (35.5%)	42 (33.9%)	15 (12.1%)	23 (18.5%)	
	Post-graduate	35	13 (37.1%)	10 (28.6%)	5 (14.3%)	7 (20.0%)	
Job	Not working	48	16 (33.3%)	13 (27.1%)	9 (18.8%)	10 (20.8%)	0.258
	Student	30	4 (13.3%)	12 (40.0%)	5 (16.7%)	9 (30.0%)	
	Private sector	68	31 (45.6%)	17 (25.0%)	10 (14.7%)	10 (14.7%)	
	Government sector	55	21 (38.2%)	14 (25.5%)	9 (16.4%)	11 (20.0%)	
	Retired	14	7 (50.0%)	5 (35.7%)	2 (14.3%)	0 (0.0%)	
Smoking status	Non-smoker	149	57 (38.3%)	44 (29.5%)	22 (14.8%)	26 (17.4%)	0.798
	Smoker	47	14 (29.8%)	14 (29.8%)	9 (19.1%)	10 (21.3%)	
	Ex-smoker	19	8 (42.1%)	3 (15.8%)	4 (21.1%)	4 (21.1%)	
Chronic disease	Yes	50	18 (36.0%)	14 (28.0%)	10 (20.0%)	8 (16.0%)	0.848
	No	165	61 (37.0%)	47 (28.5%)	25 (15.2%)	32 (19.4%)	
[a]: significant using Chi-Square test <0.05 level.							

Analyses revealed the socio-demographic factors of nationality (p=0.002, Adjusted R^2=0.090) and marital status (p=0.001; Adjusted R^2=0.090) of the patients as the most significant predictors for anxiety, while gender (p=0.016, Adjusted R^2=0.058) and marital status (p=0.002; Adjusted R^2=0.058) for depression. More specifically, Saudi nationality (p=0.001) and single status (p=0.001) were strong predictors of mild (p=0.001), moderate (p<0.001), and moderately severe types (p<0.001) of anxiety among participants (Table 5). Additionally, male gender (p=0.005) and single status (p=0.002) were found to be strong predictors of moderately severe depression among patients (p<0.001) (Table 6).

Table 5 Predictors of GAD-7 anxiety among subjects using regression analysis

Parameter Estimates		Estimate	95% Confidence Interval		p-value
			Lower Bound	Upper Bound	
Threshold	GAD-7 Anxiety=Mild	1.053	0.413	1.693	0.001
	GAD-7 Anxiety=Moderate	2.436	1.733	3.14	<0.001
	GAD-7 Anxiety=Moderately Severe	3.354	2.585	4.123	<0.001
Location	Nationality=Saudi	1.156	0.476	1.836	0.001
	Marital Status=Single	0.9	0.371	1.429	0.001

Table 6 Predictors of PHQ-9 depression among subjects using regression analysis

Parameter Estimates		Estimate	95% Confidence Interval		p-value
			Lower Bound	Upper Bound	
Threshold	PHQ-9 Depression=Mild	-0.358	-1.328	0.611	0.469
	PHQ-9 Depression=Moderate	0.903	-0.073	1.88	0.070
	PHQ-9 Depression=Moderately Severe	1.801	0.799	2.803	<0.001
Location	Age<20 years old	-0.422	-1.788	0.943	0.544
	Age=20-30 years old	0.264	-0.822	1.35	0.634
	Age=31-40 years old	0.261	-0.799	1.32	0.630
	Age=41-50 years old	0.188	-0.941	1.316	0.744
	Age=51-60 years old	0.243	-0.979	1.466	0.696
	Gender=Male	-0.745	-1.263	-0.227	0.005
	Marital Status=Single	1.081	0.4	1.762	0.002

DISCUSSION

Recent studies reported a possible association between the spread of COVID-19 and psychiatric characteristics of people, in which available data implies COVID-19 patients possibly exhibit mental health outcomes such as signs of depression, insomnia, delirium, anxiety, and post-traumatic stress [9-13]. In this study, the anxiety and depression of COVID-19 survivors during follow-up, considering they have already recovered, were still observed. The extant research indicates that those who were following COVID-19 news were the large proportion who exhibited increased anxiety [12,14]. Such news related to COVID-10 were often distressing, which affects anxiety level changes in a person [12,15]. That is, health experts are recommending limiting exposure to negative news, but still promoting other social platforms to prevent isolation-triggered anxiety [12,16]. Moreover, these survivors may have been worried about the stigma in the community of contracting COVID-19 even if they had already recovered. Therefore, counseling, as well as moral support, is still recommended to help address this concern [17]. About depression characteristics of participants in the present study, the majority of them reported that they were not having thoughts that it was good to be dead at all or of hurting themselves through some approach (80.4%, n=172), suggesting a small percentage of suicidal tendency. Similarly, the study by Wu, et al. in Wuhan, China which utilized the same PHQ-9 questionnaire reported that 370 survivors of COVID-19 reported only a small proportion of subjects (1.1%, 4 survivors) who had

suicidal thinking for once in several days [18]. Another study by Mazza and colleagues in Italy on 402 COVID-19 adult survivors only scored 2% on suicidal ideation at the BDI suicide item, and 0.8% (scoring 2 and 3) for suicidal planning [9]. Although these were only small fractions, such survivors with suicidal tendencies must still be closely followed up and monitored by psychiatric experts [18]. On the other hand, more than half of survivors in the present work experienced difficulties falling or staying asleep or sleeping too much for >1/2 days to almost every day (53.7%). Recovered patients (29.5%) in the study of Wu, et al. also reported the sleeping disorders to have bothered them. Such survivors are encouraged to take appropriate medication to help their sleep improvement [18]. Balanchar, et al. mentioned that, unlike stress that typically disappears within a short period, mental concerns like anxiety and depression persist for a longer period among COVID-19 survivors [17]. Aside from factors related to isolation, stigma, and worry to infect others, the immune response of the body to the SARS-CoV-2 infection was also been noted to trigger psychiatric consequences (e.g., anxiety, depression) [9,19]. In the present study, nearly three-fourths of participants had mild to moderate anxiety (75.3%, n=162), while roughly two-thirds experienced mild to moderate depression (65.1%, n=140). The study of Wu and others showed a relatively lower rate of survivors who experienced anxiety (13.5%, n=50) and depression (10.8%, n=40) using the same GAD-7 and PHQ-9 questionnaires [18]. The low rate was related to residual respiratory symptoms and worrying about the potential recurrence of infection in non-COVID-19 people. A comparatively lower rate of anxiety (42%) was obtained using State-Trait Anxiety Inventory Form Y (STAI-Y), and depression (31%) obtained using Zung Self-Rating Depression Scale (ZSDS) and the 13-item Beck's Depression Inventory (BDI-13) were also taken note of among the COVID-19 survivors in the study by Mazza and colleagues [9].

Furthermore, the current study revealed significant differences in the GAD-7 anxiety levels of the participants relative to the nationality (p=0.004) and marital status (p=0.007) factors. More specifically, a significantly higher number of those belonging to the <20 years old age group had moderate depression (52.6%, n=10) in comparison to those who had mild, moderately severe, and severe types. The study by Mazza, et al. in Italy reported relatively depression levels among young COVID-19 survivors. This result is also consistent with the study by Wang, et al. [20]. In terms of gender, a significantly higher proportion of male patients in the present study had mild depression (33.1%), while a higher proportion of females had moderate type (33.1%), suggesting one level higher degree of depression among females than males. This is consistent with the results of Mazza, et al. in which their studied female COVID-19 survivors experienced more struggles with both anxiety and depression [9]. Another study supports the finding that women were found to be at higher risk of exhibiting depression compared to men during the COVID-19 pandemic [12,13,15,21]. Women are reported to be more susceptible to experiencing stress and post-traumatic stress disorder compared to men [12,22].

This study has some limitations. First, the nature of its cross-sectional design does not promote a causality interpretation. Second, the status of psychological of survivors may change over time and through changes in their respective environments, which warrants the psychological impacts COVID-19 experiences being studied over a longer period (longer follow up).

Although only mild and moderate types of anxiety and depression were experienced by the studied COVID-19 survivors, medical and social attention is still necessary for these mental health concerns. Proper diagnosis and treatment of psychiatric conditions are considered crucial [23]. It is recommended that their family members nurture empathy skills for better communication. Encouraging the survivors to express or share their feelings can also help in reducing psychological challenges on their end. Policy and awareness programs may also be promoted for properly educating citizens on removing the stigma mindset. Periodic counseling for moral support is also suggested for COVID-19 survivors to improve their mental confidence and courage [17].

CONCLUSION

In this study, COVID-19 was found to have caused a post-recovery psychological impact among COVID-19 survivors. A large proportion of survivors experienced mild to moderate anxiety and depression. Although these conditions were not moderately severe to severe, mental health care attention from clinicians, psychiatrists, and family members is still essential. In addition, socio-demographic factors such as nationality and marital status significantly influenced the anxiety levels of survivors, while age, marital status, and gender significantly influenced the degree of depression. Conducting studies with longer follow-up periods may provide a more holistic picture of COVID-19-related

psychological impacts among recovered patients, which may be useful for more implementing more effective mental health care as well as establishing more appropriate psychological techniques and interventions.

DECLARATIONS

Conflicts of Interest

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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Ethical Approval

We obtained the final research approval from the Institutional Review Board in Jeddah with IRB approval number: A01088 on 28/4/2021.

Author's Contributions

Reem Mohamed Qattan provided the conception and design of the study, conducted research, provided research materials, acquisition of data, analysis, and interpretation of data, initial and final draft of an article, revised it critically for important intellectual content, and final approval of the version to be submitted; and Amal Hassan Alghamdi provided the conception and design of the study, logistic support, revised initial and final draft of an article, revised the article critically for important intellectual content and gave final approval of the version to be submitted. The manuscript is the original work of all authors. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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