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Research Article

Effect of COVID-19 on the Mental Health of Adults Living in Saudi Arabia After Two Years from the Beginning of the Pandemic

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ABSTRACT

Background: On March 11th, 2020, the World Health Organization declared COVID-19 a global pandemic. COVID-19 has affected the mental health of millions globally by disrupting their usual activities and creating depression, anxiety, and stress. The purpose of this research was to investigate the effect of COVID-19 on the mental health of residents in the Kingdom of Saudi Arabia.

Methods: An online cross-sectional survey was distributed among individuals in Saudi Arabia in July 2022. The Depression, Anxiety, and Stress Scale (DASS-21) was used to evaluate the effect of COVID-19 on the mental health of the study population.

Results: 479 Saudi Arabian residents participated in the survey; 39% reported extremely severe depression, while 60.8% and 25.9% reported extremely severe anxiety and stress, respectively. Furthermore, the results showed that females, young individuals, and participants who had more than 7 people in their households had significantly higher levels of depression, anxiety, and stress. When studying attitudes regarding protective practices against COVID-19, they were at their highest early in the pandemic and declined after two years of the pandemic.

Conclusion: This study's findings indicated that the COVID-19 pandemic has a high negative impact on the mental health of participants. These findings can be used to develop psychological interventions for the general population and more specifically vulnerable populations, as well as to execute public mental health initiatives alongside pandemic response efforts.

INTRODUCTION

The first case of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was reported in December 2019 in Wuhan, China (Li et al., 2020). On January 30, 2020, the World Health Organization (WHO) held an emergency meeting and declared a worldwide outbreak of COVID-19 and a global public health emergency (WHO, 2020). By March 2020, there were more than 80,000 cases in China (Dong et al., 2020), On March 2, 2020, Saudi Arabia announced its first COVID-19 case(SPA, 2020) resulting in mandatory lifestyle changes, which promoted feelings of fear, anxiety, stress, and depression among the general population.

The COVID-19 pandemic is a major health crisis that has changed the lives of billions globally. It has affected the mental health of nearly all persons around the world by disrupting their usual daily activities as a result of lockdowns, which in turn have caused depression, anxiety disorders, stress, panic attacks, irrational anger, impulsivity, somatisation disorders, sleep disorders, emotional disturbances, post-traumatic stress symptoms, suicidal behaviours, and new barriers for people who already live with mental illnesses (Martín, 2007).

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Recent studies conducted on the psychological impact of COVID-19 worldwide showed that individuals reporting chronic diseases had higher mean levels of stress, anxiety, and depression compared to participants without diseases, and the same was also reported in young people (Alkhamees et al., 2020; Al-Mutawa & Al-Mutairi, 2021; Antúnez & Vinet, 2012; Mazza et al., 2020). Multiple studies also showed that females have increased anxiety, depression, and stress. Additionally, being divorced and alone, which are typically connected to loneliness, may be viewed as predictors of stress and depression (Antúnez & Vinet, 2012; Chan et al., 2020; Mazza et al., 2020; Shatla et al., 2020). In Saudi Arabia, the results were similar; there was an increased risk of psychiatric complications among women and people with chronic diseases. (Alkhamees et al., 2020; Al-Mutawa & Al-Mutairi, 2021).

A recent study conducted on the Saudi population measuring mental health changes related to the COVID-19 pandemic showed that up to 23.6% of the population have experienced moderate or severe psychological impacts due to the outbreak; furthermore, the study reported moderate to severe depression (28.3%,), anxiety (24%), and stress symptoms (22.3%)(Lutfi et al., 2021). These findings are in line with those of other studies conducted during the pandemic in different countries. One study reported the level of severe anxiety was 19.1% in Iran; another study reported the levels of depression, stress, and anxiety in Spain reached 9.9%, 7.8%, and 11.6%, respectively. Other studies revealed high rates of depression (37.3%), and anxiety (26.4%) (Abolfotouh et al., 2021; Al-Hanawi et al., 2020; Alqahtani et al., 2021). Interestingly, recent works on the impact of COVID-19 on behavior and attitude have shown that women have better practices toward COVID-19 (Ettman et al., 2020; Lovibond & Lovibond, 1995; Mautong et al., 2021)

Concerning the behavioral changes during the COVID-19 pandemic; in China, the data showed that 92.3% of the participants washed their hands with soap, 97.4% wore masks when going out, and 85.0% avoided dining or gathering together (Chan et al., 2020). In the UAE, 87.0% used hand sanitizers, 95.8% washed their hands regularly, 94.6% wore face masks, and 94.2% avoided handshakes (Lutfi et al., 2021). Also in Saudi Arabia, most participants reported positive behavioral responses toward the COVID-19 pandemic (Abolfotouh et al., 2021; Al-Hanawi et al., 2020).

To the best of our knowledge, no research has been conducted in Saudi Arabia on the effects of the pandemic on the country's population's mental health and behavioural protective attitudes during the pandemic and comparing it to two years after the pandemic's beginning. This research gap presents a valuable opportunity to gain insights into the unique experiences and challenges the Saudi population faces during and after the pandemic. Understanding the mental health implications and behavioural changes can inform targeted interventions and support systems to promote well-being in the future.

This study aimed to measure the extent of the effect of COVID-19 on the mental health of Saudi Arabian residents two years after the beginning of the pandemic to improve compliance with COVID-19-related policies and interventions.

MATERIALS AND METHODS

Type of Study

A cross-sectional study was conducted to investigate the psychological impact and attitude changes of the COVID-19 pandemic on Saudi Arabian residents.

Study design, population and sample size

This study was conducted among Saudi Arabian residents between 18 - 65 years of age. The sample size of 384 individuals minimally was estimated according to a previous study done in Saudi Arabia (Alkhamees et al., 2020), in which the estimated prevalence (p) =53.8%, confidence level (Z) = 95%, and margin of error (e) = 5%. Data was gathered via a Google Forms online survey that could be completed in both Arabic and English and then disseminated via social media (WhatsApp, Twitter, Instagram, etc.). The Google form was distributed among social media accounts of Saudi people as a URL link in the direct message, so the target population was the Saudi population who had active social media accounts as well as access to the internet. The questionnaire was divided into three parts: demographic questions, a validated scale to measure stress, depression, and anxiety based on a prior study called (DASS-21) (Lovibond & Lovibond, 1995), an attitude section aimed at asking participants about the behavioral practice on COVID-19, participants were asked to compare how they behaved two years ago compared to current behavior.

Statistical analyses

The data were extracted and analyzed using the Statistical Package for the Social Sciences (SPSS). Incomplete or missing responses were removed from the analysis. The DASS 21 questions were scored according to the guidelines provided. In cases where there were fewer frequencies, multicategory variables were merged into fewer categories for better analysis. To summarize the data, the scores of the tools were presented as medians along with their corresponding interquartile ranges (IQRs). Additionally, frequency and percentages were used to summarize the demographics, work environment, and living condition-related questions. To determine whether there were statistically significant differences between the expected frequencies, the chi-squared test was employed. p-value less than 0.05 was considered significant.

Ethical consideration

Participants were required to agree and sign the study's informed consent declaration before answering. A person

who did not sign the research permission form was not permitted to participate. To protect the respondent's privacy and the confidentiality of the individual's data, each questionnaire was assigned an identifying number. The study was approved by Arabian Gulf University from the institutional review board with number E04-PI-4-22/Group4.

Table 1: *Sociodemographic characteristics (N= 479).*

Characteristics	n (%)
Gender	
Male	160 (33.4)
Female	319 (66.6)
Age	
≤23 years	152 (31.7)
23 - 30 years	118 (24.6)
31 - 45 years	117 (24.4)
>45 years	92 (19.2)
Region	
Southern	99 (20.7)
Northern	6 (1.3)
Western	97 (20.3)
Eastern	163 (34)
Central	114 (23.8)
Level of education	
High school or below	132 (27.6)
College	328 (68.5)
Postgraduate	19 (4)
Employment status	
Government employed	114 (23.8)
Self employed	66 (13.8)
Unemployed	101 (21.1)
Retired	42 (8.8)
Student	156 (32.6)
Marital status	
Single	211 (44.1)
Married	254 (53)
Divorced / Widowed	14 (2.9)
Number of people in households	
Single	10 (2.1)
From 1 to 3	75 (15.7)
From 4 to 6	187 (39)
More than 7	207 (43.2)

RESULTS

As shown in Table 1, the majority of participants were female (66.6%), with 31.7% under 23 years old. The highest response rate was found in the eastern Saudi population (34%), followed by the central region (23.8%). Furthermore, the most of participants were college students (68.5%), and most participants were married (53%).

A total of 479 participants completed the questionnaire. which measures the levels of depression, anxiety, and stress. Figure 1 shows that in terms of depression, 39% of Saudi Arabian residents have extremely severe symptoms while 40.3% and 20.7% represent moderate and severe depression, respectively. Most participants experienced extremely severe anxiety (60.8%), and moderate anxiety (20.9%). Regarding stress levels; the majority showed extremely severe (25.9%), severe (20.5%), or moderate (23.2%).

Depression levels and sociodemographic characteristics

As shown in Table 2, females had the most severe depression cases (69.5%) compared to males, with a significant difference (p = 0.004); otherwise, there was a moderate level across all age groups. However, those aged 23 or younger had the highest levels (39%), with a p-value of 0.001. For the regions in Saudi Arabia; we found a similar incidence. However, the college students had the highest number of extremely severe depressions (42.2%), with a P-value of 0.001. Additionally, there were significant differences regarding marital status in levels of depression (p-value <0.001); single people have shown higher levels of extreme depression (59.4%), whereas married people have moderate levels (62.2%). The association between sociodemographic characteristics and depression levels in 479 participants is shown in Table 2.

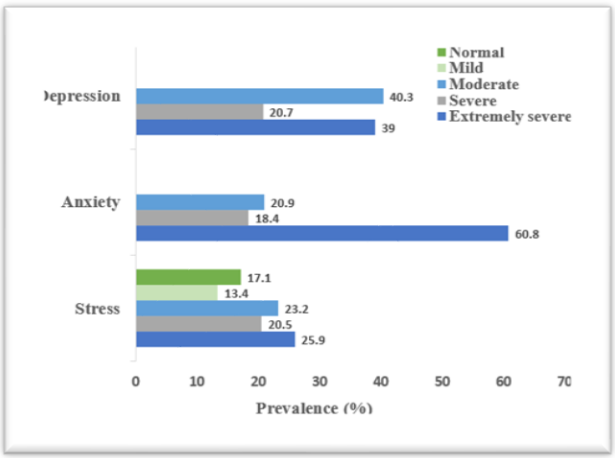

Figure 1. *Overall mental health outcome of Saudi Arabia residents. Showing descriptive analytics of different types of mental psychological health compared to their severity in the study population (n=479).*

Anxiety levels and sociodemographic characteristics

Females show a significantly higher rate of severe anxiety (72.9%) compared to males. and p-value<0.001. Age plays a significant role in anxiety levels, with 35.4% of respondents (aged 23 years or older) having extremely severe anxiety, with a p-value equal to 0.048. The Eastern region has the highest prevalence of severe anxiety (42%); there was a significant difference in marital status (p-value = 0.016), with 65% of married individuals having moderate anxiety and 60.2% having severe anxiety. Also, the number of persons in households influences the anxiety level. Households with more than seven persons show the highest prevalence of extremely severe anxiety (44.7%). as shown in Table 3.

Stress levels and sociodemographic characteristics

As we can see in Table 4, there was a significant difference between females and males (p-value = 0.001), with-

Table 2: *Association between sociodemographic characteristics and levels of depression (N= 479).*

	Depression			
Characteristics	Moderate	Severe	Extremely Severe	P-value
	n (%)	n (%)	n (%)	
Gender				
Male	80 (41.5)	23 (23.2)	57 (30.5)	**0.004**
Female	113 (58.5)	76 (76.8)	130 (69.5)	
Age				
≤23 years	50 (25.9)	29 (29.3)	73 (39.0)	**0.001**
23 - 30 years	47 (24.4)	18 (18.2)	53 (28.3)	
31 - 45 years	48 (24.9)	27 (27.3)	42 (22.5)	
>45 years	48 (24.9)	25 (25.3)	19 (10.2)	
Region				
Southern	47 (24.4)	19 (19.2)	33 (17.6)	0.256
Northern	2 (1)	2 (2)	2 (1.1)	
Western	34 (17.6)	18 (18.2)	45 (24.1)	
Eastern	73 (37.8)	35 (35.4)	55 (29.4)	
Central	37 (19.2)	25 (25.3)	52 (27.8)	
Level of education				
High school or below	49 (25.4)	27 (27.3)	56 (29.9)	0.285
College	132 (68.4)	70 (70.7)	126 (67.4)	
Postgraduate	12 (6.2)	2 (2)	5 (2.7)	
Current employment status				
Government employed	54 (28)	28 (28.3)	32 (17.1)	**<0.001**
Self employed	26 (13.5)	12 (12.1)	28 (15)	
Unemployed	39 (20.2)	20 (20.2)	42 (22.5)	
Retired	24 (12.4)	12 (12.1)	6 (3.2)	
Student	50 (25.9)	27 (27.3)	79 (42.2)	
Marital status				
Single	67 (34.7)	33 (33.3)	111 (59.4)	**<0.001**
Married	120 (62.2)	62 (62.6)	72 (38.5)	
Divorced / Widowed	6 (3.1)	4 (4)	4 (2.1)	
Number of people in households				
Single	5 (2.6)	1 (2)	4 (2.1)	0.169
From 1 to 3	30 (15.5)	17 (17.2)	28 (15)	
From 4 to 6	77 (39.9)	48 (48.5)	62 (33.2)	
More than 7	81 (42)	33 (33.3)	93 (49.7)	

66.7% of females experiencing severe stress levels. Age groups showed also a significant difference (p-value 0.001), with 42.7% of those aged 23 or younger showing extremely severe stress. The employment status influenced the stress level significantly (p-value = 0.001), with government-employed individuals having a higher percentage reaching 32.7%. Around 60% of married individuals experience mild stress, and 33.9% show extremely severe stress. Divorced or widowed individuals have the lowest stress levels (p-value 0.001). Furthermore, we found that 35.9% of Eastern Region participants show mild stress, while 30.6% of Central Region participants show extremely severe stress. Finally, our results showed extremely severe stress in households with more than 7 persons, and the value reached 54%.

Attitude during the COVID-19 pandemic and attitude after two years

In the beginning, females had a significantly higher protective attitude compared to men (p-value = 0.023) the levels reached 73% in females, and 27% in males. After 2 years, women's attitudes slightly increased (81.9%), while men's attitudes dropped down (18.1%), the difference was highly significant (p-value 0.001). Age groups were similar, but people aged between 31 and 45 had a-

Table 3: *Association between sociodemographic characteristics and levels of Anxiety (N= 479).*

Characteristics	Anxiety			P-value
	Moderate	Severe	Extremely Severe	
	n (%)	n (%)	n (%)	
Gender				
Male	52 (52)	29 (33)	79 (27.1)	**<0.001**
Female	48 (48)	59 (67)	212 (72.9)	
Age				
≤23 years	25 (25)	24 (27.3)	103 (35.4)	**0.048**
23 - 30 years	21 (21)	24 (27.3)	73 (25.1)	
31 - 45 years	26 (26)	28 (31.8)	63 (21.6)	
>45 years	28 (28)	12 (13.6)	52 (17.9)	
Region				
Southern	27 (27)	13 (14.8)	59 (20.3)	0.232
Northern	0 (0)	2 (2.3)	4 (1.4)	
Western	18 (18)	20 (22.7)	59 (20.3)	
Eastern	34 (34)	37 (42)	92 (31.6)	
Central	21 (21)	16 (18.2)	77 (26.5)	
Level of education				
High school or below	31 (31)	20 (22.7)	81 (27.8)	0.105
College	61 (61)	65 (73.9)	202 (69.4)	
Postgraduate	8 (8)	3 (3.4)	8 (2.7)	
Current employment status				
Government employed	29 (29)	23 (26.1)	62 (21.3)	0.148
Self employed	18 (18)	9 (10.2)	39 (13.4)	
Unemployed	15 (15)	22 (25)	64 (22)	
Retired	13 (13)	7 (8)	22 (7.6)	
Student	25 (25)	27 (30.7)	104 (35.7)	
Marital status				
Single	33 (33)	33 (37.5)	145 (49.8)	**0.016**
Married	65 (65)	53 (60.2)	136 (46.7)	
Divorced / Widowed	2 (2)	2 (2.3)	10 (3.4)	
Number of people in households				
Single	3 (3)	1 (1.1)	6 (2.1)	0.767
From 1 to 3	12 (12)	16 (18.2)	47 (16.2)	
From 4 to 6	44 (44)	35 (39.8)	108 (37.1)	
More than 7	41 (41)	36 (40.9)	130 (44.7)	

-higher protective attitude (24.1%). The education grad plays an important role indeed we found that college degree holders had the highest protective attitude (74.9%) and the highest moderate attitude (68.2%). After 2 years, government employees had the highest significant attitude (32.6%, P-value= 0.006), while students had the lowest (39.1%). For marital status, married people had the highest attitude (55.9%) and the highest attitude (60.9%) with a significant reached p-value = 0.035, as shown in Table 5.

The overall result of the attitude toward COVID-19 protective measurement is depicted in Figure 2. It demonstrated that the attitude toward the COVID-19 protective measure was at its highest early in the pandemic and declined after two years.

DISCUSSION

The primary goals of this study were to determine the effects of COVID-19 on mental health and how Saudi adults' attitudes had changed two years after the start of the COVID-19 pandemic.

Our findings show that 39% of Saudi Arabian residents who participated in this study were extremely severely depressed, while 40.3% were moderately depressed. Regarding anxiety around 60% of participants confirmed they had severe anxiety, on the other hand, we found that the stress level among participants was less than depression and anxiety, hence around 23% of participants showed extremely severe stress. Furthermore, the results showing the protective attitude toward COVID-19 reached the highest level, early at the beginning of the pandemic and declined after two years.

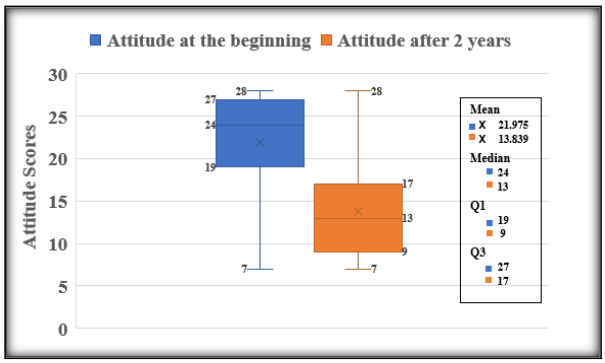

Figure 2: *Box plot showing differences in attitude toward protective measures in the participants. The scores were at the beginning of the pandemic and after 2 years of onset among participants (n=479). The medians are identified by the horizontal lines inside the box. The length of the box is the interquartile range (IQR).*

Table 4: *Association between sociodemographic characteristics and levels of Stress (N= 479).*

Characteristics	Stress				
	Normal	Mild	Moderate	Severe	Extremely Severe
	n (%)	n (%)	n (%)	n (%)	n (%)
Gender*					
Male	41 (50)	24 (37.5)	37 (33.3)	21 (21.4)	37 (29.8)
Female	41 (50)	40 (62.5)	74 (66.7)	77 (78.6)	87 (70.2)
Age*					
≤23 years	20 (24.4)	21 (32.8)	31 (27.9)	27 (27.6)	53 (42.7)
23 - 30 years	17 (20.7)	13 (20.3)	33 (29.7)	18 (18.4)	37 (29.8)
31 - 45 years	21 (25.6)	21 (32.8)	20 (18)	31 (31.6)	24 (19.4)
>45 years	24 (29.3)	9 (14.1)	27 (24.3)	22 (22.4)	10 (8.1)
Region					
Southern	21 (25.6)	12 (18.8)	20 (18)	21 (21.4)	25 (20.2)
Northern	1 (1.2)	2 (3.1)	1 (0.9)	1 (1)	1 (0.8)
Western	15 (18.3)	12 (18.8)	19 (17.1)	24 (24.5)	27 (21.8)
Eastern	26 (31.7)	23 (35.9)	47 (42.3)	34 (34.7)	33 (26.6)
Central	19 (23.2)	15 (23.4)	24 (21.6)	18 (18.4)	38 (30.6)
Level of education					
High school or below	24 (29.3)	18 (28.1)	27 (24.3)	32 (32.7)	31 (25)
College	50 (61)	44 (68.8)	78 (70.3)	64 (65.3)	92 (74.2)
Postgraduate	8 (9.8)	2 (3.1)	6 (5.4)	2 (2)	1 (0.8)
Current employment status*					
Government employed	23 (28)	19 (29.7)	23 (20.7)	32 (32.7)	17 (13.7)
Self employed	12 (14.6)	7 (10.9)	19 (17.1)	12 (12.2)	16 (12.9)
Unemployed	15 (18.3)	15 (23.4)	21 (18.9)	24 (24.5)	26 (21)
Retired	13 (15.9)	5 (7.8)	15 (13.5)	3 (3.1)	6 (4.8)
Student	19 (23.2)	18 (28.1)	33 (29.7)	27 (27.6)	59 (47.6)
Marital status*					
Single	30 (36.6)	22 (34.4)	44 (39.6)	37 (37.8)	78 (62.9)
Married	49 (59.8)	39 (60.9)	65 (58.6)	59 (60.2)	42 (33.9)
Divorced / Widowed	3 (3.7)	3 (4.7)	2 (1.8)	2 (2.0)	4 (3.2)
Number of people in households					
Single	2 (2.4)	2 (3.1)	4 (3.6)	0 (0)	2 (1.6)
From 1 to 3	11 (13.4)	8 (12.5)	22 (19.8)	17 (17.3)	17 (13.7)
From 4 to 6	32 (39)	29 (45.3)	41 (36.9)	47 (48)	38 (30.6)
More than 7	37 (45.1)	25 (39.1)	44 (39.6)	34 (34.7)	67 (54)

*Statistically significant differences.

The findings of this study were in agreement with other population-based studies that assessed the effect of mental health disorders during the COVID-19 pandemic. (Abolfotouh et al., 2021; Chan et al., 2020; Ettman et al., 2020; Mautong et al., 2021; Shatla et al., 2020).

In a study done by Tahoun et al. (2023), they measured the quality of life in the Arab population after two years of the COVID-19 pandemic and concluded that the pandemic affected the quality of life among participants in different domains, especially the psychological domain, which is in line with our findings, more than half of the participants reported moderate to severe depression and anxiety. Therefore, there is a need for adequate support and interventions to address the mental health challenges arising from the pandemic in the Arab population. The findings that the pandemic significantly affects females' mental health are consistent with a previous study from Chan, et al. study (Chan et al., 2020), which was conducted in Hong Kong. This finding could be explained by several factors, including the fact that women have many responsibilities to take care of, including caring for children while working at the same time, being socially active, and proving themselves. Additionally, most of the women in our study are married and responsible for raising children, which can be a heavy burden and cause the symptoms that surfaced.

Depression, anxiety, and stress all had a significant impact on participants who were twenty-three years of age or younger; research by Al-Mutawa and Al-Mutairi, 2021 done in Gulf Cooperation Council countries revealed the same conclusion for the group of participants who were younger than 23 years. The study found that young adults in the Gulf Cooperation Council countries were vulnerable to mental health issues, with depression, anxiety, and stress are prevalent among this age group (Al-Mutawa & Al-Mutairi, 2021). The same conclusion has been reported by other authors also in separate studies (Alkhamees et al., 2020; Antúnez & Vinet, 2012).

Table 5 (A): *Association between sociodemographic characteristics and the attitude at the beginning of the COVID-19 pandemic (N = 479).*

Characteristics	High attitude	Moderate attitude	Low attitude	P-value
	n (%)	n (%)	n (%)	
Gender				
Male	57 (27)	61 (40.4)	42 (35.9)	**0.023**
Female	154 (73)	90 (59.6)	75 (64.1)	
Age				
≤23 years	64 (30.3)	48 (31.8)	40 (34.3)	0.328
23 - 30 years	48 (22.7)	44 (29.1)	26 (22.2)	
31 - 45 years	49 (23.2)	38 (25.82	30 (25.6)	
>45 years	50 (23.7)	21 (13.9)	21 (17.9)	
Region				
Southern	55 (26.1)	23 (15.2)	21 (17.9)	0.139
Northern	2 (0.9)	4 (2.6)	0 (0)	
Western	38 (18)	35 (23.2)	24 (20.5)	
Eastern	69 (32.7)	49 (32.5)	45 (38.5)	
Central	47 (22.3)	40 (26.5)	27 (23.1)	
Level of education				
High school or below	48 (22.7)	39 (25.8)	45 (38.5)	**0.010**
College	158 (74.9)	103 (68.2)	67 (57.3)	
Postgraduate	5 (2.4)	9 (6)	5 (4.3)	
Current employment status				
Government employed	57 (27)	31 (20.5)	26 (22.2)	**0.041**
Self employed	28 (13.3)	23 (15.2)	15 (12.8)	
Unemployed	33 (15.6)	39 (25.8)	29 (24.8)	
Retired	26 (12.3)	5 (3.3)	11 (9.4)	
Student	67 (31.8)	53 (35.1)	36 (30.8)	
Marital status				
Single	89 (42.2)	71 (47)	51 (43.6)	0.606
Married	118 (55.9)	75 (49.7)	61 (52.1)	
Divorced / Widowed	4 (1.9)	5 (3.3)	5 (4.3)	

Furthermore, the study suggests that cultural factors and societal pressures may contribute to the high prevalence of mental health issues among young adults. Therefore, interventions and support systems must take into account these unique cultural contexts and address them appropriately to effectively address the mental health needs of this population.

On the other hand, marital status plays a crucial role in the level of depression, anxiety, and stress. In this study, we found that single people have extremely severe symptoms while participants who are married have mild to less severe symptoms; this finding is supported by Al-Mutawa and Al-Mutairi 2021 study showing that single individuals were also more affected by depression than married people. This could be attributed to the fact that married individuals often have a support system in the form of a spouse who can provide emotional and practical assistance during difficult times. Conversely, single individuals may face increased feelings of loneliness and isolation, which can exacerbate symptoms of depression, anxiety, and stress during the COVID-19 pandemic.

The number of persons in households was another finding; those with more than seven persons experience extremely high levels of stress, anxiety, and depression.

Table 5 (B): *Association between sociodemographic characteristics and the attitude after 2 years from the beginning of the COVID-19 pandemic (N = 479).*

	High attitude	Moderate attitude	Low attitude	P-value
Characteristics	n (%)	n (%)	n (%)	
Gender				
Male	25 (18.1)	54 (30)	81 (50.3)	**<0.001**
Female	113 (81.9)	126 (70)	80 (49.7)	
Age				
≤23 years	30 (21.7)	58 (32.2)	64 (39.8)	**<0.001**
23 - 30 years	26 (21)	42 (23.3)	47 (29.2)	
31 - 45 years	47 (34.1)	39 (21.7)	31 (19.3)	
>45 years	32 (23.2)	41 (22.8)	19 (11.8)	
Region				
Southern	38 (27.5)	33 (18.3)	28 (17.4)	0.138
Northern	1 (0.7)	1 (0.6)	4 (2.5)	
Western	30 (21.7)	38 (21.1)	29 (18)	
Eastern	46 (33.3)	60 (33.3)	57 (35.4)	
Central	23 (16.7)	48 (26.7)	43 (26.7)	
Level of education				
High school or below	39 (28.3)	40 (22.2)	53 (32.9)	0.098
College	96 (69.6)	129 (71.7)	103 (64)	
Postgraduate	3 (2.2)	11 (6.1)	5 (3.1)	
Current employment status				
Government employed	45 (32.6)	40 (22.2)	29 (18)	**0.006**
Self employed	12 (8.7)	25 (13.9)	29 (18)	
Unemployed	30 (21.7)	39 (21.7)	32 (19.9)	
Retired	17 (12.3)	17 (9.4)	8 (5)	
Student	34 (24.6)	59 (32.8)	63 (39.1)	
Marital status				
Single	49 (35.5)	76 (42.2)	86 (53.4)	**0.035**
Married	84 (60.9)	98 (54.4)	72 (44.7)	
Divorced / Widowed	5 (3.6)	6 (3.3)	3 (1.9)	

The study by Alqahtani et al., 2021 is at odds with single people having the lowest percentage of any category. Furthermore, Behisi M. et al. (2021) reported in their study that Saudi citizens living abroad far from family and friends were strongly linked to more loneliness and mental suffering. It is challenging to explain this result, but it may be related to the number of participants who responded to the survey or to the economic climate of the COVID-19 quarantine, which made people afraid for their jobs and their ability to support their families, particularly large families.

Different age groups' attitude results at the beginning of the pandemic were approximately similar (between 23.2% - and 30.3%), surprisingly after two years after the beginning of the pandemic, people aged between 31 and 45 had a higher protective attitude compared to those other groups (34.1%) which indicate that higher age groups show more compliance, these findings are consistent with those of Al-Hanawi et al., 2020 as well as the study done by Prabhu et al., 2022 showing that persons aged between 28 and 37 have a better attitude. There are several possible explanations for these results. Older people show more compliance because they are at higher risk of more complications.

According to various levels of education, those with college degrees had the most protective attitudes (74.9%) in

comparison to those with lower levels of education. These results are in line with those of the study conducted by Prabhu et al., 2022 which found that participants with master's degrees were more likely to have a protective attitude. The findings of Al-Hanawi et al., 2020 provide additional evidence in favour of the assumption that high compliance is related to a high level of education.

Another significant finding regarding overall attitude toward protective measures during COVID-19 according to differences in marital status was that married individuals had the best attitudes. Furthermore, two years after the pandemic started, married people still had the best attitude compared to other groups; this finding is well supported by Prabhu et al., 2022 and in contrast to the findings of Al-Hanawi et al., 2020 study, which found that married people displayed the lowest compliance. These conflicting results highlight the need for further research to understand the complex relationship between marital status and attitudes towards pandemic measures.

Overall attitude toward the COVID-19 protective measure among participants was at its highest early in the pandemic and declined after two years, and this decline could be attributed to various factors such as the availability of vaccines, increased understanding of the virus, and pandemic fatigue among the population, this changes in compliance to COVID-19 protective attitudes were also discussed in a study done by Petherick et al., 2021 changing government policies and guidelines regarding COVID-19 protective measures may also influence the declining attitude.

Several important limitations need to be addressed. Firstly, the number of participants according to their regions is not equally distributed, and that might be related to their decreased interest in participating in a survey. Further, widowed individuals' participation in our survey was low, and that can be attributed to the fact that many widows are mostly elderly and therefore might be illiterate.

CONCLUSION

Our findings indicate that after two years of the COVID-19 outbreak, the majority of the participants, particularly females, younger participants, and people living in households with more than seven members, were found to be mentally affected. It is important to note that these findings can be related to the ongoing COVID-19 pandemic. The pandemic has caused significant disruptions in daily life, including social isolation, economic challenges, and concerns about health and safety. These factors can contribute to increased levels of stress, anxiety, and depression among the population. The findings suggest that the most positive attitudes toward COVID-19 are displayed by married individuals, individuals with college degrees, and those who have more than seven households. Our research findings can be used to develop psychological interventions for the general population and vulnerable populations and execute public mental health initiatives alongside pandemic response efforts in the early phases of the pandemic.

AUTHOR CONTRIBUTION

NA, FA, RA, SA, and AA: Study design, data collection, writing–original draft preparation, writing–review, and editing.: Study design, data collection, statistical analysis, writing review, and editing. AA, AA, NH and MS contributed to the study design and data collection; AA, AA, and ZA: data review, data analysis, writing review, and editing. All authors read and approved the final version of this manuscript.

DECLARATIONS

Ethical Approval

The study was approved by Arabian Gulf University from the institutional review board with number E04-PI-4-22/Group4.

Participants Consent

Informed consent was obtained from all subjects involved in the study.

Source of Funding

This study has not received any external funding.

Conflict of Interest

All authors have declared that no financial support was received from any organization for the submitted work. All authors have declared that no other relationships or activities could appear to have influenced the submitted work.

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REFERENCES

Abolfotouh, M. A., Almutairi, A. F., Banimusta-fa, A., Hagras, S. A., & Al Jeraisy, M. (2021). Behavior responses and attitude of the public to COVID-19 pandemic during movement restrictions in Saudi Arabia. Internation-al Journal of General Medicine, 741–753.

Al-Hanawi, M. K., Angawi, K., Alshareef, N., Qattan, A. M. N., Helmy, H. Z., Abudawood, Y., Alqurashi, M., Kattan, W. M., Kadasah, N. A., & Chirwa, G. C. (2020). Knowledge, attitude and practice toward COVID-19 among the public in the Kingdom of Saudi Arabia: a cross-sectional study. Frontiers in Public Health, 8, 217.

Alkhamees, A. A., Alrashed, S. A., Alzunaydi, A. A., Almohimeed, A. S., & Aljohani, M. S. (2020). The psychological impact of COVID-19 pandemic on the general popula-tion of Saudi Arabia. Comprehensive Psychia-try, 102, 152192.

Al-Mutawa, N., & Al-Mutairi, N. (2021). Impact of COVID-19 pandemic and Lockdown measures on the mental health of the general population in the Gulf cooperation Council states: a cross-sectional study. Frontiers in Psychiatry, 12, 801002.

Alqahtani, A. S., Alrasheed, M. M., & Alqun-aibet, A. M. (2021). Public response, anxiety and behaviour during the first wave of COVID-19 pandemic in Saudi Arabia. Interna-tional Journal of Environmental Research and Public Health, 18(9), 4628.

Antúnez, Z., & Vinet, E. V. (2012). Escalas de depresión, ansiedad y estrés (DASS-21): Vali-dación de la versión abreviada en estudiantes universitarios chilenos. Terapia Psicológica, 30(3), 49–55.

Behisi, M. A., Altaweel, H. M., Gassas, R. F., Aldehaiman, M., & Alkhamees, A. A. (2021). COVID-19 pandemic and mental health status of Saudi citizens living abroad. International journal of environmental research and public health, 18(15), 7857.

Chan, E. Y. Y., Huang, Z., Lo, E. S. K., Hung, K. K. C., Wong, E. L. Y., & Wong, S. Y. S. (2020). Sociodemographic predictors of health risk perception, attitude and behavior practices associated with health-emergency disaster risk management for biological hazards: the case of COVID-19 pandemic in Hong Kong, SAR China. International Journal of Environmental Research and Public Health, 17(11), 3869.

Dong, X. C., Li, J. M., Bai, J. Y., Liu, Z. Q., Zhou, P. H., Gao, L., Li, X. Y., & Zhang, Y. (2020). Epidemiological characteristics of con-firmed COVID-19 cases in Tianjin. Zhonghua Liu Xing Bing Xue Za Zhi= Zhonghua Liuxingbingxue Zazhi, 41(5), 638–641.

Ettman, C. K., Abdalla, S. M., Cohen, G. H., Sampson, L., Vivier, P. M., & Galea, S. (2020). Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic. JAMA Network Open, 3(9), e2019686–e2019686.

Li, Q., Guan, X., Wu, P., Wang, X., Zhou, L., Tong, Y., Ren, R., Leung, K. S. M., Lau, E. H. Y., & Wong, J. Y. (2020). Early transmis-sion dynamics in Wuhan, China, of novel coronavirus–infected pneumonia. New Eng-land Journal of Medicine, 382(13), 1199–1207.

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behaviour Research and Therapy, 33(3), 335–343.

Lutfi, L., AlMansour, A., AlMarzouqi, A., Has-san, S. H., Salman, Z., Hamad, H., Farghaly, S., & AlAjmani, D. (2021). Knowledge, atti-tude, and practice toward COVID-19 among UAE residents: an online cross-sectional sur-vey. Dubai Medical Journal, 4(3), 182–189.

Martín, I. (2007). Estrés académico en estudiantes Universitarios, Apuntes Psicológicos, Volu-men 25, Sevilla. Recuperado El, 20.

Mautong, H., Gallardo-Rumbea, J. A., Alvarado-Villa, G. E., Fernández-Cadena, J. C., An-drade-Molina, D., Orellana-Román, C. E., & Cherrez-Ojeda, I. (2021). Assessment of de-pression, anxiety and stress levels in the Ec-uadorian general population during social iso-lation due to the COVID-19 outbreak: a cross-sectional study. BMC Psychiatry, 21(1), 1–15.

Mazza, C., Ricci, E., Biondi, S., Colasanti, M., Ferracuti, S., Napoli, C., & Roma, P. (2020). A nationwide survey of psychological distress among Italian people during the COVID-19 pandemic: immediate psychological responses and associated factors. International Journal of Environmental Research and Public Health, 17(9), 3165.

Petherick, A., Goldszmidt, R., Andrade, E. B., Furst, R., Hale, T., Pott, A., & Wood, A. (2021). A worldwide assessment of changes in adherence to COVID-19 protective behaviours and hypothesized pandemic fatigue. Nature Human Behaviour, 5(9), 1145–1160.

Prabhu, N., Alonazi, M. A., Algarni, H. A., Issrani, R., Alanazi, S. H., Alruwaili, M. K., Alanazi, G. R., Iqbal, A., & Khattak, O. (2022). Knowledge, Attitude and Practice towards the COVID-19 Pandemic: A Cross-Sectional Survey Study among the General Public in the Kingdom of Saudi Arabia. Vaccines, 10(11), 1945.

Shatla, M. M., Khafagy, A. A., Bulkhi, A. A., & Aljahdali, I. A. (2020). Public concerns and mental health changes related to the COVID-19 pandemic lockdown in Saudi Arabia. Clin Lab, 66(10), 10–7754.

SPA. (2020). Ministry of Health Announces First Case of New Coronavirus for Citizen Coming from Iran. https://www.spa.gov.sa/2041853

Tahoun, M. M., Ismail, H. M., Fiidow, O. A., Ashmawy, R., Hammouda, E. A., Elbarazi, I., & Ghazy, R. M. (2023). Quality of life among the Arab popula-tion two years after COVID-19 pandemic. BMC Public Health, 23(1), 1-13.

World Health Organization. (2020). Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)