



# Who were Psychologically more Vulnerable During COVID-19? Examining the Patterns of Psychological Feelings and Risk Behaviors in Abu Dhabi

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## Abstract

The present study aims to understand the impact of COVID-19 on mental health and physical health behaviors of people in Abu Dhabi. Abu Dhabi residents were approached to fill a survey about how COVID-19 had impacted their lives during May and June 2020, when they were experiencing social distancing and isolation measures for the first time. A total of 36,842 responded to the survey, representing a diverse range of demographical, ethnical, and professional backgrounds. Descriptive analysis and analysis of variance were used to capture the differences of ten categories of psychological feelings and risky health behaviors among different categories of respondents. The results indicated that females recorded significantly higher means for all ten mental and associated physical health variables, while those who are single and separated recorded the highest means for most negative psychological feelings and behaviors. Significant differences were also observed across age categories, except for fear. The illiterates and those with a below secondary school education recorded the highest mean values for those mental health variables. The same was true for the unemployed and homemakers. Emiratis and those living with elderly showed the most significant psychological concerns and challenges. The study provides some recommendations for policy-makers while elaborating on future research directions.

**Keywords:** COVID-19; Restrictions; Social distancing; Behavior; Abu Dhabi

## Introduction

During the COVID-19 pandemic, the Abu Dhabi residents have experienced unprecedented restrictions that touched many aspects of their lives. The UAE and Abu Dhabi governments introduced many strict pandemic prevention and control regulations and measures [1-3]. These COVID-19 prevention protocols and rules affected many aspects of people's everyday living, including social distancing, isolation, limits of family visits. In addition, certain conventional social behaviors such as shaking hands, embracing, and kissing were recommended to avoid [1,3].

As being similarly witnessed around the world, these measures presented Abu Dhabi residents with significant risks and constellations, which went over and above the health threat associated with COVID-19 to include mental or psychological health issues for them and their whole family [4]. Research elsewhere has identified various stressors faced by residents during COVID-19, including work and family well-being, unemployment and economic uncertainty, reduction in social support, reduction in access to community leisure facilities and sporting activities, homeschooling, and health crisis [5-11]. In general, most of these challenges are known for their negative impact on the well-being of residents outside the context of a pandemic and could lead to mental health problems, domestic violence, and family conflict [12-15].

As far as Abu Dhabi policymakers are concerned, given such unprecedented implications placed on lives during COVID-19, extensive exploratory work is necessary to examine the impact of COVID-19 prevention and control regulations and measures on the lives of residents and their family. Research effort like this present study allows for a better understanding of the various mental health challenges that Abu Dhabi residents have experienced during the COVID-19 pandemic and could better inform relevant policymaking in response to the current COVID pandemic. For Abu Dhabi specifically, it is essential to account for the significant efforts by various government authorities through understanding the psychological and mental challenges faced by different community categories.

## Literature Study

The COVID-19 pandemic literature, in general, has revealed various concerns and challenges affecting people at the community level such as imposed restrictions, not being to go out in public, disturbance of social life, less access to regular medical services, less get together with younger children [16-19]. Apart from some physical health issues such as weight losses, eating disorders, and sleeping disorders, the literature has recorded a wide range of psychological feelings and mental health risks reported by people during the pandemic [20-25]. These include untold fear and suffering, sadness, loneliness, stress, irritability, emotional exhaustion, and depression [16,17,19,26-28]. Risky behaviors such as excessive screen use are also widely reported [29].

Fear is one of the most common mental feelings reported during the COVID-19 pandemic. Women were generally more likely to report high levels of fear of COVID-19 [30]. As showed by Koçak, et al. cross-sectional study, women and 16-25 years old youths in Turkey had higher COVID-19 related fear, anxiety, depression, and stress [26]. Bisht, et al. however, found that in India fear of COVID-19 is independent of gender as well as age group [31]. Villalba, et al. also found no age differences in the fear of COVID-19 [32]. Mohammadpour, et al. reported that marital status correlated with the degree of fear of COVID-19 [33]. In Saudi Arabia, Al-Rahimi, et al. assessed the levels of fear and anxiety during the outbreak of COVID-19 and identified gender, lower education, age, and marital status as strong predictors of fear and anxiety [34]. These predictors are generally applicable across different countries [35].

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Because of the lockdowns, social isolation and the consequent feeling of loneliness has received much attention during the COVID-19 pandemic [36-39]. Victor, et al. stressed that social isolation is usually experienced as a feeling of anxiety and dissatisfaction associated with a “lack of connectedness or communality with others, and a deficit between the actual and desired quality and quantity of social engagement.” It is worth noticing that social isolation and loneliness are correlated and often used interchangeably [40]. Most studies acknowledge that social isolation and loneliness are essential and paramount due to the detrimental impact on mental and physical health [17,41]. Social isolation and loneliness increase the risk of anxiety, depression, and cognitive dysfunction [42]. Social isolation and loneliness have been treated as severe public health concerns especially among older people [43,44].

During the COVID-19 pandemic, the feelings of depression and sadness touched many individuals around the world [33,45,46]. In general, research suggests that gender, age, and socioeconomic status are all associated with how people are affected by catastrophic events and that women are less likely to have such symptoms than men, and the likelihood of symptoms decreases with age [47-50]. Having an older person at home during the pandemic has also received some attention, as significantly higher rates of depression and disturbed sleep among the caregivers were reported [51].

During the COVID-19 pandemic, stress is a critical challenge reported [52]. The research by Kharaba, et al. in the UAE revealed that the pandemic has significantly influenced daily psychological health such as stress symptoms [53]. Leila, et al. similarly investigated the impact of COVID-19 and societal lockdown measures on the mental health of adults in the UAE, where a large percentage of respondents reported increased stress and irritability. Females, younger participants, part-timers, and college graduates were more likely to have such a symptom. In Saudi Arabia, Tayyeb and Alsolami reported high levels of perceived stress during COVID-19. A study conducted in the province of Shaanxi in China showed that one of the most common psychological and behavioral disorders of children and teenagers between 3 and 18 was irritability [54]. Meanwhile, Karakose, et al. investigated the relationships between the COVID-19 phobias experienced by school administrators [55]. The results revealed that female school administrators experienced more significant levels of COVID-19 irritability than their male counterpart.

Fatigue and exhaustion have been shown to present themselves as a significant psychological symptom of COVID-19 [56-60]. For example, in a study in Turkey Morgul, et al. examined psychologically fatigue and exhaustion during the COVID-19 pandemic and significant differences between people of different age, gender, educational level, occupational status, place of residence, and the number of family members were found [61]. A related symptom is sleep disorder during the COVID-19 pandemic. In a survey that involved respondents from 39 countries, the prevalence of sleep problems was 18% among the general population [62]. Again, sleeping disturbances have been demonstrated to be associated with the type of categories of the population [63-67].

Another focus of researchers is the response of people to stress during pandemics by increasing food intake, especially of palatable, energy-dense foods [68-70]. This observation is more common among women [71,72]. Some warn that this might contribute to more obesity and related diseases [73]. This has been observed during the COVID-19 pandemic, as research findings suggest stress may lead to overeating, especially the intake of high-sugar foods and high-fat foods [74,75].

The results of the Canadian Perspective Survey indicated a

significant impact of COVID-19 on screen time and mental health, as more than 60% of respondents reported increasing TV time and Internet usage [29]. Similarly, Helander, et al. reported that the COVID-19 pandemic had increased people’s screen time due to various reasons, including increased time spent on virtual education, working from home, online shopping, and electronic communication with friends and family [76]. In addition, many researchers elaborated that during the COVID-19 pandemic, the strict lock-down and quarantine that were widely imposed resulted in excessive screen and Internet use [77-79]. Most studies found that younger participants reported greater use of media screens [77]. Given the importance of social media during isolation, some analysts attempted to recommend increasing the use of such sources to tackle the feelings of social isolation and anxiety [80-82].

In summary, the table categorizes relevant research findings in the literature, centering around various reported psychological feelings and mental health issues during the COVID-19 pandemic (Table 1). It is worth noticing that while many studies explore the differences of psychological feelings between people of different age, gender, marital status, and education level, the potential differences of psychological feelings and risky health behaviors between people of different employment status and different sectors are rarely examined.

Psychological Feelings	Sources and references
Fear	Ahorsu et al., 2020; Alsharawy et al., 2021; Al-Rahimi et al., 2021; Ali et al., 2021; Haddad et al., 2020; Niño et al., 2021; United Nations, 2020; Villalba et al., 2020
Loneliness and isolation	Gerst-Emerson and Jayawardhana, 2015; Heidinger and Richter, 2020; Holt-Lunstad et al., 2010; Käll et al., 2020; Müller et al., 2021; Pierce et al., 2020; Lee et al., 2021; Vitagliano et al., 2021
Depressive symptoms and sadness	Holt-Lunstad et al., 2010; Mohammadpour et al., 2021; Koçak et al., 2021; Santini et al., 2020; Vitagliano et al., 2021
Stress and irritability	Haddad et al., 2020; Karakose et al., 2021; Klaiber et al., 2020; Kharaba et al., 2021; Leila et al., 2021; Patel, 2021; Pizarro-Ruiz and Ordóñez-Cambor, 2021; Salari et al., 2020; Taylor et al., 2020; Tayyib & Alsolami, 2020; van Tilburg et al., 2020; Waite & Creswell, 2020; Westrupp et al., 2015
Fatigue and exhaustion	Huang et al., 2020; Jeste et al., 2020; Morgul et al., 2021; Nicola et al., 2020; Sohrabi et al., 2020; Tian et al., 2020; Wang, Pan, et al., 2020
Sleeping disorder	Alimoradi et al., 2021; Kaditis et al., 2021; Lin et al., 2021; Pires et al., 2021; Qiu et al., 2020; Rodríguez-Rey et al., 2020; Wang, Song, et al., 2020; Xiong et al., 2020
Overeating	Altena et al., 2020; Epel et al., 2004; Dubé et al., 2005; Gibson, 2012; Haddad et al., 2020; Oliver and Wardle, 1999; Sadler et al., 2021; Touyz et al., 2020; Vitagliano et al., 2021
Excessive screen use	Alheneidi et al., 2021; Colley et al., 2020; Girdhar et al., 2020; King et al., 2020; Mucci et al., 2020; Sun et al., 2020

**Table 1:** Common psychological feelings reported during pandemics.

## Materials and Methods

This project was part of a large survey examining the impact of the COVID-19 pandemic on Abu Dhabi residents and families. The design of the COVID-19 survey was based on an extensive review of relevant literature. Extensive international research was examined to identify the variant psychological and mental issues and challenges during the COVID-19 pandemic and previous pandemics. Therefore, this research used outputs from a rich body of international research to design a survey instrument for Abu Dhabi and to analyze differences between various community categories.

Approved by the Department of Community Development and conducted jointly with Statistics Center Abu Dhabi, the present study

focused on the data specifically related to ten psychological health questions obtained from July to September, 2020, which was the second wave of data (the first wave covered early pandemic periods in late 2019 and early 2020). This was the period of time when most people were trying extensively to navigate social restrictions, isolation policies, and lockdown measures during the pandemic.

The survey questions asked respondents to rate their feelings-fear, loneliness, sadness, stress, irritability, emotional exhaustion, depressive symptoms, sleeping disorder, overeating, and excessive screen use—on a 5 point scale from “not at all” to “a great extent”. Examining the differences of these feelings across various demographics including gender, marital status, age, education, nationality, place of work, and having older people living at home is the objective of this present research.

A descriptive analysis framework was adopted to understand the experiences of respondents living in Abu Dhabi regarding their psychological feelings during the COVID-19 pandemic. In addition to the descriptive approach, SPSS-2020 (IBM Corp., 2020) was used to perform Analysis of Variance (ANOVA) to explore differences between different sample categories [82]. For each of the categories, the ANOVA F-values and their significance were recorded.

## Results

Respondents were targeted mainly using online social media systems. A total of 36,842 residents participated in the survey. Table provides a general view of respondents in the survey (Table 2). More than 59.4% fall into the age category of 31 to 40 years old. About 46.1% are female and 53.9% are females. The majority (83.4%) are married. Emiratis comprise of 43.3% of the sample while the majority are non-Emiratis (56.7%). Concerning educational attainment, 45% hold a bachelor’s degree, 21% have a post-graduate degree, 9.8% have a college diploma, 15% have a secondary school diploma, and 3.5% have below secondary school education.

Gender	Percentage
Male	46.10%
Female	53.90%
<b>Marital status</b>	
Married	83.40%
Single	7.70%
Divorced	2.50%
Separated	0.80%
Widowed	0.80%
<b>Education level</b>	
Illiterate	0.30%
Below secondary school	3.20%
Secondary school	15%
Post high school training certificate	5.70%
College diploma	9.80%
Bachelor’s degree	45%
Master’s degree	18.30%
Doctorate degree	2.70%
<b>Age</b>	
15-20	2.00%
21-25	3.60%
26-30	9.90%
31-35	34.10%
36-40	25.30%
41-45	19%
46-50	11.90%
51-55	6.10%
56-60	2.50%

61+	1.20%
<b>Nationality</b>	
Emirati	43.30%
Non-Emirati	56.70%

**Table 2:** Respondent profile.

Table provides the overall means and standard deviations for each of the psychological feelings and risky physical behaviors (Table 3). Overall, the most profound concerns are excessive screen use (3.684), stress (3.050), and fear (2.866). According to the values of the standard deviations, the highest variabilities are observed concerning sleeping disorder (1.442), overeating (1.388), and fatigue and exhaustion (1.363). A significant F-value for all the psychological and behavioral variables is noted. The highest differences (F-values) are recorded for emotional exhaustion, irritability, stress, and sadness. The least significant differences are attributed to excessive screen use, fear, sleeping disorder, and loneliness. Females record higher means for all ten variables.

Across respondents of different marital status, significant ANOVA is noted for a total of eight variables, except for fear and irritability (Table 4). The highest F-values for the significant variables are recorded for sleeping disorder (highest mean for separated) and excessive screen use (highest mean for single). The least significant differences are attributed to stress (highest mean for separated), overeating (highest mean for widower), and sadness (highest mean for separated). The married group record the lowest means for all eight variables with significant differences.

Table provides the ANOVA results by age group (Table 5). Significant ANOVA is recorded for all ten variables. The highest F-values for the significant variables are associated with overeating, irritability, and depressive symptoms. The least significant differences are attributed to fear and loneliness. Overall, the younger age groups (15-20, 21-25, 26-30) tend to record higher means for most of the variables.

Focusing on differences by education level, we note significant ANOVA for all ten variables (Table 6). The highest F-values for the significant variables are recorded for overeating, depressive symptoms, and sleeping disorders. The least significant differences are attributed to excessive screen use, emotional exhaustion, and stress. In general, the highest means are observed with people of low educational background (the illiterates and those below high school), except for the variable of excessive screen use where the bachelor’s degree holder group and the high school group record higher means.

Examining the differences by employment status and place of work, the differences of all psychological feelings are again significant (Table 7). The highest significances are observed on irritability, emotional exhaustion, and depressive symptoms. The unemployed and homemakers record the highest means for seven variables. School students and university students record the highest means for sleeping disorder and excessive screen use. Between public sector and private sector employees, people working in the private sector report higher means for emotional exhaustion, depressive symptoms, stress, irritability, sadness, loneliness, and sleeping disorders, while public sector employees have a higher mean for fear, overeating, and excessive screen use.

Focusing on the nationality of respondents, we note significant ANOVA for eight variables (Table 8). The highest F-values were recorded for fear, overeating, stress, and excessive screen use. The least significant differences were attributed to emotional exhaustion, sadness, and depressive symptoms. Emiratis record higher means for six variables.

Variables	Overall means	Standard deviations	Male	Female	F	Sig.
Fear	2.866	1.183	2.725	2.991	243.914	0.0001
Loneliness and isolation	2.711	1.353	2.544	2.858	256.33	0.0001
Sadness	2.729	1.276	2.519	2.916	465.993	0.0001
Stress	3.05	1.284	2.831	3.245	501.543	0.0001
Irritability	2.782	1.333	2.535	3	593.59	0.0001
Fatigue and exhaustion	2.8	1.363	2.537	3.033	645.881	0.0001
Depressive symptoms	2.381	1.358	2.193	2.546	323.216	0.0001
Sleeping disorder	2.623	1.442	2.449	2.776	245.753	0.0001
Overeating	2.564	1.388	2.356	2.749	384.5	0.0001
Excessive screen use	3.684	1.342	3.542	3.808	185.858	0.0001

Table 3: Psychological feelings: Means and ANOVA by Gender.

Variables	Married	Single	Divorced	Separated	Widower	F	Sig.
Fear	2.861	2.871	2.886	3.063	3.007	1.716	0.143
Loneliness	2.68	2.846	2.818	3.045	3.015	12.765	0.001
Sadness	2.712	2.803	2.776	3.045	2.85	5.459	0.001
Stress	3.035	3.12	3.069	3.31	3.304	5.207	0.001
Irritability	2.781	2.79	2.724	2.877	2.9	0.826	0.508
Emotional exhaustion	2.77	2.962	2.843	3.237	2.9	14.24	0.001
Depressive symptoms	2.349	2.536	2.48	2.582	2.589	12.001	0.001
Sleeping disorder	2.568	2.92	2.795	2.936	2.75	34.161	0.001
Overeating	2.543	2.679	2.624	2.567	2.693	5.373	0.001
Excessive screen use	3.647	3.927	3.729	3.671	3.688	21.636	0.001

Table 4: Psychological feelings: Means and ANOVA by marital status.

Variables	15-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61+	F	Sig.
Fear	2.769	2.996	2.991	2.963	2.937	2.81	2.705	2.661	2.706	2.682	19.272	0.0001
Loneliness	2.926	2.906	2.912	2.848	2.736	2.594	2.501	2.537	2.595	2.642	23.011	0.0001
Sadness	2.847	2.923	2.939	2.855	2.776	2.653	2.529	2.499	2.434	2.529	27.384	0.0001
Stress	3.185	3.193	3.264	3.198	3.12	2.979	2.823	2.8	2.66	2.645	35.438	0.0001
Irritability	2.893	2.941	3.037	2.971	2.883	2.7	2.491	2.416	2.262	2.343	55.051	0.0001
Emotional exhaustion	3.027	3.003	3.053	2.975	2.871	2.714	2.53	2.48	2.352	2.405	44.714	0.0001
Depressive symptoms	2.717	2.654	2.634	2.587	2.456	2.244	2.088	2.074	1.923	1.957	55.116	0.0001
Sleeping disorder	3.176	2.952	2.913	2.773	2.685	2.509	2.363	2.268	2.159	2.189	50.638	0.0001
Overeating	2.989	2.861	2.817	2.793	2.624	2.43	2.306	2.183	2.116	1.967	59.258	0.0001
Excessive screen use	4.091	3.938	3.927	3.82	3.73	3.591	3.516	3.307	3.32	3.224	41.146	0.0001

Table 5: Psychological feelings: Means and ANOVA by age category.

Variables	Illiterate	Below high school	High school	Post high school	Diploma	BS	MS	PhD	F	Sig.
Fear	3.5	2.985	2.984	2.868	2.945	2.885	2.722	2.61	18.613	0.0001
Loneliness	3.263	2.847	2.859	2.72	2.772	2.742	2.507	2.575	19.638	0.0001
Sadness	3.421	2.829	2.881	2.785	2.748	2.762	2.539	2.54	21.196	0.0001
Stress	3.6	3.065	3.095	3.063	3.075	3.091	2.936	2.857	8.411	0.0001
Irritability	3.6	2.78	2.916	2.79	2.778	2.824	2.618	2.572	16.138	0.0001
Emotional exhaustion	3.15	2.719	2.866	2.825	2.818	2.846	2.659	2.692	8.962	0.0001
Depressive symptoms	3.316	2.499	2.53	2.436	2.377	2.431	2.16	2.166	24.347	0.0001
Sleeping disorder	3.2	2.771	2.807	2.748	2.66	2.649	2.389	2.45	24.195	0.0001
Overeating	3.15	2.568	2.723	2.618	2.605	2.62	2.341	2.204	27.115	0.0001
Excessive screen use	3.6	3.502	3.764	3.646	3.618	3.72	3.625	3.58	5.653	0.0001

Table 6: Psychological feelings: Means and ANOVA by education level.



Variables	Public	Private	Employer	Un-employed	Home-maker	School student	Retired	University student	F	Sig.
Fear	2.848	2.785	2.84	2.968	3.043	2.721	2.789	2.875	13.341	0.0001
Loneliness	2.611	2.64	2.759	2.924	2.988	2.797	2.613	2.868	27.572	0.0001
Sadness	2.64	2.679	2.718	2.919	2.974	2.801	2.556	2.952	25.768	0.0001
Stress	2.92	3.077	3.12	3.277	3.28	3.069	2.762	3.181	30.588	0.0001
Irritability	2.648	2.749	2.835	2.992	3.137	2.793	2.549	2.923	43.978	0.0001
Emotional exhaustion	2.671	2.787	2.824	2.986	3.096	2.966	2.526	2.963	33.109	0.0001
Depressive symptoms	2.26	2.34	2.429	2.684	2.633	2.662	2.217	2.594	31.384	0.0001
Sleeping disorder	2.527	2.582	2.654	2.973	2.765	3.097	2.375	3.018	25.113	0.0001
Overeating	2.508	2.5	2.505	2.591	2.786	2.669	2.373	2.987	20.934	0.0001
Excessive screen use	3.67	3.663	3.578	3.759	3.733	4.16	3.339	4.013	12.418	0.0001
2.723	2.723	2.723	2.723	2.723	2.723	2.723	2.723	2.723	2.723	2.723

Table 7: Psychological feelings: Means and ANOVA by employment and place of work.

Variables	Emirati	Non-Emirati	F	Sig.
Fear	2.966	2.791	102.59	0
Loneliness	2.717	2.706	0.288	0.592
Sadness	2.759	2.706	8.002	0.005
Stress	2.999	3.089	22.66	0
Irritability	2.78	2.783	0.018	0.892
Emotional exhaustion	2.772	2.822	6.178	0.013
Depressive symptoms	2.414	2.354	8.984	0.003
Sleeping disorder	2.676	2.582	19.743	0
Overeating	2.638	2.508	40.691	0
Excessive screen use	3.736	3.645	21.238	0
2.723	2.723	2.723	2.723	2.723

Table 8: Psychological feelings: Means and ANOVA by nationality.

The final ANOVA looks at differences between two groups categorized by whether respondent lives with an elderly or not. Table shows significant ANOVA for five variables-fear, depressive symptoms, sleeping disorder, overeating, and excessive screen use (Table 9).

No significance is seen for loneliness, sadness, stress, irritability, and emotional exhaustion. The highest F-values were recorded for overeating, sleeping disorder, and fear. Those with an elderly at home record higher means on all significant variables.

Variables	Yes	No	F	Sig.
Fear	2.935	2.844	20.476	0
Loneliness	2.679	2.721	3.207	0.073
Sadness	2.761	2.719	3.619	0.057
Stress	3.033	3.056	1.063	0.303
Irritability	2.792	2.778	0.387	0.534
Emotional exhaustion	2.817	2.795	0.869	0.351
Depressive symptoms	2.44	2.361	11.866	0.001
Sleeping disorder	2.717	2.593	25.97	0
Overeating	2.66	2.533	29.108	0
Excessive screen use	3.741	3.665	11.2	0.001
2.723	2.723	2.723	2.723	2.723

Table 9: Psychological feelings: Means and ANOVA by elderly at home or not.

## Discussion

During the COVID-19 pandemic, many restrictions and curfews imposed by government have overwhelmingly disrupted and affected the ordinary daily lives of individuals. In this research, we analyzed the impact of COVID-19 on the psychological status, mental health, and associated risky health behaviors witnessed among the residents of Abu Dhabi. This is one of the first attempts in Abu Dhabi to assess COVID-19's impact on the mental and psychological health of the public. Assessing the public's mental and physical challenges during a pandemic is of immense importance for policymakers to intervene and tackle adverse outcomes in a timely fashion [16,83-85].

Overall, the most significant psychological and behavioral challenges in Abu Dhabi are associated with excessive screen use, stress, and fear. As far as excessive screen use is concerned, studies in other countries also identified it as one primary outcome in the COVID-19 era [29,76]. In Abu Dhabi and elsewhere in the world, many factors and reasons during the COVID-19 lockdown and quarantine period, more specifically working from home, virtual education, online shopping, and electronic communication with friends and family contributed to that [77-79]. In addition, some creative ways of supporting the general population during the pandemic including new online applications and platforms also contributed to excessive screen use [16,83]. Overall, the psychological symptom of stress and fear is consistent with research findings reported in many other international replications [31,32,54].

Other prevalent mental health concerns in Abu Dhabi include feelings of fatigue and exhaustion, sadness, and loneliness. The symptom of fatigue and exhaustion may be attributed to the emergence of related symptoms such as sadness and loneliness [36-39,44]. The results from Huang, et al., Nicola, et al. and Sohrabi, et al. also reported higher feelings of fatigue and exhaustion shown by females [48,57,58].

Gender differences were evident for all the psychological feelings and physical health variables examined by this research. Compared to males, females in Abu Dhabi reported a higher level of mental issues and concerns. These results are in line with most of the extant international research, including the ones conducted in the UAE [26,53].

The current study highlights that the younger population reported significantly higher levels of negative psychological feelings and risky physical health behaviors. Consistent with other research, excessive screen use is most common among school children and younger youth [77]. Such results give significant importance to the use of social media during isolation [80,81]. Younger cohorts in Abu Dhabi also showed much higher level of feelings stressful, same as reported by other studies [53,54]. It is also important to note that the Abu Dhabi results showed that younger respondents (15-30 years) reported the highest level of feeling lonely, which is contrary to some studies that identified older people as having more serious concerns over loneliness [37,44].

Some vulnerable or disadvantaged groups were hit hardest by mental challenges during the pandemic. In general, the divorced, the separated, and single people showed much more severe psychological health symptoms. These groups of people did not have the companion of partners and family, and thus were more vulnerable when experiencing a pandemic and its associated implications. These results are consistent with those reported by others tackling the issue of loneliness and isolation during the COVID-19 pandemic [33,34,53,79]. Other vulnerable groups when facing the COVID-19 pandemic are those of lower levels of education, who reported a higher level of psychological health issues and feelings, especially stress, loneliness, sadness, and irritability. This result is largely consistent with that of Al-Rahimi, et

al., Karakose, et al., and Kharaba, et al. [34,53,55]. This suggests that education, knowledge and cognitive capacity seem to be able to build a buffer for protection against adverse mental challenges. This Abu Dhabi study also supports the findings of Lee, et al., Pierce, et al., and Tymoszuk, et al. that the unemployed and homemakers are likely to experience higher level of fear, loneliness, sadness, and stress [36,38,39].

Screen use was higher for Emiratis and for those who lived with older people. However, for both categories the availability of more spare time might be the reason for engaging in longer online activities and practices. Our results underscore the challenges for those families that have older adults during COVID-19. Members of those families might experience overwhelming duties and burdens that result in some adverse psychological reactions and feelings [86-88]. It should be emphasized that family caregivers or members taking care of older people should receive sufficient professional guidance and support during pandemics such as COVID-19.

One of the strengths of the current study is the relatively large sample size and the cross-sectional design, which allows the generalization of the observations and conclusions for all Abu Dhabi residents and households. In addition, the survey data collection took place during the peak of the COVID-19 pandemic, when all residents in Abu Dhabi felt lockdowns. Thus, the results of the current study are an immediate reflection of real experiences, based on which conclusions are drawn. Furthermore, the study examined a wide range of mental, physical and behavioral issues, while most other studies considered only a few psychological symptoms or feelings. A limitation of the study, however, is that respondents might have interpreted the meanings of some of the ten psychological feeling variables differently from each other.

## Conclusion

The Abu Dhabi COVID-19 survey results provide important insights into the different level of mental and physical challenges that various Abu Dhabi residents and community groups experienced during the COVID-19 pandemic lockdown. The results show that females recorded significantly higher means for all psychological feelings. Those who are single and separated recorded the highest means for most feelings. Significant differences in mental health and feelings were observed for all age categories (except fear). The illiterates and those holding degrees below secondary schools recorded the highest mean values for most mental health variables. The same is true for the unemployed, homemakers, Emiratis, and those living with elderly.

These findings can inform public health and social policymakers to focus awareness, intervention and community engagement programs on the most vulnerable community groups during emerging pandemics. The results of this study call for responsible social sector authorities and service providers to implement appropriate interventions to assist those vulnerable groups in Abu Dhabi's population who show more severe psychological symptoms. The lack of connectedness with others due to social isolation during the pandemic was much severe for the separated, divorced, unemployed, and illiterates, who usually experienced higher levels of feeling of anxiety, stress, and fear. The deficit in social connection has to be addressed through more active social engagement or consultation and services.

Future research should examine the nature of psychological feelings and risky health behaviors throughout the pandemic and post-pandemic periods from a longitudinal perspective. It is advised to carry longitudinal studies using a larger sample base to validate the results of this present study. Such an attempt could provide a more solid

and thorough understanding of the mental health issues. It should be stressed that many psychological feelings or mental health variables are significantly correlated with each other. Better psychological scales should be developed, which could better aid in analysis and policy-making. It is also recommended that qualitative interviews be conducted with the different segments of the community with a view to validating the findings of this research and exploring factors and contexts that this survey research failed to capture.

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## Conflict of Interest

The authors have no conflict of interest to declare.

## Ethical Approval

Ethical consent regarding the protocol of the study was granted by the Department of Community Development (DCD) and the Statistic Center Abu Dhabi (SCAD).

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