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The psychological burden of the COVID-19 pandemic and associated lockdown measures: Experience from 4000 participants

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1. Introduction

The novel severe acute respiratory syndrome coronavirus 2 (COVID-19) emerged in December 2019, when cases of pneumonia of unknown cause were identified in people that visited a wholesale seafood market in Wuhan, China (Zhu et al., 2020). The COVID-19 virus is primarily transmitted through droplets, affecting those within close proximity of a host. The most common symptoms of COVID-19 are fever and cough (Guan et al., 2020). Since its outbreak in December of 2019, COVID-19 has affected several countries worldwide and has been declared a pandemic in early March 2020 by the World Health Organization (WHO) (World Health organization 2020). Countries all over the world implemented social distancing rules and lockdown measures, in an attempt to limit the spread of the virus. The pandemic has caused...
noticeable psychological distress and public panic, this is partly due to the false information being spread online (Bao et al., 2020) or the fear of contracting the virus. (Brooks et al., 2020)

In February 24 2020 the first few cases of COVID-19 were identified in Kuwait, all of which arrived from the Iranian city of Mashhad. The government of Kuwait rushed to set up field hospitals and quarantine facilities in locations such as schools, fairgrounds and gymnasia in anticipation of an increase in the number of cases. Over the following month the number of positive cases increased and on March 23, Kuwait announced its first partial lockdown measures. Malls, restaurants, gyms, schools and universities were all to remain fully closed, resulting in many losing their jobs. Volunteers joined the front line forces working in supermarkets to ensure food and supplies remained in abundance and to provide a delivery service to households. Unfortunately even with the partial lockdown in place cases were on the rise, the Kuwait council of ministers decided to implement a total lockdown on all activities from May 8 2020 to May 30 2020 (Al Arabiya Network 2020). No persons were allowed outside of their homes. As of June 14 2020, in Kuwait there has been a total of 36,958 cases of COVID-19, while Worldwide there has been 7,690,708 cases and 427,630 confirmed deaths (World Health Organization 2020).

1.1. Aim

To assess the psychological burden of the COVID-19 pandemic and associated lockdown measures on the public in Kuwait, and to explore the potential influencing risk factors.

2. Methods

2.1. Study design and participants

We conducted an online questionnaire-based cross-sectional study between 25th May 2020 to 30th May 2020. This corresponds to the final week of the complete lockdown measures implemented by the government of Kuwait. A web-based survey was sent through various social media platforms, along with the reason behind the questionnaire and a disclosure that the questionnaire is anonymous and confidential. A consent was provided to all participants prior to proceeding to the questionnaire. All of the responders were over the age of 18 and incomplete questionnaires were omitted from analysis. The questionnaire included 36 questions involving demographics, lifestyle during the pandemic, depression and anxiety assessments.

Age, gender, marital status (single, married/in a relationship, divorce/separated, widowed), smoking history, height and weight (in which we calculated the BMI and classified patients into underweight, normal, overweight or obese based on the WHO classification), education obtained (high school, university bachelor’s/diploma, postgraduate degree; which included master’s degree, PhD or MD), medical history of chronic diseases and past psychiatric history.

We also collected information regarding daily life during the pandemic. Those questions included, current work status (working/studying from home, work suspended, attending work as usual, retired prior to lockdown or unemployed prior to lockdown), exercise frequency per week (0, 1-2, 3-4, 5-6, daily), volunteering in community service (yes, or no), work in the health care sector (yes or no); healthcare sector includes staff who are directly involved in daily patient care on the wards (doctors, nurses, physiotherapists, dieticians).

Perceived risk of acquiring the virus at work (no, yes working with positive cases, yes working with suspected cases). This includes individuals who are at risk of acquiring the virus at work but who are not working in the healthcare sector e.g janitors at hospitals and quarantine sites, catering services, receptionists at hospitals, security staff. If they were positive for COVID-19 (no, yes mild symptoms, yes severe symptoms), if any of their close friends or family members positive for COVID-19, if they were quarantined (either suspected or positive), daily social media use during the outbreak compared with before the outbreak (less than before, similar to before, more than before). The daily duration spent following COVID19-related news (less than 30 minutes, 30minutes to 1 hour, 1-2 hours, 2-4 hours and more than 4 hours). Responders were also asked to rate the government protocols on a scale of 1-10 (0-1, 2-3, 4-5, 6-7, 8-9, 10).

2.2. Assessment of anxiety/depression

Symptoms of depression were assessed using the 9-item Patient Health Questionnaire (PHQ-9) score and symptoms of anxiety were assessed using the Generalized Anxiety Disorder scale-7 (GAD7) score. The PHQ-9 is a self-report questionnaire that is commonly used as a screening tool for depression (Kroenke et al., 2001). It is composed of 9 questions assessing the frequency of depressive symptoms on a 4-point Likert-scale ranging from 0 (never) to 3 (nearly every day). The total score was calculated for each patient and was interpreted as follows: minimal (1-4), mild (5-9), moderate (10-14), moderately severe (15-21), severe (20-27). A standard cutoff of score of 10 was used, indicating a diagnosis of depression (Levis and Benedetti, 2019, Moriarty et al., 2015).

The GAD-7 was initially developed as a screening tool for generalized anxiety disorder (GAD) (Spitzer et al., 2006), but proved to have good sensitivity and specificity as a screening tool for panic disorder, social anxiety disorder, and post-traumatic stress disorder (Kroenke et al., 2007). Seven items are used to assess the frequency of anxiety symptoms over a period of two weeks on a 4-point liker-scale ranging from 0 (never) to 3 (nearly every day). The total score of GAD-7 ranges from 0 to 21, with increasing scores indicating more severe functional impairments as a result of anxiety. The total score was calculated for each patient and was interpreted as follows: normal (0-4), mild (5-9), moderate (10-14), and severe (15-21). A cut-off score of 8 was used, indicating a diagnosis of anxiety. (Kroenke et al., 2007)

2.3. Statistical analysis

Statistical analysis was performed on 4132 observations and 22 variables, with the aim to find out whether there is any relationship between anxiety, depression and the analyzed variables. The target sample size was determined using the formula $n = \frac{z_{\alpha}^2 \times (1 - \pi)}{e^2}$, where $z_{\alpha} = 1.96$ for a confidence level of 95% ($\alpha = 0.05$). The estimated margin of error ($e$) in the survey was ± 1.4%, for the proportion ($p$) of depression and anxiety was 0.3. For ordinal and nominal variables, we used the Chi-squared test of independence to determine whether there is a significant association between two variables. The null hypothesis states that the two tested variables are independent, i.e., there is no association in the underlying bivariate population. It is rejected, if the probability associated with the test statistic (p-value), that is of observing a sample statistic as extreme as the test statistic, is less than the significance level ($\alpha = 0.05$). In case we reject the null hypothesis, we can conclude that there is a relationship between the two variables. Then we calculated the standardized residuals (SR) to show the dependence for the significant results ($\alpha = 0.05$) from the $\chi^2$ test. Positive values of SR are interpreted as having greater observed frequency than would be found under independence assumption, and negative values indicate that they occur less often than under independence. The SR > $|2|$ are considered significant at alpha = 0.05, and SR > $|4|$ at $\alpha = 0.0001$. With SR < $|2|$ we are unable to say whether they are significant.

For continuous variables, we compared the means in the two groups (anxiety vs. no anxiety, depression vs. no depression) in relation to anxiety and to depression, by calculating the W statistics derived from the two-tailed Mann-Whitney-Wilcoxon tests, at $\alpha = 0.05$. The significant results are listed in Table 3. We calculated the point-biserial correlation coefficient $r_{pb}$ to measure the strength of association.
Table 1
Demographics of responders (N = 4132).

| Variable | n (%) |
|----------|-------|
| Total    | 4132 (100.0) |
| Gender   |       |
| Male     | 1268 (30.7) |
| Female   | 2864 (69.3) |
| Marital status |       |
| Single   | 1339 (32.4) |
| Married  | 2453 (59.4) |
| Widowed  | 105 (2.5)   |
| Separated/Divorced | 235 (5.7) |
| Smoker   |       |
| No       | 3366 (81.5) |
| Yes      | 766 (18.5)  |
| Job status during lockdown |       |
| Attending work as usual | 530 (12.8) |
| Stopped working/studying | 1620 (39.2) |
| Retired prior to lockdown | 856 (20.7) |
| Unemployed prior to lockdown | 310 (7.5) |
| Volunteering in community service |       |
| No       | 3790 (91.7) |
| Yes      | 342 (8.3)   |
| Exercising |       |
| No       | 1608 (38.9) |
| Yes, 1-2 times per week | 1043 (25.2) |
| Yes, 3-4 times per week | 649 (15.7) |
| Yes, 5-6 times per week | 400 (9.7) |
| Yes, every day of the week | 432 (10.5) |
| Working in the health sector |       |
| No       | 3850 (93.2) |
| Yes      | 282 (6.8)   |
| Risk of acquiring the virus at work |       |
| No       | 3316 (80.3) |
| Yes, dealing with positive cases | 107 (2.6) |
| Yes, dealing with suspected cases | 709 (17.2) |
| Psychiatric history |       |
| No       | 3803 (92.0) |
| Yes      | 329 (8.0)   |
| Medical history of chronic disease |       |
| No       | 2808 (68.0) |
| Yes      | 1324 (32.0) |
| Where you diagnosed with COVID-19 |       |
| No       | 4110 (99.5) |
| Yes      | 22 (0.5)    |
| COVID-19 diagnosis in friends/family |       |
| No       | 2819 (68.2) |
| Yes      | 1313 (31.8) |
| Were you quarantined |       |
| No       | 3431 (83.0) |
| Yes, Home | 617 (14.9) |
| Yes, institutional | 84 (2.0) |
| Depression |       |
| No       | 2887 (69.9) |
| Yes      | 1245 (30.1) |
| Anxiety  |       |
| No       | 3046 (73.7) |
| Yes      | 1086 (26.3) |
| BMI      |       |
| Overweight | 1469 (35.6) |
| Normal   | 1294 (31.3) |
| Obese    | 1291 (31.2) |
| Underweight | 61 (1.5) |
| Other (not disclosed) | 17 (0.4) |
| Age (years) |       |
| < 20    | 276 (6.7) |
| 21-30   | 985 (23.8) |
| 31-40   | 874 (21.2) |
| 41-50   | 756 (18.3) |
| 51-60   | 839 (20.3) |
| 61-70   | 363 (8.8)  |
| > 71    | 39 (0.9)   |
| Education Obtained |       |
| High School | 592 (14.3) |
| University Bachelor/Diploma | 2958 (71.6) |
| Post-graduate degree | 582 (14.1) |

Table 1 (continued)

| Variable | n (%) |
|----------|-------|
| Rating of government protocols |       |
| 0-1      | 172 (4.2) |
| 2-3      | 228 (5.5) |
| 4-5      | 716 (17.3) |
| 6-7      | 1356 (32.8) |
| 8-9      | 1110 (26.9) |
| 10       | 550 (13.3) |
| Time spent on social media per day during lockdown |       |
| Less than before | 514 (12.4) |
| Same as before | 1169 (28.3) |
| More than before | 2449 (59.3) |
| Time spent following COVID19-related news per day |       |
| Less than half an hour | 909 (22.0) |
| 30 mins to 1 hour | 641 (15.5) |
| 1-2 hours | 700 (16.9) |
| More than 4 hours | 320 (7.7) |
| Average height (cm) | 164.6 (117-198) |
| Average weight (kg) | 76.2 (63-191) |
| Average BMI | 28.0 (13.8-71) |

X Postgraduate degree; Master’s degree, PhD, MD.

A Community service volunteering; includes individuals who volunteered in supermarkets.

B Exercise; walking, cardio, weights.

C Health care sector; individuals directly involved in patient care on the wards. Doctors, nurses, dieticians, physiotherapists.

between a continuous and a binary variable (anxiety and depression). The coefficient ranges from -1 (negative association) to +1 (positive association), and zero indicates no association.

Furthermore, we performed a univariate logistic regression analysis, where we calculated the odds ratios (OR) to find out whether the factor under examination has an impact on depression, and on anxiety, respectively. A low odds ratio (OR < 1) indicates that the potential risk factor is associated with a decrease of odds related to depression, and anxiety. A high odds ratio (OR > 1) indicates an increase of odds related to anxiety and depression. The odds ratio of 1 indicates no change of odds related to anxiety and depression. The statistically significant variables were considered for the multivariable logistic regression analysis, what we performed to determine potential risk factors for depression and anxiety. We adjusted for confounders and calculated the odds ratios, the 95% confidence intervals (CI) and the corresponding p-values.

3. Results

We had 4132 responders above the age of 18 who completed the questionnaire fully, and were hence included in the statistical analysis (Table 1). Most responders were females 69.31% (n = 2864), married 59.37% (n = 2453), between the age of 21-30 23.84% (n = 985) and non-smokers 81.46% (n = 3366). Most responders obtained a university bachelor’s degree 71.59% (n = 2958). Only 7.96% (n = 329) had a positive past psychiatric history, all of which were on maintenance treatment with no relapse in the past year, 32.04% (n = 1324) had a past history of a chronic medical disease. Only some responders provided details regarding their psychiatric conditions, most common conditions were depression and generalized anxiety disorder (Table 5) and most common medical conditions were hypertension, diabetes mellitus, cardiovascular disease, hypothyroidism, inflammatory bowel disease (IBD) and rheumatoid arthritis.

During the pandemic most of the responders lost their jobs 39.21% (n = 1620) and only 12.83% (n = 530) were attending work regularly. Only 6.82% (n = 282) worked in the healthcare sector, this includes anyone who is directly involved in patient care on the wards (doctors, nurses, physiotherapists, dieticians). The prevalence of responders who
perceive a risk of acquiring the virus was 19.75% (n = 816), 2.59% (n = 107) work with positive cases while 17.16% (n = 709) work with suspected cases. Despite the fact that most people were not working, when asked about volunteering only 8.28% (n = 342) answered yes. People did experience a lot of free time during the lockdown, even in those responders that still attended work. Therefore, responders were

| Variable                        | n (%)   | Depression | No depression | χ²  | P-value |
|---------------------------------|---------|------------|---------------|-----|---------|
| **Total**                       | 4132 (100.0) | 2887 (69.9) | 1245 (30.1) |     |         |
| **Gender**                      |         |            |               |     |         |
| Male                            | 1268 (30.7) | 952 (33.2) | 316 (11.0) | 23.2 | < 0.0001|
| Female                          | 2864 (69.3) | 1933 (67.6) | 929 (32.4) |     |         |
| **Marital status**              |         |            |               |     |         |
| Single                          | 1339 (32.4) | 809 (28.2) | 530 (18.5) | 101.2 | < 0.0001|
| Married                         | 2453 (59.4) | 1838 (64.2) | 615 (21.5) |     |         |
| Widowed                         | 105 (2.5) | 89 (3.1) | 16 (0.6) |     |         |
| Separated/Divorced              | 235 (5.7) | 151 (5.3) | 84 (2.9) |     |         |
| **Smoker**                      |         |            |               |     |         |
| No                              | 3366 (81.5) | 2403 (83.9) | 963 (33.6) | 19.6 | < 0.0001|
| Yes                             | 766 (18.5) | 484 (16.9) | 282 (9.8) |     |         |
| **Job status**                  |         |            |               |     |         |
| Working/studying from home      | 816 (19.8) | 555 (19.4) | 261 (9.1) | 110.6 | < 0.0001|
| Attending work as usual         | 530 (12.8) | 371 (13.0) | 159 (5.6) |     |         |
| Stopped working/studying        | 1620 (39.2) | 1039 (36.3) | 581 (20.3) |     |         |
| Retired prior to the lockdown   | 856 (20.7) | 719 (25.1) | 137 (4.8) |     |         |
| Unemployed prior to the lockdown| 310 (7.5) | 203 (7.1) | 107 (3.7) |     |         |
| **Exercise**                    |         |            |               |     |         |
| No                              | 3850 (93.2) | 2707 (65.5) | 1143 (27.6) | 4.9 | 0.0262  |
| Yes                             | 282 (6.8) | 180 (4.36) | 102 (2.47) |     |         |
| **Risk of acquiring the virus at work** |         |            |               |     |         |
| No                              | 3316 (80.3) | 2378 (57.5) | 938 (22.7) | 27.3 | < 0.0001|
| Yes, dealing with positive cases| 107 (2.6) | 65 (1.57) | 42 (1.02) |     |         |
| Yes, dealing with suspected cases| 709 (17.2) | 444 (10.75) | 265 (6.41) |     |         |
| **Psychiatric history**         |         |            |               |     |         |
| No                              | 3803 (92.0) | 2714 (65.68) | 1089 (26.36) | 49.8 | < 0.0001|
| Yes                             | 329 (8.0) | 173 (4.19) | 156 (3.78) |     |         |
| **COVID-19 diagnosis in friends/family** |         |            |               |     |         |
| No                              | 2819 (68.2) | 2009 (48.62) | 810 (19.60) | 8.0 | 0.0046  |
| Yes                             | 1313 (31.8) | 878 (21.25) | 435 (10.53) |     |         |
| **Were you quarantined?**       |         |            |               |     |         |
| No                              | 3431 (83.0) | 2452 (59.34) | 979 (23.69) | 24.5 | < 0.0001|
| Yes, Home                       | 617 (14.9) | 383 (9.27) | 234 (5.66) |     |         |
| Yes, Institutional              | 84 (2.0) | 52 (1.26) | 32 (0.77) |     |         |
| **Age (years)**                 |         |            |               |     |         |
| <= 20                           | 276 (6.7) | 147 (3.56) | 129 (3.12) | 224.3 | < 0.0001|
| 21-30                           | 985 (23.8) | 600 (14.52) | 385 (9.32) |     |         |
| 31-40                           | 874 (21.2) | 566 (13.70) | 308 (7.45) |     |         |
| 41-50                           | 756 (18.3) | 523 (12.66) | 233 (5.64) |     |         |
| 51-60                           | 839 (20.3) | 687 (16.63) | 152 (3.68) |     |         |
| 61-70                           | 363 (8.8) | 327 (7.91) | 36 (0.87) |     |         |
| > 71                           | 39 (0.9) | 37 (0.90) | 2 (0.05) |     |         |
| **Education Obtained**          |         |            |               |     |         |
| High School                     | 592 (14.3) | 383 (9.27) | 209 (5.06) | 9.2 | 0.01018 |
| University Bachelors/diploma    | 2958 (71.6) | 2086 (50.48) | 872 (21.10) |     |         |
| Post-graduate degree            | 582 (14.1) | 418 (10.12) | 164 (3.97) |     |         |
| **Rating of government protocols** |         |            |               |     |         |
| 0-1                             | 172 (4.2) | 98 (2.37) | 74 (1.79) | 75.1 | < 0.0001|
| 2-3                             | 228 (5.5) | 140 (3.39) | 88 (2.13) |     |         |
| 4-5                             | 716 (17.3) | 450 (10.89) | 266 (6.44) |     |         |
| 6-7                             | 1356 (32.6) | 928 (22.46) | 428 (10.36) |     |         |
| 8-9                             | 1110 (26.9) | 845 (20.45) | 265 (6.41) |     |         |
| 10                              | 550 (13.3) | 426 (10.31) | 124 (3.00) |     |         |
| **Time spent on social media per day** |         |            |               |     |         |
| Less than before                | 514 (12.4) | 373 (9.03) | 141 (3.41) | 112.6 | < 0.0001|
| Same as before                  | 1169 (28.3) | 948 (22.94) | 221 (5.35) |     |         |
| More than before                | 2440 (59.3) | 1566 (37.90) | 883 (21.37) |     |         |
| **Time spent following COVID-19 related news per day** |         |            |               |     |         |
| Less than half an hour          | 909 (22.0) | 674 (16.31) | 235 (5.69) | 73.4 | < 0.0001|
| 30 mins to 1 hour               | 641 (15.5) | 499 (12.08) | 142 (3.44) |     |         |
| 1-2 hours                       | 700 (16.9) | 518 (12.54) | 182 (4.40) |     |         |
| More than 2 hours               | 1562 (37.8) | 1009 (24.2) | 553 (13.38) |     |         |
| More than 4 hours               | 320 (7.7) | 187 (4.53) | 133 (3.22) |     |         |
asked about how they spent their time during lockdown. Most 61.08% (n = 2524) exercise at least 1-2 times a week (Table 1). When asked about social media use during lockdown compared to before, 59.27% (n = 2449) report increased usage. When asked about their daily time spent following COVID-19 related news, 37.8% of responders (n = 1562) spend more than 2 hours and 7.74% of responders (n = 320) spend more than 4 hours. Most of our responders, 99.47% (n = 4110) were not affected by the virus themselves, but a higher percentage of 31.78% (n = 1313) had either close friends or family members who were positive for the virus.

3.1. Depression/ anxiety

The overall prevalence of depression was 30.13% (n = 1245), and the prevalence of anxiety symptoms was 25.28% (n = 1086). Significant positive and negative associations are summarized in (Table 2, 4, 6 and 7).

Women have a higher tendency for depression (SR = 2.25) and for anxiety (SR = 3.40), while men have a lesser tendency for depression (SR = 3.38) and anxiety (SR = -5.11). Responders who were single show a very high tendency for depression (SR = 6.30) and anxiety (SR = 5.97). On the contrary, married individuals tend to have no depression (SR = -4.56), nor anxiety (SR = -3.77). Smokers tend to be diagnosed with depression more often (SR = 3.37). But the association with anxiety was not statistically significant. People who stopped working during the curfew times, seem to have very high tendency to feel depressed (SR = 4.20) and anxious (SR = 4.03). Retired people, on the contrary seem to be very unlikely to get seriously depressed (SR = -7.53) or be anxious (SR = -7.07). People who work at the health sector are more likely to experience anxiety, but no statistically significant results for higher rates of depression. Workers who perceive a risk of acquiring the virus at work due to suspected cases, OR = 1.39, CI = (1.11 - 1.72), p-value = 0.004, working at the health sector (OR = 1.43, CI = (1.03 - 1.98), p-value = 0.032), being at risk of acquiring the virus at work from suspected cases (OR = 1.38, CI = (1.11 - 1.72), p-value = 0.004), stopped working or studying (OR = 1.39, CI = (1.04 - 1.86), p-value = 0.026), with a psychiatric history (OR = 2.63, CI = (2.06 - 3.36), p-value < 0.001), in a quarantine at home (OR = 1.31, CI = (1.06 - 1.60), p-value = 0.01), rating the government protocols 6-7 (OR = 1.42, CI = (1.16 - 1.74), p-value = 0.001), using social media more than before the pandemic (OR = 1.28, CI = (1.09 - 1.50), p-value = 0.002), and following the daily news related to COVID-19 for less than 1 hour per day (OR = 1.35 (1.09 - 1.67), p-value = 0.006) were significant risk factors for anxiety. (Shown in Table 6) Similarly, being a woman (OR = 2.06, CI = (1.72 - 2.48), p-value < 0.001), smoking (OR = 1.59, CI = (1.30 - 1.95), p-value < 0.001), being at risk of acquiring the virus at work from suspected (OR = 1.52, CI = (1.25 - 1.86), p-value < 0.001) or positive cases (OR = 1.68, CI = (1.06 - 2.63), p-value = 0.025), stopped working or studying (OR = 1.24, CI = (1.10 - 1.84), p-value = 0.007), with a psychiatric history (OR = 1.96, CI = (1.53 - 2.50), p-value < 0.001), in a home (OR = 1.49, CI = (1.22 - 1.81), p-value < 0.001) or institutional quarantine (OR = 1.70, CI = (1.04 - 2.73), p-value = 0.031), rating the government protocols 6-7 (OR = 1.60, CI = (1.31 - 1.95), p-value < 0.001), using social media more than before the curfew (OR = 1.60, CI = (1.37 - 1.87), p-value < 0.001), and following the daily news related to COVID-19 for less than 1 hour per day (OR = 1.65, CI = (1.35 - 2.02), p-value < 0.001) were significant risk factors for depression, as shown in Table 7.

4. Discussion

The study suggests that the COVID-19 pandemic had a significant impact on the mental health of our population. This is similar to what was seen in several studies undertaken during the pandemic (Ahmed et al., 2020, Cullen et al., 2020, González-Sanguino et al., 2020, Guo et al., 2020, Huang and Zhao, 2020, Wang et al., 2020, Mazza et al., 2020). A systematic review of 19 studies by Xiong, J et al showed a prevalence of anxiety symptoms reaching up to 50.9%, and a prevalence of depressive symptoms ranging between 14.6%-48.3% (Xiong et al., 2020). Many factors were found to be associated with an increased psychological burden including; female gender, age <40 years, chronic or psychiatric illnesses, unemployment, student status, frequent use of social media and prolonged time spent following news concerning COVID-19 (Xiong et al., 2020, Salari et al., 2020).

In comparison to studies undertaken in Saudi Arabia (Alkhamees et al., 2020), Algeria (Madani et al., 2020), Bosnia (Slijvo et al., 2020), Cyprus (Solomou and Constantinidou, 2020) and Turkey (Özdin and Bayrak Özdin, 2020), Kuwait showed a lower prevalence of anxiety symptoms, this is possibly due to the widespread awareness and psychological support provided by the authorities during the pandemic. Daily live press conferences were held on national

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**Table 3**

Significant results from the Mann – Whitney test

| Anxiety | No | Yes | W   | P-value |
|---------|----|-----|-----|---------|
| Height (cm) | 164.85 | 163.87 | 1741897 | 0.004 |
| BMI | 28.17 | 27.61 | 1740206 | 0.003 |
| Weight (kg) | 76.79 | 74.42 | 1741897 | < 0.01 |
| Depression | No | Yes | W | P-value |
| Weight (kg) | 76.42 | 75.56 | 1853205 | 0.046 |
Table 4
Significant results from the $\chi^2$ test, anxiety.

| Variable                                      | n (%)                      | Anxiety  | No anxiety | $\chi^2$ | P-value  |
|-----------------------------------------------|----------------------------|----------|------------|----------|----------|
| Total                                         | 4132 (100)                 | 1086(26.28) | 3046(73.72) |          |          |
| Gender                                        |                            |           |            |          |          |
| Male                                          | 1268(30.69)                | 240(5.81) | 1028(24.88) | 50.5     | < 0.0001 |
| Female                                        | 2864(69.31)                | 846(20.47) | 2018(48.84) |          |          |
| Marital Status                                |                            |           |            |          |          |
| Single                                        | 1339(32.41)                | 464(11.23) | 875(21.18)  | 81.2     | < 0.0001 |
| Married                                       | 2453(59.37)                | 549(13.29) | 1904(46.08) |          |          |
| Widowed                                       | 105(2.54)                  | 110(2.7)  | 94(2.27)   |          |          |
| Separated/Divorced                            | 235(5.69)                  | 62(1.50)  | 173(4.19)  |          |          |
| Job Status                                    |                            |           |            |          |          |
| Working/studying from home                    | 816(19.75)                 | 236(5.71) | 580(14.04)  | 94.4     | < 0.0001 |
| Attending work as usual                       | 530(12.83)                 | 132(3.19) | 398(9.63)  |          |          |
| Stopped working/studying                      | 1620(39.21)                | 509(12.32) | 1111(26.89) |          |          |
| Retired prior to the lockdown                 | 856(20.72)                 | 119(2.88) | 737(17.84)  |          |          |
| Exercise                                      |                            |           |            |          |          |
| No                                            | 1608(38.92)                | 481(11.64) | 1127(27.27) | 17.6     | < 0.0001 |
| Yes                                           | 2524(61.08)                | 605(14.64) | 1919(46.44) |          |          |
| Risk of acquiring the virus at work           |                            |           |            |          |          |
| No                                            | 3316(80.25)                | 828(20.04) | 2488(60.21) | 15.0     | 0.00055  |
| Yes, dealing with positive cases              | 107(2.59)                  | 35(0.85)  | 72(1.74)   |          |          |
| Yes, dealing suspected cases                  | 709(17.16)                 | 223(5.40) | 486(11.76)  |          |          |
| Past psychiatric history                      |                            |           |            |          |          |
| No                                            | 3803(92.04)                | 926(22.41) | 2877(69.63) | 90.9     | < 0.0001 |
| Yes                                           | 329(7.96)                  | 160(3.86) | 169(4.09)  |          |          |
| COVID-19 diagnosis in close friends/family    |                            |           |            |          |          |
| No                                            | 2819(68.22)                | 678(16.41) | 2141(51.82) | 22.4     | < 0.0001 |
| Yes                                           | 1313(31.78)                | 408(9.87) | 905(21.90)  |          |          |
| Were you quarantined?                         |                            |           |            |          |          |
| No                                            | 3431(83.03)                | 849(20.55) | 2582(62.49) | 24.8     | < 0.0001 |
| Yes, Home                                     | 617(14.93)                 | 210(5.08) | 407(9.85)   |          |          |
| Yes, institutional                            | 842(20.03)                 | 270(6.55) | 572(13.8)   |          |          |
| BMI                                           |                            |           |            |          |          |
| Overweight                                    | 1469(35.55)                | 370(8.95) | 1099(26.60) | 9.2      | 0.027    |
| Normal                                        | 1294(31.32)                | 376(9.10) | 918(22.22)  |          |          |
| Obese                                         | 1291(31.24)                | 318(7.70) | 973(23.55)  |          |          |
| Underweight                                   | 61(1.48)                   | 20(0.48)  | 41(0.99)    |          |          |
| Other (not disclosed)                         | 170(4.11)                  | NA        | NA         |          |          |
| Age                                           |                            |           |            |          |          |
| < = 20                                        | 2766(66.8)                 | 121(2.93) | 1555(37.75) | 197.7    | < 0.0001 |
| 21-30                                         | 985(23.84)                 | 337(8.16) | 648(15.68)  |          |          |
| 31-40                                         | 874(21.15)                 | 261(6.32) | 613(14.84)  |          |          |
| 41-50                                         | 756(18.3)                  | 205(4.96) | 551(13.33)  |          |          |
| 51-60                                         | 839(20.30)                 | 123(2.88) | 716(17.33)  |          |          |
| 61-70                                         | 363(8.79)                  | 34(0.82)  | 329(7.96)   |          |          |
| > = 71                                        | 390(9.44)                  | 5(0.12)   | 34(0.82)    |          |          |
| Education obtained                            |                            |           |            |          |          |
| High School                                   | 592(14.33)                 | 186(4.50) | 4069(98.3)  | 9.5      | 0.009    |
| University Bachelors/Diploma                  | 2958(75.59)                | 749(18.13) | 2209(53.46) |          |          |
| Post-graduate degree                          | 582(14.99)                 | 151(3.65) | 431(10.43)  |          |          |
| Rating of government protocols                |                            |           |            |          |          |
| 0-1                                           | 172(4.16)                  | 61(1.48)  | 111(2.69)   | 63.9     | < 0.0001 |
| 2-3                                           | 228(5.52)                  | 76(1.84)  | 152(3.68)   |          |          |
| 4-5                                           | 716(17.33)                 | 235(5.69) | 481(11.64)  |          |          |
| 6-7                                           | 1356(32.82)                | 379(9.17) | 977(23.64)  |          |          |
| 8-9                                           | 1110(26.86)                | 216(5.23) | 894(21.64)  |          |          |
| 10                                           | 550(13.31)                 | 119(2.88) | 431(10.43)  |          |          |
| Time spent on social media per day            |                            |           |            |          |          |
| Less than before                              | 514(12.44)                 | 124(3)    | 390(9.44)   | 40.9     | < 0.0001 |
| Same as before                                | 1169(28.29)                | 233(5.64) | 936(22.65)  |          |          |
| More than before                              | 2449(59.27)                | 729(17.64) | 1720(41.63) |          |          |

Time spent following COVID-19-related news per day (continued on next page)
television, detailing the number of new and recovered cases along with an update on any future plans being discussed by the government. Furthermore Kuwait launched an online website (coronacare.kw) providing free psychological counseling sessions along with educational videos focusing on anxiety and stress coping mechanisms. Other services provided by the website include simplified short videos containing information about the virus and methods to reduce transmission. This obviated the distress that can be brought about by some of the false information circulating online.

We identified a number of risk factors; those with family members who were confirmed positive for COVID-19 showed higher levels of anxiety. Healthcare workers are significantly at higher risk of psychological sequelae. This is supported by other studies (Huang and Zhao, 2020; Zhu et al., 2020; Chew et al., 2020; Lu et al., 2020). Potential reasons include; increased working hours, feeling helpless and having to self-isolate from families and partners. Smokers showed a higher level of depression. Women, subjects of single marital status, those who stopped working during the pandemic, having had a past psychiatric history, isolated to home quarantine, subjects younger than 30 and those who spent more time on social media than prior to the pandemic showed significantly increased levels of both depression and anxiety. Individuals with a history of psychiatric illness have a higher risk for depression and anxiety during the COVID-19 pandemic. Fear of infection, isolation, loss of jobs, financial stress and reduced social support during quarantine can trigger a relapse.

Interestingly we found a negative correlation between increased satisfaction rates with government protocols and levels of psychological burden. Feeling of safety and trust in the country's standards of care including decisions made by the government are likely contributory factors. Older populations of >50 years of age, as well as those retired seemed to be unlikely to experience psychological impacts of the pandemic compared to their younger counterparts. However, younger populations (<30) as well those with high school education degrees showed higher levels of anxiety and depression. Schools, parks, playground have been shut down in Kuwait, and adolescents were not able engage in social activities. Delays in examinations, applications to universities, pandemic-driven uncertainty regarding future decisions and opportunities are potential factors. Kuwait also did not have an online-based teaching system for either schools or universities, resulting in delays of academic progress.

Higher rates of depression were associated with a longer time spent following COVID-19 related news. Similar associations were noted by other studies (Ni et al., 2020; Gao et al., 2020). Increased exposure to news regarding deaths, casualties, increasing number of cases contributes to this finding. People who spent the same amount of time on

| Table 4 (continued) |
|---------------------|
| Variable | n (%) | Anxiety | No anxiety | χ² | P-value |
| Less than half an hour | 909(22) | 213(5.15) | 696(16.84) | 46.6 | < 0.0001 |
| 30 mins to 1 hour | 641(15.51) | 132(3.19) | 509(12.32) | |
| 1-2 hours | 700(16.94) | 154(3.73) | 546(13.21) | |
| More than 2 hours | 1562(37.8) | 477(11.54) | 1085(26.26) | |
| More than 4 hours | 320(7.74) | 110(2.66) | 210(5.08) | |

| Table 5 |
|---------|
| Frequency of psychiatric disorders. |
| Psychiatric disorder | Frequency |
| Depression | 150 |
| GAD | 71 |
| OCD | 24 |
| Panic disorder | 12 |
| ADHD | 12 |
| Bipolar disorder | 11 |
| Post partum depression | 4 |
| PTSD | 4 |
| Anorexia Nervosa | 3 |
| Specific phobia (Claustrophobia, aerophobia) | 3 |
| Emotionally unstable personality disorder (EUPD) | 2 |
| Trichotillomania | 2 |
| Social phobia | 2 |
| Agoraphobia | 1 |
| Hypochondriasis | 1 |
| Body dysmorphic disorder | 1 |

| Table 6 |
|---------|
| Risk factors for anxiety, identified by the multivariable logistic regression. |
| Variable | n (%) | Adjusted OR (95% CI) | P-value |
| Total | 4132 (100.0) | | |
| Gender | | | < 0.001 |
| Female | 2864 (69.3) | 2.11 (1.71 - 2.52) | |
| Job status | | | 0.026 |
| Stopped working/studying | 1620 (39.2) | 1.39 (1.04 - 1.86) | |
| Working in the health sector | | | 0.032 |
| Yes | 282 (6.8) | 1.43 (1.03 - 1.98) | |
| Risk of acquiring the virus at work | | | 0.004 |
| Yes, dealing with suspected cases | 709 (17.2) | 1.38 (1.11 - 1.72) | |
| Past psychiatric history | | | 0.005 |
| Yes | 329 (8.0) | 2.63 (2.06 - 3.36) | |
| Were you quarantined? | | | < 0.001 |
| Home | 617 (14.9) | 1.31 (1.06 - 1.60) | |
| Age (years) | | | 0.01 |
| 51-60 | 839 (20.3) | 1.61 (1.14 - 2.25) | |
| Rating of government protocols | | | 0.001 |
| 6-7 | 1356 (32.8) | 1.42 (1.16 - 1.74) | |
| Time spent on social media per day | | | 0.002 |
| more than before | 2449 (59.3) | 1.28 (1.09 - 1.50) | |
| Time spent following COVID-19-related news per day | | | 0.006 |
| 30 mins to 1 hour | 641 (15.5) | 1.35 (1.09 - 1.67) | |
| < 30 min. | 909 (22.0) | 1.27 (1.04 - 1.55) | |
| Time spent on social media per day | | | 0.017 |
social media as they did prior to the pandemic, showed negatively correlating anxiety and depression scores; while increased social media use resulted in higher scores. This highlights the power of social media and emphasizes the need for channeling such tool in raising awareness and promoting education.

There were several limitations to our study. The study was undertaken during the final 5 days of the lockdown period, which is when the psychological impact would be at its highest. This could have lead to overestimation in the prevalence of the mental health burden, hence the need for longitudinal studies over an extended period of time is essential to minimize bias. Follow-up studies may also be needed to understand the long-term psychological sequelae of the pandemic. The number of participants may not be representative of the entire population; a larger sample size is needed to include more subgroups of our population e.g healthcare workers.

5. Conclusion

The COVID-19 pandemic caused a significant burden on mental health, with some people showing a significantly higher risk than others. The statistically significant relationships discovered are good predictors of anxiety and depression during pandemics, identifying

### Table 7

Risk factors for depression, identified by the multivariable logistic regression.

| Variable                                      | n (%)       | Adjusted OR (95% CI) | P-value |
|-----------------------------------------------|-------------|----------------------|---------|
| Total                                         | 4132 (100.0)|                      |         |
| Gender                                        |             |                      |         |
| Female                                        | 2864 (69.3) | 2.06 (1.72 - 2.48)   | < 0.001 |
| Smoker                                        |             |                      |         |
| Yes                                           | 766 (18.5)  | 1.59 (1.30 - 1.95)   | < 0.001 |
| Job status                                    |             |                      |         |
| Stopped working/studying                      | 1620 (39.2) | 1.24 (1.10 - 1.84)   | 0.007   |
| Risk of acquiring the virus at work           |             |                      |         |
| Yes, dealing with positive cases              | 107 (2.6)   | 1.68 (1.06 - 2.63)   | 0.025   |
| Yes, dealing with suspected cases             | 709 (17.2)  | 1.52 (1.23 - 1.86)   | < 0.001 |
| Psychiatric history                           |             |                      |         |
| Yes                                           | 329 (8.0)   | 1.96 (1.53 - 2.50)   | < 0.001 |
| Were you quarantined?                         |             |                      |         |
| Yes, Home                                     | 617 (14.9)  | 1.49 (1.22 - 1.81)   | < 0.001 |
| Yes, Institutional                            | 84 (2.0)    | 1.70 (1.04 - 2.73)   | 0.031   |
| Rating of government protocols                |             |                      |         |
| 6-7                                           | 1356 (32.8) | 1.60 (1.31 - 1.95)   | < 0.001 |
| Time spent on social media per day            |             |                      |         |
| Same as before                                | 1169 (28.3) | 1.29 (1.10 - 1.51)   | 0.002   |
| More than before                              | 2449 (59.3) | 1.60 (1.37 - 1.87)   | < 0.001 |
| Time spent following COVID-19-related news per day |         |                      |         |
| 30 mins to 1 hour                             | 641 (15.5)  | 1.65 (1.35 - 2.02)   | < 0.001 |
| < 30 min.                                     | 909 (22.0)  | 1.37 (1.13 - 1.66)   | 0.001   |
| Exercise                                      |             |                      |         |
| Yes, 5-6 times per week                       | 400 (9.68)  | 1.33 (1.08 - 1.64)   | 0.007   |

Fig. 1. Mosaic plot of age categories versus depression (0 – no, 1-yes), showing strong negative and positive associations.
high-risk groups. Psychological support and mental health awareness should be made accessible to all individuals during pandemics. This can be achieved through the use of social media or internet-based interventions.

Further studies are required to understand the long-term mental health effects of COVID-19, especially in those infected by the virus.

Informed Consent

Written informed consent was obtained from the responders for the publication of their responses anonymously.

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Declaration of Competing Interest

No conflict of interest.

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