Prevalence of Anxiety and Depression during the Coronavirus Disease 2019 Pandemic in Riyadh, Saudi Arabia: A Web-Based Cross-Sectional Survey

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This work was carried out by a single author. The author AHA designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript, managed the analyses of the study and managed the literature searches.

ABSTRACT

Today, every continent in the world is affected by the novel coronavirus2019 (COVID-19). Saudi Arabia has also suffered from this highly contagious, socially disruptive, infectious disease. Our aim was to assess the anxiety and depression prevalence and identify the associated risk factors among the general population of Riyadh city, Saudi Arabia, during COVID-19 outbreak. This cross-sectional study was conducted using a web-based survey. A total of 651 participants were recruited who were ≥18 years old and lived in Riyadh city during the COVID-19 pandemic. We collected sociodemographic information of the participants and assessed their COVID-19-related knowledge assessment. We used the Arabic versions of the Generalized Anxiety Disorder-7 questionnaire and the Patient Health Questionnaire to assess the status of an individual’s anxiety and depression, respectively. We observed 28.7% and 25.5% prevalence of depression and anxiety among the general population, respectively. Females, younger people (age < 35 years), and unmarried persons showed a significantly higher prevalence of anxiety and depression. Binary logistic regression analysis also revealed that female gender, age younger than 35 years, having history of psychiatric diseases, and spending more than one hour per day on following COVID-19 news were
associated with anxiety and depression. Retired participants were less likely to suffer from anxiety or depression during the pandemic. In this study, females, younger people (age < 35 years), and individuals with history of psychiatric patients were identified as vulnerable groups who need support during this crisis. We also recommend that the general public must limit their time of watching and following COVID-19-related news.

Keywords: Coronavirus; COVID-19; mental health; anxiety; depression; Saudi Arabia.

1. INTRODUCTION

Coronavirus disease (COVID-19) is a viral infection caused due to coronavirus (Coronavirus 2019). Initially, Covid-19 cases emerged in December 2019, in the province of Wuhan, China [1]. On March 11, 2020, this disease was declared as a pandemic by the World Health Organization (WHO) (WHO 2020) [2]. By May 5, 2020, WHO had reported a total of 3,517,345 COVID-19-confirmed cases and 243,401 COVID-19-related deaths worldwide (Coronavirus disease 2020).

In Saudi Arabia, the first case of COVID-19 was reported on March 2, 2020. Within the next 4 days, there were a total of 30,251 confirmed COVID-19 cases, 200 COVID-19-related deaths, and 5,431 recovered cases [3]. The Saudi government implemented numerous preventive measures to prevent the spread of the infection. All access routes in and out of the country were closed, including international and domestic flights and land and sea borders. The Umrah was suspended and the two holy mosques; Al-Masjid al-Harām in Mecca and Al-Masjid an-Nabawī in Medina were temporarily closed for sterilization. By April 6, 2020, a 24-hour curfew was imposed, with continuing ban of entry into and exit from all cities and governorates. For assurance, food supplies, vital services, and pharmacies remained functional and were encouraged via express delivery services through smart device applications [4].

Recently, a study showed that COVID-19 had a significant impact on the physical and mental health of the general public [5]. A study recently conducted during COVID-19 outbreak in Saudi Arabia, demonstrated that nearly every one of four participants experienced moderate to severe psychological impact which included depressive, and anxiety symptoms. Since then, this is the first time that the people in Saudi Arabia had experienced such serious emergency, consisting of 24-hour curfews and mass isolation.

There has been limited research on the mental health of people in Saudi Arabia during such outbreaks and pandemics. To the best of our knowledge, there has been no investigation on the psychological impact of COVID-19 pandemic in Riyadh city and there were scarce studies on the national level. Our aim was to assess the prevalence of anxiety and depression and determine the associated factors among the general population of Riyadh city during the COVID-19 pandemic.

2. METHODS

2.1 Study Participants and Design

This cross-sectional study was conducted between April 26, and May 5, 2020, during the 24-hour curfew period in Riyadh city, the capital of Saudi Arabia. To overcome the limitations of the curfew, we performed a web-based survey. The study participants were adults, ≥18 years old, and lived in Riyadh city during the pandemic period. Using convenience sampling technique, the questionnaire was distributed electronically through direct phone messages and WhatsApp groups. The questionnaires were answered anonymously on the Internet. The sample size was calculated using online open source software [6]. Assuming a 57% prevalence rate of anxiety among Saudi citizens that was seen during the MERS-CoV outbreak, a sample size of 651 was estimated at 5% margin of error and 99% confidence level [7].

2.2 Data Collection

Data was collected from April 28 to May 2, 2020, via a questionnaire-based survey as described previously [5]. The sociodemographic and COVID-19-related data of the participants were collected. Their depression status was examined using two tools: Patient Health Questionnaire (PHQ-9) scale and Generalized Anxiety Disorder 7-item (GAD-7) scale for the anxiety.

2.3 Measure

2.3.1 Sociodemographic information

We collected demographic data, including the age, sex, nationality, marital status, occupation, number of companions during curfew period, whether working in a sector that was exempt
from the curfew (permitted movement during the curfew period), history of confirmed COVID-19 diagnosis and/or psychiatric illness, and having relatives or friends diagnosed with COVID-19 (confirmed).

2.3.1 COVID-19 data

The collection of COVID-19-related information was divided into two domains:

1. The time spent on gathering COVID-19-related information, which was determined by assessing the average amount of time that was spent on watching COVID-19-related information every day.
2. The COVID-19-related knowledge gathered, which was assessed by the aid of six questions:
   A. What is the incubation period of COVID-19 (whether or not it exceeds 14 days)?
   B. Whether the inhalation of the droplets released from the sneeze or cough of an infected person could cause infection?
   C. Whether coming in contact with a contaminated object could cause infection?
   D. Whether coming in contact with an asymptomatic individual could cause infection?
   E. Whether the consumption of “herbal medicine” could prevent infection?
   F. Whether some drugs are already available that might treat the disease?

For each correct answer, one point was awarded, and for each uncertain or incorrect answer, no point was awarded. The knowledge of the participants was considered to be excellent (quite understood), good (generally understood), and poor (did not understand) if the scores were ≥5, 4, and ≤3, respectively.

2.3.2 Anxiety

The GAD-7 scale (Arabic version) was used to determine the anxiety symptoms of the participants. This scale has previously been used for Saudi population and has been shown to be highly reliable (Cronbach’s α = 0.763) [8]. This scale includes seven items that assess the anxiety frequency on a 4-point Likert scale (range: 0 (never) – 3 (nearly every day)). The range of the total score was 0-21. Higher GAD-7 score indicated more severe anxiety-related functional impairment. Participants with scores of 0-4, 5-9, 10-14, and 15-21 were classified as not, mildly, moderately, and severely anxious, respectively. Score of ≥10 was set as cut-off score [9].

2.3.3 Depression

We used the PHQ-9 scale (Arabic version) that has previously been used and validated for Saudi population and has been shown to be reliable (Cronbach’s α = 0.857) [8]. The scale consisted of nine items that assessed the depression status of an individual on a 4-point Likert scale (range: 0 (never) – 3 (nearly every day)). The range of the total score was 0-27. Higher score indicated more severe depression-related functional impairment. Participants with scores of 0-4, 5-9, 10-14, 15-19, and 20-27 were classified as mildly, moderately, moderately severely, and severely depressed, respectively. Score of ≥10 was set as cut-off score [9].

2.4 Data Management and Analysis

SPSS version 22.0 was used for statistical analysis of the data. Descriptive statistics, including frequency and percentage and mean and standard deviation (SD), were used to analyze sociodemographic characteristics, COVID-19-related knowledge, and the data from PHQ-9 and GAD-7 surveys. The prevalence of anxiety and depression were stratified by sociodemographic factors. Chi-square test (χ2) was employed to measure the correlation between the potential risk factors and the prevalence of depression and anxiety. Finally, logistic regression analysis was performed for identification of the potential predictive factors of depression and anxiety during COVID-19. The 2-sided tests were used to evaluate p-values. Statistical significance was defined as p < 0.05.

3. RESULTS

3.1 Sociodemographic Characteristics

Table 1 shows the distribution of participants on the basis of sociodemographic characteristics. Six hundred and fifty-one respondents participated in this study, of which 332 (51%) and 319 (49%) were females and males, respectively. Mean participant age was 35.7 ± 12.1 years. Majority of the participants were married (n = 360; 55.3%), Saudi (n = 605; 95%), living with two or more people during the curfew (n = 559; 85.9%), spent less than 1 hour per day on gathering COVID-19-related news (n = 413; 63.4%), and had excellent knowledge about COVID-19 (n = 393; 60.4%). Two hundred and forty-eight participants (38.1%) were government employees, 216 participants (33.2%) worked in a sector that was exempt from the curfew, and 204 participants (31.3%) had a transportation permit. Twenty-nine participants (4.5%) had a history of...
psychiatric illness and were on medication. Only seven participants (1.1%) had a history of confirmed COVID-19 diagnosis, and 59 participants (9.1%) had a relative and/or friend who tested positive for COVID-19.

### 3.2 Prevalence of Depression and Anxiety

Overall, we observed 28.7% and 25.5% prevalence of depression and anxiety among our study sample during the COVID-19 outbreak. The results from PHQ-9 and GAD-7 surveys are shown in Table 2. We observed a significantly higher anxiety among females ($p = 0.01$), unmarried individuals ($p = 0.021$), and individuals with age <35 years ($p = 0.001$) (Table 3). Similarly, females ($p < 0.001$), individuals with age <35 years ($p < 0.001$), unmarried participants ($p < 0.001$), and non-working participants ($p = 0.005$) exhibited higher prevalence of depression (Table 4).

| Variable                                | Frequency (n) | Percentage (%) |
|-----------------------------------------|---------------|----------------|
| Total                                   | 651           | 100            |
| Age                                     | Mean± SD (35.7 ± 12.1) |               |
| < 35 years                              | 333           | 51.2           |
| ≥ 35 years                              | 318           | 48.8           |
| Sex                                     |               |                |
| Male                                    | 319           | 49.0           |
| Female                                  | 332           | 51.0           |
| Marital status                          |               |                |
| Single                                  | 255           | 39.2           |
| Married                                 | 360           | 55.3           |
| Divorced                                | 23            | 3.5            |
| Widowed                                 | 13            | 2.0            |
| Nationality                             |               |                |
| Saudi                                   | 605           | 92.9           |
| Non-Saudi                               | 46            | 7.1            |
| Occupation                              |               |                |
| Student                                 | 139           | 21.4           |
| Government                              | 248           | 38.1           |
| Private                                 | 103           | 15.8           |
| Freelancers                             | 12            | 1.8            |
| Retired                                 | 52            | 8              |
| Not working                             | 97            | 14.9           |
| Living with how many persons during curfew|            |                |
| Alone                                   | 30            | 4.6            |
| With one                                | 62            | 9.5            |
| Two and more                            | 559           | 85.9           |
| Working in a sector that was exempt from the curfew | | |
| No                                      | 435           | 66.8           |
| Yes                                     | 216           | 33.2           |
| Have movement permit during the curfew  |               |                |
| No                                      | 447           | 68.7           |
| Yes                                     | 204           | 31.3           |
| History of COVID-19 positive            |               |                |
| No                                      | 644           | 98.9           |
| Yes                                     | 7             | 1.1            |
| Relatives or friends with COVID-19      |               |                |
| No                                      | 592           | 90.9           |
| Yes                                     | 59            | 9.1            |
| History of psychiatric disorder         |               |                |
| No                                      | 622           | 95.5           |
| Yes                                     | 29            | 4.5            |
| Time spent on following COVID-19 news   |               |                |
| Less than 1h                            | 413           | 63.4           |
| 1-2h                                    | 129           | 19.8           |
| 3h and more                             | 109           | 16.7           |
| Knowledge of COVID-19                   |               |                |
| Excellent                               | 393           | 60.4           |
| Good                                    | 167           | 25.7           |
| Poor                                    | 91            | 14.0           |
Table 2. Prevalence of anxiety and depression among Riyadh population during Covid-19 pandemic

| Variable | Frequency(n) | Percentage (%) |
|----------|--------------|----------------|
| **GAD-7** |              |                |
| No anxiety | 307          | 47.2           |
| Mild        | 178          | 27.3           |
| Moderate    | 83           | 12.7           |
| Severe      | 83           | 12.7           |
| **PHQ-9**   |              |                |
| No depression | 279      | 42.9           |
| Mild        | 185          | 28.4           |
| Moderate    | 98           | 15.1           |
| Moderately severe | 44       | 6.8            |
| Severe      | 45           | 6.9            |

Table 3. Prevalence of anxiety among Riyadh population during Covid-19 pandemic stratified by sociodemographic factors

| Variable | Anxiety | \(\chi^2\) | p-value |
|----------|---------|------------|---------|
|          | Yes n (%) | No n (%) |         |
| **Total** | 166 (25.5%) | 485 (74.5%) |         |
| Sex      |          |           |         |
| Male     | 67 (21%) | 252 (79%) | 6.656   | .010*  |
| Female   | 99 (29.8%) | 233 (70.2%) |         |
| Age      |          |           |         |
| < 35 years | 103 (30.9%) | 230 (69.1%) | 10.587  | .001*  |
| \(\geq 35\) years | 63 (19.8%) | 255 (80.2%) |         |
| Marital status |          |           |         |
| Married  | 79 (21.9%) | 281 (78.1%) | 5.357   | .021*  |
| Not married | 87 (29.9%) | 204 (70.1%) |         |
| Occupation |          |           |         |
| Work     | 86 (23.7%) | 277 (76.3%) | 1.412   | .235   |
| Not working | 80 (27.8%) | 208 (72.2%) |         |

\(\chi^2 = \text{chi-square test}; \ *p\text{-value}<0.05\)

Table 4. Prevalence of depression among Riyadh population during Covid-19 pandemic, stratified by sociodemographic factors

| Variable | Depression | \(\chi^2\) | p-value |
|----------|------------|------------|---------|
|          | Yes n (%) | No n (%) |         |
| **Total** | 187 (28.7%) | 464 (71.3%) |         |
| Sex      |          |           |         |
| Male     | 70 (21.9%) | 249 (78.1%) | 14.050  | .000*  |
| Female   | 117 (35.2%) | 215 (64.8%) |         |
| Age      |          |           |         |
| < 35 years | 124 (37.2%) | 209 (62.8%) | 24.126  | .000*  |
| \(\geq 35\) years | 63 (19.8%) | 255 (80.2%) |         |
| Marital status |          |           |         |
| Married  | 81 (22.5%) | 279 (77.5%) | 15.243  | .000*  |
| Not married | 106 (36.4%) | 185 (63.6%) |         |
| Occupation |          |           |         |
| Work     | 88 (24.2%) | 275 (75.8%) | 8.053   | .005*  |
| Not working | 99 (34.4%) | 189 (65.6%) |         |

\(\chi^2 = \text{chi-square test}; \ *p\text{-value}<0.05\)

### 3.3 Factors Associated with Depression and Anxiety

We used the binary logistic regression model to identify the association of the socioeconomic and other potential risk factors with depression and anxiety in our study sample. Our findings showed that, compared to the participants who followed COVID-19-related news for less than 1 hour, the participants who followed such news for 1-2 or 3 hours were 3.1 and 4.6 times more likely to suffer from anxiety, respectively (\(p < 0.001\); Table 5). Furthermore, the retired participants showed significantly lower probability of developing anxiety (\(p = 0.026\)).

As shown in Table 6, females, individuals with age < 35 years, and participants with history of psychiatric disorder were 1.8 (\(p = 0.006\)), 1.7 (\(p = 0.043\)), and 4.4 times (\(p < 0.001\)) more likely,
respectively, to suffer from depression. In addition, the non-retired persons and individuals who spent one hour or more on following COVID-19-related news showed a higher probability of developing depression (p = 0.017 and p < 0.001, respectively).

4. DISCUSSION

In this study, we assessed the effects of COVID-19 pandemic on the prevalence of depression and anxiety in the general population of Riyadh, especially during 24-hour curfew. Our results indicated a higher prevalence of depression and anxiety among our study sample during COVID-19 pandemic. Recently, another similar study conducted in China showed an increase in anxiety, but lower depression, among general population during COVID-19, except for the individuals with age < 35 years, who also exhibited significantly lower depression [5]. Another study conducted during the MERS-COV outbreak in Jeddah, Saudi Arabia, showed moderate anxiety among half of the study participants [7].

Table 5. Logistic regression analysis of factors associated with anxiety among Riyadh population during Covid-19 pandemic

| Variables                                | p-value | Exp β (OR) | 95% CI       |
|------------------------------------------|---------|------------|--------------|
|                                          |         | Lower     | Upper        |
| Sex                                      |         |           |              |
| Male                                     | .082    | 1.472     | .952 - 2.277 |
| Female                                   | -       | -         | -            |
| Age                                      |         |           |              |
| < 35 years                                | .369    | .787      | .466 - 1.328 |
| ≥ 35 years                                | -       | -         | -            |
| Marital status                           |         |           |              |
| Single                                   | -       | -         | -            |
| Married                                  | .522    | .834      | .479 - 1.452 |
| Divorced                                 | .674    | 1.271     | .416 - 3.881 |
| Widowed                                  | .713    | .742      | .152 - 3.625 |
| Nationality                              |         |           |              |
| Saudi                                    | .897    | .951      | .444 - 2.038 |
| Non-Saudi                                | -       | -         | -            |
| Occupation                               |         |           |              |
| Student                                  | .563    | .821      | .420 - 1.603 |
| Government                               | .868    | .942      | .468 - 1.897 |
| Private                                  | .789    | .817      | .185 - 3.606 |
| Freelancers                              | .026*   | .262      | .080 - .851  |
| Retired                                  | .852    | 1.070     | .528 - 2.166 |
| Unemployed                               | -       | -         | -            |
| Living with how many persons during curfew|         |           |              |
| Alone                                    | .822    | .881      | .293 - 2.651 |
| With one                                 | .822    | .894      | .338 - 2.364 |
| Two and more                             | -       | -         | -            |
| Working in a sector that was exempt from the curfew | | | |
| No                                       | .750    | .902      | .478 - 1.702 |
| Yes                                      |         | -         | -            |
| Have movement permit during the curfew    |         |           |              |
| No                                       | .614    | .844      | .436 - 1.633 |
| Yes                                      | -       | -         | -            |
| History of COVID-19 positive              |         |           |              |
| No                                       | .551    | .445      | .031 - 6.359 |
| Yes                                      |         | -         | -            |
| Relatives or friends with COVID-19       |         |           |              |
| No                                       | .339    | .712      | .355 - 1.429 |
| Yes                                      | -       | -         | -            |
| History of psychiatric disorder          |         |           |              |
| No                                       | .249    | 1.638     | .707 - 3.795 |
| Yes                                      | -       | -         | -            |
| Time spent on watching COVID-19 news      |         |           |              |
| Less than 1h                              | .000*   | 3.082     | 1.929 - 4.924|
| 1-2h                                     |         | -         | -            |
| 3h and more                              | .000*   | 4.602     | 2.811 - 7.536|
| Knowledge of COVID-19                     |         |           |              |
| Excellent                                | .776    | .936      | .592 - 1.479 |
| Good                                     | .074    | 1.654     | .952 - 2.875 |
| Poor                                     |         | -         | -            |

* p-value < 0.05
Table 6. Logistic regression analysis of factors associated with depression among Riyadh population during Covid-19 pandemic

| Variables                              | p-value | Exp β (OR) | 95% CI Lower | 95% CI Upper |
|----------------------------------------|---------|------------|--------------|--------------|
| Sex                                    |         |            |              |              |
| Male                                   | .006*   | 1.835      | 1.189        | 2.833        |
| Female                                 |         | -          |              |              |
| Age                                    |         |            |              |              |
| < 35 years                             | .043*   | .585       | .347         | .984         |
| ≥ 35 years                             |         | -          |              |              |
| Marital status                         |         |            |              |              |
| Single                                 | -.       | -          |              |              |
| Married                                | .521    | .838       | .488         | 1.438        |
| Divorced                               | .590    | 1.346      | .457         | 3.969        |
| Widowed                                | .507    | 1.628      | .386         | 6.873        |
| Nationality                            |         |            |              |              |
| Saudi                                  | .550    | .782       | .350         | 1.750        |
| Non-Saudi                              |         | -          |              |              |
| Occupation                             |         |            |              |              |
| Student                                | .173    | .633       | .329         | 1.221        |
| Government                             | .393    | .741       | .373         | 1.474        |
| Private                                | .693    | 1.324      | .328         | 5.335        |
| Freelancers                            | .017*   | .248       | .079         | .780         |
| Retired                                | .918    | 1.036      | .524         | 2.050        |
| Not working                            |         |            |              |              |
| Living with how many persons during curfew |         |            |              |              |
| Alone                                  | .523    | .708       | .246         | 2.042        |
| With one                               | .308    | .617       | .244         | 1.559        |
| Two and more                           |         |            |              |              |
| Working in a sector that was exempt from the curfew |         |            |              |              |
| No                                     | .823    | 1.075      | .571         | 2.022        |
| Yes                                    |         | -          |              |              |
| Have movement permit during the curfew |         |            |              |              |
| No                                     | .485    | .790       | .408         | 1.531        |
| Yes                                    |         | -          |              |              |
| History of COVID-19 positive           |         |            |              |              |
| No                                     | .110    | 4.632      | .706         | 30.412       |
| Yes                                    |         | -          |              |              |
| Relatives or friends with COVID-19    |         |            |              |              |
| No                                     | .050    | .480       | .230         | 1.001        |
| Yes                                    |         | -          |              |              |
| History of psychiatric disorder        |         |            |              |              |
| No                                     | .000*   | 4.437      | 1.930        | 10.199       |
| Yes                                    |         | -          |              |              |
| Time spent on watching COVID-19 news   |         |            |              |              |
| Less than 1h                           | .000*   | 2.405      | 1.498        | 3.864        |
| 1-2h                                   |         | -          |              |              |
| 3h and more                            | .000*   | 3.909      | 2.389        | 6.395        |
| Knowledge of COVID-19                  |         |            |              |              |
| Excellent                              | .591    | .884       | .565         | 1.385        |
| Good                                   | .262    | 1.375      | .788         | 2.397        |
| Poor                                   |         | -          |              |              |

*p-value<0.05

Our results showed that anxiety and depression were more prevalent in three groups: females, adults with age less than 35 years, and unmarried participants. These findings correspond to a meta-analysis conducted in Saudi Arabia, which showed that females exhibited a higher risk of development of depression compared to males [10]. A study done in Iran also reported females to exhibit a higher level of anxiety than males [11]. A similar study conducted in Italy also showed that
Covid-19 pandemic had a higher impact over the female participants and those with age < 37 years [12].

Our logistic regression analysis revealed that spending a higher amount of time following COVID-19-related news was associated with a higher level of anxiety and depression. Our findings were in agreement with the results of a previous study in China that reported higher prevalence of anxiety among the individuals who were focused on the pandemic for ≥3 hours per day [5]. Another study conducted in Iran showed higher intensity and degree of anxiety among the individuals who followed more COVID-19-related news [11]. Similarly, the individuals who used social media or text messages to receive critical updates regarding the pandemic during the lockdown exhibited higher levels of stress [2,13,14]. Our study also showed that the retired individuals exhibited lesser psychological impact during the outbreak.

Furthermore, we noticed that female participants were around twice more likely to develop depression than males. This result was similar to those of two studies conducted in China in two different settings during the COVID-19 outbreak [13,15]. Age factor was associated with depression among our participants. Compared to adults aged 35 years and older, participants younger than 35 years were 1.7 times more likely to be depressed. Our findings corroborated the results of a previous Chinese study [4]. As expected, our findings suggested that a history of a psychiatric illness could increase the risk of depression by 4.4 times during COVID-19 pandemic.

This study has several limitations. First, it was conducted during the 24-hour curfew period, which entailed mass isolation in all Saudi provinces due to the COVID-19 outbreak, so the use of online interviews as the only tools for patient evaluation is a key limitation for this study. Second, while publishing this study, the outbreak was still active and the population’s mental health status might worsen in future. Third, since this was a descriptive cross-sectional study, it was hard to arrive at causal inferences. Fourth, there might be a possibility of sampling bias since we used non-probability convenient sampling method for recruitment of participants.

As the COVID-19 pandemic and related emergency are still active, our findings might help the decision makers to explore the needs of the community and develop adequate psychological support interventions.

5. CONCLUSION

In conclusion, we identified the prevalence of higher levels of depression and anxiety among the general population of Riyadh during COVID-19 pandemic. We report that females, younger individuals (age < 35 years), and individuals with history of psychiatric illness are more vulnerable and require more support during this crisis. We recommend the general public to limit their time in watching and following COVID-19-related news.

CONSENT AND ETHICAL APPROVAL

Approval from the institutional review board was attained from King Fahad Medical City, Ministry of Health. Prior to the study, all the 651 participants provided informed consent.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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