Psychological Distress, Fear, and Coping Strategies among Citizens and Residents in Saudi Arabia During the COVID-19 Pandemic

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Abstract

Background: COVID-19 caused the worst international public health crisis, accompanied by major global economic downturns, mass-scale job losses, which impacted on the psychosocial wellbeing of the worldwide population. This study examined factors associated with psychosocial distress, fear of COVID-19 and coping strategies amongst the general population in Saudi Arabia.

Methods: A cross-sectional study was conducted using an anonymous online questionnaire. Multivariate logistic regressions were used; Adjusted Odds Ratio (AOR) with 95% Confidence Intervals (CIs) was reported.

Results: Among 803 participants, 70 % (n=556), were females and the median age was 27 years; 35% (n=278), were frontline or essential service workers; 24% (n=195), reported comorbid conditions including mental health illness. Factors associated with moderate to high levels of psychological distress were: youth (18 - 29 years) (AOR 3.35, 95% CIs 2.06 - 5.44), females (2.59, 1.60 - 4.19), non-Saudi nationals (2.17, 1.11 - 4.26), change in employment (2.9, 1.73 - 4.87), negative financial impact (2.14, 1.29-3.56), having comorbidities (2.67, 1.47 - 4.87), and current smoking (2.87, 1.55 - 5.33). Being ex-smokers (3.72, 1.14 - 12.14) and change in employment (3.42, 1.91 - 6.11) were associated with higher levels of fear of COVID-19. People whose financial situation was impacted and who had contact with known/suspected cases (1.63, 1.12-2.38) had low medium to high resilient coping.

Conclusions: People in Saudi Arabia were at a higher risk of psychosocial distress and fear along with low resilience during the COVID-19 pandemic, warranting urgent attention from healthcare providers and policymakers, to provide specific mental health support strategies for their wellbeing currently and to avoid a post-pandemic mental health crisis.

Background

The COVID-19 disease, since its outbreak in China, has spread widely affecting more than 213 countries and territories around the world. As of mid of August 2021, globally, more than 200 million people have tested positive for coronavirus infection, with more than four million fatalities [1]. COVID-19 caused the worst international health crisis of recent times, accompanied by a major global economic downturn, mass-scale job losses, all of them leading to psycho-social issues among people. Countries were forced to adopt extreme measures such as quarantine or self-isolation of the infected and their close contacts, prevent the public gathering, closing schools and universities, travel bans, closing territorial and international borders and in some cases, forcing complete lockdown of cities [2].

In Saudi Arabia, the first Covid-19 positive case was identified in the first week of March 2020 [3]. As mid of August 2021, Saudi Arabia has recorded 536,693 cases, with 8378 fatalities [1]. The lower fatality rate of 1.7% in Saudi Arabia compared with the international rate of 3.2% indicates that Saudi Arabia has handled the crisis relatively better than other countries [4]. The authorities in Saudi Arabia responded to the pandemic rapidly and imposed several measures to reduce the spread of the infection: closed all...
borders and suspended international flights and internal transports, including pilgrimages to the Prophet's Mosque in Madinah, an unprecedented decision since 1858 [5]. Curfew was imposed for several hours a day in many cities, together with the closure of schools and workplaces and cancellation of larger social and religious events and services [5]. Furthermore, a national campaign of mass screening was initiated, where people with COVID-19 like symptoms were screened, along with their close contacts [6]. Those who returned a positive Polymerase Chain Reaction (PCR) test had to undergo mandatory 14-day quarantine [7]. In addition, arriving travellers were initially required to undergo institutional quarantine.

Saudi citizens and residents were regularly updated with the latest news and preventive measures by text messages [8, 9]. The supply of essentials goods, such as food and medicine, was ensured by home delivery.

Reports from several countries have indicated that the drastic but unavoidable measures taken to prevent the spread of COVID-19 have deeply impacted people's lifestyles, with negative physical and mental health consequences [9–11]. There has been widespread anxiety and distress in all affected countries, arising from prolonged self-isolation and quarantine, infection fears, frustration, boredom, shortage of essential supplies, inadequate information, and financial losses [12]. Even in countries such as Australia, where the infection and case fatality rate was very low, compared to other developed countries such as the USA or UK, people were distressed because of the potential to be infected with the virus, even without close contact with an infected person and the rapid spread within the communities [13, 14].

Depoux, Martin [15] warned of the possibilities of adverse psychosomatic outcomes among people due to the pandemic, which is likely to be compounded by the constant flow of information (sometimes, misinformation) via online and various forms of social media. It is feared that the rapidly expanding mass hysteria and panic regarding COVID-19 may lead to long-term psychological problems among people, regardless of their socioeconomic status [15]. The limited studies on the impact of pandemics on society concerning previous experiences such as SARS, have pointed to many stressors linked to disease outbreaks and pandemics [16, 17]. Few studies have examined the factors associated with mental wellbeing within Saudi Arabia and a study focused on the psychological impact of COVID-19 in Bahrain [7] and the United Arab Emirates [18]. A Saudi survey reports that 19.6% of 3017 respondents had moderate to severe anxiety levels during the pandemic [19]. Another study reported the occurrence of moderate or severe psychological impact among 23.6% of respondents [20]. Regarding residents in Saudi Arabia, most of them are temporary workers, mainly from low-income and middle-income countries. It is well documented that COVID-19 related deaths and infections had been disproportionately high among them compared to a high-income country like Saudi Arabia [2]. Previous research from Saudi Arabia examined the psychological impact among healthcare workers [21, 22]. However, the present study aimed at examining the factors associated with psychosocial distress, fear of COVID-19 and coping strategies amongst the general population of Saudi Arabia.

Methods
Aim of the study

This study aimed to examine the factors associated with psychosocial distress, fear of COVID-19 and coping strategies amongst the general population in Saudi Arabia.

Study design and settings

This cross-sectional study was conducted among the general population Saudi Arabia. The study was conducted over 30 days, from 15th December 2020 to 15th January 2021. The participants were aged between 18 and 65 years old. The questionnaire was designed in accordance with the previously published literature and the survey was pre-tested for validation amongst migrants and non-migrants [14, 23]. The present study used same methods and tools that used for the previous studies [14, 24].

Study population and sample size

The study population included people residing in Saudi Arabia (irrespective of nationality), ≥18 years old and could respond to either Arabic or English questionnaires on an online platform. This included including patients, frontline health and other essential service workers, and general community members. Snowball sampling was used to select study participants, so that the respondents could forward the survey link to their personal and professional networks. OpenEpi software was used to calculate the sample size. Considering 35.3 million populations in Saudi Arabia [25] assuming 50% prevalence of stress among the people, at 95% confidence intervals and 80% power, the estimated minimum sample size was 385.

Data Collection

An online link in Arabic and English was created with a structured survey questionnaire using the Google form. The plain language information statement and the informed consent form appeared on the first screen. Only the participants, who provided informed consent and agreed to participate in the study, could move to the next screen containing the single eligibility criteria of being an adult. The subsequent screens had the complete study questionnaire. The anonymous questionnaire was introduced, and the invitation, which included an internet link and a QR code, was distributed via social media platforms, online community networks, staff and student email databases of participating universities/hospitals. Participants had the freedom to complete the questionnaire in their free time at home or while waiting to see a doctor. The online survey did not capture any personally identifiable information from them.

Study tool

The structured survey questionnaire was adapted from a previous Australian study conducted for the same objective of this study [14]. Psychological distress was measured using the Kessler Psychological Distress Scale (K-10) [26], fear was measured using the Fear of COVID-19 Scale (FCV-19S) [27], and coping was measured using Brief Resilient Coping Scale (BRCS) [28]. The tools have been recently
examined for reliability and validity and it was found that these tools are valid and reliably amongst both migrant and non-migrant populations in Australia [23].

**Ethical Considerations**

All participants were requested to sign an informed consent form before filling the questionnaire to register their willingness to participate. All methods were performed in accordance with the relevant guidelines and regulations of the Declaration of Helsinki. Ethical approval was obtained from the Human Research Ethics Committee in King Fahad Medical City, Saudi Arabia (H-01-R-012).

**Data Analyses**

The database was downloaded from Google form and analyzed using SPSS v.25. Descriptive analyses had been undertaken to describe the study variables. Mean and standard deviations were computed for the continuous variable (age) and each scale (K10, FCV-19S and BRCS), while proportions were reported for categorical variables. To conduct inferential analysis K10 was defined into low (score 10–15) and moderate to very high (score 16–50), FCV-19S scale was categorized into low (score 7–21) or high (score 22–35) and BRCS into low (score 4–13) and medium to high (score 14–20) resilient coping. Cross-tabulation of the factors associated with psychological distress was done by comparing low and moderate to very high distress on the K10 scale. Factors associated with fear of COVID-19 were identified by comparing low and high fear on the FCV-19S scale, and factors associated with coping were identified by comparing low and medium to high resilient coping on the BRCS scale. Multivariable logistic regression analyses were performed to investigate the factors of moderate to very high distress on the K10 scale, high level of fear of COVID-19 on the FCV-19S scale, and medium to high resilient coping on the BRCS scale. Statistical significance was determined by \( p < 0.05 \). Odds Ratios (ORs) with a 95% confidence interval (CI) was used to assess the strength of the association. Adjusted ORs (AORs) indicated adjustment of potential confounding variables.

**Results**

A total of 803 individuals, aged \( \geq 18 \) years, living in Saudi Arabia, participated in this study. Table 1 presents the characteristics of the participants. More than half of the participants (57.1%) were younger (18-29 years) and the majority (69.5%) were females, had a bachelor’s degree or above (64.5%), and were living with family (85.8%). More than a third (34.6%) of the participants worked as frontline or essential service workers during the pandemic. Just over a third (33.7%) reported negative financial impact due to COVID-19. Only 16.3% of the participants were current smokers, and more than half (56.5%) of them increased smoking during the pandemic. About a quarter (24.3%) reported pre-existing comorbid conditions including mental health issues (5.6%). About a tenth (8.2%) of the participants had tested positive for COVID-19, while over a tenth (12%) tested negative. More than a third (36.2%) had close contact with confirmed or suspected COVID-19 cases.
| Characteristics                              | Total n (%) |
|---------------------------------------------|-------------|
| **Total study participants**                | 803         |
| **Age in years**                            |             |
| Mean (±SD)                                  | 29.1 (9.04) |
| Median                                      | 27          |
| Range                                       | 18 – 61     |
| **Age groups**                              |             |
| 18 - 29 years                               | 380 (57.1)  |
| 30 - 39 years                               | 181 (27.2)  |
| 40 - 61 years                               | 104 (15.6)  |
| **Gender**                                  |             |
| Male                                        | 244 (30.5)  |
| Female                                      | 556 (69.5)  |
| **Educational attainment**                  |             |
| Grade 1 to grade 6                          | 2 (0.3)     |
| Grade 7 to grade 12                         | 203 (25.4)  |
| Trade/certificate/diploma                   | 79 (9.9)    |
| Bachelor or above                           | 516 (64.5)  |
| **Living status**                           |             |
| Live without family members                 | 114 (14.3)  |
| Live with family members                    | 686 (85.8)  |
| **Citizenship**                             |             |
| Non-Saudi                                   | 122 (15.3)  |
| Saudi                                       | 678 (84.8)  |
| **Current employment status**               |             |
| Unemployed                                  | 0           |
| Jobs affected by COVID-19 (lost job/working hours reduced) | 529 (67.9)  |
| Characteristics                                                              | Total n (%) |
|------------------------------------------------------------------------------|-------------|
| Jobs unaffected by COVID-19 (employed/Government benefits)                   | 250 (32.1)  |
| Perceived distress due to change of employment status                        | 770         |
| A little to none                                                             | 497 (64.5)  |
| Moderate to a great deal                                                      | 273 (35.5)  |
| Frontline or essential service worker (Self-identification)                  | 803         |
| No                                                                           | 525 (65.4)  |
| Yes                                                                          | 278 (34.6)  |
| COVID-19 impacted financial situation                                        | 803         |
| No impact                                                                    | 399 (49.7)  |
| Positive impact                                                              | 133 (16.6)  |
| Negative impact                                                              | 271 (33.7)  |
| Co-morbidities                                                               | 803         |
| No                                                                           | 608 (75.7)  |
| Psychiatric/Mental health issues                                              | 45 (5.6)    |
| Other co-morbidities*                                                         | 150 (18.7)  |
| Smoking                                                                      |             |
| Never smoker                                                                 | 650 (80.9)  |
| Ex-smoker                                                                    | 22 (2.7)    |
| Current smoker                                                               | 131 (16.3)  |
| Increased smoking over the last 6 months                                      | 131         |
| No                                                                           | 57 (43.5)   |
| Yes                                                                          | 74 (56.5)   |
| Contact with known/suspected COVID-19 cases                                  | 784         |
| No                                                                           | 500 (63.8)  |
| Yes                                                                          | 284 (36.2)  |
| COVID-19 related experiences                                                 | 773         |
| No known diagnosis of COVID-19                                               | 600 (77.6)  |
| Characteristics                                                                 | Total n (%) |
|--------------------------------------------------------------------------------|-------------|
| Tested positive for COVID-19                                                   | 63 (8.2)    |
| Tested negative for COVID-19 but self-isolating                               | 93 (12.0)   |
| Recent overseas travel history and was in quarantine                           | 17 (2.2)    |
| **Healthcare service used to overcome COVID-19 related stress in the past 6 months** | 770          |
| No                                                                             | 658 (85.5)  |
| Yes                                                                            | 112 (14.5)  |

**Psychological distress**

Among the study participants, 72% experienced moderate to very high levels of psychological distress. One in four individuals (25.8%) experienced very high levels of psychological distress (Table 2). After adjusting for the effects of potential confounders, evidence of significant association for moderate to very high psychological distress was observed with age, sex, nationality, perceived distress due to change of employment, the financial impact of COVID-19, having co-morbidities and current smoking. (Table 3).
Table 2
Psychological distress among adults during the COVID-19 pandemic in Saudi Arabia

| Anxiety and depression checklist (K10)                                                                 | Total |
|--------------------------------------------------------------------------------------------------------|-------|
| About how often did you feel tired for no good reason?                                                  | 803   |
| None                                                                                                   | 233 (29.0) |
| A little                                                                                                | 193 (24.0) |
| Sometime                                                                                                | 239 (29.8) |
| Most of the time                                                                                        | 109 (13.6) |
| All the time                                                                                            | 29 (3.6) |
| About how often did you feel nervous?                                                                  | 803   |
| None                                                                                                   | 165 (20.5) |
| A little                                                                                                | 218 (27.1) |
| Sometime                                                                                                | 212 (26.4) |
| Most of the time                                                                                        | 146 (18.2) |
| All the time                                                                                            | 62 (7.7) |
| About how often did you feel so nervous that nothing could calm you down?                               | 803   |
| None                                                                                                   | 343 (42.7) |
| A little                                                                                                | 178 (22.2) |
| Sometime                                                                                                | 157 (19.6) |
| Most of the time                                                                                        | 79 (9.8) |
| All the time                                                                                            | 46 (5.7) |
| About how often did you feel hopeless?                                                                  | 803   |
| None                                                                                                   | 329 (41.0) |
| A little                                                                                                | 190 (23.7) |
| Sometime                                                                                                | 139 (17.3) |
| Most of the time                                                                                        | 95 (11.8) |
| All the time                                                                                            | 50 (6.2) |
| About how often did you feel restless or fidgety?                                                       | 803   |
| None                                                                                                   | 185 (23.0) |
| Anxiety and depression checklist (K10) | Total |
|---------------------------------------|-------|
|                                       | n (%) |
| A little                               | 223 (27.8) |
| Sometime                               | 225 (28) |
| Most of the time                       | 136 (16.9) |
| All the time                           | 34 (4.2) |
| **About how often did you feel so restless you could not sit still?** | 803 |
| None                                  | 333 (41.5) |
| A little                               | 233 (29.0) |
| Sometime                               | 140 (17.4) |
| Most of the time                       | 77 (9.6) |
| All the time                           | 20 (2.5) |
| **About how often did you feel depressed?** | 803 |
| None                                  | 310 (38.6) |
| A little                               | 211 (26.3) |
| Sometime                               | 153 (19.1) |
| Most of the time                       | 90 (11.2) |
| All the time                           | 39 (4.9) |
| **About how often did you feel that everything was an effort?** | 803 |
| None                                  | 227 (28.3) |
| A little                               | 237 (29.5) |
| Sometime                               | 168 (20.9) |
| Most of the time                       | 89 (11.1) |
| All the time                           | 82 (10.2) |
| **About how often did you feel so sad that nothing could cheer you up?** | 803 |
| None                                  | 286 (35.6) |
| A little                               | 205 (25.5) |
| Sometime                               | 159 (19.8) |
| Most of the time                       | 92 (11.5) |
| Anxiety and depression checklist (K10) | Total |
|---------------------------------------|-------|
| **n (%)**                             |       |
| All the time                          | 61 (7.6) |
| About how often did you feel worthless? | 803   |
| None                                  | 417 (51.9) |
| A little                               | 148 (18.4) |
| Sometime                               | 105 (13.1) |
| Most of the time                       | 71 (8.8) |
| All the time                           | 62 (7.7) |
| **K10 score (total)**                  | 803   |
| Mean (±SD)                             | 22.85 (9.88) |
| Minimum – Maximum                      | 10 to 50 |
| Level of psychological distress (K10 categories) | 803 |
| Low (score 10–15)                      | 225 (28.0) |
| Moderate (score 16–21)                 | 196 (24.4) |
| High (score 22–29)                     | 175 (21.8) |
| Very high (score 30–50)                | 207 (25.8) |
Table 3
Factors associated with psychological distress among adults in Saudi Arabia.

| Characteristics                        | n (row %) | Moderate to Very High (score 16–50) | Total | P     | AOR  | 95% CI       |
|----------------------------------------|-----------|-------------------------------------|-------|-------|------|--------------|
|                                        | Low (score 10 - 15) |                     |       |       |      |              |
| Age groups                             |           |                                     |       |       |      |              |
| > 29 years                             | 118 (41.8) | 164 (58.2)                          | 282   |       | 1    |              |
| 18 - 29 years                          | 60 (15.8)  | 320 (84.2)                          | 380   | 0.000 | 3.35 | 2.06 - 5.44 |
| Sex                                    |           |                                     |       |       |      |              |
| Male                                   | 107 (43.9)| 137 (56.1)                          | 244   |       | 1    |              |
| Female                                 | 118 (21.2)| 438 (78.8)                          | 556   | 0.000 | 2.59 | 1.60 - 4.19 |
| Educational attainment                 |           |                                     |       |       |      |              |
| Grade 1 – 12                           | 37 (18.0) | 168 (82.0)                          | 205   | 1     |      |              |
| Trade/certificate/diploma              | 36 (45.6) | 43 (54.4)                           | 79    | 0.138 | 0.51 | 0.21 - 1.24 |
| Bachelor or above                      | 150 (29.1)| 366 (70.9)                          | 516   | 0.875 | 0.95 | 0.53 - 1.71 |
| Living status                          |           |                                     |       |       |      |              |
| Live without family members            | 36 (31.6) | 78 (68.4)                           | 114   |       |      |              |
| Live with family members               | 187 (27.3)| 499 (72.7)                          | 686   | 0.119 | 1.7  | 0.87 - 3.32 |
| Nationality                            |           |                                     |       |       |      |              |
| Saudi                                  | 191 (28.2)| 487 (71.8)                          | 678   | 1     |      |              |
| Non-Saudi                              | 33 (27.0) | 89 (73.0)                           | 122   | 0.024 | 2.17 | 1.11 - 4.26 |
| Current employment condition           |           |                                     |       |       |      |              |
| Job unaffected by COVID-19 (employed/Government benefits) | 56 (22.4) | 194 (77.6)                          | 250   | 1     |      |              |
| Job affected by COVID-19 (lost job/working hours reduced/ | 166 (31.4)| 363 (68.6)                          | 529   | 0.605 | 0.87 | 0.51 - 1.48 |
| Characteristics                                           | n (row %)          | P   | AOR       | 95% CI      |
|-----------------------------------------------------------|--------------------|-----|-----------|-------------|
|                                                           | Low (score 10-15) |     | Moderate to Very High (score 16-50) | Total |     |         |             |
| Perceived distress due to change of employment condition  |                    |     |           |             |
| A little to none                                          | 181 (36.4)         |     | 316 (63.6) | 497        | 1    |         |             |
| Moderate to a great deal                                   | 36 (13.2)          |     | 237 (86.8) | 273        | 0.000| 2.90    | 1.73 - 4.87 |
| Frontline or essential service worker (self-identification)|                    |     |           |             |
| No                                                        | 137 (26.1)         |     | 388 (73.9) | 525        | 1    |         | 0.57 - 1.52 |
| Yes                                                       | 88 (31.7)          |     | 190 (68.3) | 278        | 0.778| 0.93    |             |
| COVID-19 impacted financial situation                     |                    |     |           |             |
| No impact                                                 | 134 (33.6)         |     | 265 (66.4) | 399        | 1    |         |             |
| Positive impact                                           | 37 (27.8)          |     | 96 (72.2)  | 133        | 0.133| 1.55    | 0.87 - 2.76 |
| Negative impact                                           | 54 (19.9)          |     | 217 (80.1) | 271        | 0.003| 2.14    | 1.29 - 3.56 |
| Co-morbidities                                            |                    |     |           |             |
| No                                                        | 186 (30.6)         |     | 422 (69.4) | 608        | 1    |         |             |
| Psychiatric/Mental health issues                          | 4 (8.9)            |     | 41 (91.1)  | 45         | 0.091| 2.72    | 0.85 - 8.66 |
| Other co-morbidities                                     | 35 (23.3)          |     | 115 (76.7) | 150        | 0.001| 2.67    | 1.47 - 4.87 |
| Smoking                                                   |                    |     |           |             |
| Never smoker                                              | 192 (29.5)         |     | 458 (70.5) | 650        | 1    |         |             |
| Ex-smoker                                                 | 8 (36.4)           |     | 14 (63.6)  | 22         | 0.782| 1.18    | 0.37 - 3.79 |
| Current smoker                                            | 25 (19.1)          |     | 106 (80.9) | 131        | 0.001| 2.87    | 1.55 - 5.33 |
| Characteristics | n (row %) | P | AOR | 95% CI |
|-----------------|----------|---|-----|--------|
|                  |          |   |     |        |
|                  | Low (score 10 - 15) | Moderate to Very High (score 16 - 50) | Total |       |
| Contact with known/suspected COVID-19 cases | | | | |
| No              | 141 (28.2) | 359 (71.8) | 500 | 1 |
| Yes             | 77 (27.1)  | 207 (72.9) | 284 | 0.184 | 0.73 | 0.46 - 1.16 |
| COVID-19 related experiences | | | | |
| No known diagnosis of COVID-19 | 165 (27.5) | 435 (72.5) | 600 | 1 |
| Tested positive for COVID-19 | 22 (34.9) | 41 (65.1) | 63 | 0.642 | 0.82 | 0.36 - 1.88 |
| Tested negative for COVID-19 but self-isolating | 26 (28.0) | 67 (72.0) | 93 | 0.612 | 0.84 | 0.43 - 1.64 |
| Recent overseas travel history and was in quarantine | 3 (17.6) | 14 (82.4) | 17 | 0.361 | 2.22 | 0.40 - 12.28 |

**Fear of COVID-19**

Among the participants, one in 10 (11.1%) demonstrated high levels of fear of COVID-19 (Table 4). In the multivariate analyses, it was found that a high level of fear of COVID-19 was significantly associated with perceived distress due to change of employment situation and smoking status. Individuals who perceived moderate to a great deal of distress due to change in employment were 3.42 (95% CI: 1.91 - 6.11) times more likely to experience high levels of fear of COVID-19 compared to the individuals who perceived a little or no distress. Being an ex-smoker was associated with higher levels of anxiety of COVID-19 compared to those who never smoked (AOR .72, 95% CI: 1.14 - 12.14) (Table 5).
| Fear of COVID-19 Scale (FCV-19S) items                                      | Total |
|---------------------------------------------------------------------------|-------|
|                                                                           | n (%) |
| **I am most afraid of COVID-19**                                          | 803   |
| Strongly disagree                                                         | 275 (34.2) |
| Somewhat disagree                                                         | 175 (21.8) |
| Neither agree nor disagree                                                 | 190 (23.7) |
| Somewhat agree                                                            | 138 (17.2) |
| Strongly agree                                                            | 25 (3.1) |
| **It makes me uncomfortable to think about COVID-19**                     | 803   |
| Strongly disagree                                                         | 245 (30.5) |
| Somewhat disagree                                                         | 162 (20.2) |
| Neither agree nor disagree                                                 | 168 (20.9) |
| Somewhat agree                                                            | 187 (23.3) |
| Strongly agree                                                            | 41 (5.1) |
| **My hands become clammy when I think about COVID-19**                    | 803   |
| Strongly disagree                                                         | 532 (66.3) |
| Somewhat disagree                                                         | 160 (19.9) |
| Neither agree nor disagree                                                 | 75 (9.3) |
| Somewhat agree                                                            | 27 (3.4) |
| Strongly agree                                                            | 9 (1.1) |
| **I am afraid of losing my life because of COVID-19**                     | 803   |
| Strongly disagree                                                         | 388 (48.3) |
| Somewhat disagree                                                         | 164 (20.4) |
| Neither agree nor disagree                                                 | 127 (15.8) |
| Somewhat agree                                                            | 84 (10.5) |
| Strongly agree                                                            | 40 (5.0) |
| **When watching news and stories about COVID-19 on social media, I become nervous or anxious** | 803   |
| Fear of COVID-19 Scale (FCV-19S) items                                      | Total |
|--------------------------------------------------------------------------|-------|
| Strongly disagree                                                        | 269 (33.5) |
| Somewhat disagree                                                        | 166 (20.7) |
| Neither agree nor disagree                                               | 173 (21.5) |
| Somewhat agree                                                           | 156 (19.4) |
| Strongly agree                                                           | 39 (4.9) |
| I cannot sleep because I’m worrying about getting COVID-19               | 803   |
| Strongly disagree                                                        | 554 (69.0) |
| Somewhat disagree                                                        | 130 (16.2) |
| Neither agree nor disagree                                               | 87 (10.8) |
| Somewhat agree                                                           | 19 (2.4) |
| Strongly agree                                                           | 13 (1.6) |
| My heart races or palpitates when I think about getting COVID-19          | 803   |
| Strongly disagree                                                        | 501 (62.4) |
| Somewhat disagree                                                        | 145 (18.1) |
| Neither agree nor disagree                                               | 100 (12.5) |
| Somewhat agree                                                           | 45 (5.6) |
| Strongly agree                                                           | 12 (1.5) |
| FCV-19S score (total)                                                    | 803   |
| Mean (±SD)                                                               | 14.01 (6.05) |
| Minimum – Maximum                                                        | 7 to 35 |
| Level of fear of COVID-19 (FCV-19S categories)                           | 803   |
| Low (score 7–21)                                                         | 714 (88.9) |
| High (score 22–35)                                                       | 89 (11.1) |
Table 5  
Factors associated with the fear of COVID-19 among adults in Saudi Arabia

| Characteristics                          | n (row %)                      | P   | AOR | 95% CI       |
|------------------------------------------|-------------------------------|-----|-----|--------------|
|                                          | Low (score 7 - 21) | High (score 22 - 35) | Total |               |
| Age groups                               |                               |     |     |              |
| 18 - 29 years                            | 339 (89.2)        | 41 (10.8)   | 380   | 0.989        | 1.00 | 0.53-1.88 |
| > 29 years                               | 248 (87.0)        | 37 (13.0)   | 285   | 1.000        |      |          |
| Sex                                      |                               |     |     |              |
| Male                                     | 220 (90.2)        | 24 (9.8)    | 244   | 1            |      |          |
| Female                                   | 492 (88.5)        | 64 (11.5)   | 556   | 0.602        | 1.20 | 0.61-2.38|
| Educational attainment                   |                               |     |     |              |
| Grade 1 – 12                             | 189 (92.2)        | 16 (7.8)    | 205   | 1            |      |          |
| Trade/certificate/diploma                | 68 (86.1)         | 11 (13.9)   | 79    | 0.741        | 1.19 | 0.42-3.42|
| Bachelor or above                        | 454 (88.0)        | 62 (12.0)   | 516   | 0.879        | 0.94 | 0.44-2.03|
| Living status                            |                               |     |     |              |
| Live without family members              | 90 (78.9)         | 24 (21.1)   | 114   | 1            |      |          |
| Live with family members                 | 621 (90.5)        | 65 (9.5)    | 686   | 0.213        | 0.61 | 0.28-1.33|
| Nationality                              |                               |     |     |              |
| Saudi                                    | 608 (89.7)        | 70 (10.3)   | 678   | 1            |      |          |
| Non-Saudi                                | 104 (85.2)        | 18 (14.8)   | 122   | 0.600        | 0.79 | 0.33-1.88|
| Current employment condition             |                               |     |     |              |
| Job unaffected by COVID-19 (employed/Government benefits) | 227 (90.8) | 23 (9.2)    | 250   | 1            |      |          |
| Characteristics | n (row %) | P | AOR | 95% CI |
|-----------------|----------|---|-----|-------|
|                 | Low (score 7 - 21) | High (score 22 - 35) | Total |       |       |
| Job affected by COVID-19 (lost job/working hours reduced/) | 464 (87.7) | 65 (12.3) | 529 | 0.188 | 1.58 | 0.80 - 3.12 |
| Perceived distress due to change of employment condition | | | | | |
| A little to none | 462 (93.0) | 35 (7) | 497 | | | |
| Moderate to a great deal | 219 (80.2) | 54 (19.8) | 273 | 0.000 | 3.42 | 1.91 - 6.11 |
| Frontline or essential service worker (self-identification) | | | | | |
| No | 489 (91.4) | 45 (8.6) | 525 | | | |
| Yes | 234 (84.2) | 44 (15.8) | 278 | 0.062 | 1.79 | 0.97 - 3.31 |
| COVID-19 impacted financial situation | | | | | |
| No impact | 366 (91.7) | 33 (8.3) | 399 | 1 | | |
| Positive impact | 121 (91.0) | 12 (9.0) | 133 | 0.815 | 1.10 | 0.50 - 2.44 |
| Negative impact | 227 (83.8) | 44 (16.2) | 271 | 0.282 | 1.40 | 0.76 - 2.59 |
| Co-morbidities | | | | | |
| No | 544 (89.5) | 64 (10.5) | 608 | 1 | | |
| Psychiatric/Mental health issues | 40 (88.9) | 5 (11.1) | 45 | 0.876 | 0.92 | 0.31 - 2.72 |
| Other co-morbidities | 130 (86.7) | 20 (13.3) | 150 | 0.207 | 1.55 | 0.78 - 3.07 |
| Smoking | | | | | |
| Never smoker | 587 (90.3) | 63 (9.7) | 650 | 1 | | |
| Ex-smoker | 17 (77.3) | 5 (22.7) | 22 | 0.029 | 3.72 | 1.14 - 12.14 |
| Characteristics                                             | n (row %) | P  | AOR | 95% CI       |
|------------------------------------------------------------|-----------|----|-----|--------------|
|                                                            | Low (score 7 - 21) | High (score 22 - 35) | Total |               |
| Current smoker                                             | 110 (84.0) | 21 (16.0) | 131 | 0.098        | 1.79 | 0.90 - 3.55 |
| Contact with known/suspected COVID-19 cases                |           |     |     |              |
| No                                                         | 454 (90.8) | 46 (9.2)  | 500 | 1            |     |             |
| Yes                                                        | 245 (86.3) | 39 (13.7) | 244 | 0.349        | 1.32 | 0.74 - 2.37 |
| COVID-19 related experiences                               |           |     |     |              |
| No known diagnosis of COVID-19                             | 540 (90.0) | 60 (10.0) | 600 |              |     |             |
| Tested positive for COVID-19                               | 55 (87.3)  | 8 (12.7)   | 63  | 0.263        | 0.54 | 0.19 - 1.58 |
| Tested negative for COVID-19 but self-isolating           | 77 (82.8)  | 16 (17.2)  | 93  | 0.860        | 1.08 | 0.47 - 2.45 |
| Recent overseas travel history and was in quarantine       | 12 (70.6)  | 5 (29.4)   | 17  | 0.564        | 0.52 | 0.06 - 4.84 |

**Coping strategies**

More than half (55.8%) of the participants had medium to high resilient coping (Table 6). Significant association for high resilience coping was observed with perceived distress due to change of employment conditions, the economic impact of the COVID-19 pandemic, and contact with known or suspected cases. Individuals who reported positive (AOR: 1.68, 95% CI: 1.03 - 2.75) or negative economic impact (AOR: 1.82, 95% CI: 1.22 - 2.71) of COVID-19 were more likely to have medium to high resilient coping. In addition, individuals who had contact with confirmed or suspected COVID-19 cases were more likely to have medium to high resilient coping (AOR: 1.63, 95% CI: 1.12 - 2.38). On the other hand, those who perceived distress due to employment changes had low resilient coping (AOR 0.63, 95% CI 0.43-0.92).
Table 6
Coping during COVID-19 pandemic in Saudi Arabia

| Brief Resilient Coping Scale (BRCS)                                                                 | Total  |
|---------------------------------------------------------------------------------------------------|--------|
|                                                                                                   | n (%)  |
| I look for creative ways to alter difficult situations                                           | 802    |
| Does not describe me at all                                                                       | 87 (10.8) |
| Does not describe me                                                                             | 101 (12.6) |
| Neutral                                                                                           | 278 (34.7) |
| Describes me                                                                                      | 275 (34.3) |
| Describes me very well                                                                           | 61 (7.6) |
| Regardless of what happens to me, I believe I can control my reaction to it                       | 802    |
| Does not describe me at all                                                                       | 43 (5.4) |
| Does not describe me                                                                             | 82 (10.2) |
| Neutral                                                                                           | 248 (30.9) |
| Describes me                                                                                      | 332 (41.4) |
| Describes me very well                                                                           | 97 (12.1) |
| I believe I can grow in positive ways by dealing with difficult situations                        | 802    |
| Does not describe me at all                                                                       | 32 (4.0) |
| Does not describe me                                                                             | 42 (5.2) |
| Neutral                                                                                           | 204 (25.4) |
| Describes me                                                                                      | 395 (49.3) |
| Describes me very well                                                                           | 129 (16.1) |
| I actively look for ways to replace the losses I encounter in life                                | 802    |
| Does not describe me at all                                                                       | 63 (7.9) |
| Does not describe me                                                                             | 64 (8.0) |
| Neutral                                                                                           | 252 (31.4) |
| Describes me                                                                                      | 303 (37.8) |
| Describes me very well                                                                           | 120 (15.0) |
| **BRCS score (total)**                                                                            |        |
| **Mean (±SD)**                                                                                   | 13.72 (3.1) |
| Brief Resilient Coping Scale (BRCS) | Total |
|-----------------------------------|-------|
| Minimum – maximum                 | 4 to 20 |
| **Levels of coping (BRCS categories)** |       |
| Low resilient copers (score 4–13) | 354 (44.1) |
| Medium resilient copers (score 14–16) | 333 (41.5) |
| High resilient copers (score 17–20) | 115 (14.3) |
Table 7
Factors associated with coping with the COVID-19 pandemic in Saudi Arabia

| Characteristics                  | n (row %)                      | P    | AOR  | 95% CI  |
|----------------------------------|--------------------------------|------|------|---------|
|                                  | Low resilient (Score 4-13)     |      |      |         |
|                                  | Medium to High resilient (Score 14-20) |      |      |         |
|                                  | Total                          |      |      |         |
| Age groups                       |                                |      |      |         |
| 18 - 29 years                    | 171 (45.1)                     | 0.781| 1.06 | 0.71 - 1.58 |
|                                 | 208 (54.9)                     |      |      |         |
|                                 | 379                            |      |      |         |
| > 29 years                       | 122 (42.8)                     | 1    |      |         |
|                                 | 163 (57.2)                     |      |      |         |
|                                 | 285                            |      |      |         |
| Sex                              |                                |      |      |         |
| Male                             | 104 (42.8)                     | 1    |      |         |
|                                 | 139 (57.2)                     |      |      |         |
|                                 | 243                            |      |      |         |
| Female                           | 248 (44.6)                     | 0.641| 1.10 | 0.73 - 1.66 |
|                                 | 308 (55.4)                     |      |      |         |
|                                 | 556                            |      |      |         |
| Educational attainment           |                                |      |      |         |
| Grade 1 – 12                     | 95 (46.6)                      | 1    |      |         |
|                                 | 109 (53.4)                     |      |      |         |
|                                 | 204                            |      |      |         |
| Trade/certificate/diploma        | 39 (49.4)                      | 0.643| 1.19 | 0.58 - 2.44 |
|                                 | 40 (50.6)                      |      |      |         |
|                                 | 79                             |      |      |         |
| Bachelor or above                | 217 (42.1)                     | 0.201| 1.33 | 0.86 - 2.07 |
|                                 | 299 (57.9)                     |      |      |         |
|                                 | 516                            |      |      |         |
| Living status                    |                                |      |      |         |
| Live without family members      | 50 (43.9)                      | 1    |      |         |
|                                 | 64 (56.1)                      |      |      |         |
|                                 | 114                            |      |      |         |
| Live with family members         | 301 (43.9)                     | 0.510| 0.83 | 0.47 - 1.46 |
|                                 | 384 (56.1)                     |      |      |         |
|                                 | 685                            |      |      |         |
| Nationality                      |                                |      |      |         |
| Non-Saudi                        | 54 (44.3)                      | 0.271| 0.73 | 0.42 - 1.27 |
|                                 | 68 (55.7)                      |      |      |         |
|                                 | 122                            |      |      |         |
| Saudi                            | 353 (44.2)                     | 1    |      |         |
|                                 | 446 (55.8)                     |      |      |         |
|                                 | 677                            |      |      |         |
| Current employment condition     |                                |      |      |         |
| Characteristics                                                                 | n (row %)                      | P     | AOR   | 95% CI   |
|-------------------------------------------------------------------------------|-------------------------------|-------|-------|---------|
|                                                                               | Low resilient (Score 4-13)    |       |       |         |
|                                                                               | Medium to High resilient (Score 14-20) |       |       |         |
|                                                                               | Total                         |       |       |         |
| Job unaffected by COVID-19 (employed/Government benefits)                      | 109 (43.8)                    |       |       |         |
|                                                                               | 140 (56.2)                    |       |       |         |
|                                                                               | 249                            |       |       |         |
|                                                                               | 1                              |       |       |         |
| Job affected by COVID-19 (lost job/working hours reduced/)                     | 230 (43.5)                    |       |       |         |
|                                                                               | 299 (56.5)                    |       |       |         |
|                                                                               | 529                            |       |       |         |
|                                                                               | 0.790                          |       | 1.07  | 0.71-1.58 |
| Perceived distress due to change of employment condition                       |                               |       |       |         |
|                                                                               | A little to none               | 217 (43.8) |       |       |         |
|                                                                               | 279 (56.2)                    |       |       |         |
|                                                                               | 496                            |       |       |         |
|                                                                               | 1                              |       |       |         |
|                                                                               | Moderate to a great deal       | 122 (44.7) |       |       |         |
|                                                                               | 151 (55.3)                    |       |       |         |
|                                                                               | 273                            |       |       |         |
|                                                                               | 0.017                          |       | 0.63  | 0.43-0.92 |
| Frontline or essential service worker (self-identification)                   |                               |       |       |         |
|                                                                               | No                             | 236 (45.0) |       |       |         |
|                                                                               | 288 (55.0)                    |       |       |         |
|                                                                               | 524                            |       |       |         |
|                                                                               | 1                              |       |       |         |
|                                                                               | Yes                            | 118 (42.4) |       |       |         |
|                                                                               | 160 (57.6)                    |       |       |         |
|                                                                               | 278                            |       |       |         |
|                                                                               | 0.519                          |       | 1.14  | 0.76-1.71 |
| COVID-19 impacted financial situation                                         |                               |       |       |         |
|                                                                               | No                             | 190 (47.6) |       |       |         |
|                                                                               | 209 (52.4)                    |       |       |         |
|                                                                               | 399                            |       |       |         |
|                                                                               | 1                              |       |       |         |
|                                                                               | Positive impact               | 51 (38.6) |       |       |         |
|                                                                               | 81 (61.4)                     |       |       |         |
|                                                                               | 132                            |       |       |         |
|                                                                               | 0.038                          |       | 1.68  | 1.03-2.75 |
|                                                                               | Negative impact               | 113 (41.7) |       |       |         |
|                                                                               | 158 (58.3)                    |       |       |         |
|                                                                               | 271                            |       |       |         |
|                                                                               | 0.003                          |       | 1.82  | 1.22-2.71 |
| Co-morbidities                                                                |                               |       |       |         |
|                                                                               | No                             | 266 (43.8) |       |       |         |
|                                                                               | 341 (56.2)                    |       |       |         |
|                                                                               | 607                            |       |       |         |
|                                                                               | 1                              |       |       |         |
|                                                                               | Psychiatric/Mental health issues | 22 (48.9) |       |       |         |
|                                                                               | 23 (51.1)                     |       |       |         |
|                                                                               | 45                             |       |       |         |
|                                                                               | 0.363                          |       | 0.72  | 0.37-1.46 |
|                                                                               | Other co-morbidities          | 66 (44.0) |       |       |         |
|                                                                               | 84 (56.0)                     |       |       |         |
|                                                                               | 150                            |       |       |         |
|                                                                               | 0.571                          |       | 1.14  | 0.72-1.81 |
| Characteristics | n (row %) | Low resilient (Score 4-13) | Medium to High resilient (Score 14-20) | Total | P  | AOR 95% CI |
|-----------------|----------|---------------------------|----------------------------------------|-------|----|------------|
| **Smoking**     |          |                           |                                        |       |    |            |
| Never smoker    | 293 (45.1)| 357 (54.9)                | 650                                    | 1     |    |            |
| Ex-smoker       | 7 (31.8)  | 15 (68.2)                 | 22                                     | 0.353 | 1.64| 0.58-4.66 |
| Current smoker  | 54 (41.5) | 76 (58.5)                 | 130                                    | 0.610 | 1.13| 0.71-1.79 |
| **Contact with known/suspected COVID-19 cases** | |            |                                        |       |    |            |
| No              | 236 (47.3)| 263 (52.7)                | 499                                    | 1     |    |            |
| Yes             | 110 (38.7)| 174 (61.3)                | 284                                    | 0.011 | 1.63| 1.12-2.38 |
| **COVID-19 related experiences** | |            |                                        |       |    |            |
| No known diagnosis of COVID-19 | 255 (42.6) | 344 (57.4) | 599 | 1 |    |            |
| Tested positive for COVID-19 | 24 (38.1) | 39 (61.9) | 63 | 0.582 | 1.22| 0.60-2.48 |
| Tested negative for COVID-19 but self-isolating | 48 (51.6) | 45 (48.4) | 93 | 0.067 | 0.59| 0.34-1.04 |
| Recent overseas travel history and was in quarantine | 8 (47.1) | 9 (52.9) | 17 | 0.593 | 0.72| 0.22-2.38 |

**Discussion**

This cross-sectional survey was conducted among people in Saudi Arabia. Aspects of psychological distress, fear of COVID-19, and coping strategies were assessed using K10, FCV-19S and BRCS scales, respectively.

This study indicated a high percentage (70%) of people who suffered from distress during the pandemic, the prevalence of which was more than double compared to other local research in Saudi Arabia. Referring to Alkamees, Alrashed [29] assessed psychological impact during an early stage of the
pandemic and showed that a quarter of the participants suffered from a moderate to severe psychological impact [20]. Al-Hanawi, Mwale [30] also conducted a study in May 2020 and indicated that 40% of the general public in Saudi Arabia suffered from psychological distress caused by COVID-19 [30]. Thus, as COVID-19 lasted for a prolonged period, more people are expected to have a psychological impact, and more efforts are needed for psychological support. The same observation was noted in Canadian research showing a significant increase in stress during the COVID-19 outbreak [31]. In addition, other factors may play a role in contributing to the increased level of psychological distress in this study as the previous studies were conducted during the initial months of the pandemic. ‘Infodemic’ could potentially contribute to the heightened distress in this study, which requires further investigations.

In terms of associated factors, age, gender, nationality, perceived distress due to change of employment conditions, the financial impact of COVID-19, and smoking were significantly associated with higher levels of psychological distress. Similar to this study, research conducted in the US during the pandemic showed that women, Hispanics, Asians, families with children under 18, and foreign-born respondents had higher subjective fear and worry levels than their counterparts [32].

Individuals aged 18-29 years had higher psychological distress this result coincides with A report from over 60 countries found that Younger age groups were more vulnerable to the mental health impact of the pandemic [10]. The explanations of the result which could be a result of dependence on inauthentic information received from social media platforms. Marar, Al-Madaney [33] reported that most of the Saudi population used social media platforms when they needed health information. Another study showed that social media had a positive impact on the knowledge of the Saudi population towards COVID-19 [34]. However, it was found that younger individuals were less likely to practice coping methods such as spirituality and mindfulness, which has proved to be a handy tool to control stress and depression [35].

In this study, smoking was associated with increased psychological distress. According to previous evidence, smoking could cause symptoms such as depression and anxiety [36]. In a study from England, there was a significant association between psychological distress and past smoking [37]. The study showed further deterioration in mental health among smokers during the COVID-19 pandemic. A systematic review also showed a bi-directional effect between psychological distress and smoking [36]. Significantly, one research indicated that 25% reported increasing smoking more than usual, though 51% reported smoking the same amount during COVID-19 pandemic [38]. It is important to note that a recent study from Saudi Arabia showed a prevalence of cigarette smoking of 21.4% in the population [39]. Thus, it is essential to further investigate to alleviate the risk of smoking and mental health in the population especially during the pandemic.

Additionally, changes in employment conditions and financial challenges were related to high level of fear from COVID-19 and psychological distress. The economic effect of COVID-19 was well described worldwide [40]. In particular, research undertaken in Italy, India, South Africa, the UK and the USA
identified that, cigarette smokers bought more cigarettes than usual triggered by the fear that stores might run out of stock or be closed because of lock down during the pandemic [11].

In terms of coping strategies, more than half of the study participants had medium to high resilient coping. The relationship between coping strategies and stress was assessed previously [41, 42] According to previous literature; Saudis are reasonably resilient to COVID-19 stress compared to other countries experiencing this pandemic with high quality of life scores [43]. Unlike other countries suffering from food insecurity and free treatment, unavailable beds at intensive care units, and insufficient doctors, the Saudi government made extraordinary efforts in economics, health, religion, social support, food, and quality of life [3].

Individuals in this research, who came in contact with confirmed or suspected COVID-19 cases were more likely to have medium to high resilient coping, which could be due to accessing free treatment and an advanced healthcare system in Saudi. In addition, there is a clear relationship between coping strategy and stress outcome [44]. In one study, religion was one of the most frequent coping strategies among nursing students in Saudi Arabia [45]. The Ministry of Health in Saudi Arabia developed multiple methods to support the wellbeing and mental health of frontline and health care providers. This included mobile applications, hotlines and virtual meeting available for addressing concerns and worries of healthcare providers [46]. It is also important to note that different health care professionals and age groups may use different coping strategies. In one study, nurses used avoiding coping style and positive reappraisal than doctors and those > 40 years of age used social support and those <40 years relied on avoidance of stress management techniques [46]. The global cross-sectional studies that assessed associated factors with psychological distress, levels of fear, and coping strategies among community members, frontline workers, and patients across 17 countries found physicians had higher psychological distress, but low levels of fear of COVID-19; nurses had medium to high resilient coping [24]. Despite positive coping strategies in the health and medical field, there were limited coping strategies for other essential service workers, and general community members who suffered from COVID-19. Future studies should focus on intervention measuring and programs among the general population in Saudi to identify coping strategies.

This study had a large and representative sample from different categories of frontline workers and the general population and was conducted during the second wave of the pandemic. Findings will assist in having a clear vision for decision-makers to manage psychological distress and fear of COVID-19 with adaptable strategies for Saudi people. However, there are several limitations to this study. The use of an online self-administered questionnaire may have introduced response and recall bias. Additionally, the dissemination of questionnaires through social media platforms for recruitment resulted in having more participants from certain regions than others.

**Conclusion**
Identification of high-risk groups with increased psychological distress and fear during the current COVID-19 pandemic was critical. Factors identified in this study would strengthen illness prevention by guiding policymakers for such a vulnerable population. Healthcare authorities should monitor young people and smokers about their mental health, and considering a behavioural support program will be invaluable. Those affected by changes in employment and negative financial impacts, should be prioritised within the current support services available in Saudi Arabia. Living in a COVID-safe environment and adopting a lifestyle supporting both physical and mental well-being during the pandemic era is warranted in Saudi Arabia.

**Abbreviations**

AOR
Adjusted Odds Ratio
BRCS
Brief Resilient Coping Scale
CIs
Confidence Interval
FCV-19S
Fear of COVID-19 Scale
Kessler Psychological Distress Scale
K-10
ORs
Odds Ratios
PCR
Polymerase Chain Reaction.

**Declarations**

**Ethics approval and consent to participate**

Ethical approval was obtained from the Human Research Ethics Committee in King Fahad Medical City, Saudi Arabia (H-01-R-012). Each study participant read the informed consent form along with a plain-language summary and ticked their consent in the online form prior to accessing the study questionnaire. All methods were performed in accordance with the relevant guidelines and regulations of the Declaration of Helsinki.

**Consent for publication**

Data were collected anonymously; therefore, no identifying information was collected from the study participants.

**Availability of data and materials**
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Conflict of Interest**

The authors have declared no conflict of interest.

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**Authors’ contributions**

TAA and MAR conceived the conception and design of the study. TAA, AA, IM, RJA, SA, AEM, AA, LNM, AAA, MB, SG and LIA conducted data collection. TAA, IM, MAR and SMSI contributed to the data analysis. TAA, AA, IM, RJA and JAA prepared the first draft of the manuscript. SMA, FS, MS, BB, WC and MAR critically reviewed the manuscript. All authors approved the final version of the article.

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**References**

1. World Health Organization. WHO Coronavirus Disease (COVID-19) Dashboard. 2021, https://covid19.who.int. Accessed 13 Aug 2021.
2. Kola L, Kohrt BA, Hanlon C, Naslund JA, Sikander S, Balaji M, et al. COVID-19 mental health impact and responses in low-income and middle-income countries: reimagining global mental health. The Lancet Psychiatry. 2021;8:535-50.
3. Al-Tawfiq JA, Memish ZA. COVID-19 in the Eastern Mediterranean Region and Saudi Arabia: prevention and therapeutic strategies. International Journal of Antimicrobial Agents. 2020;55:1-3.
4. Algaissi AA, Alharbi NK, Hassanain M, Hashem AM. Preparedness and response to COVID-19 in Saudi Arabia: Building on MERS experience. Journal of Infection and Public Health. 2020;13:834-8.
5. Alahdal H, Basingab F, Alotaibi R. An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia. Journal of Infection and Public Health. 2020;13:1446-52.
6. Khan AA, Alahdal HM, Alotaibi RM, Sonbol HS, Almaghrabi RH, Alsofayan YM, et al. Controlling COVID-19 Pandemic: A Mass Screening Experience in Saudi Arabia. Frontiers in Public Health. 2021;8:1-5.
7. Jassim G, Jameel M, Brennan E, Yusuf M, Hasan N, Alwatani Y. Psychological Impact of COVID-19, Isolation, and Quarantine: A Cross-Sectional Study. Neuropsychiatric Disease and Treatment. 2021;17:1413–21.

8. Hassounah M, Raheel H, Alhefzi M. Digital response during the COVID-19 pandemic in Saudi Arabia. Journal of Medical Internet Research. 2020;22:1-9.

9. Rubin GJ, Wessely S. The psychological effects of quarantining a city. BMJ. 2020;368:1-2.

10. Santabárbara J, Lasheras I, Lipnicki DM, Bueno-Notivol J, Pérez-Moreno M, López-Antón R, et al. Prevalence of anxiety in the COVID-19 pandemic: An updated meta-analysis of community-based studies. Progress in Neuro-Psychopharmacology and Biological Psychiatry. 2021;109:110207.

11. Yach D. Tobacco use patterns in five countries during the COVID-19 lockdown. Nicotine & Tobacco Research. 2020.

12. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. The Lancet. 2020;395:912-20.

13. Newby JM, O'Moore K, Tang S, Christensen H, Faasse K. Acute mental health responses during the COVID-19 pandemic in Australia. PloS One. 2020;15:1-21.

14. Rahman MA, Hoque N, Alif SM, Salehin M, Islam SMS, Banik B, et al. Factors associated with psychological distress, fear and coping strategies during the COVID-19 pandemic in Australia. BMC Globalization and Health. 2020;16:1-15.

15. Depoux A, Martin S, Karafillakis E, Preet R, Wilder-Smith A, Larson H. The pandemic of social media panic travels faster than the COVID-19 outbreak. Journal of Travel Medicine. 2020;27:1-2.

16. Chan EY, Cheng CK, Tam G, Huang Z, Lee P. Knowledge, attitudes, and practices of Hong Kong population towards human A/H7N9 influenza pandemic preparedness, China, 2014. BMC Public Health. 2015;15:1-10.

17. Wu P, Fang Y, Guan Z, Fan B, Kong J, Yao Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. The Canadian Journal of Psychiatry. 2009;54:302-11.

18. Saravanan C, Mahmoud I, Elshami W, Taha MH. Knowledge, Anxiety, Fear, and Psychological Distress About COVID-19 Among University Students in the United Arab Emirates. Frontiers in Psychiatry. 2020;11:10.

19. Albagmi FM, AlNujaidi HY, Al Shawan DS. Anxiety Levels Amid the COVID-19 Lockdown in Saudi Arabia. International Journal of General Medicine. 2021;14:2161–70.

20. Saudi Vision 2030. Saudi Arabia's Vision for 2030. 2019, https://vision2030.gov.sa/en. Accessed 18 Jul 2021.

21. Temsah M-H, Al-Sohime F, Alamro N, Al-Eyadhy A, Al-Hasan K, Jamal A, et al. The psychological impact of COVID-19 pandemic on health care workers in a MERS-CoV endemic country. Journal of Infection and Public Health. 2020;13:877-82.
22. Arafa A, Mohammed Z, Mahmoud O, Elshazley M, Ewis A. Depressed, anxious, and stressed: What have healthcare workers on the frontlines in Egypt and Saudi Arabia experienced during the COVID-19 pandemic? Journal of Affective Disorders. 2021;278:365-71.

23. Rahman MA, Salehin M, Islam SMS, Alif SM, Sultana F, Sharif A, et al. Reliability of the tools used to examine psychological distress, fear of COVID-19 and coping amongst migrants and non-migrants in Australia. International Journal of Mental Health Nursing. 2021;30:745–56.

24. Rahman, M.A., Islam, S.M.S., Tungpunkom, P. et al. COVID-19: Factors associated with psychological distress, fear, and coping strategies among community members across 17 countries. Global Health. 2021; 17, 1172-19.

25. Worldometer. Saudi Arabia Population (LIVE). Population of Saudi Arabia (2020 and historical) 2021, https://www.worldometers.info/world-population/saudi-arabia-population/. Accessed 10 Aug 2021.

26. Furukawa TA, Kessler RC, Slade T, Andrews G. The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. Psychological Medicine. 2003;33:357-62.

27. Ahorsu DK, Lin C-Y, Imani V, Saffari M, Griffiths MD, Pakpour AH. The fear of COVID-19 scale: development and initial validation. International Journal of Mental Health and Addiction. 2020;27:1-9.

28. Sinclair VG, Wallston KA. The development and psychometric evaluation of the Brief Resilient Coping Scale. Assessment. 2004;11:94-101.

29. Alkhamees AA, Alrashed SA, Alzunaydi AA, Almohimeed AS, Aljohani MS. The psychological impact of COVID-19 pandemic on the general population of Saudi Arabia. Comprehensive Psychiatry. 2020;102:1-9.

30. Al-Hanawi MK, Mwale ML, Alshareef N, Qattan AM, Angawi K, Almubark R, et al. Psychological distress amongst health workers and the general public during the COVID-19 pandemic in Saudi Arabia. Risk Management and Healthcare Policy. 2020;13:733–42.

31. Fitzpatrick KM, Drawve G, Harris C. Facing new fears during the COVID-19 pandemic: The State of America’s mental health. Journal of Anxiety Disorders. 2020;75:1-10.

32. Marar SD, Al-Madaney MM, Almousawi FH. Health information on social media: Perceptions, attitudes, and practices of patients and their companions. Saudi Medical Journal. 2019;40:1294–8.

33. Alnasser AHA, Al-Tawfiq JA, Al Kalif MSH, Alobaysi AMA, Al Mubarak MHM, Alturki HNH, et al. The positive impact of social media on the level of COVID-19 awareness in Saudi Arabia: a web-based cross-sectional survey. Le Infezioni in Medicina. 2020;28:545-50.

34. Matiz A, Fabbro F, Crescentini C. Single vs. group mindfulness meditation: Effects on personality, religiousness/spirituality, and mindfulness skills. Mindfulness. 2018;9:1236-44.

35. Fluharty M, Taylor AE, Grabski M, Munafò MR. The association of cigarette smoking with depression and anxiety: a systematic review. Nicotine & Tobacco Research. 2016;19:3-13.

36. Kock L, Brown J, Shahab L, Moore G, Horton M, Brose L. Smoking, distress and COVID-19 in England: cross-sectional population surveys from 2016 to 2020. Preventive Medicine Reports. 2021;23:1-8.
37. Chen DT-H. The psychosocial impact of the COVID-19 pandemic on changes in smoking behavior: Evidence from a nationwide survey in the UK. Tobacco Prevention & Cessation. 2020;59:1-5.
38. Algabbani AM, Almubark R, Althumiri N, Alqahtani A, BinDhim N. The prevalence of cigarette smoking in Saudi Arabia in 2018. In: Authority SFaD, editor. Saudi Arabia: Food and Drug Regulatory Science Journal; 2018. p. 1-11.
39. Ceylan RF, Ozkan B, Mulazimogullari E. Historical evidence for economic effects of COVID-19. The European Journal of Health Economics. 2020;21:817–23.
40. Phua D, Tang H, Tham K. Coping responses of emergency physicians and nurses to the 2003 severe acute respiratory syndrome outbreak. Academic Emergency Medicine. 2005;12:322-8.
41. Khalid S, Hashmi I, Khan SJ, Qazi IA, Nasir H. Effect of metal ions and petrochemicals on bioremediation of chlorpyrifos in aerobic sequencing batch bioreactor (ASBR). Environmental Science and Pollution Research. 2016;23:20646-60.
42. Alyami M, de Albuquerque JV, Krägeloh CU, Alyami H, Henning MA. Effects of fear of COVID-19 on mental well-being and quality of life among Saudi adults: a path analysis. Saudi Journal of Medicine & Medical Sciences. 2021;9:24–30.
43. Girma A, Ayalew E, Mesafint G. Covid-19 Pandemic-Related Stress and Coping Strategies Among Adults with Chronic Disease in Southwest Ethiopia. Neuropsychiatric Disease and Treatment. 2021;17:1551–61.
44. Alsolais A, Alquwez N, Alotaibi KA, Alqarni AS, Almalki M, Alsolami F, et al. Risk perceptions, fear, depression, anxiety, stress and coping among Saudi nursing students during the COVID-19 pandemic. Journal of Mental Health. 2021;30:194-201.
45. Public Health Authority. Preventive Guide for Mental and Social Health. Saudi Arabia2021, https://covid19.cdc.gov.sa/community-public/mental-health/. Accessed 10 Aug 2021.
46. Salopek-Žiha D, Hlavati M, Gvozdanović Z, Gašić M, Placento H, Jakić H, et al. Differences in distress and coping with the COVID-19 stressor in nurses and physicians. Psychiatria Danubina. 2020;32:287-93.