Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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The psychological impact of COVID-19 pandemic on the general population of Saudi Arabia

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ABSTRACT

Background: The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an emerging infection causing a widely spread pandemic of Coronavirus disease 2019 (COVID-19). The current COVID-2019 pandemic is prompting fear of falling sick, dying, helplessness and stigma, urgent and timely understanding of mental health status is needed to help the community. Our investigation designed to survey the general population in Saudi Arabia to assess the degree of psychological impact during the pandemic.

Methods: During the early stage of the outbreak, we conducted an online-based survey using a snowballing sample technique. The surveys collected data about several aspects of participant sociodemographic, knowledge, concerns, psychological impact, and mental health status. We assessed the psychological impact and mental health status using the Impact of Event Scale-Revised (IES-R), and the Depression, Anxiety, and Stress Scale (DASS-21).

Results: Our survey recruited 1160 respondents of the general public of Saudi Arabia. Of them, 23.6% reported moderate or severe psychological impact of the outbreak, 28.3%,24%, and 22.3% reported moderate to severe depressive, anxiety, and stress symptoms, respectively. Females reported IES-R (B: 5.46, 95% CI: 3.61 to 7.31) and DASS subscales B coefficient ranged from 1.65 to 2.63, along with high-school students, working in the medical field, and poor self-reported health status was significantly associated with a high level of IES-R and DASS scales ($p < .05$). Experiencing breathing difficulty and dizziness showed a stronger association with higher IES-R and DASS subscales than other somatic symptoms (e.g., headache and fever);($p < .001$). Respondents who practiced specific preventative measures (e.g., hand washing, social distancing) demonstrated a protective effect against stress, anxiety, and depression symptoms. Social distancing appeared to be protective on stress and anxiety subscales (B: -1.49, 95% CI: −2.79 to −0.19),(B: -1.53, 95% CI: −2.50 to −0.57),respectively; and hand hygiene on depression subscale (B: -2.43, 95% CI: −4.44 to −0.42).

Conclusion: Throughout the early stage of the COVID-19 outbreak in Saudi Arabia, the results showed that nearly one-fourth of the sampled general population experienced moderate to severe psychological impact. Following specific precautionary measures appeared to have a protective effect on the individual's mental health. Our findings can be used to construct psychological interventions directed toward vulnerable populations and to implement public mental health strategies in the early stages of the outbreak.

1. Introduction

Coronavirus disease 2019 (COVID-19) is a new communicable disease caused by the new strains of severe acute respiratory syndrome coronavirus, SARS-CoV-2 [1]. The first outbreak reported was in December 2019, in Wuhan, China, as pneumonia of unknown etiology linked to a seafood market exposure [2]. On January 30, the World Health Organization (WHO) declared the outbreak as a Public Health Emergency of International Concern (PHEIC) and a pandemic On March 11 [3].

The first case reported In Saudi Arabia was on March 7; at that time, increasing numbers were seen all over the world, with the majority of confirmed cases currently in the united states, brazil, and Russia [4]. After reporting the first case in Saudi Arabia, the government response was swift and immediate, started by launching a social media campaign encouraging people to stay at home and to follow the ministry of health instructions [5]. On March 23, a lockdown was imposed on Mecca,

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Medina, and Riyadh with travel restrictions all over the country, and within the next ten days, the curfew was extended to 24-Hour [6].

The fast climbing of cases of COVID-19 all over the world and the rapid changes in people daily living have left people alarmed and frightened. Historically, there have been multiple outbreaks over the years, such as the SARS epidemic, when moderate to severe post-traumatic-stress symptoms were reported in the highly affected areas [7]. During the swine flu (influenza A H1N1) outbreak, a study showed that 9.6% and 32.9% of the general population were either very or moderately worried about the possibility of being infected, respectively [8]. Ebola, MERS, and SARS epidemics all showed an impact on mental health that includes depression, and even substance abuse has been reported [9]. During the MERS outbreak in Jeddah, western Saudi Arabia, a survey reported a significant association between the level of anxiety and avoiding behaviors [10]. In the current pandemic, a recent study carried out in china concerning COVID-19 psychological impact, revealed that 53.8% of respondents are showing moderate to severe psychological impact, 16.5% and 28.8% reported moderate to high depressive or anxiety symptoms respectfully, and 8.1% moderate to high levels of stress were reported [11]. Anxiety and depression symptoms showed no decline four weeks after the COVID-19 pandemic [12].

To the best of our knowledge, there are no published studies assessing the general population response to the emerging coronavirus infections in Saudi Arabia. Therefore, this study aims to measure the degree of psychological responses resulted from the COVID-19 pandemic on Saudi Arabia's general population.

2. Materials and methods

2.1. Study design and setting

This study followed a cross-sectional design to assess the general population's psychological impact on the COVID19 pandemic at the time of curfew and lockdown in the kingdom of Saudi Arabia. We used an online-based questionnaire distributed through social media apps, like WhatsApp and Twitter, participants were encouraged to distribute the survey. Physical distribution was not feasible due to the lockdown in the kingdom. Participants have received the survey request through WhatsApp's groups of colleagues, family, or friends. In another platform, “Twitter,” they received tweets or messages via different accounts in Saudi Arabia. These messages showed the study purpose, link, and asked for participation. The survey was titled Psychological Impact in Saudi Arabia. After clicking on the link of the survey, a cover page showing the study's title, purpose, and needed time for completion showed up. If they agreed to participate, they were asked to click “start the survey,” and then they start answering the survey questions.

2.2. Study procedure

As mentioned earlier, the survey was distributed during a period of curfew, and practices of social(physical)distancing were promoted by the Saudi ministry of health; therefore, we followed an online data collection technique. The survey was done online by using a common platform, google survey (Google LLC, Mountain View, California, USA). The study protocol was approved by the Institutional Review Board of Qassim University (No.19–08-01). All participants were informed about study purposes and provided informed consent. Data were kept confidential and were not disclosed unless for study purposes. Data collected was conducted over four days (April 2–5 April 2020) after cases in Saudi Arabia reached one thousand and while curfew and social distancing measures were implemented by health authorities. The sample size was calculated using Epi Info™ 7 (Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA). The calculated sample size was 1149 based on the assumption of anticipated % frequency (p) of 53.8% of respondents rated the psychological impact of the outbreak as moderate or severe in previous studies,5% margin of error, confidence interval(%) of 95% and a design effect of 3 as we followed non-probability sampling [11].

2.3. Survey

The survey developed based on a recent study conducted in 194 cities in China [11]. The adopted questionnaire covers several aspects of participant sociodemographic, knowledge concerns, psychological impact, and mental health status. Sociodemographic variables of participants included gender, age, education, residential place in the preceding 14 days, marital status, employment status if they work in the Medical field or one of their relatives, monthly household income in Saudi Riyal, parental status, household size, and type. Moreover, participants were asked about physical symptoms they experienced in the preceding 14 days, including fever, chills, headache, myalgia, dry cough, difficulty in breathing, dizziness, nasal congestion, sore throat, diarrhea, and others. Furthermore, they were required to rate their physical health status (1 to 5, where 1 indicates poor health status) and self-report any history of chronic medical or psychiatric illnesses if they existed. The survey included parts on health service utilization in the preceding 14 days included consultation with a doctor in the clinic, admission to the hospital, being quarantined or isolated by health authorities, and being tested for COVID-19. Contact history variables included close contact with an individual with confirmed COVID-19, indirect contact with an individual with confirmed COVID-19, and contact with an individual with suspected COVID-19 case, infected substance, or surfaces.

The second part of the survey covered the participants' knowledge and concerns about COVID-19 and. It included aspects related to the routes of transmission of SARS-CoV-2, level of confidence in COVID-19 diagnostic tests, level of satisfaction of health information about COVID-19, if following up the trending news of cases, and death in the country, and potential treatment for COVID-19 infection. Participants were asked to identify their source of information based on the provided list, the actual number of confirmed cases of COVID-19, and deaths in the country on the day of data collection. Concern about COVID-19 included self, and other relatives contracted SARS-CoV-2, perceived susceptibility to infection, and survival if infected.

The third part covers precautionary measures against SARS-CoV-2 including avoidance of sharing of utensils during meals and handshaking, cough etiquette (covering mouth when coughing and sneezing), hand hygiene, wearing a mask regardless of the presence or absence of symptoms and if applying social distancing measures (no handshaking and keeping a distance of one meter). To assess their compliance with social distancing instruction, they were asked the average number of hours staying at home per day to minimize the risk of contracting the infection during the last 14 days. They were given certain statements and asked to rate their opinions on whether they felt too much unnecessary worry had been made about the COVID-19 pandemic.

The last part of the survey assessed the psychological impact of COVID-19 using the Impact of Event Scale-Revised (IES-R) and Depression, Anxiety, and Stress Scale (DASS-21), both scales used previously in assessing psychological impact related to SARS and COVID-19 [11,13]. The IES-R is an easily self-administered questionnaire that has been translated and validated in Arabic speakers to assess the symptoms of posttraumatic stress disorder PTSD after traumatic event experience in the past seven days [14,15]. This 22-item scale is composed of three subscales measure the mean avoidance, intrusion, and hyperarousal [14]. Responses to each item were rated from 0 to 4, where 0 indicates Not at all and 4 Extremely. The total IES-R score was subdivided into 0–23 (normal), 24–32 (mild), 33–36 (moderate), and > 37 (severe psychological impact) [14].

Furthermore, Mental health status was assessed using the translated Arabic version of DASS-21 [16]. DASS has been shown to be a reliable and valid measure in assessing mental health status in Arabic speakers

[16]. This scale is composed of three subscales, depression, anxiety, and stress. Each subscale is composed of seven items, and each response was rated from 0 to 3, where 0 indicates 'Did not apply to me' and 3 indicated 'Applied to me most of the time' [17]. Depression subscale was assessed in items 3, 5, 10, 13, 16, 17, and 21. The total score depression subscale score was subdivided into normal (0–9), mild (10−12), moderate (13−20), severe (21–27), and extremely severe depression (28–42) [17]. Anxiety subscale assessed in items 2, 4, 7, 9, 15, 19, and 20. The total score of anxiety subscale was subdivided into normal (0–6), mild (7–9), moderate (10–14), severe (15–19), and extremely severe anxiety (20–42) [17]. Stress subscale is constructed by items 1, 6, 8, 11, 12, 14, and 18. The total score of stress subscale was subdivided into normal (0−10), mild (11–18), moderate (19–26), severe (27–34), and extremely severe stress (35–42) [17].

2.4. Statistical analysis

As described in the study methodology, statistical analysis was carried out using IBM SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY, USA). The data were cleaned, sorted, and processed prior to commencement of analyses. The survey's answers fields were designed to be mandatory to be filled before proceeding to the next section, options such as "None" or "I don't know" were provided when necessary in order to proceed and minimize missed data. Descriptive analyses were conducted for sociodemographic characteristics, health status/service utilization variables, symptom profile, contact history, knowledge and concerns, and precautionary measures. The results of these analyses were presented using frequencies and percentages for categorical variables and means and standard deviations for continuous variables using the total sample ($n = 1160$) as the base. The psychological burden of the COVID-19 pandemic was measured using scores on the IES-R and the three subscales of the DASS; results presented in means and standard deviation. Univariate analyses to determine the presence and strength of associations between individual variables and scores on each of the four scales (IES-R, DASS-stress, DASS-anxiety, and DASS-depression) were carried out using linear regressions. All tests of associations were carried out at a level of significance of <0.05 and 95% confidence Interval.

3. Results

3.1. The mental health burden of the emerging coronavirus disease

With a range of 0 to 88, the average score of the participants on the revised impact of event scale (IES-R) questionnaire was 20.9 ± 15.7. More than half of the participants (59.7%) had normal scores on the IES-R, but 16.6% had scores in the mild range, and 17.9% classified as severe. On the DASS, 70.2% had normal scores on the stress subscale, 70.1% on the anxiety subscale, and 59.1% on the depression subscale. Severe symptoms of stress were experienced by 13.7%, which is similar to the 13.9% who experienced severe symptoms of anxiety and 16.4% who experienced severe symptoms of depression (Table 1).

Table 1
Participants' performance on the revised impact of event scale (IES-R), and the three subscales of the Depression, Anxiety and Stress Scale - 21 Items (DASS-21).

	IES-R	Stress[a]	Anxiety[a]	Depression[a]
Score, Mean ± *SD*	20.9 ± 15.7	10.7 ± 11.1	6.0 ± 8.3	10.0 ± 10.6
Categories, *N (%)*				
Normal	693 (59.7)	814 (70.2)	813 (70.1)	685 (59.1)
Mild	193 (16.6)	87 (7.5)	68 (5.9)	146 (12.6)
Moderate	66 (5.7)	100 (8.6)	117 (10.1)	138 (11.9)
Severe	208 (17.9)	93 (8.0)	48 (4.1)	77 (6.6)
Extremely severe	*NA*	66 (5.7)	114 (9.8)	114 (9.8)

[a] subscales of the DASS.

3.2. Sociodemographic characteristics and influence on psychological response to the COVID-19 pandemic

The majority of the participants in this study were females (63.9%), between the ages of 31 and 40 years (23%), have at least a bachelor's degree (61.2%), married (54.2%), and employed (35.0%; Table 2). Most of the participants had gross family incomes of at least 5000 SAR up to 14,999 SAR. Also, the majority lived in a villa (58.4%) and lived with six or more people in the same household (57.2%). Only a small proportion did work in a medical field (11.7%), but more of them had family members who worked in the medical field (27.9%).

The female gender was associated with higher scores in the IES-R (B: 5.46, 95% CI: 3.61 to 7.31) and all three sub-scales of the DASS with odds of between 1.65 and 2.63. With respect to age, those between 18 and 30 years are more susceptible to adverse mental health outcomes with 7.75 times odds of having higher scores on the IES-R (95% CI: 2.53 to 12.98) and all the three subscales of the DASS. Participants with only a high school degree were more likely to have higher scores on all scales: IES-R and the three subscales of the DASS. Employment was only significantly associated with lower scores on the IES-R (B = −5.72, 95% CI: −10.68 to −0.77). Being a student as significantly associated with higher scores across all three subscales of the DASS with B coefficients ranging from 3.69 to 6.71.

Earning less than 5000 SAR was significantly associated with higher scores on the IES-R (B = 4.00, 95% CI: 0.11–7.90) and the depression subscale of the DASS (B = 2.85, 95% CI: 0.21 to 5.49). However, working in the medical field or having a family member who works in the field was associated with higher scores on the DASS. When participants worked in the medical field, they were more likely to have higher scores on the stress (B = 4.33, 95% CI 2.35 to 6.31) and depression (B = 2.77, 95% CI 0.88 to 4.67) subscales of the DASS. When they had family members who worked in the medical field, they were more likely to have higher scores across all three subscales of the DASS (stress: B = 1.77, 95% CI 0.34 to 3.20; anxiety: B = 1.17, 95% CI 0.11 to 2.24; and depression: B = 2.04, 95% CI 0.68 to 3.40).

3.3. Health status/service utilization and Symptoms effect on mental health status

The physical health status of the majority of the respondents at the time of the study was self-reported to be good or very good (86.6%; Table 3). However, a sizeable proportion had a chronic disease (17.3%), and 10.5% had been diagnosed to have a psychiatric disorder at the time of data collection. Within the two weeks period preceding data collection, 16.8% had visited hospitals for different reasons, and only 0.8% of the total population needed to be admitted for serious illness. Thirty-three respondents were tested for COVID-19 (2.8%), and 12 respondents (1.0%) were quarantined within the previous 14 days.

Across the three subscales of the DASS and the IES-R, having a poor health status was found to be significantly associated with high scores. Participants with poor or very poor health were several times more likely than those with good health to have poor psychological health with a B coefficient of 15.10 on the IES-R (95% CI: 9.37–20.84), 14.95 on the stress subscale of the DASS (95% CI: 10.94 to 18.95), 12.18 on the anxiety subscale of the DASS (95% CI: 9.23 to 15.12), and 13.83 on the depression subscale of the DASS (95% CI: 10.02–17.64). Having a chronic disease was only significantly associated with lower scores on the stress subscale of the DASS (with B coefficient of −2.08 and 95% CI of −3.77 to −0.39). Having a psychiatric disorder was significantly associated with higher scores on all the scales (IES-R: B = 8.43, 95% CI 5.53 to 11.33; DASS-stress, B = 8.83, 95% CI 6.80 to 10.85; DASS-anxiety: B = 8.27, 95% CI 6.78 to 9.75; and DASS-depression: B = 9.83, 95% CI 7.92 to 11.75).

Within the immediate period before the study, some of the participants had experienced a wide range of symptoms that have been associated with COVID-19 (Table 3). These most reported symptoms were

Table 2
Association between sociodemographic variables and the psychological impact/adverse mental health status during the epidemic ($n = 1160$).

Variable	N (%)	IES-R	DASS – Stress	DASS – Anxiety	DASS – Depression
		B (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)
Sex					
Female	741 (63.9)	5.46*** (3.61–7.31)	2.63*** (1.30–3.96)	2.06*** (1.07–3.04)	1.65* (0.38–2.92)
Male	419 (36.1)	Reference			
Age					
18–30 years	535 (46.1)	7.75** (2.53–12.98)	10.06*** (6.47–13.66)	5.79*** (3.06–8.52)	9.65*** (6.21–13.08)
31–40 years	270 (23.3)	6.85* (1.47–12.24)	8.25*** (4.55–11.96)	4.62** (1.81–7.43)	6.63*** (3.09–10.17)
41–50 years	200 (17.2)	2.74 (−2.75–8.23)	3.64 (−0.15–7.42)	2.16 (−0.71–5.03)	3.32 (−0.29–6.93)
51–60 years	119 (10.3)	1.40 (−4.37–7.17)	1.66 (−2.32–5.63)	0.83 (−2.19–3.84)	1.88 (−1.91–5.68)
> 60 years	36 (3.1)	Reference			
Education					
Primary school	13 (1.1)	4.66 (−4.65–13.96)	−0.05 (−6.66–6.57)	0.55 (−4.39–5.49)	1.68 (−4.60–7.96)
Middle school	18 (1.6)	3.52 (−4.66–11.70)	−0.31 (−6.13–5.50)	1.63 (−2.71–5.97)	0.86 (−4.66–6.38)
High school	183 (15.8)	8.83*** (4.29–13.38)	5.00** (1.77–8.23)	4.65*** (2.24–7.07)	7.44*** (4.37–10.51)
Diploma	100 (8.6)	6.69** (1.70–11.67)	1.72 (−1.83–5.26)	1.93 (−0.72–4.57)	3.31 (−0.06–6.67)
Bachelors	710 (61.2)	9.16*** (5.05–13.28)	5.60*** (2.67–8.52)	4.12*** (1.93–6.30)	6.40*** (3.62–9.18)
Master	77 (6.6)	2.68 (−2.57–7.93)	1.98 (−1.76–5.71)	2.35 (−0.43–5.14)	2.33 (−1.22–5.88)
PhD	59 (5.1)	Reference	Reference	Reference	Reference
Marital status					
Single	488 (42.1)	1.20 (−8.10–10.50)	3.45 (−3.00–9.90)	1.64 (−3.21–6.50)	3.68 (−2.40–9.76)
Married	630 (54.3)	−2.80 (−12.08–6.48)	−2.29 (−8.73–4.14)	−10.92 (−60.76–20.92)	−2.71 (−8.77–3.36)
Divorced	31 (2.7)	−3.19 (−13.90–7.51)	−2.22 (−9.65–5.20)	−10.14 (−60.72–40.45)	−1.55 (−8.55–5.45)
Widowed	11 (0.9)	Reference	Reference	Reference	Reference
Employment status					
Unemployed	264 (22.8)	−0.46 (−5.53–4.62)	3.20 (−0.32–6.71)	2.44 (−0.22–5.10)	3.34 (−0.02–6.69)
Employed	406 (35)	−5.72* (−10.68 to −0.77)	0.17 (−3.26–3.60)	0.16 (−2.44–2.75)	0.55 (−2.73–3.82)
Student	336 (29)	−0.51 (−5.51–4.49)	5.59** (2.13–9.06)	3.69** (1.07–6.31)	6.71*** (3.41–10.01)
Retired	113 (9.7)	−7.94** (−13.45 to −2.44)	−5.08** (−8.90 to −1.26)	−2.41 (−5.30–0.47)	−2.80 (−6.43–0.84)
Self-employed	41 (3.5)	Reference	Reference	Reference	Reference
Family monthly income					
<5000 SAR	90 (7.8)	4.00* (0.11–7.90)	2.51 (−0.27–5.28)	1.50 (−0.56–3.56)	2.85* (0.21–5.49)
5000–9999 SAR	234 (20.2)	1.64 (−1.32–4.59)	−0.53 (−2.63–1.58)	−0.62 (−2.18–0.94)	−0.18 (−2.19–1.82)
10,000–14,999 SAR	277 (23.9)	1.30 (−1.55–4.15)	−1.03 (−3.06–1.00)	−0.59 (−2.10–0.91)	−0.66 (−2.60–1.27)
15,000–19,999 SAR	231 (19.9)	0.84 (−2.13–3.80)	−0.41 (−2.52–1.70)	−0.95 (−2.52–0.62)	−0.26 (−2.27–1.75)
20,000–24,999 SAR	130 (11.2)	−2.63 (−6.09–0.83)	−2.04 (−4.50–0.42)	−2.37* (−4.20 to −0.54)	−2.15 (−4.49–0.19)
>25,000 SAR	198 (17.1)	Reference	Reference	Reference	Reference
Working in the medical field					
Yes^	136 (11.7)	0.42 (−2.38–3.23)	4.33*** (2.35–6.31)	1.32 (−0.16–2.80)	2.77** (0.88–4.67)
Have a family member that works in the medical field					
Yes^	324 (27.9)	1.76 (−0.24–3.77)	1.77* (0.34–3.20)	1.17* (0.11–2.24)	2.04** (0.68–3.40)

IES-R: Revised Impact of Event Scale (IES-R);DASS-21: Depression, Anxiety and Stress Scale - 21 Items; B (95% CI):beta coefficient(95% confidence interval); ^ No "as reference * $p < .05$; ** $p < .01$; *** $p < 0.001$.

headache (23.8%), and sore throat (11.1%). It is important to note that 60.8% of the participants indicated that they had not experienced any of these symptoms within the same period. However, participants who had experienced any of dizziness, difficulty breathing, muscle pains, headache, nasal congestion, sore throat, and diarrhea were significantly more likely to have high scores on the IES and all three subscales of the DASS. Not experiencing any of the above-listed symptoms was significantly associated with lower scores on all the scales: IES-R at a 95% confidence interval (Table 3).

3.4. Knowledge about COVID-19 and psychological impact

Participants were tested to know their level of knowledge, confidence, and satisfaction with regards to the COVID-19 pandemic (Table 4). The majority of them believe that transmission of the disease is through exposure to air droplets released by an infected person via sneezing and coughing and direct contact (96.6%). Similarly, the majority of them were very (30.6%) or extremely (44.4%) confident about the effectiveness of the methods used in diagnosing the disease; and a total of 78.7% were very/extremely satisfied with the amount of information available on the disease.

On probing further to understand the sources of information for the participants, the majority sourced their information from the Saudi Ministry of Health (87.2%), the World Health Organization (40.9%), and non-official social media applications and platforms such as WhatsApp, Twitter, YouTube, etc. (40.3%). Across all the information sources, participants who sourced their information from the World Health Organization were significantly more likely to have worse scores across both the IES-R (B = 2.60, 95% CI 0.78 to 4.43) and DASS stress (B = 3.06, 95% CI 1.77 to 4.35), anxiety (B = 1.37, 95% CI 0.40 to 2.33), and depression (B = 2.38, 95% CI 1.15 to 3.62) subscales. Relying on local news was significantly associated with lower scores on the DASS-anxiety (B = −1.06, 95% CI -2.10 to −0.02). All other information sources had no significant associations with the scores on either the IES-R or DASS.

Only 1.5% of the total population have had a relative diagnosed with COVID-19. When asked about their perceivability of contracting SARS-CoV-2 during the current outbreak, the majority believed they had lower chances of being infected with 41.6% saying it was not likely and another 23.9% believed it was only slightly likely. However, if infected, the majority believed their chances of recovering was very likely (33.1%) or extremely likely (43.4%). Having relatives who have tested positive for COVID-19 or being diagnosed with the disease had no significant impact on the scores on the IES-R and DASS. Participants who believed they have a slight chance of recovering if they should contract COVID-19 were significantly more likely to have higher scores across all the scales - IES-R and DASS stress, anxiety, and depression. Similarly, those who believed they were very likely to have the disease were more likely to have higher scores across all the scales (IES-R: B = 9.81, 95% CI 5.80 to 13.83; DASS-stress:

Table 3
Association between health status/health service utilization and symptoms of the psychological impact/adverse mental health status during the epidemic ($n = 1160$).

Variable	N (%)	IES-R	DASS – Stress	DASS – Anxiety	DASS – Depression
		B (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)
Self-evaluation of health status					
Poor/very poor	28 (2.4)	15.10*** (9.37–20.84)	14.95*** (10.94–18.95)	12.18*** (9.23–15.12)	13.83*** (10.02–17.64)
Average	128 (11.0)	9.00*** (6.19–11.81)	7.71*** (5.74–9.67)	6.53*** (5.09–7.98)	8.06*** (6.20–9.93)
Good/very good	1004 (86.6)	Reference	Reference	Reference	Reference
Suffering from chronic disease					
Yes^	201 (17.3)	1.12 (−1.27–3.50)	−2.08* (−3.77 to −0.39)	−0.18 (−1.44–1.08)	−1.42 (−3.03–0.20)
Diagnosed with a psychiatric disorder					
Yes^	122 (10.5)	8.43*** (5.53–11.33)	8.83*** (6.80–10.85)	8.27*** (6.78–9.75)	9.83*** (7.92–11.75)
Visited a hospital in the past 14 days					
Yes^	195 (16.8)	1.64 (−0.77–4.06)	1.58 (−0.13–3.30)	1.66* (0.39–2.94)	0.79 (−0.84–2.43)
Admitted in a hospital within the last 14 days					
Yes^	9 (0.8)	−1.35 (−11.63–8.93)	0.65 (−6.67–7.96)	−2.22 (−7.66–3.22)	−0.93 (−7.91–6.04)
Tested for COVID in the past 14 days					
Yes^	33 (2.8)	−0.68 (−6.10–4.75)	−1.34 (−5.20–2.52)	0.52 (−2.35–3.39)	−1.72 (−5.40–1.96)
Recent quarantine in the past 14 days					
Yes^	12 (1.0)	−2.84 (−11.76–6.07)	1.83 (−4.52–8.17)	1.87 (−2.85–6.59)	−2.56 (−8.61–3.48)
Association between symptoms and the psychological impact/adverse mental health status					
Fever					
Yes^	45 (3.9)	1.03 (−3.64–5.70)	3.39* (0.08–6.71)	4.78 (2.33–7.24)	4.08* (0.92–7.24)
Headache					
Yes^	276 (23.8)	5.13*** (3.03–7.23)	6.20*** (4.74–7.67)	4.44*** (3.35–5.53)	4.81*** (3.40–6.22)
Muscle pain					
Yes^	122 (10.5)	8.11*** (5.21–11.01)	7.56*** (5.52–9.61)	7.00*** (5.50–8.50)	6.52*** (4.56–8.48)
Dry cough					
Yes^	35 (3.0)	2.64 (−2.63–7.91)	3.70 (−0.04–7.45)	3.26* (0.48–6.04)	1.26 (−2.32–4.84)
Dizziness					
Yes^	104 (9.0)	9.42*** (6.31–12.53)	7.35*** (5.14–9.56)	6.68*** (5.05–8.30)	6.53*** (4.42–8.64)
Nasal congestion					
Yes^	113 (9.7)	4.37** (1.34–7.40)	4.92*** (2.77–7.06)	3.98*** (2.39–5.58)	4.47*** (2.42–6.52)
Sore throat					
Yes^	129 (11.1)	4.82*** (1.97–7.68)	3.77*** (1.74–5.80)	5.24*** (3.75–6.73)	2.42* (0.48–4.36)
Difficulty breathing					
Yes^	46 (4.0)	8.78*** (4.18–13.37)	8.79*** (5.54–12.03)	11.43*** (9.07–13.78)	9.15*** (6.06–12.24)
Diarrhea					
Yes^	66 (5.7)	4.37* (0.48–8.25)	4.92*** (2.16–7.68)	4.71*** (2.67–6.75)	4.68*** (2.06–7.31)
No symptoms					
Yes^	705 (60.8)	−5.52*** (−7.34 to −3.70)	−5.85*** (−7.12 to −4.58)	−5.04*** (−5.98 to −4.11)	−5.16*** (−6.37 to −3.94)

IES-R: Revised Impact of Event Scale (IES-R);DASS-21: Depression, Anxiety and Stress Scale - 21 Items; B (95% CI):beta coefficient(95% confidence interval); ^ No "as reference * $p < .05$; ** $p < .01$; *** $p < .001$.

B = 9.41, 95% CI 6.60 to 12.22; DASS-anxiety: B = 6.90, 95% CI 4.80 to 9.00; and DASS-depression: B = 9.54, 95% CI 6.85 to 12.22). Also, participants were asked what they thought about the statement: "I feel that there is much unnecessary worrying regarding COVID-19". The majority of them disagreed that there is much unnecessary worrying regarding the disease (71.5%). However, those who strongly disagreed were significantly more likely to have higher scores on the stress subscale of the DASS (B = 2.67, 95% CI: 0.17–5.16).

3.5. Contact history and precautionary measures and psychological impact

Some of the participants had had indirect contact with someone diagnosed with COVID-19 (0.5%) or direct contact with someone diagnosed with the disease (0.2%). Having direct or indirect contact with a diagnosed case of COVID-19 had no significant association with IES-R and DASS scores (Table 5). About 1.7% of the participants had had direct contact with someone suspected to have COVID-19, and this group appeared to have significantly high scores on the anxiety (B = 4.39, 95% CI 0.74 to 8.05) and depression (B = 6.27, 95% CI 1.58 to 10.96) subscales of the DASS. The majority of the participants did not have any contact history suggestive of contact with the infectious agent of COVID-19 (81.4%), and this set of people were found to have significantly lower scores on the IES-R (B = −2.99, 95% CI -5.30 to −0.68).

The majority of the participants had maintained strict self-isolation, not going out at all as a result of the coronavirus outbreak (56.4%, Table 5). Another 38.1% were indoors for more than 12 h per day. However, the amount of time spent indoors (intensity of self-isolation) had no significant impact on scores on the IES-R and DASS. Probing into how participants had protected themselves from COVID-19 over the previous 14 days, the majority of them had been washing and disinfecting their hands regularly (89.7%). Other measures adopted include avoiding handshakes (67.0%), distancing themselves physically from others for at least one meter (58.9%), avoiding the sharing of utensils during meals (23.4%), and using face masks even when without any symptoms (16.9%). Also, 7.2% of the respondents said they had not done anything specific to protect themselves.

With regards to the psychological impact of these precautionary measures, those who washed and disinfected their hands frequently were significantly associated with lower scores on the depression subscale of the DASS (B = −2.43, 95% CI -4.44 to −0.42). Those who maintained at least one meter of social distancing were also significantly associated with lower scores on the stress (B = −1.49, 95% CI -2.79 to −0.19) and anxiety (B = −1.53, 95% CI -2.50 to −0.57) subscales of the DASS.

4. Discussion

This study aimed to assess the psychological impact of COVID-19 pandemic on the general population of Saudi Arabia; Our results suggest that concerning the early psychological impact of the general public,23.6% of respondents reported moderate or severe psychological impact of the outbreak and severe symptoms of stress were experienced

Table 4
Associations between knowledge and concerns about COVID-19 and the psychological impact/adverse mental health status during the epidemic ($n = 1160$).

Variables	N (%)	IES-R	DASS – Stress	DASS – Anxiety	DASS – Depression
		B (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)
Knowledge of the mode of transmission of the coronavirus					
Exposure to sneeze /cough droplets and direct contact	1121 (96.6)	−2.76 (−9.10–3.58)	2.33 (−2.18–6.84)	−0.21 (−3.56–3.15)	3.01 (−1.29–7.31)
Through the air	15 (1.3)	−1.58 (−11.70–8.53)	1.98 (−5.21–9.18)	10.03 (−40.32–60.39)	30.32 (−30.54–100.17)
I don't know	24 (2.1)	Reference	Reference	Reference	Reference
Confidence about options of diagnosing the disease					
Not confident	22 (1.9)	5.74 (−0.89–12.37)	2.77 (−1.93–7.47)	3.44 (−0.06–6.95)	1.95 (−2.56–6.46)
Slightly confident	36 (3.1)	6.77* (1.52–12.02)	6.23** (2.50–9.95)	4.93*** (2.16–7.71)	5.65** (2.08–9.22)
Moderately confident	232 (20)	5.17*** (2.77–7.58)	4.12*** (2.41–5.82)	2.25*** (0.97–3.52)	2.73** (1.09–4.37)
Very confident	355 (30.6)	1.22 (−0.88–3.32)	1.88* (0.39–3.37)	0.99 (−0.12–2.10)	1.04 (−0.39–2.47)
Extremely confident	515 (44.4)	Reference	Reference	Reference	Reference
Satisfaction with the amount of information on the disease					
Not satisfied	24 (2.1)	4.63 (−1.73–10.99)	0.18 (−4.33–4.69)	0.29 (−3.07–3.64)	0.25 (−4.07–4.56)
Slightly satisfied	44 (3.8)	4.68 (−0.09–9.46)	5.22** (1.84–8.61)	4.13** (1.61–6.65)	4.44** (1.20–7.68)
Moderately satisfied	179 (15.4)	4.83*** (2.22–7.44)	3.92*** (2.07–5.77)	2.95*** (1.57–4.33)	3.09*** (1.32–4.86)
Very satisfied	339 (29.2)	2.47* (0.38–4.56)	1.94* (0.45–3.42)	1.37* (0.27–2.48)	1.59* (0.17–3.01)
Extremely satisfied	574 (49.5)	Reference	Reference	Reference	Reference
Participant's understanding of how they can protect themselves from COVID-19					
Using herbs such as myrrh and ginger					
Yes^	151 (13.0)	3.35* (0.67–6.02)	1.12 (−0.78–3.03)	1.41 (−0.01–2.82)	−0.04 (−1.86–1.78)
Social distancing for 1 m or more					
Yes^	792 (68.3)	−1.46 (−3.40–0.47)	0.40 (−0.98–1.78)	−0.57 (−1.59–0.46)	−0.01 (−1.33–1.30)
Self-isolation					
Yes^	1091 (94.1)	−0.49 (−4.31–3.32)	−0.16 (−2.87–2.56)	−1.01 (−3.02–1.01)	−1.23 (−3.81–1.36)
Washing and disinfecting my hands continuously					
Yes^	1030 (88.8)	−0.34 (−3.20–2.52)	−0.16 (−2.19–1.88)	−1.25 (−2.76–0.26)	−0.58 (−2.52–1.36)
Using antibiotics					
Yes^	32 (2.8)	−4.01 (−9.51–1.49)	−2.51 (−6.43–1.40)	−0.75 (−3.67–2.16)	0.73 (−3.00–4.47)
No protection needed					
Yes^	4 (0.3)	11.64 (−3.73–27.01)	7.83 (−3.10–18.77)	10.56* (2.43–18.68)	4.98 (−5.45–15.42)
I don't know					
Yes^	16 (1.4)	3.02 (−4.71–10.75)	3.10 (−2.40–8.60)	5.22* (1.13–9.30)	3.77 (−1.48–9.01)
Chances of recovering if diagnosed with COVID-19					
Not likely	17 (1.5)	7.75* (0.32–15.18)	1.06 (−4.22–6.35)	1.40 (−2.52–5.32)	1.73 (−3.29–6.74)
Slightly	36 (3.1)	10.95*** (5.75–16.15)	8.19*** (4.49–11.89)	7.28*** (4.54–10.02)	10.47*** (6.96–13.98)
Moderately	220 (19)	7.07*** (4.63–9.50)	5.19*** (3.46–6.92)	3.83*** (2.54–5.11)	5.01*** (3.36–6.65)
Very likely	384 (33.1)	4.53*** (2.49–6.57)	2.58*** (1.13–4.04)	0.87 (−0.20–1.95)	2.46*** (1.09–3.84)
Extremely likely	503 (43.4)	Reference	Reference	Reference	Reference
Perceived likelihood of infection during the current outbreak of the coronavirus					
Extremely likely	40 (3.4)	3.74 (−1.22–8.70)	6.68*** (3.20–10.15)	4.34** (1.74–6.94)	7.54*** (4.21–10.86)
Very likely	64 (5.5)	9.81*** (5.80–13.83)	9.41*** (6.60–12.22)	6.90*** (4.80–9.00)	9.54*** (6.85–12.22)
Moderately	297 (25.6)	5.53*** (3.30–7.75)	5.72*** (4.17–7.28)	3.70*** (2.53–4.86)	4.37*** (2.88–5.86)
Slightly	277 (23.9)	5.77*** (3.49–8.04)	3.58*** (1.99–5.18)	2.48*** (1.29–3.67)	2.80*** (1.27–4.32)
Not likely	482 (41.6)	Reference	Reference	Reference	Reference
Opinion about the statement: "I feel that there are a lot of unnecessary worrying regarding COVID-19"					
Strongly disagree	695 (59.9)	−0.09 (−3.60–3.41)	2.67* (0.17–5.16)	1.02 (−0.84–2.88)	2.06 (−0.32–4.44)
Disagree	134 (11.6)	−2.56 (−6.80–1.68)	2.52 (−0.50–5.53)	1.02 (−1.22–3.27)	2.12 (−0.76–5.00)
Undecided	162 (14)	−1.11 (−5.21–2.98)	0.98 (−1.93–3.89)	0.01 (−2.16–2.18)	1.23 (−1.55–4.01)
Agree	83 (7.2)	1.78 (−2.94–6.50)	2.16 (−1.19–5.52)	1.54 (−0.97–4.04)	1.82 (−1.39–5.02)
Strongly agree	86 (7.4)	Reference	Reference	Reference	Reference

IES-R: Revised Impact of Event Scale (IES-R);DASS-21: Depression, Anxiety and Stress Scale - 21 Items; B (95% CI):beta coefficient(95% confidence interval); ^ No "as reference * $p < .05$; ** $p < .01$; *** $p < .001$.

by 13.7%, which is similar to the 13.9% who experienced severe symptoms of anxiety and 16.4% who experienced severe symptoms of depression. Our findings are in line with previous findings of a study conducted during the pandemic in Iran where it reported the level of severe anxiety to be 19.1% and another study in Spain where it reported the level depression, stress, anxiety to be 9.9%, 7.8%, 11.6% respectively [18] [19]. Contrary to the findings of our study, a recently published study in china where 53.8% reported their psychological impact of the outbreak moderate or severe, 16.5% and 28% reported depressive and anxiety symptoms ranged from moderate to severe, while 8.1% reported moderate to severe stress levels [11]. The lower prevalence in our study could be attributed to that in the early days of the outbreak; only a few cases have been reported in Saudi Arabia with the majority of cases are imported from abroad and the lower perceived likelihood of being infected during the current outbreak as we found in this study.

Among participants, 11.7% worked in a medical field, and 27.9% had a family member working in a medical field; those participants had a higher score in the stress and anxiety and depression subscale, and this is in agreement with previous studies published recently and during MERS outbreak in Saudi Arabia and studies conducted during the current COVID-19 pandemic in Singapore and India [20–23].In addition to that, we found that females and students had higher scores across all DASS subscales, as was consistent with a previous study done in China [11], this could be attributed to the uncertainty of used methods in continuing the educational process after closing up the campuses and schools. Furthermore, earning less than 5000 SAR was significantly

Table 5
Associations between contact history, precautionary measures, and the psychological impact/adverse mental health status during the epidemic ($n = 1160$).

Variables	N (%)	IES-R	DASS – Stress	DASS – Anxiety	DASS – Depression
		B (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)
Indirect contact with someone diagnosed with COVID-19					
Yes^	6 (0.5)	0.10 (−12.47–12.68)	3.99 (−4.95–12.94)	6.39 (−0.26–13.03)	3.98 (−4.54–12.51)
Direct contact with someone diagnosed with COVID-19					
Yes^	2 (0.2)	0.60 (−21.14–22.35)	4.31 (−11.15–19.78)	0.02 (−11.49–11.53)	−3.04 (−17.79–11.71)
Direct contact with someone suspected to have COVID-19					
Yes^	20 (1.7)	1.94 (−4.99–8.86)	4.28 (−0.64–9.20)	4.39* (0.74–8.05)	6.27** (1.58–10.96)
Contact with surfaces and tools infected with COVID-19					
Yes^	4 (0.3)	8.38 (−7.00–23.76)	0.81 (−10.14–11.76)	7.04 (−1.09–15.18)	2.47 (−7.97–12.91)
Nothing happened					
Yes^	944 (81.4)	−2.99* (−5.30 to −0.68)	−4.12 (−5.75 to −2.49)	−3.24 (−4.46 to −2.03)	−3.99 (−5.55 to −2.44)
I don't know					
Yes^	281 (24.2)	3.15** (1.06–5.25)	3.03 (1.54–4.52)	2.72 (1.62–3.82)	2.66 (1.24–4.08)
Number of hours of self-isolation					
Did not go out at all	654 (56.4)	−3.24 (−14.87–8.39)	1.98 (−6.29–10.25)	2.89 (−3.27–9.05)	−2.35 (−10.25–5.55)
> 12 h/day	442 (38.1)	−6.36 (−18.01–5.30)	−0.18 (−8.47–8.10)	1.48 (−4.70–7.66)	−4.12 (−12.04–3.80)
8 to <12 h/day	47 (4.1)	−6.34 (−18.74–6.06)	−1.88 (−10.70–6.93)	1.14 (−5.43–7.71)	−4.25 (−12.67–4.17)
4 to <8 h/day	10 (0.9)	−2.73 (−17.81–12.35)	1.09 (−9.64–11.81)	3.09 (−4.91–11.08)	−4.34 (−14.59–5.90)
<4 h/day	7 (0.6)	Reference	Reference	Reference	Reference
How participants have protected themselves from COVID-19 over the past 14 days					
Washing and disinfecting hands continuously					
Yes^	1041 (89.7)	0.89 (−2.08–3.86)	−0.43 (−2.54–1.69)	−0.45 (−2.03–1.12)	−2.43* (−4.44 to −0.42)
Avoided handshakes					
Yes^	777 (67.0)	−1.09 (−3.01–0.83)	−0.69 (−2.05–0.68)	−0.68 (−1.70–0.33)	−1.26 (−2.55–0.04)
Social distancing for at least 1 m					
Yes^	683 (58.9)	−0.67 (−2.50–1.17)	−1.49* (−2.79 to −0.19)	−1.53** (−2.50 to −0.57)	−2.25 (−3.48 to −1.01)
Avoided sharing of utensils during meals					
Yes^	271 (23.4)	2.50* (0.37–4.62)	1.38 (−0.14–2.89)	0.57 (−0.55–1.70)	0.37 (−1.08–1.81)
Used a face mask even without any symptoms					
Yes^	196 (16.9)	3.17** (0.77–5.57)	0.82 (−0.89–2.54)	0.61 (−0.66–1.89)	0.80 (−0.83–2.44)
Did nothing					
Yes^	84 (7.2)	−3.89* (−7.37 to −0.42)	0.61 (−1.86–3.09)	−0.39 (−2.23–1.45)	2.35 (−0.01–4.71)

IES-R: Revised Impact of Event Scale (IES-R);DASS-21: Depression, Anxiety and Stress Scale - 21 Items; B (95% CI):beta coefficient(95% confidence interval); ^ No as reference * $p < .05$; ** $p < .01$; *** $p < .001$.

associated with higher scores on the IES-R the depression subscale, the economic impact of the pandemic cannot be overlooked which had left families with lower-income fearing of losing their jobs and homes, to mitigate this damage the Saudi government has released several initiatives, including offering free health care for everybody and financial incentives for the private sector [24].

Respondents with poor self-rated health status found to have a greater psychological impact and poorer mental health compared to the majority of the respondents (86.6%) who view their health status to be (good or very good). Moreover, the most reported physical symptom were headaches, sore throat, muscle pain, symptomatic respondents had poorer psychological status when compared to non-symptomatic. Similarly, this was seen in the study carried out in Mainland, China, during the COVID-19 pandemic [11]. This may be explained by the fact that the novel coronavirus found to be more aggressive on people with comorbidities and below-optimal health status, which may result in more psychological burden and excessive worry [25]. People with mental disorders are also more susceptible to stress compared to the general public, and such outbreaks can provoke relapses or even worsen the already existing psychological disorder [26]. In our study, participants with reported mental disorders (10.5%) showed high scores on all DASS and IER-S scales. Our finding is in alignment with a recent study comparing people with and without psychiatric illnesses during the current COVID 19 pandemic where people with psychiatric illnesses were more likely to exhibit higher levels of PTSD, depression, anxiety, and stress [27]. This finding stresses the need to support this particular population, especially during the lockdown where access to psychiatric services is difficult through expanding the telepsychiatry services and home delivery of medications. Besides that,(17.3%) of the participants reported having a chronic disease, which was associated with lower scores on the stress subscale, which is inconsistent with the study conducted in the Mainland, China [11]. Within the two weeks preceding data collection, 16.8% had visited hospitals for different reasons, and they score high on anxiety subscale. Respondents who have been quarantined and tested for COVID-19 show no significant association with any of the subscales, and this might be explained by the assurance they received from the negative results of the screening and showing no symptoms during the quarantine period.

Overall, the majority of the respondents (95%) showed an excellent level of knowledge on the mode of transmission of the coronavirus (contact, droplet), which indicates a satisfactory level (85%) of information about the disease being delivered to the general population. Those levels showed better rates compared to the study conducted in Mainland, China [11]. The overwhelming majority of respondents indicated some level of confidence in available testing options. However, those with lesser degrees of confidence (low, moderate) were likely to be associated with a higher level of depression, anxiety, stress, and psychological impact, as reported by Wang et al. [11]. The current study shows the general population confidence in local health authorities as shown to be the dominant source of information on COVID-19 related matters (88%), followed by WHO and non-official news circulating social media platforms like WhatsApp and Twitter, It worth noticing that our samples population was approached using those platform, however, the non-official sources were not the primary source of information, This shows the importance of delivering timely evidence-based information by the official health authorities through All platforms. Respondents demonstrated high levels of application of evidence-based preventive measures, i.e., hand hygiene and social distancing, which indicate a sufficient level of information as discussed earlier.

Moreover, respondents display a high level of optimism in recovery in case they have the infection, which is consistent with their age group and the fact that 80% of the infected population will have mild disease [3]. Similar to the finding of AlNajjar et al., an increase in perceived susceptibility to the infection was associated with higher psychological

impact [28]. Besides that, only 5% reported very high susceptibility of contracting the disease compared to 13% amid MERS infection in Jeddah, SA [28].

Hand hygiene and other Precautionary measures were found to have protective psychological effects, which is consistent with the finding reported in China during the earlier stages of the pandemic [11]. On the contrary, those who avoided sharing utensils showed a high IES-R score; this could be attributed to the direct relation of utensils to the primary mode of transmission., Also using a protective mask regardless of the presence of the symptoms was associated with worse IES-R score in contrary to findings by a recent study where they found that mask-wearing was associated with lower levels of anxiety and depression [12].When comparing our results to a previous study during the outbreak of influenza A (H1N1) in Saudi Arabia, about 61% of the population reported that they did not take mild or minimal precautions to prevent infection [29]. There is an increase in using precautionary measures right now, which can be attributed to social media campaigns that are focused on boosting public awareness and emphasizing the importance of wearing masks to prevent spreading of the virus in the community [30]; moreover, the Saudi government adopted new regulations mandating masks wearing in public places [31].

The findings of this study emphasize the need for governments to adopt new strategies to improve psychological services for community and individuals level by focusing on delivering accurate, evidence-based information to minimize the effect of fake news and to identify and support high-risk groups especially those with preexisting mental illness by expanding telepsychiatry services, promoting mental wellness and psychological interventions nationwide.

Limitations of the study include the time of data collection where the outbreak in Saudi Arabia was at its early stage with reported cases less than two thousand, which may have underestimated the psychological impact of the outbreak. For the time-sensitivity of the outbreak and with a curfew in place, we adopted a snowballing sampling strategy, which is a non-probability sampling technique. However, we assumed a study design effect of 3 in the sample calculation to compensate for the used sampling technique. Oversampling of particular regions (e.g., Qassim region), where we approached the initial sampled group, and the limitations to reach less educated people and non-social media users led to less generalizable results. Also, As a limitation of the study design, the survey provides only a snapshot of psychological responses at a particular point in time, and a longitudinal study is required to provide information on whether the observed impact will last for longer periods. The self-reported psychological impact, anxiety, depression, and stress may not adequately represent the mental health status assessed in an interview; thus, for the outcome to be determined, prospective studies are necessary to provide more accurate data to support the need for focused public mental health strategies. Lastly, the number of respondents who have been quarantined, tested for COVID-19, and had a contact history with infected persons was minimal, and our result could not be generalized on them. Despite all the above limitations, our study provides information about the immediate psychological responses of Saudi Arabia's general population on the COVID-19 pandemic. It covers many factors that can influence mental health and provides a broader vision of the issue for future researches. Our results give an idea about the magnitude of the psychological burden on the community during such outbreaks and offer ways to minimize the impact.

5. Conclusions

Throughout the early stage COVID-19 pandemic in Saudi Arabia, the results showed that one-fourth of the general population experienced moderate to severe psychological impact. Working in the medical field, females, students, and having a mental disorder are all associated with high scores in stress, anxiety, and depression subscales. Following specific precautionary measures appeared to have a protective effect on the individual's mental health. Our findings can be used to construct a psychological intervention directed toward the general and vulnerable population and to implement public mental health strategies in combination with pandemic response efforts in early stages of the event.

Author contributions

Conceptualization, Abdulmajeed Alkhamees, Saleh Alrashed, Ali Alzunaydi, Ahmed Almohimeed and Moath Aljohani; Data curation, Moath Aljohani; Formal analysis, Abdulmajeed Alkhamees; Investigation, Abdulmajeed Alkhamees; Methodology, Abdulmajeed Alkhamees, Saleh Alrashed, Ali Alzunaydi, Ahmed Almohimeed and Moath Aljohani; Project administration, Abdulmajeed Alkhamees; Supervision, Abdulmajeed Alkhamees and Moath Aljohani; Writing – original draft, Abdulmajeed Alkhamees, Saleh Alrashed, Ali Alzunaydi, Ahmed Almohimeed and Moath Aljohani; Writing – review & editing, Abdulmajeed Alkhamees, Saleh Alrashed, Ali Alzunaydi, Ahmed Almohimeed and Moath Aljohani.; All authors have read and agreed to the published version of the manuscript.

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Declaration of Competing Interest

The authors declare no conflict of interest.

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Appendix A. Supplementary data

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