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Original Article

Prevalence of Depression and Anxiety among General Population during COVID-19 Second Wave in Saudi Arabia

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ABSTRACT

Introduction: Coronavirus 2019 (COVID-19) pandemic had serious impact on people's mental health in the 21st century. Mental disorders have influenced economically on the society and have a dramatic effect on families too. This study aims to assess the effects of COVID-19 on psychological outcomes of pandemic and its associated risk factors on the general population of Saudi Arabia. **Materials and Methods:** A cross-sectional survey was conducted by distributing the questionnaires electronically in Saudi Arabia from 1st March 2021 to 30thApril, 2022. PHQ-9, GAD-7 and PSQ-30 were used to assess the prevalence of depression and anxiety among population. A total of 1532 participants completed the study. **Results:** The prevalence of depression, anxiety, and stress was 25.1%, 42.5%, and 68.48%, respectively. Significant predictors were Saudi nationals, young and single participants, less earning and respondents with no children. The mean depression score was significantly higher in participants that had not been infected with COVID-19 and anyone who is not living with an infected person had scored significantly. **Conclusion:** In this study, we disclosed a high prevalence of depression, anxiety and stress during the COVID-19 pandemic in Saudi Arabia. In conclusion, COVID-19 is an epidemiological crisis that is casting a shadow on vulnerable population. Appropriate knowledge and specialized interventions must be accessible to promote the psychological health of the Saudi population.

Keywords: COVID-19, Anxiety, Depression, Saudi Arabia.

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INTRODUCTION

Several epidemics and pandemics that pose a threat to human lives, global economic security, and the healthcare system have been faced previously. Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) is a novel coronavirus that was first exposed in Wuhan, Hubei province, Central China on 26th December 2019, and is responsible for the 2019-20 pandemic.[1] SARS-CoV-2 is the most pathogenic human coronavirus shaking up the whole world with its life threatening symptoms.[2] The symptoms may be ranges from ranges from mild (i.e., mild pneumonia or no pneumonia) to severe (i.e., dyspnea) and even fatal infection (i.e., respiratory failure, shock, and/or multi-organ failure) which resulted in finally death of a patient.[3]

Meanwhile COVID-19 have serious psychological effects on people's health such as fear, stress, anxiety, depression, anger, and insomnia in particularly specialized population, such as older adults, students, healthcare workers, patients with underlying health conditions etc.[4] Community such as female sex, low socioeconomic status, more exposure to social media and social support at national and international levels were more affected with psychological impacts. People are more likely to experience fear of getting infecting or dying, feeling helpless and being alone.[5] Consequently, pandemic had a psychological outcome such as moderate to severe anxiety and depressive symptoms, respectively.[6]

Prior art demonstrated that outbreak of infectious diseases, including SARS, MERS, H1N1 and Ebola, were associated with psychological impact in general population such as depression, anxiety and stress.[7] Mental disorders have considerable economic impact on the society and have a dramatic effect on families also. As pandemic found associated with severe mental illnesses which can turn into suicidal tendencies, its exploration in specialized population is essential. Community level screening will provide timely detection, early prevention, proper intervention and mental health initiation.[8] Most studies measure the immediate impact of COVID-19 pandemic on mental health for short term period.[9,10] This study aims to assess the mental health of citizens and nationals of Kingdom of Saudi Arabia during second wave of COVID-19 pandemic using questionnaires. This study will

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provide baseline information for healthcare professionals about impact of the COVID-19 pandemic on mental health. This will help in the prevention of psychological disorder in the early stage and assist professionals in promoting mental health awareness for prevention and treatment of mental illnesses at community level.

MATERIALS AND METHODS

Study design and study population

An online cross-sectional study was conducted in Saudi Arabia from 1st March 2021 to 30th April, 2022, to assess mental issues such as anxiety, depression and stress among the general population during the COVID-19 pandemic.

Sampling strategy

A convenience sample of eligible participants from Taif Region, Saudi Arabia was invited to fill an online questionnaire distributed through social media (Facebook, WhatsApp and E-mail). As voluntarily participation was anticipated, written informed consents were exempted.

Inclusion and exclusion criteria

The inclusion criteria were:

a) Taif, Saudi Arabia residents, aged 18 years and above, and

b) Absence of any cognitive deficit.

Participants were excluded if they were:

a) Young participants (Below 18 years of age);

b) Unable to participate due to psychological trauma.

Questionnaire development

The online questionnaire were divided into three parts; In first part participants have to reported their nationality, age, gender, marital status, education level, employment status and income. Participant's age were subcategorized into 18-29, 30-49, and 50 years and above. Education was classified into the following three categories: uneducated, complete secondary grade, complete bachelor degree or higher education. Employment status was categorized as retired, unemployed, employed or student. Current income status was categorized as 2000 SR or below, 2000-5000 SR, 5000-10,000 SR and 10,000 SR and above. Furthermore, fear of being infected with COVID-19 or transmitting it to other family members (Yes/No question) was asked and whether they had any underlying chronic conditions (Yes/No question). In other two parts, severity of depression and anxiety symptoms were measured using the Patient Health Questionnaire (PHQ)-9 (Appendix-1) and Generalized Anxiety Disorder 7-item (GAD-7) (Appendix-2).

Depression and anxiety assessment scales

Previously validated PHQ-9 and GAD-7 questionnaires-based tool were used to assess depression and anxiety among the study participants. These screening objects were previously used and validated for the same objective.[11-13] The PHQ-9 scale is used to evaluate the presence and severity of depression, while GAD-7 instrument was used to screen for anxiety among participants using a 4-point Likert scale. The PHQ-9 instrument includes 9 items where score of 0-4 indicates minimal depression, 5-9 mild depression, 10-14 moderate depression, 15-19 moderately severe depression, and 20-27 severe depression.[13,14] The GAD-7 instrument includes 7 items, where a total score of 5-9 indicates mild anxiety, 10-14 moderate anxiety, and 15-21 severe anxiety.[14,15]

An estimate of prevalence and classification of depression and anxiety

As previously reported, cut-off point were used to determine the prevalence rates of depression and anxiety; where higher the score, the more severe the case.[13] A total score of (≥ 15) in the PHQ-9 and GAD-7 instrument indicates moderately severe or severe depression and severe anxiety, respectively. The prevalence rate of depression and anxiety will be estimated by dividing the number of participants who exceeded the borderline score (≥ 15) by the total number of participants in the same population.

An estimate of prevalence and classification of stress

Previously validated 30-item PSQ, were developed and distributed to assess prevalence of stress. Highest the scores, the more severe is the perceived stress. The score was transformed between zero (lowest level of perceived stress) and one (highest level of perceived stress) by subtracting 30 from the raw score and dividing the result by 90 [PSQ = (raw value−30)/90].[16] Values <0.34 indicates low stress, 0.34-0.46 indicates moderate stress and >0.46 indicates high stress, respectively.[17]

Sample size

The sample size was calculated using the formula described by Rönnlund and coworkers:[17]

$$n = \frac{Z^2 p\,(1-p)}{E^2},$$

where, n = minimum sample size when population is large, Z = confidence level at 95% (standard value of 1.96), p = prevalence taken (0.5) based on 50.74% vs. 30.40% prevalence of depression were reported in non-Saudi participants when compared with Saudi ones in a similar study conducted in Saudi Arabia between 28 May and 1 June 2020,[18] E = allowable error (5% of p). For finite population: n finite= n

1+n/N,

where n = calculated initial sample size using the previous formula, which was 1536 and N = finite population number (Taif population in 2020 is 689,000. Approx. 30% of population is less than 18 years, 482300 population is 18 years or above) (https://www.stats.gov.sa/en/5305).

N finite=1536

1+1536/482300

n finite = 1531

After considering the proportion (q) that was expected to refuse to participate or provide inadequate information, the final number of samples to be recruited was

$$n^* = \frac{n}{1-q},$$

Where q is the proportion of attrition and was taken as 10%. After adjusting for the number of non-responses, the final number of samples was 1701.

Statistical analysis

Descriptive statistics was performed to describe demographic characteristics of participants'. The data was reported as mean ± SD for distributed variables and the categorical data will calculated as percentages (frequencies). The *Post hoc* Tukey test was used to compare the median scores between different groups. Chi square test is performed for testing associations between categorical variables. Statistically significant variables were fitted into multiple regression models to analyze their relationship with stress, anxiety, and depression. A two-sided $p<0.05$ was considered as statistically significant. SPSS software (version 25) was used for statistical analyses.[11]

RESULTS

Sociodemographic profile of participants

A total 1532 respondents completed the survey where as shown in Table 1 mostly were Saudis (96%), male (84.5%), between 18 to 65 years of age, with an average age of 31.25 ± 9.23 years. The majority of subjects were aged 18-29 years (58.5%) and single (48.5%). Majority of the participants (72.2%) were graduates, while only few (1.4%) were uneducated. More than half percent of participants (52%) have monthly income of 2000 SR or below and 42.5% have at least one child.

Prevalence of depression, anxiety and stress among participants

As shown in Figure 1, more than half of population was suffered from psychological distress during pandemic. Finding showed that 25.1% and 42.5% of respondents were suffered from depression and anxiety, respectively. While most of the participant had experienced stress (68.48%).

Prevalence of depression

9.4% of participants reported depression where more than half (54.2%) reported it during the entire time period of pandemic. 25.1% reported prevalence of depression from March to May, while only 10.8%, 9.9% and 8.81% revealed the symptoms during June-August, September-November and December-April, respectively (Figure 2).

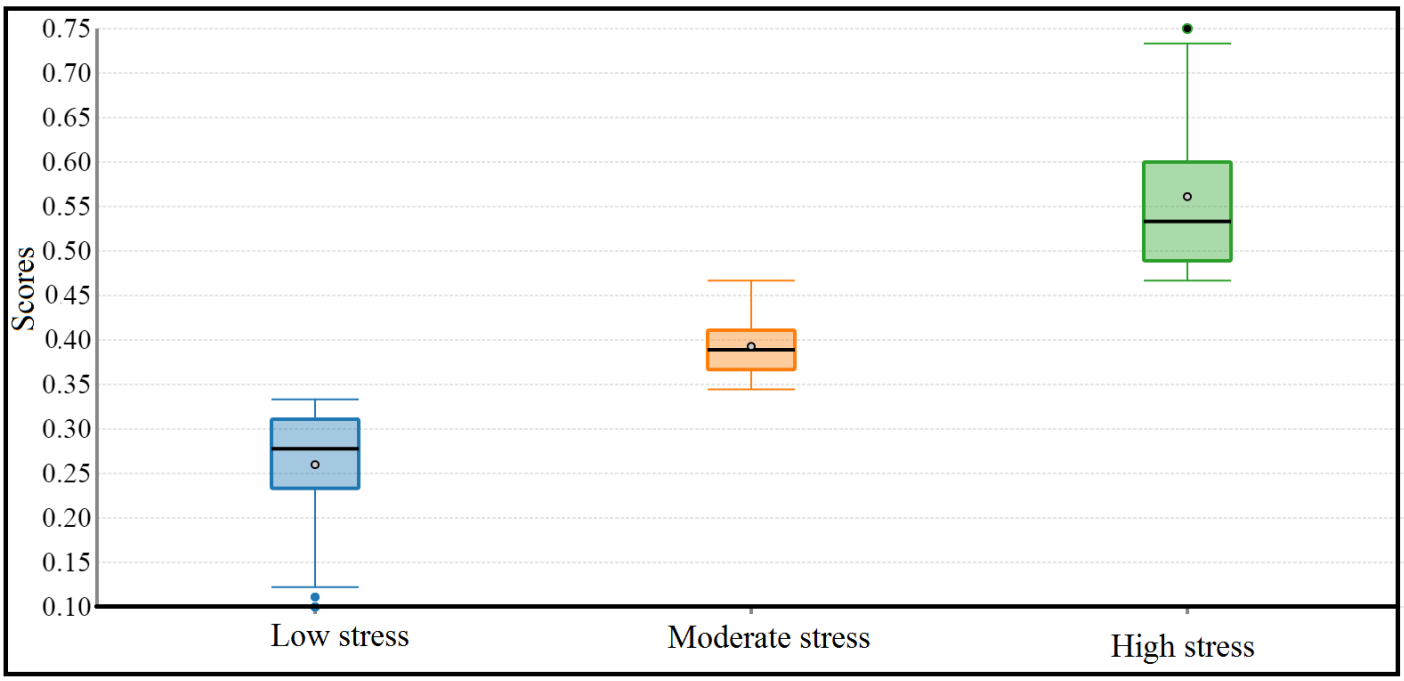

Figure 1: Prevalence of anxiety, depression and stress among participants.

Table 1: Distribution of socio-demographic variables in participants.

Demographics	Number (%)
Nationality	
Saudi	1471 (96%)
Non-Saudi	61 (4%)
Gender	
Male	237 (15.5%)
Female	1295 (84.5%)
Age	
18 – 29 years	841 (54.9%)
30 – 49 years	602 (39.3%)
50 years and above	89 (5.8%)
Marital Status	
Single	743 (48.5%)
Married	725 (47.3%)
Divorced	51 (3.3%)
Widow	14 (0.9%)
Education level	
Uneducated	21 (1.4%)
Completed secondary grade	306 (20%)
Complete bachelor degree	1106 (72.2%)
Higher education	98 (6.4%)
Employment status	
Retired	57 (3.7%)
Unemployed	530 (34.6%)
Employed	355 (23.2%)
University students	590 (38.5%)
Income	
2000 SR or below	797 (52%)
2000–5000 SR	277 (18.1%)
5000–10,000 SR	162 (10.6%)
10,000 SR and above	296 (19.3%)
Chronic disease history	
Yes	236 (15.4%)
No	1296 (84.6%)
Mention the name of the disease	Hypertension, allergies, rheumatoid arthritis, anemia, irritable bowel syndrome, diabetes, thyroid disorders, asthma, bronchitis
Do you have children?	
Yes	651 (42.5%)
No	881 (57.5%)

*n= 1532

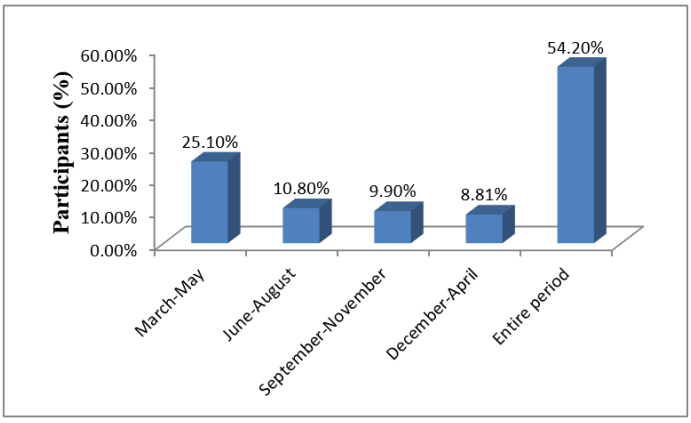

Figure 2: Prevalence of depression among participants in different time period.

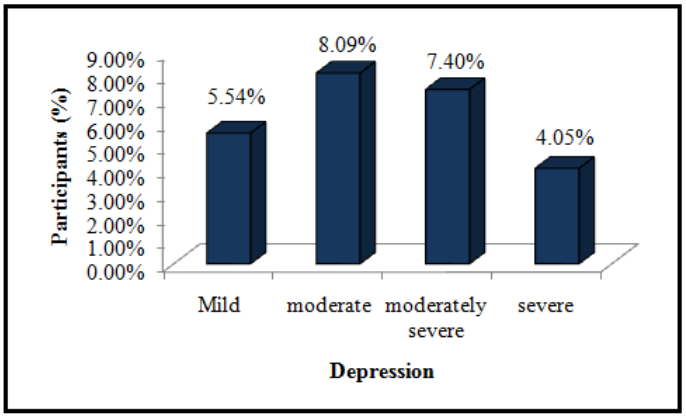

Figure 3: Prevalence of depression level among population.

Responses to depression questionnaire (PHQ-9) are given in Table 2. The symptoms of the disorders were mild, moderate, and moderately severe to very severe in 5.54%, 8.09%, 7.4% and 4.05% of the population, respectively (Figure 3). A box plot design is showing in Figure displaying depression scores in participants (Figure 4). Average scores for depression was 7±1.2 (mild depression), 11.78±1.4 (moderate depression), 17.20±1.26 (moderately severe depression) and 22.31±1.70 (severe depression), respectively.

Prevalence of anxiety

39.7% of participants reported anxiety during the entire time period of pandemic. 38.1% reported prevalence of anxiety from March to May, while only 18.4%, 3.8% and 3.21% revealed the symptoms during June-August, September-November and December-April, respectively (Figure 5).

Responses of participants to PSQ-30 questionnaire are shown in Table 3. The symptoms of the disorders were mild, moderate and moderately severe in 21.93%, 14.32%, and 6.29% of the population, respectively (Figure 6). 7.97% of participants have score between 1 to 4 and thus not included. A box plot design is showing in Figure 7 displaying anxiety scores in participants. Average scores

Table 2: Responses to Depression questionnaire (PHQ-9).

Sl. No	Question	Not at all	Several days	More than half the days	Nearly every day
		0	1	2	3
1	Little interest or pleasure in doing things.	19.2%	36.5%	23.6%	20.7%
2	Feeling down, depressed, or hopeless.	6.4%	43.3%	28.1%	22.2%
3	Trouble falling or staying asleep, or sleeping too much.	12.8%	27.1%	30%	30%
4	Feeling tired or having little energy.	8.9%	35%	25.1%	31%
5	Poor appetite or overeating.	15.3%	24.6%	25.1%	35%
6	Feeling bad about yourself or that you are a failure orhave let yourself or your family down.	32.5%	23.2%	19.7%	24.6%
7	Trouble concentrating on things, such as reading the newspaper or watching television.	32%	30.5%	23.2%	14.3%
8	Moving or speaking so slowly that other people could have noticed. Or the opposite being so figety or restless that you have been moving around a lot more than usual.	34.5%	31%	17.2%	17.2%
9	Thoughts that you would be better off dead, or of hurting yourself.	48.3%	28.6%	13.3%	9.9%

*n= 385

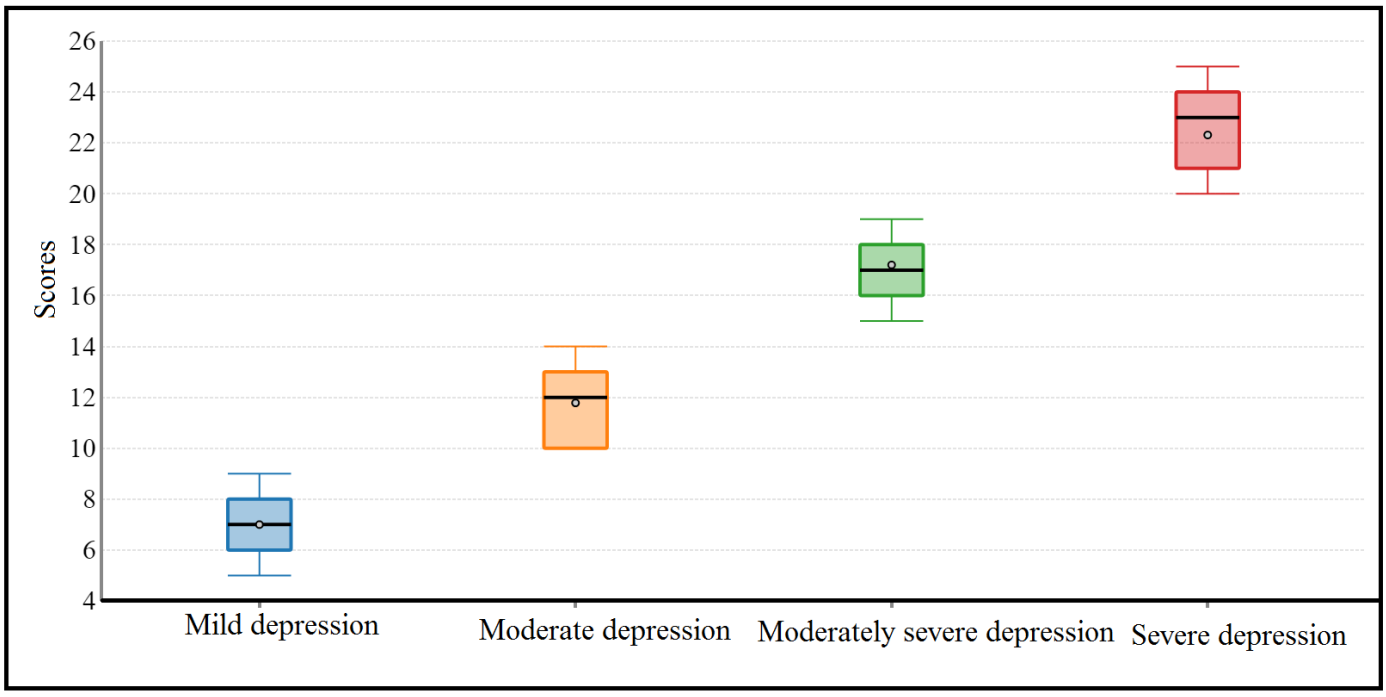

Figure 4: Box-plot design showing distribution of depression scores among participants. (Depression Severity: 0-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately severe, 20-27 severe)

for anxiety was 7.039±1.48 (mild anxiety), 11.51±1.96 (moderate anxiety), 16.44±3.24 (severe anxiety), respectively.

Prevalence of stress

Responses of participants to PSQ-30 questionnaire are shown in Table 4. Low, moderate and severe stress was observed in 20.17%, 24.74%, and 21.87% of the population, respectively (Figure 8). A box plot design is showing in Figure 9 displaying stress scores in participants. Average scores for stress was 0.258±0.075 (low stress), 0.391±0.04 (moderate stress), 0.558±0.11 (severe stress), respectively.

Table 3: Responses to Anxiety questionnaire (GAD-7).

Sl. No	Question	Not at all	Several days	More than half the days	Nearly every day
		0	1	2	3
1	Feeling nervous, anxious, or on edge.	21%	44.2%	21%	13.8
2	Not being able to stop or control worrying.	32.1%	42%	17.9%	8%
3	Worrying too much about different things.	46.3%	28.7%	15.2%	9.9%
4	Trouble relaxing.	28.3%	41.6%	16.1%	14.1%
5	Being so restless that it's hard to sit still.	20%	35%	19.7%	24.4%
6	Becoming easily annoyed or irritable.	32.7%	33.8%	14.4%	19.1%
7	Feeling afraid as if something awful might happen.	20.4%	37%	16.6%	26%
Total	21				

*n= 652

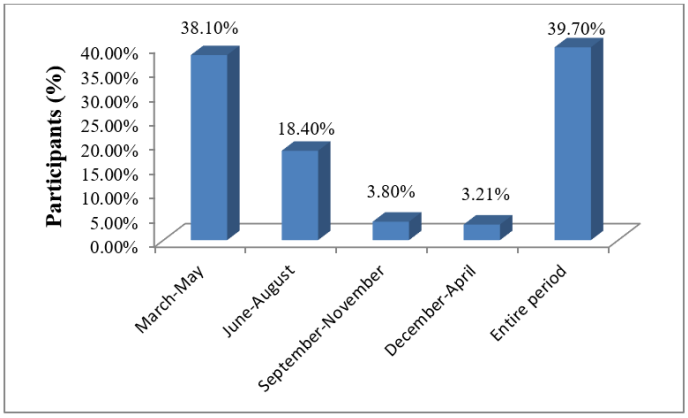

Figure 5: Prevalence of anxiety among participants in different time period.

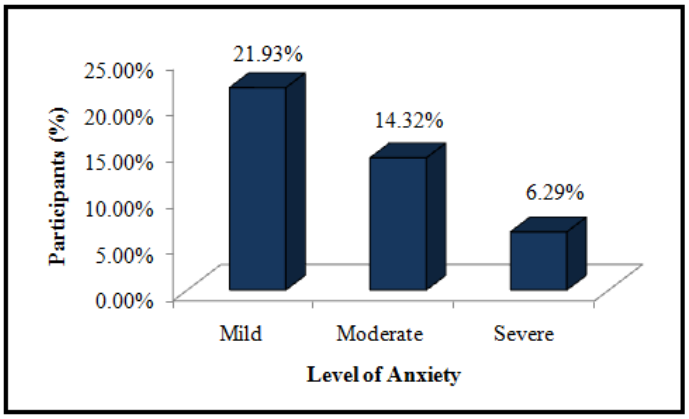

Figure 6: Prevalence of anxiety level among population.

Effect of socio-demographic characteristics on prevalence of depression, anxiety and stress

Participants' psychological health status during COVID-19 pandemic (Table 5) illustrate that a significant high percentage of depression (98.18% vs 1.92%), anxiety (97.39% vs 2.60%) and stress (99.41% vs 0.59%) was found among Saudis than in non-Saudi participants. Female gender were found to be more anxious (87.11%, χ^2: 5.80) and stressed (87.39%; χ^2: 19.25) than male gender. Similarly, young participants were more depressed (73.25%; χ^2: 171.68), anxious (65.34%) and stressed (63.24%) than higher ages. Single participants were significantly (p<0.00001) more depressed (69.87%; χ^2: 171.68), anxious (60.12%; χ^2: 103.88) and stressed (43.98%; χ^2: 251.16) when compared with married couples (25%, 34.2% and 39%, respectively). Similarly high level of depression, anxiety and stressed was predicted in divorced and widowed participants. Unexpected non-significant results were predicted when considering education level; but still high percentage of depression among uneducated population (61.9%) can't be ignored. Among education status, university students (45.71%) reported more depression incidents. On the other hand, retired respondents were less likely to be stressed (3.03%; χ^2: 55) than unemployed (34.89%), employed (23.36%) and university students (38.71%), respectively. Similarly, participants have less earning (2000 SR or below) are more likely to depressed (62.33%; χ^2: 28.24) and stressed (53.86%; χ^2: 75.08) during pandemic when compared with high earning participants. A significant high prevalence rate of anxiety was observed in respondents with chronic diseases (63% vs 38.81%). Respondents having no kids were more likely to report experiencing depression, anxiety, and stress than those who were having children (84.16% vs. 15.84%, 75% vs. 25%, and 60.7% vs. 39.3%, respectively; p < 0.05).

Effect of variables on scores of depression, anxiety and stress

Effect of different variables on various scores was shown in Table 6. The depression scores were evenly distributed between

Table 4: Responses to Stress questionnaire (PSQ-30).

Sl. No	Question	Almost	Sometimes	Often	Usually
		1	2	3	4
1	You feel rested.	25.6%	35.7%	26.9%	11.7%
2	You feel that many are demands are being made on you.	27.3%	34.7%	27.4%	10.6%
3	You are irritable or grouchy.	16.2%	57.2%	19.3%	7.2%
4	You have to many things to do.	29.1%	21.3%	30.1%	19.5%
5	You feel lonely or isolated.	23.3%	43.5%	16.8%	16.4%
6	You find yourself in situation of conflict.	24.2%	42.2%	18.1%	15.5%
7	You feel you are doing things you really like.	22.7%	37.2%	26.4%	13.7%
8	You feel tired.	20.8%	43.9%	21.1%	14.3%
9	You fear you may not mange to attain your goals.	22.7%	36.3%	25.8%	15.2%
10	You feel calm.	22%	38.4%	25.3%	14.3%
11	You have too many decisions to make.	28.2%	29.8%	26.7%	15.3%
12	You feel frustrated.	23.3%	47.8%	16.2%	12.6%
13	You are full of energy.	24.5%	34.7%	26.9%	13.9%
14	You feel tense.	21.8%	52.7%	17.3%	8.1%
15	Your problems seem to be piling up.	27.4%	40.4%	17.7%	14.4%
16	You feel your in a hurry.	23.6%	44.4%	20.8%	11.2%
17	You feel safe and protected.	22.9%	24.4%	26.4%	26.4%
18	You have many worries.	24.7%	44.4%	19.1%	11.7%
19	You are under pressure from other people.	24.7%	43.5%	19%	12.8%
21	You enjoy yourself.	23.5%	24.4%	31%	21.1%
22	You are afraid for the future.	24.4%	36.6%	20.9%	18.1%
23	You feel you are doing things because you have to not because you want to.	20.2%	40.8%	23.3%	15.7%
24	You feel criticized or judged.	26.9%	39.4%	20.4%	13.4%
25	You are lighthearted.	28%	45.7%	15.3%	11%
26	You feel mentally exhausted.	26.5%	36.3%	22%	15.2%
27	You have trouble relaxing.	23.5%	46%	17.7%	12.8%
28	You feel loaded down with responsibility.	27.8%	32.9%	24.4%	15%
29	You have enough time for yourself.	28.2%	38.6%	19.5%	13.7%
30	You feel under pressure from deadlines.	23.8%	40.1%	19.9%	16.2%

*n= 1023

Saudi and non-Saudi (13.73±5.42 Saudi and 14.12±4.29); male and female participants (12.96±3.02 in men and 13.55±5.4 in women). The *Post-hoc* Tukey test scores of depression were significantly higher in younger participants i.e. age: 18-29 (p=0.0459; F= 3.1296) than higher aged respondents. University students had significantly (p= 0.0034; F=4.7099) scored highest (15.27±5.53) than employed (11.21±5.02) or unemployed participants (13.01±4.48). When considering anxiety, higher education was linked with more significant scores (p= 0.007) and found no significant associations amongst the nationality, gender, age and marital categories. Significant differences (p=0.046; F=4.07) were reported between anxiety scores of participants who completed secondary education (11.51±4.59) and those who were highly educated (8.5±3.64). The *Post-hoc* Tukey test found significantly higher stress scores (p<0.05) amongst the Saudi nationals (0.4±0.19; F: 8.7889) and single participants (0.41±0.14; F: 2.8361). The participants having monthly income 2000 SR or below is more significantly associated with high anxiety (p=0.019; F= 3.34916) and stress scores (p=0.0381; F=2.8252). A significant higher stress scores were found to be associated with higher monthly income participants when compared with 2000-5000 SR monthly earner (p= 0.0492). Participants having no children have significant (p= 0.0093; F= 6.8351) higher stress scores (0.42±0.11) than participants with children (0.38±0.14).

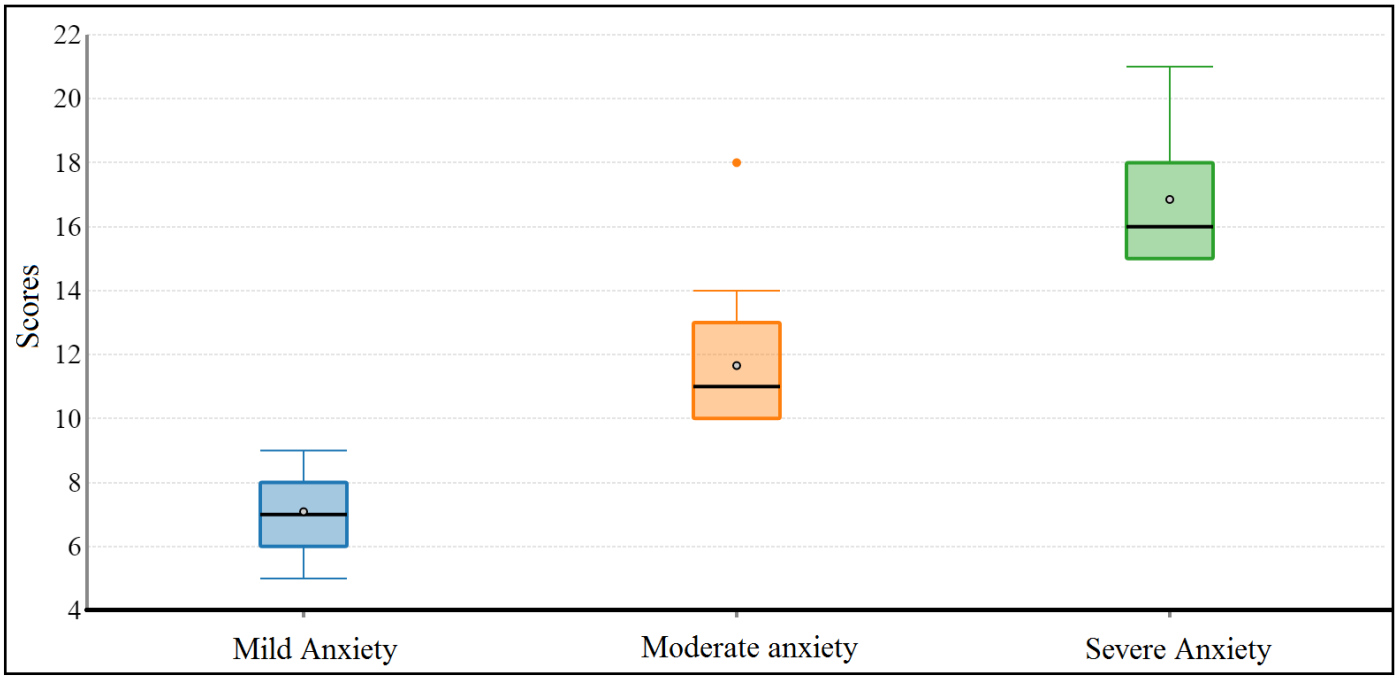

Figure 7: Box-plot design showing distribution of anxiety scores among participants.

(Score of 5–9 indicates mild anxiety, 10–14 moderate anxiety, and 15–21 severe anxiety)

Effect of pandemic related factors on prevalence of depression, anxiety and stress

As shown in Table 7, 63.2% participants were concerned about being infected with the COVID or transmitting it to family members, where only 5.2% were diagnosed with COVID-19 symptoms. 12.3% were infected with COVID-19 and 70.8% of participants confirmed about COVID infection in their relatives. 21.8% were living with someone who was diagnosed with COVID-19. Regarding knowledge level about pandemic, 69.5% have good knowledge while only 2.5% have no or less knowledge about COVID-19.

Using the *Post hoc* Tukey test, the mean of the scores was compared and found that mental disturbances level varies in different groups depending upon pandemic related factors (Table 8). The mean depression score was significantly higher in participants that had not been infected with Covid-19 (p= 0.0096, F=7.35). Anyone who is not living with an infected person had scored significantly (p=0.021, F= 5.42) high (15.42±5.25) when compared with participants who are living with an infected ones (13.32±5.0). Level of depression did not vary significantly if anyone's relative were found to be infected and on the basis of knowledge level of participants about COVID-19. All pandemic related factors had non-significant impact on anxiety and stress scores.

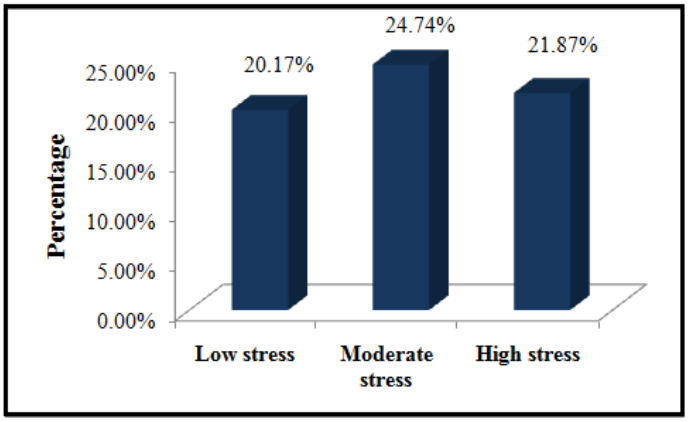

Figure 8: Prevalence of stress level among population.

Regression model on factors affecting depression, stress and anxiety

The variables with a p-value of less than 0.05 in chi-square testing were inserted in multiple regression models to find the effect of depression, anxiety and stress scores on study variables (Table 9). The result revealed that Saudi nationality (B=0.54; CI= 0.44-0.64), uneducated status (B=0.085; CI= 0.023-0.195), being students (B=0.068; CI= 0.0084-0.144) and presence of any chronic diseases (B=0.285; CI= 0.221-0.351) were established a significant positive relationship with stress scores. When considering anxiety scores, Saudi nationality (B=0.68; CI=0.62-0.75), female gender (B=0.05; CI=0.0001-0.10), uneducated status (B=0.17; CI=0.09-0.26) and income less than 2000 (B=0.091; CI= 0.049-0.13) or more than 10,000 SAR (B= 0.122; CI=0.07-0.17) has been found to associated with high scores. Saudi nationality (B=0.276; CI=0.23-0.32),

Table 5: Effect of variables on prevalence of Depression, stress and anxiety among participants.

Variables	Division	Depression N (%)*	Anxiety N (%)	Stress N (%)
Nationality	Saudi	378 (98.18%)	635 (97.39%)	1017 (99.41%)
	Non-Saudi	7.4 (1.92%)	17 (2.60%)	6 (0.59%)
	P value	0.0016*	0.015*	<0.0001*
	Chi square (χ^2) value	9.996	5.8	958.073
Gender	Male	57 (14.8%)	84 (12.8%)	129 (12.6%)
	Female	328 (85.19%)	568 (87.11%)	894 (87.39%)
	P value	0.54	0.015*	<0.0001*
	Chi square (χ^2) value	0.358	5.80	19.25
Age	18-29	282 (73.25%)	426 (65.34%)	647 (63.24%)
	30-49 years	90 (23.38%)	194 (29.75%)	316 (30.89%)
	50 years and above	13 (3.37%)	32 (4.9%)	60 (5.86%)
	P value	<0.00001*	<0.00001*	<0.0001*
	Chi square (χ^2) value	127.20	56.09	274.13
Marital Status	Single	269 (69.87%)	392 (60.12%)	577 (43.98%)
	Married	97 (25%)	223 (34.20%)	399 (39%)
	Divorced	12 (3.11%)	29 (4.45%)	37 (3.62%)
	Widow	6 (1.55%)	8 (1.23%)	10 (0.98%)
	P value	<0.00001	<0.00001	<0.0001
	Chi square (χ^2) value	171.68	103.88	251.16
Education level	Uneducated	8 (2.1%)	8 (1.23%)	16 (1.56%)
	Completed secondary grade	82 (21.3%)	138 (21.17%)	212 (20.72%)
	Complete bachelor degree	267 (69.35%)	468 (71.78%)	728 (71.16%)
	Higher education	28 (7.27%)	39 (5.98%)	67 (6.54%)
	P value	0.069	0.61	0.0018*
	Chi square (χ^2) value	7.065	1.7995	15.05
Employment status	Retired	15 (3.89%)	26 (3.99%)	31 (3.03%)
	Unemployed	115 (30%)	224 (34.36%)	357 (34.89%)
	Employed	79 (20.51%)	155 (23.77%)	239 (23.36%)
	University students	176 (45.71%)	247 (37.88%)	396 (38.71%)
	P value	0.000068*	0.92	<0.00001*
	Chi square (χ^2) value	21.92	0.4747	55
Income	2000 SR or below	240 (62.33%)	321 (49.23%)	551 (53.86%)
	2000–5000 SR	47 (12.21%)	129 (19.79%)	166 (16.23%)
	5000–10,000 SR	32 (8.31%)	66 (10.12%)	107 (10.45%)
	10,000 SR and above	66 (17.14%)	136 (20.86%)	199 (19.45%)
	P value	<0.00001*	0.09	<0.00001*
	Chi square (χ^2) value	28.24	6.431	75.08
Chronic disease history	Yes	52 (13.5%)	149 (22.85%)	160 (15.64%)
	No	333 (86.49%)	503 (77.15%)	863 (84.36%)
	P value	0.339	0.000025	0.0386
	Chi square (χ^2) value	0.9336	17.78	0.844

Variables	Division	Depression N (%)*	Anxiety N (%)	Stress N (%)
Do you have children?	Yes	61 (15.84%)	163 (25%)	402 (39.3%)
	No	324 (84.16%)	489 (75%)	621 (60.7%)
	P value	<0.00001*	<0.00001*	<0.00001*
	Chi square (χ^2) value	169.97	182.31	104.11

n*= 385 for depression, *n*= 652 for anxiety and *n*= 1023 for stress Chi square test is applied using N mentioned in Table 4.1

Table 6: Effect of variables on scores of depression, anxiety and stress.

Variables	Division	Depression Scores		Anxiety Scores		Stress Scores	
		Mean±SD	*P* value	Mean±SD	*P* value	Mean±SD	*P* value
Nationality	Saudi	13.73±5.42	0.81	9.87±3.95	0.82	0.4±0.19	0.0032*
	Non-Saudi	14.12±4.29		9.6±3.13		0.33±0.17	
Gender	Male	12.96±3.02	0.61	10.18±4.05	0.71	0.39±0.18	0.84
	Female	13.55±5.4		9.9±3.89		0.40±0.19	
Age	18 – 29	13.69±5.5	0.046*	10.2±4.1	0.26	0.41±0.19	0.133
	30 – 49 years	11.43±5.99		9.3±3.5		0.39±0.2	
	50 years and above	12±4.6		9.9±5.2		0.43±0.14	
Marital Status	Single	13.67±5.42	0.89	10±3.9	0.48	0.41±0.14	0.0376*
	Married	13.09±5.9		9.8±3.8		0.40±0.15	
	Divorced	14.4±5.68		9.5±4.46		0.36±0.14	
	Widow	13±1.98		9.2±3.78		0.33±0.16	
Education level	Uneducated	12.27±4.54	0.66	11.11±4.88	0.007*	0.39±0.13	0.15
	Completed secondary grade	12.9±6.21		11.51±4.59		0.45±0.22	
	Complete bachelor degree	13.4±5.49		9.91±3.8		0.41±0.18	
	Higher education	15±6.48		8.5±3.64		0.40±0.16	
Employment status	Retired	13.5±6.47	0.0034*	8.2±5.7	0.21	0.43±0.14	0.16
	Unemployed	13.01±4.48		9.2±3.48		0.39±0.20	
	Employed	11.21±5.02		9.45±3.12		0.39±0.19	
	University students	15.27±5.53		10.23±4.25		0.43±0.12	
Income	2000 SR or below	14.42±5.3	0.1168	10.14±3.9	0.019*	0.41±0.19	0.0381*
	2000–5000 SR	13±5.79		7.3±2.3		0.38±0.21	
	5000–10,000 SR	12.59±4.65		10 ±4		0.39±0.17	
	10,000 SR and above	15.28±7.14		10.37±4.4		0.43±0.17	
Chronic disease history	Yes	13.78±5.5	0.46	10.03±4.14	0.91	0.41±0.17	0.87
	No	12.86±4.49		9.8±2.77		0.38±0.13	
Do you have children?	Yes	13.22±5.59	0.62	10.67±4.1	0.159	0.38±0.14	0.0093*
	No	13.75±5.41		9.81±3.8		0.42±0.11	

*Statistically Significant when $p<0.05$** Depression scores: 5-27; anxiety scores: 5-21 and stress scores: 0.1-1

Table 7: Prevalence of pandemic related factors among participants.

Worried about being infected with the corona virus or transmitting it to family members	N(%)
Yes	968(63.2%)
No	564(36.8%)
Do you have COVID-19 symptoms?	
Yes	80(5.2%)
No	1452(94.8%)
Have you been infected with COVID-19?	
Yes	188(12.3%)
No	1344(87.7%)
Have any of your relatives been infected with Corona virus?	
Yes	1085(70.8%)
No	447(29.2%)
Are you living with someone who is infected with virus?	
Yes	334(21.8%)
No	1198(78.2%)
Self–evaluated level of knowledge about COVID-19	
Not at all or Low	41(2.7%)
Medium	426(27.8%)
Well	611(39.9%)
Very well	454(29.6%)

*n= 1532

female gender (B=0.049 (CI= 0.019-0.079), income less than 2000 (B=0.028; CI= 0.0015-0.05) or more than 10,000 SAR (B=0.0998; CI=0.07-0.127), individuals with no children (B=0.054; CI=0.020-0.086) and presence of any chronic disease (B=0.095; CI= 0.067-0.123) was associated with high stress scores. Similarly, the participants not infected with Covid-19 (B=0.082; CI= 0.052-0.113) and not living with an infected person (B= 0.032; CI= 0.0086-0.055) were also showed significant high stress scores.

DISCUSSION

Depression, anxiety and stress are the most common mental health issues among general population worldwide during pandemic-19.[19] The aim of the study was to explore the levels of depression, anxiety, and stress in Saudi population during second wave of Covid-19 epidemic. A total 1532 respondents completed the survey where mostly were Saudis, 18-29 years old, graduates, monthly income of 2000 SR or below and have no kids. Our findings revealed that more than half of population was suffered from psychological illness where 25.1%, 42.5% and 68.48% were suffered from depression, anxiety and stress, respectively. While other researchers reported high prevalence of depression (52.1%) while almost similar prevalence of anxiety (42.1%) and stress (63.4%) in Iranian population.[20] A similar study conducted in Saudi Arabia showed that depression, anxiety and stress symptoms reported were 28.9%, 16.4% and 17.8% respectively.[21] A meta-analysis comprising 288,830 participants from 19 countries reported 33% (95% CI: 28%-39%) and 30% (26%-36%) prevalence of anxiety and depression.[22] Based on the findings, it

Figure 9: Box-plot design showing distribution of stress scores among participants. (<0.34- low stress, 0.34-0.46- moderate stress, >0.46- high stress)

Table 8: Effect of pandemic related factors on scores of depression, anxiety and stress.

	Depression Scores		Anxiety Scores		Stress scores	
	Mean±SD	*P* value	Mean±SD	*P* value	Mean±SD	*P* value
Worried about being infected with the Coronavirus or transmitting it to family members?						
Yes	14.16±5.19	0.8536	11.05±3.92	0.42	0.41±0.11	0.19
No	13.98±6.57		10.57±4.19		0.39±0.09	
Do you have COVID-19 symptoms?						
Yes	13.54±5.58	0.44	10.86±4.17	0.46	0.42±0.03	0.436
No	14.80±5.72		9.92±4.56		0.40±0.07	
Have you been infected with COVID-19?						
Yes	12.2±4.61	0.0076*	10.77±4.33	0.841	0.40±0.12	0.59
No	15.27±5.22		10.94±3.92		0.41±0.09	
Have any of your relatives been infected with Coronavirus?						
Yes	13.99±5.13	0.62	11.07±4.2	0.42	0.41±0.076	0.50
No	14.58±4.26		10.54±3.40		0.40±0.098	
Are you living with someone who is infected with virus?						
Yes	13.32±5.0	0.021*	10.82±4.66	0.85	0.40±0.08	0.35
No	15.42±5.25		10.98±3.82		0.41±0.11	
Self–evaluated level of knowledge about COVID-19						
Not at all or Low	13.86±5.43	0. 617	11.8±2.86	0.61	0.53±0.12	0.27
Medium	14.84±5.87		10.74±3.86		0.39±0.07	
Well	13.36±5.23		11.39±3.75		0.42±0.09	
Very well	14.39±5.57		10.51±4.41		0.40±0.08	

*Statistically Significant when $p<0.05$** $n=1532$

can be concluded that the level of psychological illnesses during pandemic COVID-19 had been increased among population.

In our study, 25.1% participants reported the prevalence from March to May, 10.8% during June-August, 9.9% during September-November, 8.81% during December-April and 54.2% reported it during the entire time period of pandemic. 38.1% reported prevalence of anxiety from March to May, 39.7% reported it during the entire period while only 18.4%, 3.8% and 3.21% revealed the symptoms during June-August and September-November, December-April, respectively. 5.54%, 8.09%, 7.4% and 4.05% of the population revealed mild, moderate, and moderately severe to very severe depression with average scores of 7±1.2, 11.78±1.4, 17.20±1.26 and 22.31±1.70, respectively. The symptoms of mild, moderate and moderately severe anxiety were reported in 21.93%, 14.32%, and 6.29% of the population, respectively. Average scores for anxiety was 7.039±1.48 (mild anxiety), 11.51±1.96 (moderate anxiety) and 16.44±3.24 (severe anxiety), respectively. Low, moderate and severe stress was observed in 20.17%, 24.74%, and 21.87% of the population with mean scores of 0.258±0.075, 0.391±0.04 and 0.558±0.11, respectively.

In the current study, according to chi square test, several factors were associated with depression, anxiety and stress prevalence rates such as Saudi nationals, female gender, young (age 18-29), single, divorced and widowed participants. Retired and university students reported more depression incidents. On the other hand, retired respondents were less likely to be stressed than unemployed, employed and university students, respectively. The result of multiple regression analysis revealed that Saudi nationality, uneducated, being students and presence of any chronic diseases were established a significant positive relationship with stress scores. When considering anxiety scores, Saudi nationality, female gender, uneducated status and income less than 2000 or more than 10,000 SAR has been found to associated with high scores. Saudi nationality, female gender, income less than 2000 or more than 10,000 SAR, individuals with no children and presence of any chronic disease was associated with high stress scores.

Our finding were in consistent with the previous researches which revealed high prevalence of anxiety and stress among females.[21-23] To date, several studies reported where young age was directly correlated with increased depression, anxiety, and stress.[21,22] In our finding too, depression scores were significantly higher in younger participants (18-29) than higher aged respondents. Similarly, University students had significantly scored highest than employed or unemployed participants. There are several caveats

Table 9: **Multiple Regression model on factors affecting stress, anxiety, and depression.**

Variables	Depression			Anxiety			Stress		
	B (CI 95%)	SE	*P* Value	B (CI 95%)	SE	*P* Value	B (CI 95%)	SE	*P* Value
Constant	2.07 (1.29-2.86)	0.398	<0.0001*	1.40 (1.0-1.79)	0.19	<0.0001*	28.68 (26.16-31.19)	1.28	<0.0001*
Nationality (Saudi)	0.54 (0.44-0.64)	0.049	<0.0001*	0.68 (0.62-0.75)	0.03	<0.0001*	0.276 (0.23-0.32)	0.02	<0.0001*
Gender (Female)	-0.011 (-0.096-0.07)	0.043	0.789	0.05 (0.0001-0.10)	0.026	0.049*	0.049 (0.019-0.079)	0.015	0.0012*
Age (18-29)	-0.00423 (-0.069-0.062	0.033	0.89	0.04 (-0.0037-0.089)	0.024	0.071	0.0024 (-0.027-0.032)	0.015	0.87
Marital status (Single)	-0.00979 (-0.072-0.052)	0.031	0.756	0.0165 (-0.029-0.063)	0.023	0.483	-0.008 (-0.039-0.024)	0.016	0.63
Education status (Uneducated)	0.085844 (0.023-0.195)	0.055	0.045*	0.17 (0.09-0.26)	0.04	<0.0001*	0.018 (-0.03-0.07)	0.027	0.495
Employment status (Unemployed)	0.029832 (-0.038-0.098)	0.035	0.389	0.0083 (-0.04-0.06)	0.026	0.75	0.014 (-0.015-0.045)	0.015	0.334
Employment status (Student)	0.068341 (0.0084-0.144)	0.039	0.032*	0.0094 (-0.04-0.06)	0.026	0.72	0.026 (-0.0046-0.057)	0.015	0.09
Income (2000 or less)	0.00679 (-0.041-0.054)	0.024	0.779	0.091 (0.049-0.13)	0.021	<0.0001*	0.028 (0.0015-0.05)	0.013	0.038*
Income (10,000 or more)	0.04 (-0.03-0.12)	0.039	0.26	0.122 (0.07-0.17)	0.025	<0.0001*	0.0998 (0.07-0.127)	0.014	<0.0001*
Children (No)	0.045807 (-0.036-0.128)	0.041	0.271	0.038 (-0.014-0.09)	0.026	0.156	0.054 (0.020-0.086)	0.017	0.0016*
Chronic Disease (Yes)	0.285869 (0.221-0.351)	0.033	<0.0001*	0.0065 (-0.21-0.225)	0.11	0.953	0.095 (0.067-0.123)	0.014	<0.0001*
Have you been infected with COVID-19? (No)	0.020838 (-0.034-0.076)	0.028	0.456	-0.013 (-0.067-0.04)	0.027	0.64	0.082 (0.052-0.113)	0.015	<0.0001*
Are you living with someone who is infected with virus? (No)	-0.01465 (-0.069-0.04)	0.028	0.599	-0.02 (-0.025-0.032)	0.023	0.76	0.032 (0.0086-0.055)	0.011	0.007*

* CI- confidence interval; Statistically Significant when $p<0.05$

to favor these negative outcomes on youngsters, such as greater access to COVID-19 information through media, more external exposure, fewer previous experiences and disaster exposures.[22] Additionally suspended school and colleges or transformation to online education system imposed feeling of loneliness among youngsters and thus increase level of psychological illness.[23]

Participants have earning 2000 SR or below are more likely to be depressed during pandemic when compared with high earning participants. This can be supported by the fact that low income families had more fear of losing income or jobs due to uncertainties during pandemic outbreak.[24] Being single and no children has significant association with psychological distress during COVID outbreak. While one may expect that marriages and children might induce high degree of anxiety and stress, strangely we find them significant protective factor against psychological suffering. Respondents having no kids were more likely to report depression than those who were having children. Previous studies also confer a high level of mental protection from COVID-19 among married couples and parents.[21] Our finding revealed a significant association between chronic diseases and stress and anxiety, while Non-significant association with depression. A similar study conducted in Greece showed significantly higher levels of distress and somatization, but non-significant differences in anxiety and depression for chronic disease patients and healthy participants.[25]

The mean depression score was significantly higher in participants that had not been infected with COVID-19. Anyone who is not living with an infected person had scored significantly high when compared with participants who are living with infected ones. This is conflicting with previous reports where high level of drepression, anxiety and stress were experienced by individuals having contact with COVID-19 patients or history of travel abroad.[21] Level of depression did not vary significantly on the basis of pandemic related factors such as if anyone's relative were found to be infected and on the basis of knowledge level of participants about COVID-19**.** All pandemic related factors had non-significant impact on anxiety and stress scores. While in multiple regression we find a strong correlation between selected pandemic related factors and stress.

Our research finding can guide the future research and can emphasize the government to adopt new strategies to improve psychological distress among population especially the sensitive ones. The findings can further strengthen the importance of protective factors in neutralizing the COVID-19 pandemic's effect on mental health of vulnerable population. Such high prevalence could further emphasize for development of certain Mindfulness-Based Stress Reduction (MBSR) program to reduce depression, anxiety and stress among general population. Parents can play a significant role by expending more time with youth and communicate with young people to express their feelings and fears about the current situation.

This study had certain limitations that must be considered before interpreting the findings. First is the absence of pre-pandemic data that can be considered as baseline for better comparison. Second, the questionnaires distributed were also not validated for its appropriateness. Third, due to less physical interaction during COVID-19 outbreak, instead of random sampling method, the snowball sampling method was adopted. Fourth, because of less physical interaction, some points of questionnaires may be underestimated by the participants and thus can affect the scores.

CONCLUSION

In this study, high prevalence of depression, anxiety and stress were identified during the second wave COVID-19 pandemic in Saudi Arabia. Specific subgroups of the general population were identified at higher risk: young, Saudi nationals, female gender, single, no children, low monthly income, participants that had not been infected with Covid-19 and individual who is not living with an infected person. Medical Authorities should focus on vulnerable risk groups through awareness campaigns about appropriate treatment, prevention and specialized interventions to promote the psychological health of the Saudi population.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

MBSR: mindfulness-based stress reduction; **SARS-CoV-2:** Severe acute respiratory syndrome coronavirus-2; **PHQ-9:** Patient Health Questionnaire; **GAD-7:** Generalized Anxiety Disorder; **PSQ:** Perceived Stress Questionnaire.

REFERENCES

1. Chams N, Chams S, Badran R, Shams A, Araji A, Raad M, *et al*. COVID-19: A multi-disciplinary review. Front Public Health. 2020;8:1.
2. Chakraborty A, Diwan A, Chinige V, Holkar P, Arora V. A short review on COVID-19: A great concern to public health. Trends in Res. 2020;3(3):1-2. doi: 10.15761/TR.1000167.
3. Wu Z, Mcgoogan JM. Characteristics of important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: Summary of a report of 72314 cases from the Chinese Center for Disease Control Prevention. JAMA. 2020;323(13):1239-42. doi: 10.1001/jama.2020.2648, PMID 32091533.
4. Huang Y, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 epidemic in China: A web-based cross-sectional survey. Med Rxiv. 2020;288:112954.
5. Hall RC, Hall RC, Chapman MJ. The 1995 Kikwit Ebola outbreak: Lessons Hospitals and physicians can apply to future viral epidemics. Gen Hosp Psychiatry. 2008;30(5):446-52. doi: 10.1016/j.genhosppsych.2008.05.003, PMID 18774428.
6. Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, *et al*. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. Lancet Psychiatry. 2020;7(3):228-9. doi: 10.1016/S2215-0366(20)30046-8, PMID 32032543.
7. Marouzadeh S, Pourshaikhian M, Pourramzani A, Sheikholeslami F, Moghadamnia MT, Alavi SA. Prevalence of anxiety and depression in general population of Iran

during the COVID-19 pandemic: A web-basedcross-sectionalstudy. Res Square. 2020:1-19.

8. Amoran OE, Ogunsemi OO, Lasebikan VO. Assessment of mental disorders using the patient health questionnaire as a general screening tool in western Nigeria: A community-based study. J Neurosci Rural Pract. 2012;3(1):6-11. doi: 10.4103/0976-3147.91922, PMID 22346182.
9. Zhang Y, Ma ZF. Impact of the COVID-19 pandemic on mental health and quality of life among local residents in Liaoning Province, China: A Cross-Sectional Study. Int J Environ Res Public Health [study]. 2020;17(7):17(7):2381. doi: 10.3390/ijerph17072381, PMID 32244498.
10. Alyami HS, Naser AY, Dahmash EZ, Alyami MH, Al Meanazel OT, Al-Meanazel AT, *et al*. Depression and anxiety during 2019 coronavirus disease pandemic in Saudi Arabia: A cross-sectional study. Med Rxiv. 2020:1-15.
11. Löwe B, Decker O, Müller S, Brähler E, Schellberg D, Herzog W, *et al*. Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. Med Care. 2008;46(3):266-74. doi: 10.1097/MLR.0b013e318160d093, PMID 18388841.
12. Levis B, Benedetti A, Thombs BD. Accuracy of Patient Health Questionnaire-9 (PHQ-9) for screening to detect major depression: Individual participant data meta-analysis. BMJ. 2019;365:1476.
13. Almater AI, Tobaigy MF, Younis AS, Alaqeel MK, Abouammoh MA. Effect of 2019 coronavirus pandemic on ophthalmologists practicing in Saudi Arabia: A psychological health assessment. Middle East Afr J Ophthalmol. 2020;27(2):79-85. doi: 10.4103/meajo.MEAJO_220_20, PMID 32874039.
14. Schwenk T, Terrell L, Harrison R, Tremper A, Valenstein M, Bostwick J, *et al*. Depression guideline. Guidelines for Clinical Care Ambulatory. 2011;1-15.
15. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: The GAD-7. Arch Intern Med. 2006;166(10):1092-7. doi: 10.1001/archinte.166.10.1092, PMID 16717171.
16. Østerås B, Sigmundsson H, Haga M. Psychometric properties of the Perceived Stress Questionnaire (PSQ) in 15-16 years old Norwegian adolescents. Front Psychol. 2018;9:1850. doi: 10.3389/fpsyg.2018.01850, PMID 30327631.
17. Rönnlund M, Åström E, Adolfsson R. MCarelli MG. Perceived stress in adults aged 65 to 90: Relations to facets of time perspective and COMT Val158Met polymorphism. Front Psychol. 2018;317(9):1-10.
18. Zakout YMA, Alreshidi FS, Elsaid RM, Ahmed HG. The magnitude of COVID-19 related stress, anxiety and depression associated with intense mass media coverage in Saudi Arabia. AIMS Public Health. 2020;7(3):664-78. doi: 10.3934/publichealth.2020052, PMID 32968685.
19. Jia R, Ayling K, Chalder T, Massey A, Broadbent E, Coupland C, *et al*. Mental health in the UK during the COVID-19 pandemic: Cross-sectional analyses from a community cohort study. BMJ Open. 2020;10(9):e040620. doi: 10.1136/bmjopen-2020-040620, PMID 32933965.
20. Khademian F, Delavari S, Koohjani Z, Khademian Z. An investigation of depression, anxiety, and stress and its relating factors during COVID-19 pandemic in Iran. BMC Public Health. 2021;21(1):275. doi: 10.1186/s12889-021-10329-3, PMID 33535992.
21. Alamri HS, Algarni A, Shehata SF, Al Bshabshe A, Alshehri NN, AL Asiri AM, *et al*. Prevalence of Depression, Anxiety, and Stress among the General Population in Saudi Arabia during Covid-19 Pandemic. Int J Environ Res Public Health. 2020;17(24):9183.
22. Wang H, Xia Q, Xiong Z, Li Z, Xiang W, Yuan Y, *et al*. The psychological distress and coping styles in the early stages of the 2019 coronavirus disease (COVID-19) epidemic in the general mainland Chinese population: A web-based survey. PLOS ONE. 2020;15(5).
23. Alsharji KE. Anxiety and depression during the COVID19 pandemic in Kuwait: The importance of physical activity. Middle East Curr Psychiatry. 2020;27(1):60. doi: 10.1186/s43045-020-00065-6.
24. Alkhamees AA, Alrashed SA, Alzunaydi AA, Almohimeed AS, Aljohani MS. The psychological impact of COVID-19 pandemic on the general population of Saudi Arabia. Compr Psychiatry. 2020;102:152192. doi: 10.1016/j.comppsych.2020.152192, PMID 32688022.
25. Louvardi M, Pelekasis P, Chrousos GP, Darviri C. Mental health in chronic disease patients during the COVID-19 quarantine in Greece. Palliat Support Care. 2020;18(4):394-9. doi: 10.1017/S1478951520000528, PMID 32594950.

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