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COVID-19 pandemic related excessive electronic media exposure and mental health in Saudi Arabia

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Abstract. – OBJECTIVE: Due to the continued spread of COVID-19 and the emergence of novel mutated viral variants, families all over the world are experiencing wide-ranging stressors that threaten not only their financial well-being but also their physical and mental health. The present study assessed the association between excessive electronic media exposure of pandemic-related news and mental health of the residents of Ha'il Province, Saudi Arabia. The present study also assessed the prevalence of perceived stress, fear of COVID-19, anxiety, depression, and loneliness due to COVID-19-related restrictions in the same population.

MATERIALS AND METHODS: A total of 490 residents of Ha'il Province participated in a cross-sectional online survey during a two-month period (March to April 2021). A validated 38-item self-report survey was used to collect the data.

RESULTS: Significant associations were reported between excessive electronic media exposure and the prevalence of perceived stress (χ^2=140.56; p<.001), generalized anxiety (χ^2=74.55; p<.001), depression (χ^2=71.58; p<.001), COVID-19-related fear (χ^2=24.54; p<.001), and loneliness (χ^2=11.46; p<.001). It was also found that participants without depressive symptoms were 0.28 times less likely to have been exposed to excessive electronic media exposure (AOR: 0.28; C.I. 0.16-0.48; p<.001). Similarly, participants with no stress/mild stress were 0.32 times less likely to have been exposed to excessive electronic media exposure (AOR: 0.32; C.I. 0.19-0.52; p<.001).

CONCLUSIONS: The findings of the present study suggest an urgent need for educational resilience programs (online and in-person) for susceptible individuals (females, unemployed, urban residents, etc.). Such programs would help them to develop skills to cope with the psychological impact of the COVID-19 pandemic.

Key Words:
COVID-19 restrictions, Pandemic-related news, Electronic media exposure, Perceived stress, Depression, Generalized anxiety.

Introduction

By the beginning of November 2021, more than 249 million individuals across the world had been diagnosed with coronavirus disease 2019 (COVID-19) along with 5.05 million reported deaths. In Saudi Arabia (the location of the present study), over 548,000 diagnosed cases and approximately 8,800 deaths have been reported due to COVID-19[1]. Individuals of all ages and characteristics have suffered due to the COVID-19

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pandemic[2,3]. During the initial phases of the pandemic, many countries worldwide implemented measures of quarantining and spatial distancing as fundamental measures to control the spread of the disease[4]. Since then, many countries have either gone into second or third national lockdowns or are seriously thinking of re-implementing them, to control the recent upsurge in new cases.

Prolonged nationwide lockdowns not only cause physical suffering, but also have the potential to cause mass hysteria. They can also lead to elevated levels of anxiety and emotional distress among the population[5-7]. Social isolation, quarantine (self or enforced), and stringent measures of spatial distancing have been commonly seen during extended lockdowns. These measures coupled with constrained and limited social interaction can negatively impact individuals' emotional and psychological well-being[3,8]. Financial hardships and unemployment, as well as closing of businesses seen during extensive worldwide outbreaks of infectious diseases like COVID-19 are known to be associated with emotional anguish and anxiety[9]. Numerous indices that are associated with the psychological well-being of the general population can potentially be impacted by the societal disconnect and seclusion that are generally associated with pandemics[10].

Job loss, shutting down of businesses, and the economic fallout all associated with lengthened lockdowns can potentially lead to mental instability. These factors can also have a negative impact on the psychological well-being of the general population[11-13]. Additionally, with the relative relaxing of the spatial distancing measures, the non-mandatory wearing of facemasks in public, and the permission of social gatherings, there have been instances where countries that had hurriedly eased off their COVID-19 preventive measures were hit by subsequent second (and in some cases third) waves[14]. Moreover, the recent emergence of numerous novel mutated viral variants (most notably the delta variant of concern)[15] has increased concerns regarding their infectivity as well as virulence. It has also caused an extensive increase in new COVID-19 cases[16].

In relation to studies carried out during the COVID-19 pandemic, a meta-analysis by Salari et al[17] reported that the prevalence of (i) stress was 29.6% (N=9074; five studies), (ii) anxiety was 31.9% (N=63,439; 17 studies), and (iii) depression was 33.7% (N=44,531; 14 studies). In relation to prevalence of mental health disorder by country during the ongoing pandemic, studies have reported that the (i) rates of anxiety were 50.9% in Iran[18], in China[19,20] were in the range of 6.3%-44.6%, 33.2% in Japan[21], 31% in Nepal[22], 43% in India[23], 47.1% in Iraq[24], 21.6% in the United Kingdom (UK)[25], 32.4% in Spain[26], 49.6% in Nigeria[27], and 18.7% in Italy[28], 49.1% in Bangladesh[29]; (ii) rates of depression were in the range of 17.2%-53.5% in China[19,20], 43.1% in Japan[21], 34% in Nepal[22], 38.9% in India[23], 44.9% in Iraq[24], 22.1% in the UK[25], 44.1% in Spain[26], 23.5% in Nigeria[27], and 32.8% in Italy[28]; and (iii) rates of stress were 32.1% in China[20], 35.7% in India[23], 17.5% in Iraq[24], 37% in Spain[26], and 27.2% in Italy[27].

The COVID-19 pandemic can potentially worsen individuals' pre-existing poor mental health, social isolation, and loneliness[30]. It can also be associated with elevated levels of anxiety, depression, and (in extreme cases) suicidal ideas[8]. Social seclusion has also been reported to be associated with suicidal ideas as well as suicidal attempts[31]. During COVID-19-related lockdown, the rates of reported loneliness have been high. A study[32] conducted in the UK reported the prevalence of loneliness to be 27%. Another study[33], analyzed the predictors of loneliness before the COVID-19 pandemic (UK Household Longitudinal Study (UKHLS) and during the COVID-19 pandemic (University College London [UCL] COVID-19 Social Study). This study showed loneliness levels to be higher during the pandemic. Before the pandemic, the UKHLS reported 28.6% of sample felt lonely sometimes and 8.5% felt lonely often during the pandemic. The UCL COVID-19 Social Study reported 32.5% of participants felt lonely sometimes and 18.3% felt lonely often.

A heightened perception of the risk of contracting the disease, lack of essential daily supplies, extreme financial suffering, job losses, and the fear of losing jobs have been common during the ongoing pandemic[5-7]. These stressors coupled with the sense of losing control in life can all get amplified by the misinformation, rumors, and false information present on the media during the COVID-19 pandemic[5-7]. A study conducted in Bangladesh[29] found that increased exposure to electronic media (internet) and social media (Facebook) during the pandemic were associated with increased anxiety. The fear of COVID-19 appears to be the most common central emotional response to the pandemic[34]. Wide-ranging stressors are being experienced by families all over the world due to the recent worldwide upsurge of new cases of COVID-19. These stressors not only threaten their financial well-being but also their physical and mental health. The

present study examined the association between excessive electronic media exposure (EME) of pandemic-related news and mental health of the residents in the Ha'il Province of Saudi Arabia. The present study also assessed the prevalence of perceived stress, fear of COVID-19, anxiety, depression, loneliness due to COVID-19-related restrictions in the same population.

Ha'il Province is the eighth largest Province amongst the 13 Provinces of Saudi Arabia, in terms of area and the ninth largest in terms of population. Most of the population in the province (around 77%) are Saudi nationals[35]. The 2017 population characteristics survey found the population of Ha'il Province to be around 699,774 (approximately 2.19% of the total population of KSA)[36]. According to projections by the United Nations, more than two-thirds of the population of Ha'il province resides in Ha'il city itself[37].

Materials and Methods

Study Design and Study Population

An online cross-sectional survey was used to collect the data. Google Forms was used to prepare and host the self-report survey. The anonymous online survey was then disseminated on various social media platforms (WhatsApp, Instagram, Twitter, Facebook, etc.) among male and female residents above 18 years of age living in Ha'il Province, Saudi Arabia.

Inclusion and Exclusion Criteria

Saudi male as well as female residents of Ha'il Province, above the age of 18 years, having a proper understanding of English (or) Arabic languages, willing to participate in the study, complete the survey, and provide informed consent were included in the study. Those residents not meeting the inclusion criteria were excluded from the present study.

Data Collection

A 38-item validated, self-report survey was used for data collection. The survey comprised six sections (**Supplementary Material 1**). Section one included 14 questions regarding the socio-economic characteristics of the respondents; section two comprised ten questions of the Perceived Stress Scale (PSS-10)[38]; Section three comprised seven questions of the Fear of COVID-19 Scale (FCV-19S)[39]; sections four and five comprised two questions each of the Generalized Anxiety Disorder Scale (GAD-2)[40] and Patient Health Questionnaire (PHQ-2)[41] respectively; and section six comprised three questions of the University of California, Los Angeles (UCLA) Loneliness Scale[42].

Measures

Socio-demographic information

Participants in the present study reported their gender, town/city of current residence, age-group, exact-age, educational level, location of current residence, employment status, family income, marital status, living status, relative and/or family member and/or friend with COVID-19, type of electronic media used and the EME to pandemic-related news.

Perceived Stress Scale-10

The Perceived Stress Scale-10 (PSS-10)[38], is a 10-item instrument assessing various perceived stresses (e.g., *"How often have you been upset because of something that happened unexpectedly?"*). The responses of the instrument were scored on a five-point scale from 0 (*Never*) to 4 (*Very often*), providing scores in the range of 0 to 40. Higher scores signify higher perceived stress[38]. Scores of 0 to 12 indicate no stress, 13 to 17 indicate mild stress, 18 to 21 indicate moderate stress, and > 22 indicate severe stress[43]. Internal consistency of PSS-10 in the present study was excellent (α=.93).

Fear of COVID-19 Scale

The Fear of COVID-19 Scale (FCV-19S)[39], is a seven-item instrument useful in assessing the fear of COVID-19 (e.g.,*"It makes me uncomfortable to think about COVID-19"*). Responses of the instrument are scored on a five-point scale from 1 (*Strongly disagree*) to 5 (*Strongly agree*) with scores in the range of 7 to 35. Higher scores indicate greater fear of COVID-19. A cut-off score of (≥16.5) has been used to differentiate extreme COVID-19-related fear and those with normal fear of COVID-19[44]. Internal consistency of FCV-19S in the current sample was very good (α=.88).

Generalized Anxiety Disorder-2

The Generalized Anxiety Disorder-2 (GAD-2)[40], is a two-item instrument that assesses generalized anxiety disorder over the previous twoweeks (e.g., *"Over the last 2 weeks how often were you bothered by the following problems: Feeling ner-*

vous, anxious, or on edge?"). Responses of the instrument were scored on a four-point scale from 0 (*Not at all*) to 3 (*Nearly every day*) with total scores in the range of 0 to 6. Cut-off score of ≥ 3, for GAD-2 scale has shown 83% specificity as well as 86% sensitivity in diagnosing generalized anxiety disorder[40]. Internal consistency of GAD-2 in the present study was good (α =.79).

Patient Health Questionnaire-2

The Patient Health Questionnaire-2 (PHQ-2)[41], is a two-item instrument that assesses depression, and comprises the first two items of the nine-item Patient Health Questionnaire (PHQ-9). It assesses the extent to which an individual experiences depressive mood as well as anhedonia over the previous two-week period (e.g., *"Over the last 2 weeks how often were you bothered by the following problems: Little interest or pleasure in doing things?"*). Responses of the instrument are scored a four-point scale with scores having a range 0 to 6. A cut-off score of ≥3, can be used to diagnose depression[41]. Internal consistency of PHQ-2 in the present study was very good (α =.80).

Three-item UCLA Loneliness Scale

The three-item UCLA Loneliness Scale[42], was used to assess loneliness (e.g., *"How often do you feel isolated from others?"*). Responses of the instrument are scored on a three-point scale from 1 (*Hardly ever*) to 3 (*Often*) with scores in the range of 3 to 9. Higher scores indicate greater loneliness. A score greater than 6 has been used in previous research as a cut-off score for loneliness[42]. Internal consistency of the three-item UCLA Loneliness Scale in the present study was good (α =.78).

Survey instrument and pilot study

After a thorough and extensive literature review, the research team decided to use the PSS-10, FCV-19S, GAD-2, PHQ-2 and the three-item UCLA Loneliness Scale for assessing the psychological impact of COVID-19 restrictions amongst the current sample. Like Hossain et al[29], questions relating to the EME were also included in the survey to assess the association between excessive EME and mental health among the sample. As aforementioned, the final version of the survey comprised 38 questions spread across six sections. It was then translated into Arabic by making use of the forward-backward translation method[45]. For assessing the ease of use and for determining the completion time, the survey was piloted amongst a focus group of 49 participants based on previous studies[46-48]. An average completion time of approximately 10 minutes was observed and participants understood the questions with relative ease.

Data Collection

Data were collected using an anonymous online survey. Informed consent was taken by asking study participants to select 'Yes' for the mandatory question seeking their consent only after which they could progress to other sections of the survey. A 'No' response automatically ended the survey and this was deemed as a dropout. Failure to complete any section of the survey rendered the response incomplete, and any section having missing values was subsequently excluded from the analysis. Strict confidentiality of data was maintained. The participants were also informed that the data generated would be used only for scientific purpose. A response rate of 89.1% (490/550) was observed.

Sample size calculation

Raosoft sample size calculator was used for calculating the sample size. A sample size of 384 was calculated based on a 5% margin of error, 95% confidence interval, along with an approximate population size of 700,000, power (1-β) of 0.80and with a 50% response distribution[49,50]. The Cochran's equation[51], was used to reconfirm the calculated sample size.$n_0 = Z^2pq/e^2$;n_0: sample size, Z^2: corresponds to the desired confidence level, e.g., 95% (i.e., Z = 1.96), e - desired level of precision (e = 5% = 0.05), *p* - estimated proportion of an attribute that is present in the population(*p* = 0.5), and *q* = *1-p* (i.e., *q*= 1 – 0.5 = 0.5).

$(1.96)^2$ x 0.5 x 0.5 / $(0.5)^2$ = 3.84 x 0.25 / 0.0025 = 0.96 / 0.0025 = 384

The sample size was further cross-checked and reconfirmed using Open Epi[52]; having a population of 1,000,000; with a finite population correction factor, having a confidence limit of 5%, along with a design effect of 1, yielding a 384 sample size[53].

Ethics

Approval of the Human Research Ethics Committee (HREC), University of Ha'il, was taken prior to the start of the study. Reference number: EC-00119; approval number: HREC 00119/CM-UOH.04/20.

Statistical Analysis

Statistical Package for the Social Sciences (SPSS-10 Inc., Chicago, IL, USA) version 23 was used to analyze the data. The demographics were expressed as frequencies, total percentages, means, and standard deviations. Cross-tabulations with Pearson's Chi-square was used to look for any statistically significant association between the variables. For variables with an expected cell count less than five, Fisher's exact test was used. Pearson's correlation was calculated to examine significant associations between continuous variables (scores of different scales). Multivariate logistic regression was used to assess any association between socio-economic characteristics and with EME as the outcome variable. Linear regression model was also used to assess any association between socio-economic characteristics and with stress as the outcome variable. Before any statistical analysis was carried out, the normality of data was confirmed by the Shapiro-Wilk and Kolmogorov-Smirnov tests. The alpha level was set at 0.05 to determine statistical significance.

Results

Sample Characteristics

Table I shows the socio-economic characteristics of study participants. Over half of participants were female (n=284; 58%), while the rest were male (n=206; 42%). All participants were Saudi nationals (n=490; 100%) who resided in Ha'il city (n=371; 75.7%) or resided outside the city (n=119; 24.3%). The mean age of the sample was 34.81 years (SD ± 13.01). Approximately two-fifths of participants were aged 18-27 years (38%), while only 8.8% were aged over 57 years. Approximately one-third had a Bachelor's degree (35.3%), while the percentage of those with Masters (23.3%) and Doctorates (8.8%) was lower. Approximately, one-third of participants (31.0%) had government jobs, while 22.7%were unemployed during the pandemic. More than three-quarters of participants (77.5%) earned less than 15,000 Saudi Riyals (SAR) per month at the time of the study (approximately $4000[US] per month). Nearly half of participants were married (46.3%), while 39.6% were unmarried/single. Approximately, two-thirds of participants (64.5%) lived with their family or friends, while the rest lived alone (35.5%). The most popular form of electronic media used by participants was internet (51.6%), while radio was the least popular media form (21.6%). Nearly half of participants (49%) spent more than three hours daily on electronic media seeking pandemic-related news (Table I).

Association Between Electronic Media Exposure of Pandemic-Related News and the Socio-Demographics of Participants

Table II shows the results of the cross-tabulations between EME to pandemic-related news (hours/day) and the participants' socio-economic characteristics. EME to pandemic-related news was significantly associated with being a female (χ^2=39.59; p<.001), belonging to the age group 18-47 years, having Masters or doctorate degree (χ^2=52.66; p<.001), being single/unmarried or divorced (χ^2=54.46; p<.001), being unemployed or a student (χ^2=78.23; p<.001). EME to pandemic-related news was also significantly associated living in an urban locality (χ^2=60.43; p<.001), having a family income below 15,000 SAR/month (χ^2=85.76; p<.001), and using internet as a form of electronic media to seek pandemic-related news (χ^2=21.33; p<.001).

Significant associations were reported between the EME to pandemic-related newsand the prevalence of generalized anxiety (χ^2=74.55; p<.001), depression (χ^2=71.58; p<.001), COVID-19-related fear (χ^2=24.54; p<.001), and loneliness (χ^2=11.46; p<.001) (Table III)

Association Between EME of Pandemic-Related News and the Mental Health of Participants

Table IV shows the results of multivariable binary logistic regression. It was found that participants without depressive symptoms were 0.28 times less likely to have been exposed to excessive EME(AOR: 0.28; 95% C.I. 0.16-0.48; p<.001). Similarly, participants with no stress/mild stress were 0.32 times less likely to have been exposed to excessive EME (AOR: 0.32; 95% C.I. 0.19-0.52; p<.001).

Association Between Socio-Demographics and the Mental Health of Participants

Table V shows the results of the cross-tabulations between the participants' socio-economic characteristics and the different categories of perceived stress. Perceived stress was significantly associated with having Masters or doctorate degree (χ^2=204.87; p<.001), living in an urban locality (χ^2=217.50; p<.001), being married or divorced (χ^2=112.02; p<.001), living alone (χ^2=45.88; p<.001). Perceived stress was also seen to be sig-

Table I. Participant's socio-economic characteristics.

Variable	Options	Frequency (n)	Percentage (%)
Gender	Male	206	42.0
	Female	284	58.0
Residence in Ha'il Province	In Ha'il city	371	75.7
	Around Ha'il city	119	24.3
Residence in Ha'il Province (Around Ha'il city)	Baqaa	35	7.1
	Ghazalah	30	6.1
	Shanan	12	2.4
	Sumairah	15	3.1
	Mawqaq	10	2.0
	Shamli	5	1.0
	Sulaimi	8	1.6
	Ha'it	4	0.8
Age group	18-27 years	186	38.0
	28-37 years	118	24.1
	38-47 years	86	17.6
	48-57 years	57	11.6
	> 57 years	43	8.8
Mean age (SD)	34.81 years (± 13.01)		
Educational level	High school	160	32.7
	Bachelors	173	35.3
	Masters	114	23.3
	Doctorate	43	8.8
Location	Rural	222	45.3
	Urban	268	54.7
Employment status	Student	90	18.4
	Unemployed	111	22.7
	Private/self-employed	137	28.0
	Government employee	152	31.0
Family income (in SAR per month)	< 5000	129	26.3
	5001-10000	153	31.2
	10001-15000	98	20.0
	> 15000	110	22.4
Marital status	Unmarried/single	194	39.6
	Married	227	46.3
	Divorced	69	14.1
Living status	Living with family/friends	316	64.5
	Living alone	174	35.5
Relative (and/or) family member (and/or) friend with COVID-19	No	421	85.9
	Yes	69	14.1
Type of electronic media	Radio	106	21.6
	Television	131	26.7
	Internet	253	51.6
EME (hours/day) to pandemic-related news	< 1	169	34.5
	1 - 2	81	16.5
	3 - 4	122	24.9
	> 4	118	24.1

nificantly associated having a family member and/or friend with COVID-19 (χ^2=78.69; p<.001), spending more than three hours per day on electronic media seeking pandemic-related news (χ^2=140.56; p<.001), being female (χ^2=100.93; p<.001), being a student or being unemployed (χ^2=142.63; p<.001), and earning less than 15,000 SAR per month (χ^2=103.57; p<.001).

Association Between Participants Different Mental Health Parameters (Depression, Anxiety, Loneliness, Perceived Stress and COVID-19-Related Fear

Significant associations were observed between prevalence of loneliness and generalized anxiety (χ^2=34.93; p<.001), prevalence of loneliness and depression (χ^2=79.76; p<.001), prevalence of lone-

liness and COVID-19-related fear (χ^2=140.56; p<.001). Significant associations were also seen between the prevalence of COVID-19-related fear and generalized anxiety (χ^2=65.19; p<.001), and the prevalence of COVID-19-related fear and depression (χ^2=52.66; p<.001) (Table VI).

Significant positive associations were also found between PSS-10 score and GAD-2 score (r=.54; p<.001), PSS-10 Score and PHQ-2 score (r=.57; p<.001), PSS-10 Score and FCV-19S score (r=.56; p<.001), PSS-10 Score and ULCA 3-item Loneliness score (r=.35; p<.001), ULCA 3-item Loneliness score and GAD-2 score (r=.24; p<.001). Similar significant positive associations were also seen between ULCA 3-item Loneliness score and PHQ-2 score (r=.41; p<.001), and the ULCA 3-item Loneliness score and FCV-19S score (r=.38; p<.001). These significant positive

Table II. Cross-tabulations electronic media exposure to pandemic-related news (hours/day) and participants' socio-economic characteristics.

Variable	< 1	1 - 2	3 - 4	> 4	Frequency (percentage)	*p*-value	χ^2
Gender							
Female	66 (39.1%)	51 (63.0%)	88 (72.1%)	79 (66.9%)	284 (58.0%)	*p*<.001***	39.59
Male	103 (60.9%)	30 (37.0%)	34 (27.9%)	39 (33.1%)	206 (42.0%)		
Residence in Ha'il Province							
In Ha'il City	126 (74.6%)	63 (77.8%)	90 (73.8%)	92 (78.0%)	371 (75.7%)	0.83	0.89
Around Ha'il City	43 (25.4%)	18 (22.2%)	32 (26.2%)	26 (22.0%)	119 (24.3%)		
Age group							
18-27 years	82 (48.5%)	34 (42.0%)	35 (28.7%)	35 (29.7%)	186 (38.0%)	*p*<.001***	52.66
28-37 years	30 (17.8%)	21 (25.9%)	41 (33.6%)	26 (22.0%)	118 (24.1%)		
38-47 years	13 (7.7%)	8 (9.9%)	28 (23.0%)	37 (31.4%)	86 (17.6%)		
48-57 years	25 (14.8%)	13 (16.0%)	9 (7.4%)	10 (8.5%)	57 (11.6%)		
> 57 years	19 (11.2%)	5 (6.2%)	9 (7.4%)	10 (8.5%)	43 (8.8%)		
Marital status							
Unmarried/single	86 (50.9%)	36 (44.4%)	36 (29.5%)	36 (30.5%)	194 (39.6%)	*p*<.001***	54.46
Married	76 (45.0%)	43 (53.1%)	59 (48.4%)	49 (41.5%)	227 (46.3%)		
Divorced	7 (4.1%)	2 (2.5%)	27 (22.1%)	33 (28.0%)	69 (14.1%)		
Educational qualification							
High school	82 (48.5%)	24 (29.6%)	26 (21.3%)	28 (23.7%)	160 (32.7%)	*p*<.001***	67.59
Bachelors	51 (30.2%)	39 (48.1%)	58 (47.5%)	25 (21.2%)	173 (35.3%)		
Masters	27 (16.0%)	15 (18.5%)	25 (20.5%)	47 (39.8%)	114 (23.3%)		
Doctorate	9 (5.3%)	3 (3.7%)	13 (10.7%)	18 (15.3%)	43 (8.8%)		
Employment status							
Student	17 (10.1%)	9 (11.1%)	28 (23.0%)	36 (30.5%)	90 (18.4%)	*p*<.001***	78.23
Unemployed	20 (11.8%)	23 (28.4%)	29 (23.8%)	39 (33.1%)	111 (22.7%)		
Private/self employed	44 (26.0%)	28 (34.6%)	40 (32.8%)	25 (21.2%)	137 (28.0%)		
Government Employee	88 (52.1%)	21 (25.9%)	25 (20.5%)	18 (15.3%)	152 (31.0%)		
Location of current residence							
Rural	116 (68.6%)	33 (40.7%)	33 (27.0%)	40 (33.9%)	222 (45.3%)	*p*<.001***	60.42
Urban	53 (31.4%)	48 (59.3%)	89 (73.0%)	78 (66.1%)	268 (54.7%)		
Family income							
< 5000	15 (8.9%)	12 (14.8%)	40 (32.8%)	62 (52.5%)	129 (26.3%)	*p*<.001***	85.76
5001-10000	59 (34.9%)	24 (29.6%)	43 (35.2%)	27 (22.9%)	153 (31.2%)		
10001-15000	44 (26.0%)	19 (23.5%)	23 (18.9%)	12 (10.2%)	98 (20.0%)		
> 15000	51 (30.2%)	26 (32.1%)	16 (13.1%)	17 (14.4%)	110 (22.4%)		
Type of electronic media used							
Internet	83 (49.1%)	40 (49.4%)	60 (49.2%)	70 (59.3%)	253 (51.6%)	(*p*<0.01**)	
Television	33 (19.5%)	28 (34.6%)	42 (34.4%)	28 (23.7%)	131 (26.7%)	0.002	21.33
Others	53 (31.4%)	13 (16.0%)	20 (16.4%)	20 (16.9%)	106 (21.6%)		

Table III. Prevalence of generalized anxiety, depression, COVID-19-related fear, loneliness and electronic media exposure.

EME of pandemic-related news and prevalence of generalized anxiety

Variable	No anxiety	Anxiety	Frequency (percentage)	*p*-value	χ^2
<1 hour	134 (49.1%)	35 (16.1%)	169 (34.5%)	$p<.001^{***}$	74.55
1-2 hours	50 (18.3%)	31 (14.3%)	81 (16.5%)		
3-4 hours	50 (18.3%)	72 (33.2%)	122 (24.9%)		
> 4 hours	39 (14.3%)	79 (36.4%)	118 (24.1%)		

EME of pandemic-related news and prevalence of depression

Variable	Minimal depression	Depression	Frequency (percentage)	*p*-value	χ^2
<1 hour	148 (42.8%)	21 (14.6%)	169 (34.5%)	$p<.001^{***}$	71.58
1-2 hours	70 (20.2%)	11 (7.6%)	81 (16.5%)		
3-4 hours	72 (20.8%)	50 (34.7%)	122 (24.9%)		
> 4 hours	56 (16.2%)	62 (43.1%)	118 (24.1%)		

EME of pandemic-related news and prevalence of COVID-19-related fear

Variable	Normal COVID-19-related fear	Extreme COVID-19-related fear	Frequency (percentage)	*p*-value	χ^2
<1 hour	110 (44.5%)	59 (24.3%)	169 (34.5%)	$p<.001^{***}$	24.54
1-2 hours	40 (16.2%)	41 (16.9%)	81 (16.5%)		
3-4 hours	47 (19.0%)	75 (30.9%)	122 (24.9%)		
> 4 hours	50 (20.2%)	68 (28.0%)	118 (24.1%)		

EME of pandemic-related news and prevalence of loneliness

Variable	Not lonely	Lonely	Frequency (percentage)	*p*-value	χ^2
<1 hour	122 (39.6%)	47 (25.8%)	169 (34.5%)	$p<.001^{***}$	11.46
1-2 hours	49 (15.9%)	32 (17.6%)	81 (16.5%)		
3-4 hours	65 (21.1%)	57 (31.3%)	122 (24.9%)		
> 4 hours	72 (23.4%)	46 (25.3%)	118 (24.1%)		

associations showed that as scores on one variable increased so did the other.

The prevalence of perceived stress had a significant association with generalized anxiety (χ^2=162.45; $p<.001$), depression (χ^2=166.24; $p<.001$), loneliness (χ^2=60.84; $p<.001$) and COVID-19-related fear (χ^2=113.88; $p<.001$) (Table VII).

Table VIII shows the results of linear regression. The stress level among females was found to be 8.06 points more than their male counterparts (β: 8.06 CI 95%; 6.51-9.61; $p<0.001$). Participants with only a high school qualification were 9.69 points less likely to be stressed in comparison with those with education qualification of a bachelor's degree or higher (β: 9.69 CI 95%; 8.12-11.24; $p<0.001$). Unemployed participants were 9.30 points more likely to be stressed as compared with employed participants (β: 9.30 CI 95%; 7.80-10.80; $p<0.001$). Participants residing in rural localities were 11.65 points less likely to be stressed than those residing in urban localities (β: 11.65 C.I 95%; 10.31-12.98; $p<0.001$). Participants who spent less time per day on electronic media seeking pandemic-related news were less likely to be stressed than those spending more time every day on electronic media (β: 4.10 CI 95%; 3.49-4.70; $p<0.001$).

Discussion

The findings of the present study are consistent with Hossain et al[29] who reported that an increased exposure to electronic (internet) media during the pandemic was associated with increased anxiety. The present study also found sig-

Table IV. Odds of EME associated with prevalence of COVID-19-related fear, depression, anxiety, loneliness, and perceived stress.

Determinants	Adjusted odds ratio (AOR)	95% C.I. Lower	Upper	*p*-value
Prevalence of COVID-19-related fear				
Normal COVID-19-related fear	1.04	0.65	1.65	0.88
Extreme COVID-19-related fear				*Ref*
Prevalence of depression				
No depression	0.28	0.16	0.48	p<.001
Depression	Ref			
Prevalence of generalized anxiety				
No anxiety	0.42	0.27	0.66	*p*<.001
Anxiety	Ref			
Prevalence of loneliness				
Not lonely	1.66	1.01	2.72	0.05
Lonely	Ref			
Prevalence of perceived stress				
No stress/mild stress	0.32	0.19	0.52	*p*<.001
Moderate stress/severe stress				*Ref*

C.I: Confidence Interval; Fear categories, prevalence of depression, prevalence of anxiety, prevalence of loneliness, binary categories of perceived stress and EME as outcome variable.

nificant associations between excessive EME and the prevalence of generalized anxiety, perceived stress, depression, COVID-19-related fear, and loneliness. It was also found that more than half of participants with severe stress (54.7%) had an educational qualification of either a Master's degree or a doctorate. A high percentage of participants with no stress (84.3%) only had a Bachelor's degree or a high school certificate. Given that more educated individuals tend to spend more time on electronic media keeping themselves up-to-date with the latest worldwide news, their over-exposure to pandemic-related news may have possibly contributed to their increased levels of stress.

These findings are in contrast with Kowal et al[54] who reported increased levels of stress among-participants having lower education. The present study also found that 86.6% of participants with severe stress resided in urban localities, while a similarly high percentage of participants with no stress (87.9%) were residents of rural localities. Due to the conservative lifestyle of the residents of rural localities in Muslim and Arab countries, they are likely to have decreased exposure to electronic media and consequently have less exposure to misinformation, false/fake news, and rumours related to the pandemic.This could be a reason for their decreased levels of stress. Recently published COVID-19 response plan by UNHabitat[55] also emphasized the urban-centric character of the current pandemic. It was reported that the ongoing pandemic has affected in excess of 1430 cities worldwide across 210 countries. Moreover, more than 95% of the total cases are located in urban areas[55,56].

A very high percentage of the sample (77.5%) in the present studyearned less than 15,000 SAR per month (approximately $4000[US]) during the pandemic. Similar findings were also reported in two other Saudi Arabian studies conducted by Al Yami et al[57,58] who also reported very similar percentages. More specifically, 73.2% and 77.4% of their studied samples earned less than 16,000 SAR per month (approximately $4266[US]) during the pandemic. Relatively modest earnings during the pandemic might be one of the possible factors to have contributed to their increased psychological distress.

Kowal et al[54], reported elevated stress among participants who were single during the pandemic. The present study also showed that participants who were living on their own, unmarried/single orwere divorced during the pandemic had increased stress than those in a relationship. A significant association was also observed in the present study between the participant's gender and

Table V. Cross-tabulations - Participants' socio-economic characteristics and perceived stress categories.

Variable	No stress	Mild stress	Moderate stress	Severe stress	Frequency (percentage)	*p*-value	χ^2
Gender							
Female	47 (28.5%)	40 (55.6%)	43 (72.9%)	154 (79.4%)	284 (58.0%)	$p<.001^{***}$	100.93
Male	118 (71.5%)	32 (44.4%)	16 (27.1%)	40 (20.6%)	206 (42.0%)		
Residence in Ha'il Province							
In Ha'il City	121 (73.3%)	55 (76.4%)	43 (72.9%)	152 (78.4%)	371(75.7%)		
Around Ha'il City	44 (26.7%)	17 (23.6%)	16 (27.1%)	42 (21.6%)	119 (24.3%)	.68	1.51
Age group							
18–27 years	95 (57.6%)	29 (40.3%)	18 (30.5%)	44 (22.7%)	186 (38.0%)		
28–37 years	13 (7.9%)	19 (26.4%)	16 (27.1%)	70 (36.1%)	118 (24.1%)	$p<.001^{***}$	115.17
38–47 years	10 (6.1%)	7 (9.7%)	8 (13.6%)	61 (31.4%)	86 (17.6%)		
48–57 years	26 (15.8%)	10 (13.9%)	9 (15.3%)	12 (6.2%)	57 (11.6%)		
> 57 years	21 (12.7%)	7 (9.7%)	8 (13.6%)	7 (3.6%)	43 (8.8%)		
Educational level							
High school	113 (68.5%)	24 (33.3%)	7 (11.9%)	16 (8.2%)	160 (32.7%)		
Bachelors	26 (15.8%)	36 (50.0%)	39 (66.1%)	72 (37.1%)	173 (35.3%)	$p<.001^{***}$	204.87
Masters	23 (13.9%)	11 (15.3%)	10 (16.9%)	70 (36.1%)	114 (23.3%)		
Doctorate	3 (1.8%)	1 (1.4%)	3 (5.1%)	36 (18.6%)	43 (8.8%)		
Employment status							
Student	14 (8.5%)	6 (8.3%)	8 (13.6%)	62 (32.0%)	90 (18.4%)		
Unemployed	18 (10.9%)	9 (12.5%)	14 (23.7%)	70(36.1%)	111 (22.7%)	$p<.001^{***}$	142.63
Private/self-employed	42 (25.5%)	23 (31.9%)	27 (45.8%)	45 (23.2%)	137 (28.0%)		
Government employee	91 (55.2%)	34 (47.2%)	10 (16.9%)	17 (8.8%)	152 (31.0%)		
Location of current residence							
Rural	145 (87.9%)	39 (54.2%)	12 (20.3%)	26 (13.4%)	222 (45.3%)	$p<.001^{***}$	217.50
Urban	20 (12.1%)	33 (45.8%)	47 (79.7%)	168 (86.6%)	268 (54.7%)		
Monthly income (in SAR per month)							
< 5000	16 (9.7%)	8 (11.1%)	15 (25.4%)	90 (46.4%)	129 (26.3%)		
5001-10000	45 (27.3%)	25 (34.7%)	26 (44.1%)	57 (29.4%)	153 (31.2%)	$p<.001^{***}$	103.57
10001-15000	40 (24.2%)	17 (23.6%)	13 (22.0%)	28 (14.4%)	98 (20.0%)		
> 15000	64 (38.8%)	22 (30.6%)	5 (8.5%)	19 (9.8%)	110 (22.4%)		
Marital status							
Unmarried/ single	102 (61.8%)	32 (44.4%)	18 (30.5%)	42 (21.6%)	194 (39.6%)		
Married	60 (36.4%)	36 (50.0%)	39 (66.1%)	92 (47.4%)	227 (46.3%)	$p<.001^{***}$	112.02
Divorced	3 (1.8%)	4 (5.6%)	2 (3.4%)	60 (30.9%)	69 (14.1%)		
Living status							
Living with family (or) friends	134 (81.2%)	50 (69.4%)	40 (67.8%)	92 (47.4%)	316 (64.5%)	$p<.001^{***}$	45.88
Living alone	31 (18.8%)	22 (30.6%)	19 (32.2%)	102 (52.6%)	174 (35.5%)		
Relative/family member/friend with COVID-19							
No	162 (98.2%)	67 (93.1%)	51 (86.4%)	125 (64.4%)	405 (82.7%)	$p<.001^{***}$	78.69
Yes	3 (1.8%)	5 (6.9%)	8 (13.6%)	69 (35.6%)	85 (17.3%)		
Type of electronic media used							
Internet	90 (54.5%)	24 (33.3%)	20 (33.9%)	119 (61.3%)	253 (51.6%)		
Television	19 (11.5%)	28 (38.9%)	34 (57.6%)	50 (25.8%)	131 (26.7%)	$p<.001^{***}$	75.87
Radio	56 (33.9%)	20 (27.8%)	5 (8.5%)	25 (12.9%)	106 (21.6%)		
EME (hoursper day) of pandemic-related news							
< 1	105 (63.6%)	25 (34.7%)	15 (25.4%)	24 (12.4%)	169 (34.5%)		
1 – 2	23 (13.9%)	17 (23.6%)	16 (27.1%)	25 (12.9%)	81 (16.5%)	$p<.001^{***}$	140.56
3 – 4	13 (7.9%)	24 (33.3%)	16 (27.1%)	69 (35.6%)	122 (24.9%)		
> 4	24 (14.5%)	6 (8.3%)	12 (20.3%)	76 (39.2%)	118 (24.1%)		

Table VI. Prevalence of generalized anxiety, depression, COVID-19-related fear, and loneliness.

Prevalence of loneliness and generalized anxiety.

Variable	No anxiety	Anxiety	Frequency (percentage)	*p*-value	χ^2
Not lonely	203 (74.4%)	105 (48.4%)	308 (62.9%)	$p<.001^{***}$	34.93
Lonely	70 (25.6%)	112 (51.6%)	182 (37.1%)		

Prevalence of loneliness and depression

Variable	Minimal depression	Depression	Frequency (percentage)	*p*-value	χ^2
Not lonely	261 (75.4%)	47 (32.6%)	308 (62.9%)	$p<.001^{***}$	79.76
Lonely	85 (24.6%)	97 (67.4%)	182 (37.1%)		

Prevalence of loneliness and COVID-19-related fear

Variable	Normal COVID-19-related fear	Extreme COVID-19-related fear	Frequency (percentage)	*p*-value	χ^2
Not lonely	204 (82.6%)	104 (42.8%)	308 (62.9%)	$p<.001^{***}$	140.56
Lonely	43 (17.4%)	139 (57.2%)	182 (37.1%)		

Prevalence of generalized anxiety and COVID-19-related fear

Variable	No anxiety	Anxiety	Frequency (percentage)	*p*-value	χ^2
Normal COVID-19-related fear	182 (66.7%)	65 (30.0%)	247 (50.4%)	$p<.001***$	65.19
Extreme COVID-19-related fear	91 (33.3%)	152 (60.0%)	243 (49.6%)		

Prevalence of depression and COVID-19-related fear

Variable	Minimal Depression	Depression	Frequency (percentage)	*p*-value	χ^2
Normal COVID-19-related fear	211 (61.0%)	36 (25.0%)	247 (50.4%)	$p<.001^{***}$	52.66
Extreme COVID-19-related fear	135 (39.0)	108 (75.0)	243 (49.6)		

perceived stress. These findings concur with Qiu et al[59] who observed that during the COVID-19 pandemic females reported more psychosocial distress in comparison with males. Kowal et al[54] also reported elevated levels of stress among females during the ongoing pandemic. The socio-cultural as well as biological factors associated with gender might play a role in mediating this association[60]. For example, hormonal fluctuations appear to have a major impact on the course of panic disorders among females. More specifically, the decrease in the levels of estrogen, as well as progesterone, characteristic of the mid-luteal phase of menstrual cycle has shown to be associated with the appearance or worsening of symptoms related to anxiety and panic disorder[61]. The female predominance in anxiety disorders could also be due to the genetically and/or biologically determined differentiation[62].

Two-fifths of participants in the present study reported severe stress (39.6%). Similar high levels of stress during the pandemic (27.2%) were also reported in an Italian study[28]. In the present study, participants with severe stress were predominantly female (79.9%), aged 18-47 years (90.2%), and just over one-third had a relative and/or family member and/or friend who had contracted COVID-19 (36.5%). These findings are relatively similar to

Table VII. Prevalence of perceived stress; generalized anxiety, depression, loneliness, and COVID-19-related fear.

Prevalence of generalized anxiety and prevalence of perceived stress.

Variable	No stress	Mild stress	Moderate stress	Severe stress	Frequency (percentage)	*p*-value	χ^2
No anxiety	143 (86.7%)	56 (77.8%)	29 (49.2%)	45 (23.2%)	273 (55.7%)	$p<.001^{***}$	162.45
Anxiety	22 (13.3%)	16 (22.2%)	30 (50.8%)	149 (76.8%)	217 (44.3%)		
Prevalence of depression and prevalence of perceived stress							
Minimal depression	158 (95.8%)	61 (84.7%)	53 (89.8%)	74 (38.1%)	346 (70.6%)	$p<.001^{***}$	166.24
Depression	7 (4.2%)	11 (15.3%)	6 (10.2%)	120 (61.9%)	144 (29.4%)		
Prevalence of loneliness and prevalence of perceived stress							
Not lonely	135 (81.8%)	49 (68.1%)	41 (69.5%)	83 (42.8%)	308 (62.9%)	$p<.001^{***}$	60.84
Lonely	30 (18.2%)	23 (31.9%)	18 (30.5%)	111 (57.2%)	182 (37.1%)		
Prevalence of COVID-19-related fear and prevalence of perceived stress							
Normal COVID-19-related fear	129 (78.2%)	44 (61.1%)	30 (50.8%)	44 (22.7%)	247 (50.4%)	$p<.001^{***}$	113.88
Extreme COVID-19-related fear	36 (20.6%)	28 (38.9%)	29 (49.2%)	150 (77.3%)	243 (49.6%)		

Table VIII. Linear regression between the perceived stress score and selected sample characteristics.

Determinant	β	95% CI Lower	95% CI Upper	*p*-value
Gender				
Gender				
Female	8.06	6.51	9.61	<0.001
Male				Ref
Age				
Age (years)	0.10	0.03	0.16	0.003
Education level				
Bachelors or higher	9.69	8.12	11.27	<0.001
High school				Ref
Employment status				
Unemployed	9.30	7.80	10.80	<0.001
Employee (private/government)				Ref
Location of current residence				
Urban	11.65	10.31	12.98	<0.001
Rural				Ref
Time spent on electronic media (hours per day)				
Time (hrs)	4.10	3.49	4.70	<0.001

Note: CI = Confidence Interval. The variables included in the linear regression were continuous variables (PSS-10 scale score, age, time spent on electronic media) and dichotomous variable (gender, education level, employment status and location).

Moghanibashi-Mansourieh[18] who also found anxiety to be more common amongthose aged 21-40 years, among females, and among those who had a family member and/or friend who had contracted COVID-19. Given that the present study also found a significant association between perceived stress and anxiety, these variables might also have an effect on increasing the prevalence of stress among the participants. Qui et al[59] also reported high psychosocial stress amongst young people during the COVID-19 pandemic.

Three-quarters of participants with severe stress in the present study (76.8%) also reported generalized anxiety. More than half of participants with severe stress (57.2%), generalized anxiety (51.6%), and depression (67.4%) were also found to be lonely. Extreme COVID-19-related fear was significantly associated with perceived stress, generalized anxiety, depression, and loneliness. Additionally, a significant association was also reported by Bauerle et al[63] between the level of information attained with regards to COVID-19 and COVID-19-related fear. These findings concur with Alyami et al[58] who conducted a path analysis to examine the effects of COVID-19-related fear on mental well-being and quality of life. They suggested that participants having elevated fear of COVID-19 probably experienced symptoms related to anxiety and/or depression.

The sense of ambiguity and feeling of uncertainty associated with infectious disease outbreaks like the COVID-19 pandemic greatly diminish rational thinking and are likely to cause psychological distress as well as mental health illnesses[64-66]. Social isolation, societal disconnect, and the financial hardship are all commonly associated with pandemics, and can create a sense of insecurity thereby inducing psychological distress, including fear, grief, tedium, anger, irritation, annoyance, vulnerability, seclusion, and loneliness[2,8,58,64-68]. The present study, also found loneliness to be associated with elevated stress.

Misinformation concerning the COVID-19 pandemic appears to have become widespread[69]. Even though some of this misinformation and fake news might not be harmful but, some falsehoods might lead some individuals to engage in behaviors that do not protect them against the virus[70]. Most of the time, pandemic-related news can be frustrating and disappointing, as well as containing rumors and/or falsehoods[18]. This may increase the levels of anxiety among individuals getting exposed to regular and constant COVID-19 pandemic-related news[18]. The spread of misinformation may not only mask healthy behaviors but also encourages erroneous practices which increase the spread of the disease (resulting in poor physical and/or mental health amongst individuals). Countless incidents of misfortune as a consequence of these rumors have been reported worldwide[71]. The findings of the present study also showed a significant association between excessive EME and the prevalence of stress, generalized anxiety, and depression. Another study[72] conducted during the pandemic found constant exposure to pandemic-related news to be one of the most common risk factors associated with mental distress. Extensive COVID-19-related misinformation also has the potential to lead to xenophobia[73-75].

Zhu et al[76] reported that during the COVID-19 pandemic, individuals living in collectivistic societies (e.g., India, China, etc.) were found to be increasingly supportive of the preventive measures put in place by their respective governments to control the spread of the diseases as compared with residents of individualistic societies (e.g., USA, UK, etc.)[76]. Saudi Arabia is a traditional, conservative and a collectivistic society. The low mortality rate of Saudi Arabia bears witness to the widespread popularity, acceptance, and adherence to the preventive measures implemented by the Saudi Ministry of Health to prevent the spread of COVID-19[77]. It was observed by Shuwiekh et al[78] while examining the differential mental health impact of COVID-19 in Arab countries, that countries like Saudi Arabia with low population density showed lower negative mental health impacts as compared to other Arab countries, such as Egypt with higher population density[78].

To help overcome some of the public health issues in KSA, special care and attention (such as identifying and normalizing the stressors, providing psychological support, providing interventions to address mental health issues, sleep deprivation, facilitating contact with agencies to overcome the financial fallout, providing increased access to tools of communication with relatives, etc.)[78] to those (i) in quarantine and isolation centers, (ii) who are financially vulnerable, and (iii) who have known histories of mental health issues and/or addiction issues, in order to assist them in controlling their fears, as well as anxiety during the pandemic period[3]. The employment of social learning techniques for creative and effective communication (*via* social, electronic, and print media by making use of sports personalities and celebrities) is needed to highlight and encourage

adherence to governmental regulations as well as encourage the general population to participate in activities of community cooperation focusing on helping those in need[76].

To tackle the unprecedented public health issues arising as a consequence of COVID-19 pandemic in the kingdom, the Saudi Data and Artificial Intelligence Authority (SDAIA), in cooperation with Saudi Ministry of Health (MoH), have introduced various initiatives and developed several mobile applications including Alanzi[79] to create public health awareness, obtain movement permits during hours of curfew, enable contact tracing, book appointments, and provide online consultations. There is also *Da'em*, a round-the-clock confidential online wellness program providing psychological support to healthcare workers across Saudi Arabia[77].

The current unprecendented situation warrants an unequivocal need for electornic media providers to play a more positive role. Suggestive measures include: (i) fact-checking of information before it is broadcasted, and preventing the spread of misinformation, false-information, rumors, etc.[80]; (ii) broadcasting apolitical, unbiased messages with accurate information to boost the morale of the general public[81]; (iii) airing special transmissions of well known psychiatrists, psychologists and other healthcare professionals to advise, instruct, and help vulnerable individuals in coping with the psychological impact of the ongoing pandemic[82]; (iv) informing the general public about the mental health issues arising from the ongoing pandemic and ways of improving mental wellness[83]; (v) employing grief counselors and other patients who have recovered to console families who have lost their relatives to the pandemic and help them in coping with their recent loss; (vi) invitingcelebrities, sports personalities, well known politicians, and social media influencers to spread a message of unity, togetherness, and optimism to motivate and to help reduce the panic and anxiety among the general public[80]; and (vii) airing special broadcasts concentrating on the physical and mental well-being of the children, highlighting ways of overcoming boredom and improving their physical condition[80]. Srivastava et al[84] also advocated the need of the mass media to be careful and responsive when reporting mental health issues, as well as cautious reporting of suicide without sensationalizing[13,84].

Moreover, in Arab countries, religious values, social and cultural norms play an important role in shaping the presentation of psychological distress[85]. General awareness towards mental illnesses is poor. Stigma and negative misplaced perceptions[86] are commonly associated with mental illnesses[87]. Members of the general public are reluctant and hesitant in acknowledging mental health issues and seeking help[88]. Because of the cultural and geographical sensitivities associated with mental health issues in the Arab countries, there is an urgent need to educate the general population for the need to acknowledge and accept any mental health issues that may have risen due to the ongoing pandemic and to seek professional help in overcoming them.

To the best of the authors' knowledge, the present study is the first in Saudi Arabia to examine the association between excessive EME of pandemic-related news and the prevalence of stress, generalized anxiety, depression, COVID-19-related fear, and loneliness. Furthermore, the present study is the first in Saudi Arabia to propose suggestive measures on how the electronic media can play a significant and a positive role in helping the vulnerable cope with the psychological impact of the ongoing pandemic.

However, the present study is not without its limitations. For instance, the cross-sectional design did not make it possible to assess the causality between the variables. Due to COVID restrictions, an online survey was the only possible safe method of data collection. Moreover, the invitation link was distributed on social media, and older people without internet access or without the knowledge of social media, or not knowing how to use *Google Forms*, might not have been able to participate. Additionally, the study was conducted only in one single Province of Saudi Arabia (i.e., Ha'il) and all participants were Saudi. Therefore, the results cannot necessarily be generalized to other parts of the country and the Saudi participants may not have been representative due to the convenience sampling. Finally, the study utilized a self-report survey, andthere is the possibility of recall bias. The snowball convenience sampling technique may also have led to selection bias.

Conclusions

The findings of the present study suggest that some individuals (females, participants with higher educational qualification, unemployed, those residing in urban areas, and those with excessive EME may be an increased risk of experiencing elevated stress during the COVID-19 pandemic.

As elevated stress had a positive association with generalized anxiety and depression, there is an urgent need for educational resilience programs (online, if they cannot be carried out in-person) for these susceptible individuals to help them to develop skills to help cope with the psychological impact of the COVID-19 pandemic. Electronic media can also play a positive role by airing dedicated transmissions of well known psychiatrists and psychologists to help vulnerable individuals cope with the psychological impact of the ongoing pandemic.

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Institutional Review Board Statement
The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Human Research Ethics Committee (HREC), University of Ha'il, reference number: EC-00119; approval number: HREC 00119/CM-UOH.04/20.

Informed Consent Statement
Informed consent was obtained from all subjects involved in the study.

Data Availability Statement
Access to study data can be provided by the first author (Dr. Sultan AlNohair) upon reasonable request.

Conflict of interests
The authors declare that they have no conflict of interests.

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