Psychological effect of the COVID-19 pandemic on a cohort of Egyptian population

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Background
The current coronavirus disease (COVID-19) pandemic has had a great effect worldwide. Although health care workers (HCWs) play an essential role and are one of the most exposed groups, information about the psychosocial effect among the general population and those who came in contact with COVID-19-infected patients is still required.
Aim
The study's main aim was to assess the prevalence of anxiety and depression among the general population, those who came in contact with patients, and frontline HCWs in response to the COVID-19 pandemic in Egypt and to investigate factors associated with psychological distress.
Materials and methods
A cross-sectional study was carried out using an online-administered questionnaire. The questionnaire included sociodemographic data and data related to the current pandemic. Hospital-based anxiety and depression scale (HADS)-Arabic version was used to assess anxiety and depression. Multivariable logistic regression analysis was performed to identify significant predictors.
Results
A total of 1778 participants were involved in the current study, and of them, 82.6% were general population, 10.6% were HCWs, whereas those who came in contact with COVID-19-infected patients were 6.8%, with more female predominance. Of 1778 participants, 711 (40%) had abnormal depressive score. Overall, 52.9% of those who came in contact with COVID-19-infected patients had abnormal depressive score, whereas 39.4% and 36.5% of the general population and HCWs, respectively, had abnormal depressive score, with statistically significant difference. Regarding anxiety, there was a highly significant difference among the three groups with higher abnormal anxiety score among those who came in contact with COVID-19-infected patients (46.3%) than the general population and HCWs (33% and 33.9%, respectively). Overall, 34% of all participants had abnormal anxiety score. While evaluating different parameters associated with psychological distress by multiple logistic regression analysis, individuals without a history of previous psychological illness and those who rely on internet and approved sites as sources of information experienced less anxiety and depression. Female sex and lower levels of education have a higher risk of anxiety.
Conclusions
During the current pandemic, the Egyptian population has a high prevalence of psychological distress, with a higher prevalence among those who came in contact with COVID-19-infected patients than in the general population and HCWs. Among different parameters associated with psychological distress, individuals without a history of previous psychological illness and those who rely on internet and approved sites as sources of information experienced less anxiety and depression during the COVID-19 pandemic. Therefore, establishing early targeted mental health interventions should become routine as a part of our preparedness efforts.

Keywords:
anxiety, COVID-19, depression, sources of information

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Background

An outbreak of a novel coronavirus termed severe acute respiratory symdrome (SARS) coronavirus 2 emerged in December 2019 in Wuhan city, China

(Wu *et al.*, 2020) with serious cases of pneumonia, and then the disease spread across the world to be recognized by the World Health Organization (WHO) as a global pandemic in February 2020 (Legido-Quigley *et al.*, 2020). It has seriously affected the global economy and daily lives owing to preventive measures such as social distancing and job loss. The rapid spread of coronavirus has led to anxiety about the future and depressive disorders (Xiang, 2020). Previous studies showed serious psychosocial effects on the general population during outbreaks of infection, which may be explained by several reasons. The most important ones are anxiety, fear of sickness, social isolation and stigma, and dying (Ramaci *et al.*, 2020). In fact, health care workers (HCWs) are confronted with many stresses during this pandemic, with continuous distressing fear about risk of infection transmission to their parents and children. Another important cause of psychiatric disturbance is losing jobs and financial problems (Jenna *et al.*, 2020; Kontoangelos *et al.*, 2020). During the outbreak of the swine flu, anxiety disorders were found in approximately 10–30% of the general population (Rubin *et al.*, 2010). Moreover, significant psychiatric disturbances were observed during the SARS outbreak (Sim, 2010) Braquehais *et al.* (2020) and Pappa *et al.* (2020) also stated that HCWs working in the first line of care with greater clinical responsibilities and those who have been infected have had a higher rate of anxiety and depressive symptoms. Moreover, Zhang *et al.* (2020) found that medical HCWs compared with nonmedical HCWs had a higher prevalence of anxiety. This study aimed to measure the prevalence of psychological effect of coronavirus disease 2019 (COVID-19) pandemic on the general population, those who came in contact with patients, and frontline HCWs and to assess factors associated with anxiety and depression in the Egyptian population during the COVID-19 era.

Methods

(1) A cross-sectional, questionnaire-based study was conducted to assess the psychological effect of COVID-19. We have developed a questionnaire that was presented as an online survey by Google Forms to ensure a wide reach and easy access.
(2) Each questionnaire consists of three main parts.
(3) Personal information included name, age, level of education, history of medical, and history of previous psychiatric disorder.
(4) Sources of information were either from authorized websites, such as WHO websites, traditional mainstream media (radio, TV, and newspapers), and social media, or from the public regarding the COVID-19 pandemic.
(5) The practice, as a method of transmission of infection, measures should be taken in case of doubt of infection or appearance of any symptoms of COVID-19.
(6) Moreover, we asked participants about their attitude and precautionary measures regarding patients of COVID-19.
(7) Physical symptoms of COVID-19 (chills, headache, myalgia, cough, difficulty in breathing, dizziness, sore throat, and persistent fever) in the past 14 days were recorded to exclude suspected cases of COVID-19.
(8) The evaluation of psychological distress and depression was done using a questionnaire. We used the hospital-based anxiety and depression scale (HADS)-Arabic version (Zigmond and Snaith, 1983; Terkawi*et al.*, 2017). HADS is a self-reported questionnaire that performs well in screening for separate dimensions of anxiety and depression in both somatic, psychiatric, and primary care patients, and it is also validated in the general population. HADS consists of 14 items: seven items regarding anxiety subscale (HADS-A), and seven items regarding depression subscale (HADS-D). Each item is rated on a 4-point scale with a response ranging from 0 to 3 with possible total scores ranging from 0 to 21 for each subscale. HADS score of 0-7 means normal, 8-10 means borderline case, and 11-21 means abnormal (cases). Additionally, an overall total score (HADS-T) can also be calculated by summing all items (0–42 range), with higher scores indicating greater levels of psychological distress.

Participants

The selected sample for the current study was all frontline HCWs in Kafrelsheikh University Hospital and a convenient sample of family members who came in contact with the admitted COVID-19-infected patients in Kafrelsheikh University Hospital.

The target participants were subdivided into three groups:

Group I included frontline HCWs: doctors, nurses, and health-related administrators.

Group II included those who came in contact with confirmed and suspected COVID-19-infected patients.
Group III included the general population with no symptoms of COVID-19 and not in contact with cases.

Ethical consideration

Expedited ethics approval was received from the Research Ethics Committee of the Faculty of Medicine, Kafrelsheikh University, which adhered to the principles of the Declaration of Helsinki (MKSU22-3-2021). All respondents replied to a question if they agree to participate in this study before filling out the questionnaire.

Statistical analysis

The calculated sample size for the general population study group was at a minimum of 384 using Epi-info software statistical package version 3.01. The criteria used for sample size calculation were 95% confidence limit, 80% power of the study, and 50% expected outcome. Sorting and analysis of data were performed using the Statistical Package for the Social Sciences (SPSS) version 21. In this study, the qualitative variables were prescribed using number and percent, and χ^2 test was used for analysis. Numerical variables were expressed as median (minimum-maximum). Kruskal–Wallis Test or Mann–Whitney *U*-test (for non-normal distributed data) was used for comparison between groups. The analysis of the relationship between sex, age, education level, group, history of chronic illness, or psychological problems and anxiety or depression was done using the chi-square test or Mann–Whitney *U*-test. The variables with $P<0.2$ were entered in the multiple logistic regression analysis models, and the results were tabulated as odds ratio and confidence interval. *P* value ≤ 0.05 was adopted as the level of significance.

Results

The current work enrolled a large number of participants. A total of 1778 individuals responded to our survey questionnaire. Of the studied individuals, 1468 (82.6%) were general population, whereas 189 (10.6%) were frontline HCWs. Of the studied individuals, 121 (6.8%) were those who came in contact with suspected or proven cases of COVID-19. Female participation was predominant. The mean age of the general population was 21, whereas it was 24 in both contacts and HCWs. We found that 21.5% of the contact participants had a history of chronic illness, whereas it was 5.8% in HCWs and 6.4% in the general population. Regarding the history of psychological disorders, there was no significant difference between the different groups. Regarding the source of information, 31% of the participants depended on social media, 20% depended up on approved internet sites, 4.7% on TV, and only 2.4% received their information from community members. Overall, 41.9% depended upon more than one source.

The prevalence of depressive and anxiety symptoms among the studied groups according to HADS showed a significant difference between those who came in contact with cases of COVID-19 on one side and HCWs and the general population on the other side.

Regarding the degree of depression and after classification of participants to normal, borderline cases, and abnormal (depression cases), we found that there was a significant difference, as 52.9% of those who came in contact with COVID-19-infected patients had abnormal depressive scores, whereas 39.4% and 36.5% of the general population and HCWs, respectively, had abnormal depressive score. Of 1778 participants, 711 (40%) had abnormal depressive scores.

Regarding anxiety, there was a highly significant difference among the three groups with higher abnormal anxiety scores in those who came in contact with COVID-19 (46.3%) than in the general population and HCWs (33% and 33.9%, respectively). Overall, 34% of all participants had abnormal anxiety scores.

While evaluating the contributing risk factors of depression in multiple logistic regression model, it was found that the normal population and HCW groups were associated with a decreased risk of depression, as odds of presence of depression manifestations (54.0% and 53.0%, respectively) were less than in those who came in contact with COVID-19-infected patients, with a statistically significant difference. Compared with those with a previous history of psychological disorders, odds of presence of depression manifestations were 58.0% lower among those without any previous history of psychological disorders, with a statistically significant difference. Regarding the source of information, odds of presence of depression manifestations among those who depend on the internet and approved sites as sources of information were 31.0% less than those who depend on social media alone, with a statistically significant difference.

While evaluating the contributing risk factors of anxiety in the multiple logistic regression model, it was found that female sex was associated with an increased risk of anxiety as odds of presence of anxiety manifestations was 2.41 times than that of males with a highly statistically significant difference. Compared with those with a master's degree or above, odds of presence of anxiety manifestations among those with high school or below were 1.89 times higher, with a statistically significant difference. The general population group was associated with a decreased risk of anxiety, as odds of presence of anxiety manifestations were 48.0% less than in those who came in contact with COVID-19-infected patients, with a statistically significant difference. Compared with those with a previous history of psychological disorders, odds of presence of anxiety manifestations were 63.0% lower among those not having any previous history of psychological disorders, with a statistically significant difference. Regarding the source of information, odds of presence of anxiety manifestations among those who depend on the internet and approved sites as sources of information were 55.0% less than those who depend on social media alone, with a statistically significant difference (Tables 1–7).

Discussion

This cross-sectional survey enrolled 1778 respondents from Egypt. In the current study, 82.6% of the participants were normal without any physical symptoms suggestive of COVID-19 infection, whereas 10.6% were HCWs. Those who came in contact with proved or suspected COVID-19-infected patients were 6.8%. The limited number of contacts in the current work could be explained by the restricted spread of disease at that time in Egypt and the reluctance of most of those who came in contact with COVID-19-infected patients to take up the questionnaire as an effect of the disease on their psychological condition or properly owing to stigma associated with COVID-19 infection early in the spread of the disease in Egypt. As of March 6, 2020, Egypt had reported three cases of COVID-19, and we started data collection of the study on April 18, 2020.

Most of our participants were females (73.3%). This is in agreement with Qiu et al., 2020, who showed that

Table 1 Demographic characteristics of the studied sample

	General population (*n*=1468)	Health care workers (*n*=189)	Those who came in contact with COVID-19-infected patients (*n*=121)	Total (*n*=1778)	Test	*P* value
Sex						
Male	373 (25.4)	64 (33.9)	37 (30.6)	474 (26.7)	7.1	**0.028***
Female	1095 (74.6)	125 (66.1)	84 (69.4)	1304 (73.3)		
Age (years)	21 (11–68)	24 (18–47)	24 (15–89)	21 (11–89)	W**	**0.001***
Educational level						
Master or above	97 (6.6)	42 (22.2)	27 (22.3)	166 (9.3)	120.0	**0.001***
College	1290 (87.9)	146 (77.2)	72 (59.5)	1508 (84.8)		
High school or below	81 (5.5)	1 (0.5)	22 (18.2)	104 (5.8)		
History of chronic illness	94 (6.4)	11 (5.8)	26 (21.5)	131 (7.4)	38.0	**0.001***
History of psychological disorders	356 (24.3)	34 (18.0)	24 (19.8)	414 (23.3)	4.5	0.103
Source of information						
Social media	460 (31.3)	49 (25.9)	42 (34.7)	551 (31.0)	92.3	**0.001***
TV	61 (4.2)	4 (2.1)	18 (14.9)	83 (4.7)		
Community members	33 (2.2)	6 (3.2)	4 (3.3)	43 (2.4)		
Internet and approved sites	256 (17.4)	75 (39.7)	25 (20.7)	356 (20.0)		
>one source	658 (44.8)	55 (29.1)	32 (26.4)	745 (41.9)		

Values are presented as median (minimum–maximum) or number (%). COVID, coronavirus disease 2019. *Significant. **Kruskal–Wallis test. Bold values mean significant W kruskal–Wallis.

Table 2 Prevalence of depressive symptoms among the studied sample according to hospital anxiety and depression scale (HADS)

	General population (*n*=1468)	Health care workers (*n*=189)	Those who came in contact with COVID-19 patients (*n*=121)	Total (*n*=1778)	χ^2	*P* value
Hardly enjoy the things that used to enjoy	153 (10.4)	21 (11.1)	28 (23.1)	202 (11.4)	38.1	**0.001***
Cannot laugh at all and see the funny side of things	84 (5.7)	16 (8.5)	14 (11.6)	114 (6.4)	18.7	**0.005***
Not feel cheerful at all	141 (9.6)	29 (15.3)	24 (19.8)	194 (10.9)	52.7	**0.001***
Nearly all the time feel as if slowed down	277 (18.9)	26 (13.8)	26 (21.5)	329 (18.5)	9.8	0.129
Definitely have lost interest in my appearance	131 (8.9)	18 (9.5)	16 (13.2)	165 (9.3)	6.4	0.373
Hardly look forward with enjoyment to things	160 (10.9)	18 (9.5)	24 (19.8)	202 (11.4)	18.9	**0.004***
Rarely can enjoy a good book or radio or TV program	495 (33.7)	57 (30.2)	54 (44.6)	606 (34.1)	13.9	**0.030***

Values are presented as number (%). COVID, coronavirus disease 2019. *Significant. Bold values mean significant.

Table 3 Prevalence of different degrees of depression among the studied sample according to hospital anxiety and depression scale (HADS)

	General population (*n*=1468)	Health care workers (*n*=189)	Those who came in contact with COVID-19 patients (*n*=121)	Total (*n*=1778)	Test	*P* value
Normal	489 (33.3)	67 (35.4)	20 (16.5)	576 (32.4)	16.5	0.002*
Borderline	401 (27.3)	53 (28.0)	37 (30.6)	491 (27.6)		
Abnormal	578 (39.4)	69 (36.5)	64 (52.9)	711 (40.0)		
Median depression score	9 (0–21)	9 (0–21)	11 (2–21)	9 (0–21)	W**	0.001*

Values are presented as median (minimum–maximum) or number (%). COVID, coronavirus disease 2019. *Significant. **Kruskal–Wallis test. W Kruskal–Wallis test.

approximately 64.73% of participants were females, and this could be explained by the higher prevalence of females among nurses and doctors in HCW subgroup or that females might have more time and initiative to participate in surveys.

Regarding the source of information, 39.7% of HCWs got their information about COVID-19 from approved internet websites, whereas most of the general population and those who came in contact with COVID-19 (31.3% and 34.7%, respectively) got their information about COVID-19 from the social media. Another study found that 93.5% of the general population during the initial stage of COVID-19 epidemic in China got their information about COVID-19 from the internet (Wang *et al.*, 2020).

In the current study, 39.4% of the general population and 36.5% of HCWs showed abnormal depressive features and 27.3% of the general population and 28% of HCWs showed mild borderline depressive features, and the mean depression score was 9 in both groups. This is in agreement with another study, which found that approximately 21% of the general population and 19.8% of HCWs showed depressive features (Wang *et al.*, 2019), and another study, which found that 35% of the respondents experienced psychological distress by using COVID-19 Peritraumatic Distress Index (CPDI) (Qiu *et al.*, 2020). A study on the Chinese general population at the initial phase of COVID-19 showed that 16.5% of respondents reported moderate to severe depressive symptoms as assessed by the depression anxiety status scale (DASS -1) (Wang *et al.*, 2019). Another study enrolled 1275 respondents from health care workers and reported that 50.4% experienced depression (Lai *et al.*, 2020). Moreover, another work showed that 50% of Egyptian physicians had severe psychological distress with a higher prevalence among frontline and less experienced doctors (Sehsah *et al.*, 2021). In contrast, another Egyptian study, carried out on 262 HCWs from different hospitals in Egypt, showed that 94% of the participants experienced depression (Aly *et al.*, 2021). Sources of distress in health care workers may include feelings of susceptibility to infection and apprehensions about the

Table 4 Prevalence of anxiety symptoms among the studied sample according to hospital anxiety and depression scale (HADS)

	General population (*n*=1468)	Health care workers (*n*=189)	Those who came in contact with COVID-19 patients (*n*=121)	Total (*n*=1778)	χ^2	*P* value
Most of the time feel tense or 'wound up'	149 (10.1)	17 (9.0)	22 (18.2)	188 (10.6)	43.5	0.001*
Very definitely get a sort of frightened feeling	127 (8.7)	21 (11.1)	18 (14.9)	166 (9.3)	25.6	0.001*
A great deal of the time with worrying thoughts	228 (15.5)	33 (17.5)	32 (26.4)	293 (16.5)	21.6	0.001*
Cannot at all sit at ease and feel relaxed	198 (13.5)	24 (12.7)	26 (21.5)	248 (13.9)	25.9	0.001*
Very often get a sort of frightened feeling like 'butterflies' in the stomach	217 (14.8)	34 (18.0)	32 (26.4)	283 (15.9)	35.6	0.001*
Cannot at all feel restless as have to be on the move	113 (7.7)	16 (8.5)	14 (11.6)	143 (8.0)	27.5	0.001*
Very often get sudden feelings of panic	145 (9.9)	23 (12.2)	16 (13.2)	184 (10.3)	28.1	0.001*

Values are presented as number (%). COVID, coronavirus disease 2019. *Significant.

Table 5 Prevalence of different degrees of anxiety among the studied sample according to hospital anxiety and depression scale (HADS)

	General population (*n*=1468)	Health care workers (*n*=189)	Those who came in contact with COVID-19-infected patients (*n*=121)	Total (*n*=1778)	Test	*P* value
Normal	644 (43.9)	86 (45.5)	24 (19.8)	754 (42.4)	27.7	0.001*
Borderline	340 (23.2)	39 (20.6)	41 (33.9)	420 (23.6)		
Abnormal	484 (33.0)	64 (33.9)	56 (46.3)	604 (34.0)		
Median anxiety score	8 (0–21)	8 (0–21)	10 (4–21)	8 (0–21)	W**	0.001*

Values are presented as median (minimum–maximum) or number (%). COVID, coronavirus disease 2019. *Significant. **Kruskal–Wallis test. W Kruskal–Wallis test.

health of self, the spread of the virus, the health of family and others, in addition to changes in work and being isolated (Wong *et al.*, 2005). COVID-19 is a human-to-human transmissible disease (Awadasseid *et al.*, 2020) that is associated with high morbidity and potential fatality (Wang *et al.*, 2020).

On the contrary, 52.9% of those who came in contact with COVID-19-infected patients had abnormal depressive features and 30.7% showed mild borderline depressive features, and the mean depression score was 11. There was a highly significant difference among the three groups. In multimodal regression analysis, we found that compared with those who came in contact with COVID-19, the general population and HCWs had a lower depression risk. This result is in agreement with Lung *et al.*, 2009, who found that those who came in contact with patients with SARS were more susceptible to mental symptoms (Lung *et al.*, 2009), but is unlike other studies, which showed that contact with patients did not increase the risk of depression (Huang and Zhao, 2020 and Wang *et al.*, 2020).

In the current work, 33% of the general population and 33.9% of HCWs showed abnormal anxiety features, and 23.2% of general population and 20.6% of HCWs showed mild borderline anxiety features, and the mean anxiety score was 8. A previous study conducted on HCWs in Egypt revealed a higher prevalence of anxiety among HCWs, as 90.5% had anxiety, with 18.5% with severe anxiety and 18% with mild anxiety (Aly *et al.*, 2021). Similar to our results, another study showed that approximately 34.1% of general population and 35.6% of HCWs showed anxiety features (Huang and Zhao, 2020). Similarly, a study on the Chinese general population showed that 28.8% of respondents reported moderate to severe anxiety symptoms using DASS-1 (Wang *et al.*, 2019). Another work also found that 40% of HCWs reported anxiety (Lai *et al.*, 2019). In contrast to the current study, another study reported that only 15.4%

Table 6 Multiple logistic regression analysis of depression-related factors among the studied sample

					Multiple logistic regression analysis		
	Depressed group (*n*=711)	Nondepressed group (*n*=1067)	Test	*P* value	OR	(95% CI)	*P* value
Sex							
Male	169 (35.7)	305 (64.3)	5.1	0.024*	1.00	—	—
Female	542 (41.6)	762 (58.4)			1.18	(0.94–1.48)	0.138
Age (years)	21 (11–51)	21 (14–89)	U**	0.334			
Educational level							
Master or above	56 (33.7)	110 (66.3)	3.5	0.167	1.00	—	—
College	609 (40.4)	899 (59.6)			1.13	(0.77–1.66)	0.522
High school or below	46 (44.2)	58 (55.8)			1.64	(0.67–1.99)	0.581
Group							
General population	578 (39.4)	890 (60.6)	9.5	0.008*	0.46	(0.31–0.71)	**0.001***
Health care workers	69 (36.5)	120 (63.5)			0.47	(0.29–.77)	**0.003***
Those who came in contact with COVID-19	64 (52.9)	57 (47.1)			1.00	—	—
History of chronic illness							
Yes	61 (46.6)	70 (53.4)	2.5	0.110	1.00	—	—
No	650 (39.5)	997 (60.5)			0.91	(0.62–1.34)	0.660
History of previous psychological illness							
Yes	235 (56.8)	179 (43.2)	63.2	0.000*	1.00	—	—
No	476 (34.9)	888 (65.1)			0.42	(0.33–0.53)	**0.001***
Source of information							
Social media	234 (42.5)	317 (57.5)	14.4	0.006*	1.00	—	—
TV	26 (31.3)	57 (68.7)			0.66	(0.39–1.11)	0.116
Community members	14 (32.6)	29 (67.4)			0.65	(0.33–1.29)	0.223
Internet and approved sites	118 (33.1)	238 (66.9)			0.69	(0.51–0.92)	**0.012***
>one source	319 (42.8)	426 (57.2)			1.02	(0.81–1.29)	0.814

Values are presented as median (minimum–maximum) or number (%). CI, confidence interval; COVID, coronavirus disease 2019; OR, odds ratio. *Significant. **Mann–Whitney *U* test. Bold values means significant. *U* Mann–Whitney test.

of HCWs, dealing with SARS, had mental symptoms using the Chinese Health Questionnaire (Lung *et al.*, 2009). The high prevalence of anxiety in the current study could be justified by the shortage of supplies and the increased flow of acute cases, and this increases the pressure on health care personnel. Moreover, the insufficient number of HCWs in Egypt resulted in an increased workload with insufficient personal protective equipment and greater fear of infection risk (Refeai *et al.*, 2020).

On the contrary, 46.4% of those who came in contact with COVID-19-infected patients showed abnormal anxiety features and 33.9% showed mild borderline anxiety features, and the mean anxiety score was 11. There is a highly statistically significant difference among the three groups in the mean anxiety score. A recent study during the initial stage of COVID-19 in China showed that among the respondents who had a direct or indirect contact history with individuals with confirmed or suspected COVID-19, the majority of them were worried about their family members getting infected with COVID-19, but they believed that they would survive if infected (Wang *et al.*, 2019).

While evaluating the contributing risk factors of depression related to COVID-19 pandemic, we found that those without a previous history of psychological disorders had a lower depression risk when compared with those with a previous history of psychological disorders. It is worth mentioning that 23.3% of all respondents already gave a history of previous psychological disorders, but we thought that they properly experienced only minor psychological disorders and most of them did not seek psychiatric consultation nor received treatment previously.

This study suggested that those who depend on the internet and approved sites as sources of information regarding COVID-19 had a lower depression risk, and this result is in contrast to another study, which found that there was no difference in susceptibility to depression associated with different sources of COVID-19 information (Wang *et al.*, 2019). Our results could be justified by the fact that approved internet sites usually publish facts about the disease, whereas spreading rumors is very common in social media.

Table 7 Multiple logistic regression analysis of anxiety-related factors among the studied sample

					Multiple logistic regression analysis		
	Anxiety group (*n*=604)	Non-anxiety group (*n*=1174)	Test	*P* value	OR	(95% CI)	*P* value
Sex							
Male	96 (20.3)	378 (79.3)	54.2	0.000*	1.00	—	—
Female	508 (39.1)	796 (61.0)			2.41	(1.85–3.11)	**0.001***
Age (years)	22 (15–89)	21 (11–68)	U**	0.489			
Educational level							
Master or above	47 (28.3)	119 (71.7)	8.2	0.016*	1.00	—	—
College	510 (33.8)	998 (66.2)			1.32	(0.91–1.92)	0.146
High school or below	47 (45.2)	57 (54.8)			1.89	(1.1–3.2)	**0.022***
Group							
General population	484 (33.0)	984 (67.0)	8.8	0.012*	0.52	(0.35–0.79)	**0.002***
Health care workers	64 (33.9)	125 (66.1)			0.67	(0.41–1.11)	0.118
Those who came in contact with COVID-19	56 (46.3)	65 (53.7)			1.00	—	—
History of chronic illness							
Yes	68 (51.9)	63 (48.1)	12.5	0.000*	1.00	—	—
No	541 (32.8)	1106 (67.2)			0.721	(0.49–1.06)	0.095
History of previous psychological illness							
Yes	194 (46.9)	220 (53.1)	88.4	0.000*	1.00	—	—
No	384 (28.2)	980 (71.8)			0.376	(0.29–0.48)	**0.001***
Source of information							
Social media	208 (37.7)	243 (62.3)	27.0	0.000*	1.00	—	—
TV	33 (39.3)	50 (60.2)			1.01	(0.60–1.69)	0.961
Community members	16 (37.2)	27 (62.8)			1.03	(0.52–2.02)	0.932
Internet and approved sites	80 (22.5)	276 (77.5)			0.45	(0.33–.63)	**0.001***
>one source	267 (35.8)	478 (64.2)			0.94	(0.73–1.19)	0.614

Values are presented as median (minimum–maximum) or number (%). CI, confidence interval; COVID, coronavirus disease 2019; OR, odds ratio. *Significant. **Mann–Whitney *U* test. Bold values means significant. *U* Mann-Whitney test.

We also found that the female anxiety risk was 2.41 times that of males, and this finding is in agreement with other studies, which suggested that females showed higher psychological distress than their male counterparts (Roberts *et al*., 2018 and Qiu *et al*., 2020). Similarly, an Egyptian study, conducted in April 2020 on 1629 participants, showed that female sex was associated with a higher prevalence of severe to very severe depression, anxiety, and stress (Arafa *et al*., 2021). An other Chinese study showed that females experienced greater psychological effect of the COVID-19 outbreak as well as higher levels of stress, anxiety, and depression (Wang *et al*., 2019). In contrast, another study found that there was no difference between males and females in susceptibility to anxiety (Huang and Zhao, 2020).

The age of participants was not a risk factor for psychological disease. This result is in contrast to a recent study, which showed that participants under 35 years were more likely to have a generalized anxiety disorder than those 35 years and older (Huang and Zhao, 2020), and another study also found that people under 18 years had the lowest CPDI scores than individuals between 18 and 30 years of age or above 60 years (Qiu *et al*., 2020). Compared with those with a master's degree or above, odds of presence of anxiety manifestations among those with high school or below was 1.89 times higher with a statistically significant difference, probably because of high self-awareness of their health. This goes in accordance with Roberts *et al*. (2018). Another study found that educational level did not have a statistically significant effect on mental health (Lung *et al*., 2009).

It is worth mentioning that on March 31, the Egyptian Ministry of Health announced that two mental health hotlines had been established to provide psychological support to all citizens, including HCWs, during the COVID-19 pandemic (Ahram online, 2020; Elkholy *et al*., 2020). Before COVID-19 era, there was a study conducted as an initial step for the National Survey of Prevalence of Mental Disorders in Egypt and included 14 640 adults aged 18–64 years in 5 regions in Egypt and concluded that the prevalence of mental disorders in Egypt was estimated to be 16.93%; mood disorders

and anxiety were the most common with the percentages of 6.34% and 4.75%, respectively (Ghanem *et al*., 2009). In the current study, it is clear that mental disorders noticeably increased in Covid-19 time.

This study has several limitations

First, we collected our information through network-based questionnaire, so we missed a category of respondents who are illiterate or less educated and not skilled in using internet. Moreover, the number of respondents with contact history was small in our study (6.8%), and we think that this category should be studied in detail on a large cohort in further research. Another limitation is that self-reported levels of psychological effect, anxiety, and depression may not always be aligned with assessment by mental health professionals. Lastly, approximately 23.3% of respondents reported a history of psychological effect before COVID-19; more detailed information about their psychological history should be reported in the questionnaire to know the extent of the affection of COVID-19 on their mental health.

Conclusion

During the current pandemic, the Egyptian population has a high prevalence of psychological distress with a higher prevalence among those who came in contact with COVID-19-infected patients than in the general population and health care workers. Among different parameters associated with psychological distress, individuals without a history of previous psychological illness and those who rely on internet and approved sites as sources of information experienced less anxiety and depression during COVID-19 pandemic. Therefore, establishing early targeted mental health interventions should become routine as a part of our preparedness efforts.

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Conflicts of interest

There are no conflicts of interest.

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