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Depression among Medical Staff during the Coronavirus Disease-19 Pandemic in Egypt: A Comparative Web-Based Cross-Sectional Study

Noha M. Elghazally, Doaa Abdeldaim*

Department of Public Health and Community Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

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***Correspondence:** Doaa Abdeldaim, Department of Public Health and Community Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt.
E-mail: Doaam3y@gmail.com
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Abstract

BACKGROUND: The coronavirus disease (COVID-19) outbreak had created several challenges for health care workers and public worldwide. That pandemic also leads to a significant mental health crisis across the globe.

AIM: The study aimed to determine depression levels of physicians who work in isolation hospitals that treat patients with COVID-19 and those with other health facilities in Egypt during COVID-19 pandemic. Risk factors for depression were determined and interpreted to provide further psychological interventions for health care workers.

MATERIALS AND METHODS: It was a cross-sectional web-based study among Egyptian physicians. The participants were divided into two groups based on their workplace; 1177 of whom worked in front line hospitals (group II) and the remaining 1154 physicians (group I) in other health facilities (second line). Depression was assessed using the Patient Health Questionnaire-9.

RESULTS: In group I and II, nearly one-third had mild depressive symptoms whereas 5.1% in group I and 14.6% in group II had severe ones with a significant difference between both groups (p = 0.001). Females, younger age groups, divorced or widowed, frontline physicians, 1–5 years of work experience, specialty jobs and contact with patients with COVID-19 were more affected than others.

CONCLUSIONS: Depressive symptoms are common among medical staff especially frontline health care workers. Regular evaluation of medical personnel involved in treatment and diagnosis of patients with COVID-19 must assess their stress, depression, and anxiety.

Introduction

On March 12, 2020, the World Health Organization (WHO) declared the coronavirus disease (COVID-19) as a pandemic with reporting approximately 4,628,903 confirmed cases and 312,009 deaths [1]. The number of cases and deaths is rising rapidly, and created unexpected social, economic, and psychological devastation for both individuals and communities. The worldwide impact of this crisis is comparable with war [2]. The COVID-19 outbreak4 and subsequent global spread had created several challenges for health care workers and public worldwide. That pandemic leads to a high rate of mental health disorders across the globe [3]. The spread of infection has created a panic mode in the community as acute stress, anxiety, and depression in vulnerable individuals [3]. Risk factors such as long periods of social isolation, fear of unemployment, economic losses due to closure and death of family members are proposed to exacerbate self-destructive behavior of this pandemic [4].

Moreover, COVID-19 can cause neurological manifestations, including headache, impaired sense of smell and taste, agitation, delirium, and meningoencephalitis [5], [6]. Global infectious diseases have immediate and prolonged effect on the mental health of healthcare workers (HCWs) as during COVID-19 pandemic or previous international health crises such as severe acute respiratory syndrome and Middle East respiratory syndrome. Frontline health care workers who are involved in direct diagnosis, treatment, and care of patients with COVID-19 showed higher levels of symptoms of anxiety, insomnia, depression, and distress [7]. Global infectious diseases have immediate and prolonged effect on the mental health of HCWs as during COVID-19 pandemic. Health care workers who were isolated or working in high-risk locations had 2–3 times higher risk of post-traumatic stress [8]. There are many reasons behind mental health problems such as increasing number of confirmed and suspected cases, overwork, decline of personal protective equipment, widespread media coverage, lack of certain drugs, fear of infection for themselves and their families, caring for severing ill patients, caring for colleagues who have also become ill, and multiple losses [9], [10], [11], [12]. Hence, psychological support among health care workers is a critical part of the public health response. The WHO has published brief messages related to mental health and

the importance of psychological first aid, it can be done through protecting the physical well-being of physicians and supporting the families of physicians [13], [14].

At present, many countries in the Eastern Mediterranean Region have started implementing activities and developing mental health programs as part of their national response to the COVID-19 pandemic [15]. On March 31, 2020, Egypt's Health Ministry announced the establishment of two hotlines (080-8880700 and 0220816831) to provide citizens with psychological support during the coronavirus pandemic; that was done with the help of 150 mental health professionals who had received online training for remote communication and provide psychological aid to the treatment teams at the isolation hospitals and other community groups [16]. It later expanded this service by appointing psychiatrists in all quarantine hospitals to provide specialized psychological care to patients with COVID19, healthcare personnel and people with mental health conditions [16].

This present study aimed to determine depression levels of physicians who work in isolation hospitals that treat patients with COVID-19 and those with other health facilities in Egypt during COVID-19 pandemic. Besides, to explore risk factors for depression were determined and interpreted to provide further psychological interventions for health care workers.

Materials and Methods

Study design and participants

This cross-sectional web-based study was conducted from 1 to May 15, 2020. The target population included Egyptian physicians from 27 governorates and autonomous regions were invited to participate in an online survey. In total, 2331 health care workers respond to the survey. Based on workplace of the participants, they were divided into two groups: group I: physicians who work in health facilities in Egypt other than isolation hospitals (second line); group Π: physicians who work in isolation hospitals (Frontline physicians). The specified inclusion criteria were as follows: (1) Egyptian physicians; (2) confirming that they work in health facilities in Egypt. Furthermore, the exclusion criteria comprised the followings: (1) Physicians with any nationality other than Egyptian; (2) those who were on vacation while studying.

Measures

A self-administered questionnaire was designed for data collection. It was developed on the basis of literature and statistical experts in our college evaluated its validity and reliability (Cronbach's $\alpha \geq 0.70$). This 19-item questionnaire consisted of three sections:

Section one

This section comprises seven items; it is mainly focused on participants' characteristics including age, gender, marital status, residence, the type of job, years of experience, and presence of non-communicable diseases.

Section two

This section evaluated participants' experiences of exposure to COVID-19-related events in their lives; whether there had confirmed COVID-19 cases in families or friends, whether they had been directly contact with confirmed or suspected COVID-19 patients, or whether they got infected with COVID-19 (3 questions).

Section three

This section included a 9-item Patient Health Questionnaire (PHQ-9) to assess depression levels among participants. The PHQ-9 is the depression module, which scores each of the 9 DSM-IV criteria as "0" (not at all) to "3" (nearly every day). The PHQ-9 score of ≥10 had a sensitivity of 88% and a specificity of 88% for major depression. The scores of 5, 10, 15, and 20 represented mild, moderate, moderately severe, and severe depression, respectively [17].

Procedure

Data collected through an online self-administered questionnaire using Google forms with a consent form included with it. The link to the questionnaire was sent through emails, WhatsApp groups, Facebook groups, and other social media. The participants were encouraged to pass the survey to many people as possible. Once receiving and clicking on the link the participants will be directed to the objectives of the study and informed consent. After they accept taking the survey, they will fill up the demographic details. Then, a set of several questions will appear consecutively, in which the participants will answer.

Statistical analysis

The data analysis was performed using Statistical Package for the Social Sciences IBM Chicago, version 23. Depression and its associated factors among health care workers during the COVID-19 pandemic were considered as the outcome variable. Comparison of study variables was performed using independent

sample t test and chi-square test. Explanatory variables included demographics, marriage history, and effects of COVID-19 related data. Each explanatory variable was divided into categories, and each observation will be presented as frequency number and percentage. The level of significance adopted was $p < 0.05$.

Results

Table 1 presented the sociodemographic data and COVID-19 related events of study groups. The sample included 2331 physicians; 1177 of whom worked in front line hospitals (group II) and the remaining 1154 physicians (group I) in other health facilities (second line). The mean age of the participants is 34.3 ± 6.1 years. The majority of participants in group I and group II were in age group between 30 and 40 years (70.6% and 55%, respectively). In both groups, the majority of participants were females, married, urban dwellers, and specialists. The most common years of experience in groups I were 6–10 years (48.4%) and 1–5 years in group II (46.5%) with a mean of 6.8 years for all participants. Comorbidities affected insignificant percentage of both groups (3.7%). 5.3% of those in group II had confirmed cases in their families or among their friends. There was a high frequency of direct contact with confirmed or suspected patients in group II (97.8 %) and 56.3% in group I. In Groups I and II, only a small percentage of physicians (1.7% and 3.8%, respectively) were infected.

Table 2 demonstrated the prevalence of depressive symptoms and severity among the study groups for several days. Groups I and II were uninterested in doing things (51.3% and 43.7% respectively). Almost the same proportion in both groups felt down, depressed or hopeless (45.3% and 46.3%). In group I and group II (45.1% and 40.1% respectively) were at risk of falling or staying asleep or sleeping excessively. Approximately, half of the people in group I and II (45.9% and 50.6%, respectively) were tired or had little energy. More than one- third of those in Groups I and II (35.2% and 35.5%, respectively) didn't have a poor appetite or overeating. Moreover, 41.3% of responders in group I and 40.2% in group II felt bad about themselves and their families.

On the other hand, nearly two fifths of those in group I and II (44.5% and 40.5%, respectively) had no trouble in the concentration on things at all. Furthermore, more than two thirds of those in Group I (68.9%) and 61.1% of those in Group II didn't speak or move as slowly as usual. 91.4% of those in group I and 78.8% of those in group II had no thoughts of death or self-harm. Nearly one-third of those in groups I and II (31.2% and 32.9%, respectively) had mild depressive symptoms, while 5.1% in Groups I and 14.6% in group II had severe ones.

The mean total score for the group I was 8.3 and 9.8 for group II with a significant difference between the two groups. Association between total

Table 1: Distribution of sociodemographic data and COVID-19 related events in the lives of studied groups

Sociodemographic data	Overall (n = 2331) Mean ± SD/n (%)	Group I (n = 1154) Mean ± SD/n (%)	Group II (n = 1177) Mean ± SD/n (%)	p-value
Age groups				
20	507 (21.8)	194 (16.8)	313 (26.6)	0.0001*
30	1462 (62.7)	815 (70.6)	647 (55)	
40	303 (13)	124 (10.7)	179 (15.2)	
50–60 year	59 (2.5)	21 (1.8)	38 (3.2)	
Age (years)	34.3 ± 6.1	34.5 ± 5.5	34.2 ± 6.7	0.3
Sex				
Male	366 (15.7)	213 (18.5)	153 (13)	0.0001*
Female	1965 (84.3)	941 (81.5)	1024 (87)	
Marital status				
Single	793 (34)	233 (20.2)	560 (47.6)	0.0001*
Married	1486 (63.7)	901 (78.1)	585 (49.7)	
Divorced/widow	52 (2.3)	20 (1.7)	32 (2.7)	
Residence				
Urban	1661 (71.3)	790 (68.5)	871 (74)	0.003*
Rural	670 (28.7)	364 (31.5)	306 (26)	
Type of job				
Resident	462 (19.8)	205 (17.8)	257 (21.8)	0.04*
Specialist	1698 (72.8)	867 (75.1)	831 (70.6)	
Consultant	171 (7.3)	82 (7.1)	89 (7.6)	
Years of experience (Mean ± SD)	6.8 ± 4.2	6.8 ± 3.7	6.9 ± 4.6	0.7
1–5 year	1011 (43.4)	464 (40.2%)	547 (46.5%)	0.0001*
6–10 year	985 (42.3)	558 (48.4)	427 (36.3)	
11–15 year	268 (11.5)	107 (9.3)	161 (13.7)	
16–20 year	28 (1.2)	13 (1.1)	15 (1.3)	
> 21 year	39 (1.7)	12 (1)	27 (2.3)	
Suffer from comorbidities				
Yes	87 (3.7)	35 (3)	52 (4.4)	0.8
No	2245 (96.3)	1119 (97)	1125 (95.6)	
Whether there had been confirmed COVID-19 cases in families or friends?				
Yes	92 (3.9)	30 (2.5)	62 (5.3)	0.001*
No	2239 (96.1)	1124 (97.4)	1115 (94.3)	
Whether you had been directly contact with confirmed or suspected COVID-19 patients?				
Yes	1801 (77.3)	650 (56.3)	1151 (97.8)	0.0001*
No	530 (22.7)	504 (43.7)	26 (2.2)	
Whether you infected with COVID-19?				
Yes	65 (2.8)	20 (1.7)	45 (3.8)	0.002*
No	2266 (97.2)	1134 (98.3)	1132 (96.2)	

depression score and sociodemographic data of participants are shown in Table 3. Age, sex, marital status, occupation, years of experience, a kind of job, presence of confirmed cases in families or friends, and direct contact with confirmed or suspected cases all had statistically significant differences with the prevalence of depressive symptoms. 31% of those aged 40–50 had mild depressive symptoms, while 43.1% of those aged 50–60 had moderate depressive symptoms. In terms of gender, 33.7 % of males and 31.8% of females had mild depression. Furthermore, 27.7% of single participants and 34.8% of married participants had mild depression, while 38.5% of divorced and widowed participants had moderate depression. 31.8% of first line physicians had mild depression but 11.8% was severely depressed. The same was true for the second line physicians with 31.2% having mild symptoms and only 5.1% having severe ones. There was no difference in residence between both groups with 32.2% and 31.8% of urban and rural residents suffering from mild depression, respectively. 38.2% of physicians with few years of experience (1–5 years) suffered from mild depression. Residents and specialists (39.4% and 31% 9, respectively) showed mild depression, while consultants (27.1%) showed moderate depression. Regarding the presence of comorbidities, 38% of those with comorbidity had mild depression. Furthermore, 38% of physicians who had confirmed COVID-19 cases in their families and friends and 33.6% who had direct contact with confirmed or suspected COVID-19 patients noticed with mild depression. 30.8%, who were infected with COVID-19 experienced mild depression.

Discussion

Epidemiological studies have reported that during disease pandemics, HCWs at the frontline

Table 2: Prevalence of depressive symptoms among the studied groups

PHQ-9 items	Group I (n = 1154) n (%)	Group II (n = 1177) n (%)	X^2/t P value
Little interest or pleasure in doing things:			
Not at all	168 (14.6)	190 (16.1%)	19.1
Several days	592 (51.3)	514 (43.7%)	0.0001*
More than half the days	172 (14.9)	170 (14.4%)	
Nearly every day	222 (19.2)	303 (25.7%)	
Feeling down, depressed or hopeless:			
Not at all	269 (23.3)	210 (17.8%)	26
Several days	523 (45.3)	545 (46.3%)	0.0001*
More than half the days	220 (19.1)	200 (17%)	
Nearly every day	142 (12.3)	222 (18.9%)	
Trouble falling or staying asleep or sleeping too much:			
Not at all	420 (36.4)	240 (20.4%)	106.4
Several days	463 (40.1)	531 (45.1%)	0.0001*
More than half the days	162 (14)	160 (13.6%)	
Nearly every day	109 (9.4)	246 (20.9%)	
Feeling tired or having little energy:			
Not at all	243 (21.1)	183 (15.5%)	12.8
Several days	530 (45.9)	596 (50.6%)	0.005*
More than half the days	183 (15.9)	183 (15.5%)	
Nearly every day	198 (17.2)	215 (18.3%)	
Poor appetite or overeating:			
Not at all	406 (35.2)	418 (35.5%)	19.2
Several days	381 (33)	356 (30.2%)	0.0001*
More than half the days	219 (19)	181 (15.4%)	
Nearly every day	148 (12.8)	222 (18.9%)	
Feeling bad about yourself-or that you are failure or have let yourself or your family down:			
Not at all	439 (38)	422 (35.9)	33
Several days	477 (41.3)	473 (40.2)	0.0001*
More than half the days	141 (12.2)	100 (8.5)	
Nearly every day	97 (8.4)	182 (15.5)	
Trouble concentrating on things, such as reading newspaper or watching television:			
Not at all	513 (44.5)	480 (40.8)	45.5
Several days	420 (36.4)	334 (28.4)	0.0001*
More than half the days	111 (9.6)	191 (16.2)	
Nearly every day	110 (9.5)	172 (14.6)	
Moving or speaking so slowly. Or the opposite-being so aggressive or agitated that you have been moving around a lot more than usual			
Not at all	795 (68.9)	719 (61.1)	47.5
Several days	271 (23.5)	258 (21.9)	0.0001*
More than half the days	39 (3.4)	90 (7.6)	
Nearly every day	49 (4.2)	110 (9.3)	
Thought that you would be better off dead or of hurting yourself:			
Not at all	1055 (91.4)	927 (78.8)	98.7
Several days	59 (5.1)	130 (11)	0.0001*
More than half the days	30 (2.6)	120 (10.2)	
Nearly every day	10 (0.9)	0 (0)	
Total depression scores (Mean ± SD)	8.3 ± 5.6	9.8 ± 7.1	5.9
			0.01*
Severity of depression			
No depressive symptoms	30 (2.6)	20 (1.7)	68.4
Minimal depression	332 (28.8)	284 (24.1)	0.001*
Mild depression	360 (31.2)	387 (32.9)	
Moderate depression	282 (24.5)	224 (19)	
Moderately severe depression	90 (7.8)	90 (7.9)	
Severe depression	59 (5.1)	172 (14.6)	

who combats illness are vulnerable to stress, which may lead to depression [18]. In this present study, we assessed depression levels and analyzed independent risk factors during the COVID-19 pandemic.

Short-term depressive symptoms among HCWs caring for patients infected during a pandemic were as anxiety, while depression felt by healthcare workers in long-term [19]. Similarly, workers caring for patients during the Ebola outbreak also experienced both anxiety and depression [20]. The prevalence of depression in the current study was recorded by using PHQ-9 among both groups; nearly one third of group I and II (31.2% and 32.9%, respectively) had mild depressive symptoms, whereas 5.1% in group I and 14.6% in group II had severe ones, with the statistically significant difference between them. The total measured depression scores were significantly higher among group II than I (9.8 ± 7.1 vs. 8.3 ± 5.6). The nearby results found by Kang *et al.*, in Wuhan, reported 36.9% subthreshold mental health disturbances, 34.4% mild disorders,

Table 3: Association between total depression score and sociodemographic data of studied groups

Variable	PHQ-9 depressive symptoms					
	No depressive symptoms (%)	Minimal depression (%)	Mild depression	Moderate depression	Moderately severe depression	Severe depression
Age group						
20	4 (0.8)	125 (24.7)	17 0(33.5)	98 (19.3)	45 (8.9)	65 (12.8)
30	24 (1.6)	387 (26.5)	492 (33.7)	341 (23.3)	111 (7.6)	107 (7.3)
40	12 (4)	94 (31)	80 (26.4)	42 (13.9)	24 (7.9)	51 (16.8)
50–60 year	10 (17.2)	10 (17.2)	5 (8.6)	25 (43.1)	0 (0)	8 (13.8)
X^2, p-value	150.7, 0.0001*					
Effect size	0.005					
Sex						
Male	30 (8.2)	129 (35.3)	123 (33.7)	73 (20)	10 (2.7)	0 (0)
Female	20 (1)	48 (24.8)	624 (31.8)	433 (22)	170 (8.7)	231 (11.8)
X^2, p-value	145.2, 0.0001*					
Effect size	0.04					
Marital status						
Single	10 (1.3)	180 (22.7)	220 (27.7)	123 (15.5)	120 (15.1)	140 (17.7)
Married	40 (2.7)	426 (28.7)	517 (34.8)	363 (24.4)	60 (4)	79 (5.3)
Divorced/Widow	0 (0)	10 (19.2)	10 (19.2)	20 (38.5)	0 (0)	12 (23.1)
X^2, p-value	255.9, 0.0001*					
Effect size	0.04					
Occupation						
Second line	30 (2.6)	332 (28.8)	360 (31.2)	282 (24.5)	90 (7.8)	59 (5.1)
Front line	20 (1)	487 (24.8)	624 (31.8)	433 (22)	170 (8.7)	231 (11.8)
X^2 p-value	68.4, 0.0001*					
Effect size	0.02					
Residence						
Urban	34 (2)	439 (26.4)	534 (32.2)	363 (21.9)	123 (7.4)	167 (10.1)
Rural	16 (2.4)	177 (26.4)	213 (31.8)	143 (21.3)	57 (8.5)	64 (9.6)
X^2, p-value	1.2, 0.9					
Effect size	0.0					
Years of experience						
1–5 y	15 (1.5)	233 (23)	386 (38.2)	185 (18.3)	102 (10.1)	90 (8.9)
6–10 y	16 (1.6)	294 (29.8)	280 (28.4)	255 (25.9)	55 (5.6)	85 (8.6)
11–15 y	9 (3.4)	75 (28)	73 (27.2)	41 (15.3)	22 (8.2)	48 (17.9)
16–20 y	7 (25)	6 (21.4)	6 (21.4)	5 (17.9)	1 (3.6)	3 (10.7)
>21 y	3 (7.9)	8 (21.1)	2 ((5.3)	20 (52.6)	0 (0)	5 (13.2)
X^2, p	188.6, 0.000*					
Effect size	0.02					
Type of job						
Resident	15 (3.2)	119 (25.8)	182 (39.4)	90 (19.5)	28 (6.1)	28 (6.1)
Specialist	21 (1.2)	456 (26.9)	526 (26.9)	370 (21.8)	143 (8.4)	182 (10.7)
Consultant	14 (8.2)	41 (24.1)	39 (22.9)	46 (27.1)	9 (5.3)	21 (12.4)
X^2, p	68.2, 0.0001*					
Effect size	0.007					
Comorbidity						
Absent	3 (3.5)	28 (32.6)	18 (20.9)	20 (23.3)	6 (7)	11 (12.8)
Present	47 (2.1)	588 (26.2)	729 (32.5)	486 (21.7)	174 (7.8)	220 (9.8)
X^2, p	6.4, 0.3					
Effect size	0.0					
Whether there had been confirmed COVID-19 cases in families or friends?						
Yes	1 (1.1)	16 (17.4)	35 (38)	13 (14.1)	8 (8.7)	19 (20.7)
No	49 (2.2)	600 (26.8)	712 (31.8)	493 (22)	172 (7.7)	212 (9.5)
X^2, p	18.3,0.003*					
Effect size	0.002					
Whether you had been directly contact with confirmed or suspected COVID-19 patients?						
Yes	20 (1.1)	466 (25.9)	605 (33.6)	382 (21.2)	135 (7.5)	193 (10.7)
No	30 (5.7)	150 (28.4)	142 (26.8)	124 (23.4)	45 (8.5)	38 (7.2)
X^2, p	53, 0.000*					
Effect size	0.006					
Whether you infected with COVID-19?						
Yes	0 (0)	15 (23.1)	20 (30.8)	12 (18.5)	5 (7.7)	13 (20)
No	50 (2.2)	601 (26.5)	727 (32.1)	494 (21.8)	175 (7.7)	218 (9.6)
X^2, p	8.9, 0.1					
Effect size	0.001					

22.4% moderate disorders, and 6.2% severe disturbance among nursing staff [21].

Du *et al*. [22] also examined the psychosocial impact of COVID-19 among Wuhan and non-Wuhan frontline health care workers and revealed that 12.7% of them had at least mild depressive. Moreover, they reported more negative affective symptoms among Wuhan health care workers.

Zhang *et al*. [23] demonstrated signs of depression among Chinese medical workers. Another study among frontline health care workers in China found that depression appeared among 50.4% of them [24]. Hence, health care workers may be at higher risk of depression and anxiety than the general population during fighting against COVID-19 [10].

On contrary, Li *et al*. [25] conducted a study in Singapore and found that the frontline nurse had significantly lower rates of trauma than non–frontline nurses and the general population. Moreover, Liang *et al*. [26] showed that there was no significant difference in anxiety and depression scores among the staff in the COVID-19-related department and other departments. Reasons for this discrepancy might be related to the unavailability of psychological support and unavailability of information related to current pandemic. It was critical in current study to clarify the related factors that endanger the mental health of health care workers as these could be potential targets for intervention.

There was a significant difference in levels of depression among physicians in different age groups, with higher rates among those between 20 and 30 years old; also, female physicians had more rates of depression than males. Our findings were consistent with the results of Rossi *et al*. [27] who reported younger age and female sex are associated with higher levels of depression among health care workers. In this regard, the previous research suggested that females are more prone to depression, anxiety and psychological stress [28], [29], [30], [31].

Other factors significantly associated with depression in the current study were feeling lonely among HCWs either as divorced, widow or single, having concomitant chronic non-communicable diseases, having confirmed COVID-19 cases in families or friends, contacted directly with confirmed or suspected COVID-19 patients, or infected with COVID-19. Nearby results detected by Zhang *et al*. [23] showed that having disease currently or being in contact with COVID-19 patients in hospitals were considered common risk factors for depression symptoms among medical health workers in China.

In our study, health care workers with short years of experience (1–5 years) or those with specialty degrees reported higher rates of depression. The nearby results which were done by Lai *et al*. [24] in China showed that possessing an intermediate professional title was associated with higher levels of anxiety and depression. Moreover, Ricci-Cabello *et al*. [32] explained that the occurrence of depression and other mental problems were linked to occupational factors, for example, working in a high-risk environment (frontline staff), and having lower levels of specialized training and job experience. These findings emphasize the importance of training as preparedness public health activities during pandemics as young physicians are the cornerstones in the fight.

Limitations of the study

This present study suffered from some methodological limitations. First, the findings could not be generalized to various cases since the sample size was small and participants were selected from a single geographic region. Second, cross-sectional studies mostly fail to specify a definite reason behind a correlation. This restriction might avoid a deep understanding of the essence of the causal relationship between study variables. As the third limitation, this study used self-report scales that can only identify the emotions of patients through the assessment and can't to reflect their real emotions. Hence, it is suggested that future studies should focus on methodological limitations, such as the sole reliance on self-report scales due to memory bias and demand characteristics, lack of empirical data, and disregarding ethnic and personality differences [33].

Conclusions

Our findings presented that symptom of depression are common among medical staff during the COVID-19 pandemic, especially frontline physicians, females, and younger age.

Recommendations

Health experts should start setting up multidisciplinary mental health teams at regional and national levels to deal with mental health problems and provide psychological support to health care workers. Workplace interventions that reduce stigma associated with mental illness and encourage support for colleagues experiencing psychological difficulties should be improved. Furthermore, regular evaluation of medical personnel involved in treatment and diagnosis of patients with COVID-19 must assess their stress, depression, and anxiety.

Ethical Approval

The study was held subsequently upon approval of the Research Ethics Committee at Tanta Faculty of Medicine. A consent was attached to the Google form. It explained the type of study, objectives, and importance at the beginning of the survey link. The responders were informed that they can withdraw at any stage of the survey, and they were asked if they are fully willing to participate in this study before being enrolled. Confidentiality was assured for all participating individuals.

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References

1. World Health Organization. Available from: https://www.who.int/docs/default-source/coronaviruse/situationreports/20200427-sitrep-98-covid-19.pdf?sfvrsn=90323472_4 [Last accessed on 2020 Apr 27].
2. Wikipedia Contributors. List of Wars by Death Toll. Wikipedia. Available from: https://en.wikipedia.org/wiki/List_of_wars_by_death_toll [Last accessed on 2020 Mar 26].
3. Mao L, Jin H, Wang M, Hu Y, Chen S, He Q, *et al*. Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in Wuhan, China. JAMA Neurol. 2020;77(6):683-90. https://doi.org/10.1001/jamaneurol.2020.1127
PMid:32275288
4. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, *et al*. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. Int J Environ Res Public Health. 2020;17(5):1729. https://doi.org/10.3390/ijerph17051729
PMid:32155789
5. Yao H, Chen JH, Xu YF. Patients with mental health disorders in the COVID-19 epidemic. Lancet Psychiatry. 2020;7(4):e21. https://doi.org/10.1016/S2215-0366(20)30090-0
PMid:32199510
6. Khosravi M. Candidate Psychotropics against SARS–CoV–2: A Narrative Review. Pharmacopsychiatry. 2021. https://doi.org/10.1055/a-1551-3756
PMid:34399430
7. Greenberg N. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. BMJ. 2020;368:m1211. https://doi.org/10.1136/bmj.m1211
PMid:32217624
8. Kang L, Li Y, Hu S, Chen M, Yang C, Yang BX, *et al*. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. Lancet Psychiatry. 2020;7(3):e14. https://doi.org/10.1016/S2215-0366(20)30047-X
PMid:32035030
9. Walton M, Murray E, Christian MD. Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic. Eur Heart J Acute Cardiovasc Care. 2020;9(3):241-7. https://doi.org/10.1177/2048872620922795
PMid:32342698
10. Khosravi M. Stress Reduction Model of COVID-19 Pandemic. Iran J Psychiatry Behav Sci. 2020;14(2):e103865. https://doi.org/10.5812/ijpbs.103865
11. Khosravi M. Worden's task-based model for treating persistent complex bereavement disorder during the coronavirus disease-19 pandemic: A narrative review. Open Access Maced J Med Sci. 2020;8(T1):553-9. https://doi.org/10.3889/oamjms.2020.5502
12. Khosravi M. Worden's task-based approach for supporting people bereaved by COVID-19. Curr Psychol. 2021;1-2. https://doi.org/10.1007/s12144-020-01292-0
PMid:33424200
13. World Health Organization. Mental Health and psychological consideration during the COVID-19 Outbreak. Geneva: World Health Organization; 2021. Available from: https://www.who.int/publications/i/item/WHO-2019-nCoV-MentalHealth-2020.1 [Last accessed on 2020 Mar 18].
14. Huang J, Liu F, Teng Z, Chen J, Zhao J, Wang X, Wu R. Care for the psychological status of frontline medical staff fighting against Coronavirus Disease 2019 (COVID-19). Clin Infect Dis. 2020;71(12):3268-9. https://doi.org/10.1093/cid/ciaa385
PMid:32246142
15. Khosravi M. COVID-19 quarantine: Two-way interaction between physical activity and mental health. Eur J Transl Myol. 2021;30(4):9509. https://doi.org/10.4081/ejtm.2020.9509
PMid:33520149
16. Egypt-Ministry of Health and Population (MOHP): COVID-19 (Corona virus Information). Available from: https://socialprotection.org/connect/stakeholders/egypt-mohp-ministry-health-and-population [Last accessed on 2020 Apr 01].
17. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a brief depressionseveritymeasure.JGenInternMed.2001;16(9):606-13. https://doi.org/10.1046/j.1525-1497.2001.016009606.x
PMid: 11556941
18. Douglas AM, Marco AR. Prevalence of depression and depressive symptoms among resident physicians: A systematic review and meta-analysis. JAMA. 2015;314(22):2373-83. https://doi.org/10.1001/jama.2015.15845
PMid:26647259
19. Chong MY, Wang WC, Hsieh WC, Lee CY, Chiu NM, Yeh WC, *et al*. Psychological impact of severe acute respiratory syndrome on health workers in a tertiary hospital. Br J Psychiatry. 2004;185:127-33. https://doi.org/10.1192/bjp.185.2.127
PMid:15286063
20. McMahon SA, Ho LS, Brown H, Miller L, Ansumana R, Kennedy CE. Healthcare providers on the frontlines: a qualitative investigation of the social and emotional impact of delivering health services during Sierra Leone's Ebola epidemic. Health Policy Plan. 2016;31(9):1232-9. https://doi.org/10.1093/heapol/czw055
PMid:27277598
21. Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, *et al*. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. Brain Behav Immun. 2020;87:11-7. https://doi.org/10.1016/j.bbi.2020.03.028
PMid:32240764

22. Du J, Dong L, Wang T, Yuan C, Fu R, Zhang L, *et al*. Psychological symptoms among frontline healthcare workers during COVID-19 outbreak in Wuhan. Gen Hosp Psychiatry. 2020;67:144-5. https://doi.org/10.1016/j.genhosppsych.2020.03.011
PMid:32381270

23. Zhang WR, Wang K, Yin L, Zhao WF, Xue Q, Peng M, *et al*. Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. Psychother Psychosom. 2020;89(4):242-50. https://doi.org/10.1159/000507639
PMid:32272480

24. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, *et al*. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw Open. 2020;3(3):e203976. https://doi.org/10.1001/jamanetworkopen.2020.3976
PMid:32202646

25. Li Z, Ge J, Yang M, Feng J, Qiao M, Jiang R, *et al*. Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. Brain Behav Immun. 2020;88:916-9. https://doi.org/10.1016/j.bbi.2020.03.007
PMid:32169498

26. Liang Y, Chen M, Zheng X, Liu J. Screening for Chinese medical staff mental health by SDS and SAS during the outbreak of COVID-19. J Psychosom Res. 2020;133:110102. https://doi.org/10.1016/j.jpsychores.2020.110102
PMid:32224344

27. Rossi R, Socci V, Pacitti F, Di Lorenzo G, Di Marco A, Siracusano A, *et al*. Mental health outcomes among frontline and second-line health care workers during the coronavirus disease 2019 (COVID-19) pandemic in Italy. JAMA Netw Open. 2020;3(5):e2010185. https://doi.org/10.1001/jamanetworkopen.2020.10185
PMid:32463467

28. Maunder RG, Lancee WJ, Rourke S, Hunter JJ, Goldbloom D, Balderson K, *et al*. Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. Psychosom Med. 2004;66(6):938-42. https://doi.org/10.1097/01.psy.0000145673.84698.18
PMid:15564361

29. Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, *et al*. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. Arch Gen Psychiatry. 1994;51(1):8-19. https://doi.org/10.1001/archpsyc.1994.03950010008002
PMid:8279933

30. Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. Posttraumatic stress disorder in the national comorbidity survey. Arch Gen Psychiatry. 1995;52(12):1048-60. https://doi.org/10.1001/archpsyc.1995.03950240066012
PMid:7492257

31. Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry. 2005;62(6):617-27. https://doi.org/10.1001/archpsyc.62.6.617
PMid:15939839

32. Serrano-Ripoll MJ, Meneses-Echavez JF, Ricci-Cabello I, Fraile-Navarro D, Fiol-deRoque MA, Pastor-Moreno G, *et al*. Impact of viral epidemic outbreaks on mental health of healthcare workers: A rapid systematic review and meta-analysis. J Affect Disord. 2020;277:347-57. https://doi.org/10.1016/j.jad.2020.08.034
PMid:32861835

33. Khosravi M. Neuroticism as a marker of vulnerability to COVID-19 Infection. Psychiatry Investig. 2020;17(7):710-1. https://doi.org/10.30773/pi.2020.0199
PMid:32654438