

## Assessment of anxiety and depression status among health care workers from Baghdad post cure from COVID-19

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### Abstract:

**Background:** Early evaluation of the mental health of healthcare workers (HCWs) following their COVID-19 infection and consideration of effective therapeutic strategies is important. Front-line HCWs who are actively involved in the diagnosis, treatment, and care of COVID-19 patients are at risk of experiencing psychological distress and other mental health symptoms.

**Objective:** To assess depression and anxiety among HCWs following their cure from COVID-19 infection and identify associations between depression and anxiety levels and certain demographic and other factors.

**Cases and Methods:** A cross-sectional study was conducted on data collected from 11th-17th Jan 2021 by an electronic questionnaire including GAD-7 anxiety scale and PHQ-9 Depression scale delivered to all HCWs working in health facilities in Al-Risafa health directorate post their COVID-19 infection. Out of 1535 HCWs cured of COVID-19 infection, 1154 were included in the study.

**Results:** The mean age  $\pm$  SD of the HCWs was 35.5 $\pm$ 9.9 years, 61.0% of whom were females. Depression levels were normal in 29.7% and anxiety levels were normal in 43.2% of the HCWs. Depression and anxiety were statistically significantly associated with the type of the institution, gender, job title, smoking status, hospital admission, oxygen use, O<sub>2</sub> saturation level <93% and getting COVID-19 infection more than one time.

**Conclusion:** The proportion of HCWs that had no or minimal depression was low, less than half had normal anxiety level despite the availability of governmental psychological assistance for 80.2% of the studied HCWs. Special strategies to enhance mental well-being in COVID-19-exposed HCWs must be introduced as soon as possible.

**Keywords:** COVID-19, Depression, Anxiety, HCWs .

### Introduction:

A novel coronavirus which was officially recognized as SARS-CoV2, emerged in Wuhan, China, has allowed COVID-19 pneumonia to rapidly spread. On January 30, 2020, the World Health Organization held an emergency meeting and declared the global COVID-19 pandemic a public health emergency of international concern.<sup>1</sup> early evaluation of the mental health of

HCWs and the consideration of effective therapeutic strategies is important, given the insights gained from recent global outbreaks and their psychosocial impacts.<sup>2</sup> When a new outbreak emerges, infection in medical institutions occurs quickly. According to the WHO daily situation update, the WHO had reported 22,073 COVID-19 cases among HCWs as of Wednesday, April 8, 2020, following the COVID-19 outbreak.<sup>3</sup> In the face of this critical situation, front-line HCWs who are actively involved in the diagnosis, treatment, and care of COVID-19 patients are at risk of experiencing psychological distress and other mental health symptoms. As the number of reported and suspected cases is increasing, a disproportionate workload, a shortage of personal protective equipment, extensive media attention, a lack of specific medications, and feelings of insufficient help are all factors that lead to the emotional burden of the health care staff.<sup>4</sup>

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On February 11, 2020, the number of HCWs infected with SARS-CoV-2 in China reached 1716 and 5 have died (0.3%).<sup>5</sup> As of the beginning of March, there were 3300 infected HCWs in China, with at least 22 deaths, and over 2600 infected HCWs in Italy, with 13 deaths.<sup>6,7</sup> According to previous Chinese reports, HCWs with a higher workload burden and treating patients with life-threatening medical conditions had more serious psychological problems, including psychopathological conditions.<sup>8</sup> In Singapore and India, hospital employees, including doctors, nurses, pharmacists, technicians, and clerical staff, reported anxiety, stress, and psychological distress.<sup>9</sup>

As they fight the COVID-19 outbreak, hospital staff is under great physical and psychological pressure. HCWs are highly vulnerable to infections associated with health care.<sup>10</sup> Studies conducted during the previous outbreaks of Middle East Respiratory Syndrome (MERS) SARS and currently COVID-19 have shown that front-line medical personnel experience high levels of stress due to the outbreaks that lead to depression, anxiety, and post-traumatic stress disorder (PTSD).<sup>11-13</sup> The key staff for monitoring and preventing the spread of a serious infectious disease, HCWs, are at high risk of infection. During the outbreak of SARS, Ebola virus disease, and MERS, hundreds of HCWs were infected and even died.<sup>14</sup>

Inadequate safety measures, such as personal protective equipment (PPE), can lead to dangerous working environments, a sense of insecurity, and an increased risk of infection. Aside from the fact that a substantial number of COVID-19 cases are asymptomatic,<sup>15</sup> there is currently no definite treatment for this infection. All these factors contribute to the increased immediate and long-term psychological stress of HCWs, which can have acute or chronic health effects, as already demonstrated during SARS.<sup>16</sup> In addition, distressed health worker believed psychological health services as valuable measures for alleviating acute psychological health issues and improving their expectation of physical health.<sup>17</sup> Employees in the health care field need a support system at work to promote their mental health, as well as regular monitoring of their behavior, which is critical in health emergencies.<sup>18</sup> Thus, hospital administrators and health authorities should carefully consider the mental health of HCWs. It is also important to consider systematic and realistic steps to safeguard the mental health of health care staff. Few studies have analyzed the mental health of HCWs who deal with COVID-19 patients. In turn, many therapeutic services were provided to enhance this target group's overall mental health.<sup>19</sup>

### **Cases and Methods:**

**Setting and study design:** A cross-sectional study was done on data collected from 11th-17th Jan. 2021, by an electronic version questionnaire through Google-form delivered to all health care workers infected with COVID-19 and were cured of the

disease, working at different health facilities in Al-Risafa health directorate in Baghdad.

**Ethical consideration:** The study was authorized by Al-Risafa Health Directorate Scientific and Ethical Review Committee. A consent message at the beginning of the electronic questionnaire was taken from each participant.

**Definition of cases, inclusion, and exclusion criteria:** All HCWs of all age groups working at health facilities in Al-Risafa health directorate diagnosed as COVID-19 and were cured from the disease according to interim guidelines set by the World Health Organization on 27 May 2020, were included in this study.<sup>20</sup>

**Data collection procedure:** Out of 1535 HCWs cured of COVID-19 infection (were identified from infectious diseases control center in the health directorate), 1154 participated in the study (response rate 75.17%). The Researchers delivered the questionnaire electronically to all health facilities in Al-Risafa health directorate.

**Questionnaire:** The questionnaire consists of three parts:

Part 1: Includes eight demographics features (age, gender, marital status, education level, job title, institution type, comorbidities, and smoking history).

Part 2: Includes five items (hospital admission, oxygen use, oxygen saturation level < 93, getting COVID-19 infection more than one time and governmental psychological support).

Part 3: It was formed based on Patient Health Questionnaire (PHQ-9) and Generalized Anxiety Disorder 7 (GAD-7) scale to measure the depression and anxiety symptoms during the past two weeks.

- PHQ-9 Depression scale from PHQ. Nine items (have little pleasure or interest in doing things), (feel down, depressed, or hopeless), (have trouble falling asleep, stay asleep or sleep too much), (feel tired or have little energy), (have poor appetite or overeating), (feel bad about yourself or that you are a failure or have let yourself or your family down), (trouble concentrate on doing things such as reading the newspaper or watching the television), (move or speak so slowly that other people notice or the opposite being so fidgety or restless that you move around a lot more than usual) and (thoughts that you would be better off dead, or hurting yourself). This is determined by assigning scores of 0, 1, 2, and 3 to the answer groups (0: not at all, 1: a few days, 2: more than half of the days, and 3: almost every day). The total score for the nine items on the PHQ-9 scale ranges from 0 to 27. Cut-points for mild, moderate, moderately severe, and severe depression are 5, 10, 15, and 20 points, respectively. 0–4 none-minimal, 5–9 mild, 10–14 moderate, 15–19 moderate - severe, 20–27 severe depression. GAD-7 Anxiety measure was developed after PHQ Seven items (feel nervous, anxious, or on edge), (not able to stop or control worrying), (worry too much about different things), (trouble relax), (so restless that it is hard to sit still), (become easily annoyed or irritable) and (feel afraid, as if something awful might happen). This is

determined by assigning scores of 0, 1, 2, and 3 to the answer groups of (0: not at all, 1: a few days, 2: more than half of the days, and 3: almost every day). The total score for the seven items on the GAD-7 scale ranges from 0 to 21. Cut-points for mild, moderate, and severe anxiety are 5, 10, and 15 points, respectively. 0 - 4 normal, 5 - 9 mild, 10 - 14 moderate, 15 - 21 severe anxiety.<sup>21-23</sup>

Statistical analysis: The answers were downloaded from the electronic form of the questionnaire (Google-form) to the computer as an excel file and imported to the statistical package for social science (SPSS ver.23) to be analyzed. Categorical data was formulated as numbers and percentages, normal distribution numerical data were described as means and standard deviations. The Chi-square was used to test for associations with a P-value of  $\leq 0.05$  considered significant.

### Results:

The sample size was 1154 HCWs cured from COVID-19, of whom 56.9% work in primary health care centers; 39.3% were < 30 years of age with a mean age  $\pm$  SD of  $35.5 \pm 9.9$  years. There were 61% female HCWs and 39% male HCWs; 70.8% HCWs were married; 22.2% were paramedics; 60.7% had an education level of college and higher; 85.4% were non-smokers and 22.4% had chronic disease of whom 29.4% were hypertensive. The study revealed that 89.2% of HCWs were not admitted to hospital; 80.7% did not use oxygen and 80.2% received governmental psychological support as shown in table 1.

Depression questions: Many HCWs answered (several days) on the questions about "interest or pleasure", "depressed", "trouble sleeping", "feeling tired" and "poor appetite or overeating" (45.1%, 45.4%, 43.2%, 49.2% and 41.6% respectively); while several HCW answered with (not at all) in questions about "feeling bad about yourself", "concentration trouble", "moving or speaking so slowly" and "thoughts about death or hurting the self" (57.4%, 42.5%, 54.8% and 83.7% respectively).

Anxiety questions: Close to half HCWs answered (several days) on questions about "anxiety or feeling

nervous", "trouble relaxing" and "becoming easily annoyed or irritable" (45.7%, 47.0% and 42.6% respectively), the percent of the HCWs answered (not at all) on questions about "not being able to stop or control worrying", "being so restless" and "feeling afraid" were (45.7%, 53.6% and 44.5% respectively); while regarding question "worrying too much about different things" (39.6% answered not at all and 38.2% answered several days) as illustrated in table 2. Out of 1154 HCWs, 32.8% had mild depression, 29.7% had minimal depression, 20.2% had moderate depression, 11.4% had moderate - severe depression and 5.8% had severe depression as illustrated in figure 1. Regarding anxiety, 43.2% were normal, 31.6% were mild, 14.5% were moderate and 10.7% were severe as illustrated in figure 2. There was a statistically significant association between institution type, gender, job title, education level, and history of smoking, presence of comorbidity and levels of depression but there was no statistically significant association between age groups, marital status and levels of depression as illustrated in table 3. There was a statistically significant association between institution type, age groups, gender, marital status, job title, history of smoking and levels of anxiety but there was no statistically significant association between education level, presence of comorbidity and levels of anxiety as demonstrated in table 4. There was a statistically significant association between hospital admission, oxygen use, oxygen saturation level < 93, getting COVID-19 infection more than one time and depression levels, but there was no statistically significant association between governmental psychological support and depression levels. As for anxiety levels association, there was a statistically significant association between hospital admission, oxygen use, oxygen saturation level < 93, get COVID-19 infection more than one-time and anxiety levels, but there was no statistically significant association between governmental psychological support and anxiety levels as illustrated in table 5.

**Table (1): Distribution of participants according to their demographic and certain other characteristics**

Characteristics	Frequency	Percent	
Institution Type	Isolation hospital	43	3.7
	General hospital	166	14.4
	Specialized hospital	67	5.8
	Specialized center	172	14.9
	Primary health care center	657	56.9
	Sector headquarters	49	4.2
Age group (years) Mean $\pm$ SD=35.5 $\pm$ 9.9	<30	454	39.3
	30-39	343	29.7
	40-49	200	17.3
	$\geq$ 50	157	13.6
Gender	Male	450	39.0
	Female	704	61.0
Marital status	Married	817	70.8
	Single	286	24.8
	*Previously married	51	4.4
Job title	Doctor	144	12.5
	Dentist	194	16.8

	Pharmacist	104	9.0
	Nurse staff	110	9.5
	Paramedics staff	256	22.2
	Administrative staff	78	6.8
	Engineer staff	45	3.9
	Technical staff	223	19.3
Education level	Primary	14	1.2
	Secondary	104	9.0
	Institute	335	29.0
	College and Higher	701	60.7
Smoker	Yes	169	14.6
	No	985	85.4
Comorbidities	Yes	258	22.4
	No	896	77.6
Type of comorbidity	Hypertension	76	29.4
Total (258)	Diabetes	47	18.2
	Coronary heart disease	11	4.2
	Chronic lung disease	57	22.0
	Arthritis	36	13.9
	Chronic neurological disease	3	1.1
	Others	28	10.8
Disease related variables			
Hospital admission	Yes	125	10.8
	No	1029	89.2
Oxygen use	Yes	223	19.3
	No	931	80.7
Oxygen saturation level below 93%	Yes	483	41.9
	No	671	58.1
Getting COVID-19 infection more than one time	Yes	182	15.8
	No	972	84.2
Governmental psychological support	Yes	926	80.2
	No	228	19.8

**Table (2): Distribution of participants according to depression and anxiety questions**

Depression questions	Not at all	%	Several days	%	More than half the days	%	Nearly every day	%
Little interest or pleasure in doing things	380	32.9	521	45.1	128	11.1	125	10.8
Feeling down, depressed or hopeless	331	28.7	524	45.4	148	12.8	151	13.1
Trouble falling or staying asleep or sleeping too much	312	27.0	498	43.2	170	14.7	174	15.1
Feeling tired or having little energy	142	12.3	568	49.2	172	14.9	272	23.6
Poor appetite or overeating	308	26.7	480	41.6	194	16.8	172	14.9
Feeling bad about yourself or that you are a failure or have let yourself or your family	662	57.4	322	27.9	63	5.5	107	9.3
Trouble concentrating on things such as reading the newspaper or watching TV	491	42.5	412	35.7	127	11.0	124	10.7
Moving or speaking so slowly that other people could have noticed or opposite being so fidgety or restless that have moving around a lot more than usual	632	54.8	321	27.8	106	9.2	95	8.2
Thoughts that would be better off dead or of hurting yourself	966	83.7	117	10.1	34	2.9	37	3.2
Anxiety questions	Not at all	%	Several days	%	More than half the days	%	Nearly every day	%
Feeling nervous, anxious, or on edge	378	32.8	527	45.7	141	12.2	108	9.4
Not being able to stop or control worrying	527	45.7	419	36.3	116	10.1	92	8.0
Worrying too much about different things	457	39.6	441	38.2	108	9.4	148	12.8
Trouble relaxing	362	31.4	542	47.0	135	11.7	115	10.0
Being so restless that it's hard to sit still	618	53.6	337	29.2	106	9.2	93	8.1
Becoming easily annoyed or irritable	338	29.3	492	42.6	144	12.5	180	15.6
Feeling afraid as if something awful might happen	514	44.5	394	34.1	100	8.7	146	12.7

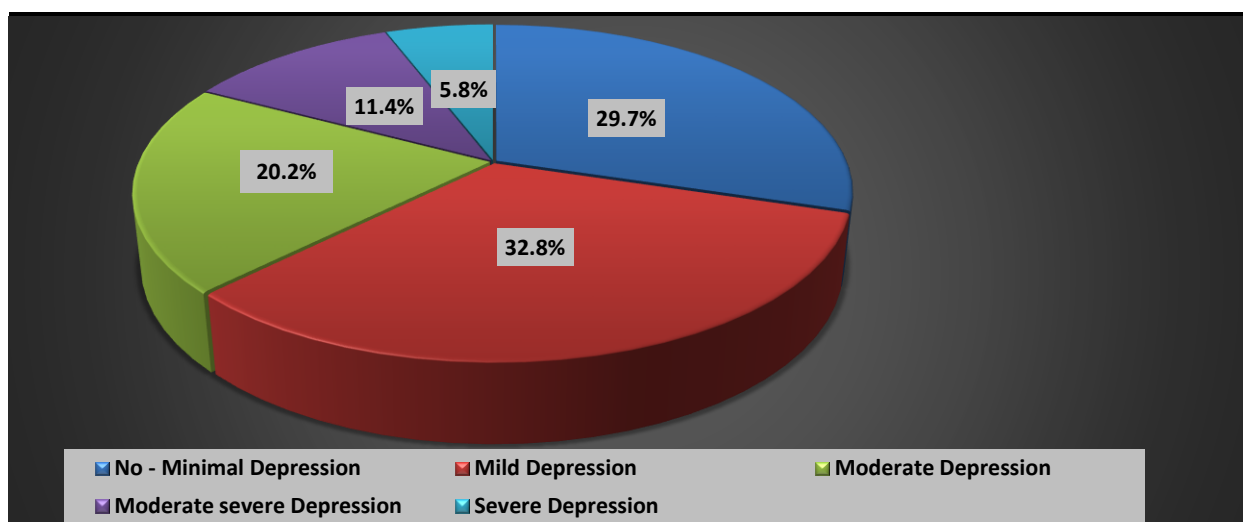


Figure (1): Distribution of participants according to Depression levels.

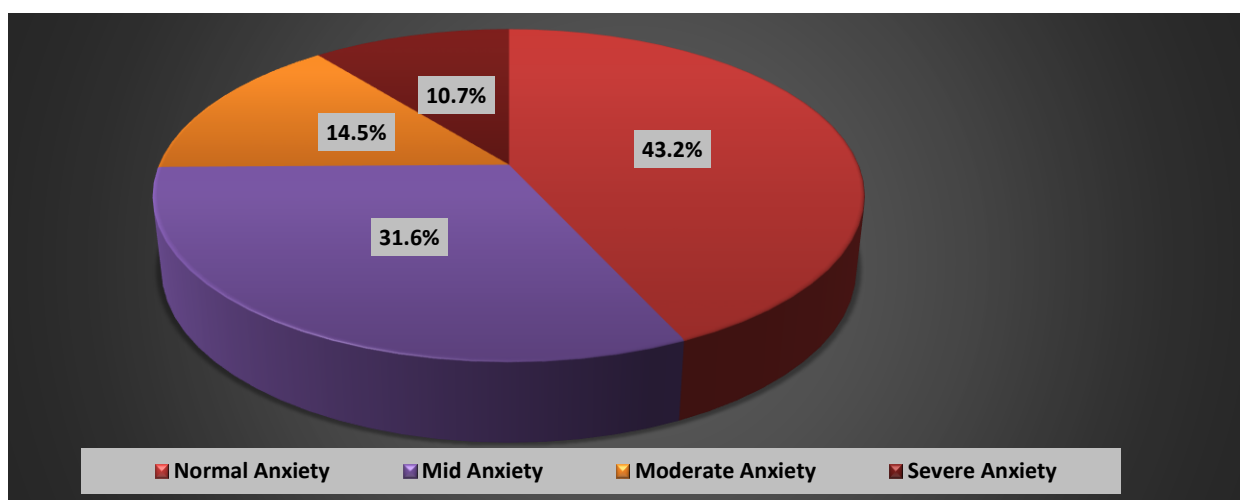


Figure (2): Distribution of participants according to Anxiety levels.

Table (3): Distribution of participants' depression levels according to their demographic variables

Characteristics	Depression					P value	
	No or Minimal No/%	Mild No/%	Moderate No/%	Moderate -severe No/%	Severe No/%		
Institution type	Isolation hospital	10/23.3	15/34.9	12/27.9	4/9.3	2/4.7	0.016
	General hospital	42/25.3	64/38.6	34/20.5	18/10.8	8/4.8	
	Specialized hospital	19/28.4	14/20.9	13/19.4	18/26.9	3/4.5	
	Specialized center	57/33.1	66/38.4	34/19.8	8/4.7	7/4.1	
	PHC*	198/30.1	204/31.1	132/20.1	80/12.2	43/6.5	
	Sector headquarters	17/34.7	16/32.7	8/16.3	4/8.2	4/8.2	
Age group (years)	<30	118/26.0	165/36.3	94/20.7	54/11.9	23/5.1	0.453
	30-39	102/29.7	105/30.6	72/21.0	41/12.0	23/6.7	
	40-49	67/33.5	60/30.0	42/21.0	18/9.0	13/6.5	
	≥50	56/35.7	49/31.2	25/15.9	19/12.1	8/5.1	
Gender	Male	184/40.9	141/31.3	80/17.8	30/6.7	15/3.3	0.000
	Female	159/22.0	238/33.8	153/21.7	102/14.5	52/7.4	
Marital status	Married	254/31.1	268/32.8	162/19.8	83/10.2	50/6.1	0.178
	Single	8/28.3	93/32.5	59/20.6	41/14.3	12/4.2	
	Previous married	8/15.7	18/35.3	12/23.5	8/15.7	5/9.8	
Job title	Doctor	49/34.0	54/37.5	24/16.7	13/9.0	4/2.8	0.011
	Dentist	69/35.6	70/36.1	41/21.1	11/5.7	3/1.5	
	Pharmacist	33/31.7	33/31.7	19/18.3	11/10.6	8/7.7	
	Nurse staff	29/26.4	33/30.0	25/22.7	17/15.5	6/5.5	
	Paramedics staff	59/23.0	75/29.3	64/25.0	38/14.8	20/7.8	
	Administrative staff	20/25.6	30/38.5	11/14.1	8/10.3	9/11.5	
	Engineer staff	16/35.6	15/33.3	6/13.3	7/15.6	1/2.2	



	Technical staff	68/30.5	69/30.9	43/19.3	27/12.1	16/7.2	
Education level	Primary	2/14.3	6/42.9	3/21.4	1/7.1	2/14.3	0.034
	Secondary	28/26.9	30/28.8	23/22.1	13/12.5	10/9.6	
	Institution	82/24.5	107/31.9	75/22.4	52/15.5	19/5.7	
	College and Higher	231/33.0	236/33.7	132/18.8	66/9.4	36/5.1	
Smoker	yes	67/39.6	50/29.6	21/12.4	20/11.8	11/6.5	0.010
	No	276/28.0	329/33.4	212/21.5	112/11.4	56/5.7	
Comorbidity	Yes	63/24.4	76/29.5	60/23.3	38/14.7	21/8.1	0.017
	No	280/31.3	303/33.8	173/19.3	94/10.5	46/5.1	

\*PHC=primary health care center.

**Table (4): Distribution of participants' anxiety levels according to their demographic variables**

Characteristics		Anxiety				P value		
		Normal No/%	Mild No/%	Moderate No/%	Severe No/%			
Institution type	Isolator hospital	17/39.5	9/20.9	8/18.6	9/20.9	0.011		
	General hospital	68/41.0	67/40.4	16/9.6	15/9.0			
	Specialized hospital	24/35.8	14/20.9	16/23.9	13/19.4			
	Specialized center	74/43.0	60/34.9	27/15.7	11/6.4			
	Primary health care center	292/44.4	200/30.4	94/14.3	71/10.8			
	Sector headquarters	23/46.9	15/30.6	6/12.2	5/10.2			
Age group (years)	<30	166/36.6	161/35.5	83/18.3	44/9.7	0.000		
	30-39	164/47.8	94/27.4	36/10.5	49/14.3			
	40-49	90/45.0	59/29.5	28/14.0	23/11.5			
	≥50	78/49.7	51/32.5	20/12.7	8/5.1			
Gender	male	249/55.3	118/26.2	56/12.4	27/6.0	0.000		
	female	249/35.4	247/35.1	111/15.8	97/13.8			
Marital status	married	384/47.0	244/29.9	103/12.6	86/10.5	0.000		
	single	103/36.0	103/36.0	53/18.5	27/9.4			
	Previous married	11/21.6	18/35.3	11/21.6	11/21.6			
	Doctor	65/45.1	55/38.2	13/0.9	11/7.6			
Job title	Dentist	91/46.9	63/32.5	31/16.0	9/4.6	0.045		
	pharmacist	49/47.1	33/31.7	10/9.6	12/11.5			
	Nurse staff	40/36.4	37/33.6	20/18.2	13/11.8			
	Paramedics staff	112/43.8	72/28.1	37/14.5	35/13.7			
	Administrative staff	32/41.0	21/26.9	9/11.5	16/20.5			
	Engineer staff	21/46.7	14/31.1	6/13.3	4/8.9			
	Technical staff	88/39.5	70/31.4	41/18.4	24/10.8			
	Education level	Primary	2/14.3	4/28.6	5/35.7		3/21.4	0.124
	secondary	43/41.3	33/31.7	12/11.5	16/15.4			
Institution	139/41.5	106/31.6	50/14.9	40/11.9				
College and Higher	314/44.8	222/31.7	100/14.3	65/9.3				
Smoker	Yes	87/51.5	37/21.9	26/15.4	19/11.2	0.026		
	No	411/41.7	328/33.3	141/14.3	105/10.7			
Comorbidity	Yes	104/40.3	75/29.1	46/17.8	33/12.8	0.158		
	No	394/44.0	290/32.4	121/13.5	91/10.2			

**Table (5): Distribution of participants' depression and anxiety levels according to their disease variables**

Disease Variables		Depression					P value
		No or Minimal No/%	Mild No/%	Moderate No/%	Moderate-severe No/%	severe No/%	
Hospital admission	Yes	24/19.2	43/34.4	26/20.8	22/17.6	10/8.0	0.025
	No	319/31.0	336/32.7	207/20.1	110/10.7	57/5.5	
Oxygen use	Yes	35/15.7	65/29.1	53/23.8	38/17.0	32/14.3	0.000
	No	308/33.1	314/33.7	180/19.3	94/10.1	35/3.8	
Oxygen saturation level below93%	Yes	82/17.0	157/32.5	118/24.4	77/15.9	49/10.1	0.000
	No	261/38.9	222/33.1	115/17.1	55/8.2	18/2.7	
COVID-19 infection more than one time	Yes	20/11.0	65/35.7	40/22.0	32/17.6	25/13.7	0.000
	No	323/33.2	314/32.3	193/19.9	100/10.3	42/4.3	
Governmental psychological support	Yes	287/31.0	292/31.5	188/20.3	104/11.2	55/5.9	0.254
	No	56/24.6	87/38.2	45/19.7	28/12.3	12/5.3	
		Anxiety				P value	
		Normal	Mild	Moderate	Severe		
Hospital admission	Yes	41/32.8	50/40.0	16/12.8	18/14.4	0.035	
	No	457/44.4	315/30.6	151/14.7	106/10.3		
Oxygen use	Yes	76/34.1	65/29.1	31/13.9	51/22.9	0.000	
	No	422/45.3	300/32.2	136/14.6	73/7.8		
	Yes	154/31.9	164/34.0	78/16.1	87/18.0		

Oxygen saturation level below 93%	No	344/51.3	201/30.0	89/13.3	37/5.5	0.000
COVID-19 infection more than one time	Yes	56/30.8	48/26.4	42/23.1	36/19.8	0.000
	No	442/45.5	317/32.6	125/12.9	88/9.1	
Governmental psychological support	Yes	408/44.1	287/31.0	138/14.9	93/10.0	0.236
	No	90/39.5	78/34.2	29/12.7	31/13.6	

### Discussion:

COVID-19 is an important public health issue that has implications for a significant number of morbidities and mortalities. As in Al-Risafa Health Directorate, we lack epidemiological research on the psychological impact of COVID -19 on patients after their cure, this is the first study conducted on HCWs in Iraq. Out of 1154 HCWs included in the study, 56.9% were from primary health care centers. The mean age for participants of (35.5 years) differs from studies in Italy 38.324, Ireland 40.725, and Spain 48.3 years<sup>26</sup>. The difference in mean age may be due to societal differences, methods of sampling, and the healthy life style in these countries. In our study, COVID-19 affected female HCWs 61% more than males 39% which is consistent with the results of another study from Iraq (51.7% females vs. 48.2% males)<sup>27</sup>, but not so with another study from Basra, Iraq which reported a nearly equal proportion (49.5% females vs. 50.5% males)<sup>28</sup>. Our study showed that 60.7% of infected cases had a college or higher education because the sample was collected from clinical institutions where most workers have a college degree or higher. We found that 85.4% of our HCWs were non-smokers. This subject needs to be investigated further by future studies. Out of 1154, 22.4% of HCWs had at least one chronic illness, 29.4% hypertension, 22% chronic lung disease, and 18.2% diabetes. This is somewhat higher than the results of studies done previously in Iraq which have shown that one-fifth of COVID-19 cases had a medical comorbidity 18.4%. These included cardiovascular disease, diabetes, and chronic obstructive pulmonary disease<sup>29</sup>. Overall, our results echoed some previous researches in terms of common comorbidities in COVID-19 patients. Diseases (including hypertension and coronary heart disease) remained the most common risk factors of medical comorbidities, despite variability in proportions within individual studies due to small sample size and the respective countries in which the patients were managed. Diabetes was also commonly found among COVID-19 patients.<sup>30</sup> Out of our total sample, we found that 483 (41.9%) of our HCWs had SPO2 oxygen saturation levels were below 93% and suffered from severe COVID-19 infection which is a higher percent in comparison to the Chinese Center for Disease Control and Prevention which recorded 72,314 cases, with about 14% (6,168 cases) were severe,<sup>31</sup> and 223 (19.3%) used oxygen which is a lower percent in comparison with the general population where about 36 (26.1%)<sup>32</sup> were admitted to the intensive care unit and used oxygen to correct hypoxia. There are many explanations regarding why

some of these patients whose SPO2 saturation levels were less than 93% didn't use supplemental oxygen or were not admitted to hospital. They might have used supplemental O2 at home because most of them are medical staff working at medical institutions which would make them able to care for themselves with some support from colleagues which was confirmed when 80.2% of participants stated that they were supported by their bosses and institutions. Moreover, some of them might not be aware that when SPO2 saturation levels drop below 93% the patient would need to be put on a high concentration of O2. We found that only 19.3% of them had used O2. Also, the cause may be that since O2 saturation levels drop only when the patient moves and that it is not required to resort to the use of supplemental SPO2 if its saturation is above 93% at rest. Out of 1154 HCWs, 32% suffered from mild depression after their cure from COVID-19, 29.7% were normal and 5.8% had severe depression. This is inconsistent with a study done among HCWs in China where 49.6% were normal, 35.6% were mild and 6.2% had severe depression<sup>33</sup> and, another study from China to determine the psychological effect of COVID-19 on HCWs, where 55.6% were normal, while 31.6% had mild depression.<sup>34</sup> A study done in Nepal to assess the mental impacts among HCWs during the COVID-19 pandemic, 62.5% of HCWs were normal (no depression).<sup>35</sup> Regarding anxiety 43.2% of our HCWs were normal, 31.6% were mild and 10.7% were severe, these results were lower than a study done in China in which 54% of HCWs were normal, 34.4% were mild and 11.6% were moderate/severe.<sup>34</sup> Our results regarding normal and mild anxiety percentages among HCWs were lower than the results obtained from a study done in China where 55.4% were normal and 32.3% were mild, while our results were higher regarding moderate and severe percentages 7.0% moderate and 5.3% were severe.<sup>33</sup> We discovered that COVID-19 survivors had a high incidence of depressive and anxiety disorders: 70.3%, of COVID-19 HCWs had depression ranging from mild to severe depression, 37.4% had moderate to severe depression, 56.8% had state anxiety scores above the clinical cutoff ranging from mild to severe anxiety, and 25.2% had moderate to severe anxiety. Another research found that medical health workers had higher rates of anxiety (13.0% vs. 8.5%, p value < 0.01) and depression (12.2% vs. 9.5%, p value < 0.04)<sup>36</sup>. Also, as compared with the general public (34.4% of the general population had psychological issues).<sup>37</sup>

Employees in the healthcare sector are at a much higher risk of developing mental disorders. This may be attributed to a higher risk of contracting COVID-19 as a result of being exposed to COVID-19 patients and the time-consuming work that comes with caring for them, as well as the intense and challenging nature of the job, emphasizing the value of offering psychological support to healthcare staff during a pandemic. We couldn't find studies that analyzed the psychological impact on HCWs who were infected with Coronavirus after their cure from COVID-19. However, there was a study that mentioned that the incidence of any psychiatric diagnosis for the general population in the immediate 14 to 90 days after COVID-19 diagnosis was 18.1%. The most common mental diagnosis after the COVID-19 diagnosis was anxiety (12.8%), followed by mood disorders (9.9%).<sup>38</sup> This research assessed not only anxiety and depression, but also other mental illnesses, and its findings are different from ours because it stated that these incidence rates were minimum estimates for a variety of factors, including that there will be patients who have not yet been identified or diagnosed, and that some patients who seek treatment are not included in the study. A previous rapid review found that anxiety and depression prevalence among health professionals during the COVID-19 outbreak was 23.2% and 22.8% respectively, based on a meta-analysis of 12 studies conducted in China and one study conducted in Singapore.<sup>39</sup> Survivors of critical illness are more likely to have long-term psychiatric disabilities once they are discharged from hospital. The prevalence of clinically related depressive and anxiety symptoms was 29% and 34%, respectively, after a year.<sup>40</sup> Taken together; these results show that the pandemic has a significant psychological effect on health professionals at the time of spread, after infection, and after remission. Regarding our HCWs working in different institutions, we found that there was a statistically significant association between depression, anxiety levels, and institution type  $p$ -value = 0.016 and 0.011 respectively similar to a study done in China ( $p$ -value < 0.001, 0.001 respectively).<sup>33</sup> This association may be due to direct contact of HCWs with patients infected with COVID 19, fear of workers from the second infection, and the daily contact with patients who are suffering or dying from COVID-19. We found that there was also a statistically significant association between depression, anxiety levels, and gender, where females were more vulnerable to mental symptoms due to a heavier work and family load than men. Regarding job title, there was also a statistically significant association with depression and anxiety levels consistent with a study done in China.<sup>33</sup> Inadequate precautionary measures, such as PPEs, may result in unsafe working environments, a feeling of insecurity, and a higher risk of infection. Since many COVID-19 cases are asymptomatic<sup>15</sup>, a lack of a strong sense of security among HCWs can increase their psychological distress and have a negative effect on their mental health. Low education staff suffered

significantly more from depression may be because they are not aware in a scientific way about COVID-19 and did not follow the proper infection prevention control measures making them more afraid of being infected which might increase their psychological distress. Also, there was a statistically significant association between smoking, with depression and anxiety levels. There was a statistically significant association between hospital admission, oxygen use, SPO2 level of <93% and the development of mental illness (depression and anxiety), these parameters indicate the severity status of the infection. A statistically significant association with recurrent infection with COVID-19 was also noted. The fundamental mechanisms relating to the severity of disease and mental outcomes are unclear, and they require immediate investigation. The cause can be traced back to the body's immune response to the virus, and it may also be a dose-response relationship, biological factors directly related to COVID-19 (viral load, or the existence of the immune response) or psychological stressors such as social isolation, the psychological effect of a novel severe life-threatening disease, fears about infecting others, and stigma may all play a role in the association. **Limitations:** Our study has certain limitations. This was a cross-sectional online survey and the sample is not necessarily a well representative one. The causal relationships should be interpreted with caution. Other mental issues were not assessed in our study such as post-traumatic stress disorder and fear. Although a relatively large number of HCWs participated in this study, the sample was taken from Al-Risafa health directorate only, which may limit the generalizability of findings.

#### **Conclusion:**

The findings of this study reveal the high prevalence of mental health issues among HCWs following COVID-19 infection. These findings will facilitate in a deeper understanding of the effect of pandemics on healthcare workers' mental health, as well as the implementation of strategies that go beyond saving COVID-19 patients' lives. Special approaches and assistance for HCWs that have been exposed to COVID-19 must be introduced right away. Self-relaxation programs, physical exercise, and keeping a healthy lifestyle should also be emphasized.

#### **Author contributions:**

Study conception: AbdulGhani Sadoon Hamdan  
Study design: Iman Ahmed Mohammed, Osamah Abbas Jaber: Acquisition of data analysis: Iman Ahmed Mohammed, Ghsoon Harbi Abbas  
Interpretation of data: Iman Ahmed Mohammed  
Drafting of manuscript: Iman Ahmed Mohammed, Osamah Abbas Jaber : Critical revision: Iman Ahmed Mohammed

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## تقييم حالة القلق والاكتئاب بين العاملين في مجال الرعاية الصحية في بغداد بعد الشفاء من COVID-19

مركز التدريب والتنمية البشرية في دائرة صحة بغداد الرصافة  
تعليم طبي دائرة صحة بغداد /الرصافة  
مستشفى ابن رشد للأمراض العقلية  
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### الخلاصة

**خلفية البحث:** يعد التقييم المبكر للصحة العقلية للعاملين في الرعاية الصحية والنظر في الاستراتيجيات العلاجية الفعالة أمرًا مهمًا. يتعرض موظفو الخط الأمامي في الرعاية الصحية الذين يشاركون بنشاط في التشخيص والعلاج والرعاية لمرضى كورونا فايروس-19 إلى خطر المعاناة من الضائقة النفسية وأعراض الصحة العقلية الأخرى.

**الاهداف:** تقييم الحالة العقلية (الاكتئاب والقلق) بين العاملين في مجال الرعاية الصحية بعد اصابتهم بمرض كورونا فايروس - 19 وتحديد العلاقة بين الاكتئاب ومستويات القلق و (عوامل ديموغرافية معينة وعوامل أخرى).

**الحالات والمنهجية:** تم إجراء دراسة مقطعية على البيانات التي تم جمعها في الفترة من 11 إلى 17 يناير 2021 من خلال استبيان إلكتروني يتضمن مقياس القلق GAD-7 ومقياس الاكتئاب PHQ-9 الذي تم تسليمه إلى جميع العاملين في مجال الرعاية الصحية بعد الإصابة بفيروس كورونا - 19 الذين يعملون في المؤسسات الصحية التابعة لدائرة صحة بغداد الرصافة. من بين 1535 من العاملين في مجال الرعاية الصحية تم شفاؤهم من عدوى كورونا فايروس - 19، تم تضمين 1154 في الدراسة.

**النتائج:** كان متوسط العمر  $\pm$  الانحراف المعياري للعاملين في مجال الرعاية الصحية =  $35.5 \pm 9.9$  سنة، 61.0% اناث. فيما يتعلق بالاكتئاب، كان 29.7% فقط من العاملين في مجال الرعاية الصحية طبيعيين و 43.2% منهم كان مستوى قلقهم طبيعيًا. ارتبط الاكتئاب والقلق بشكل كبير إحصائيًا بنوع المؤسسة والجنس والمسمى الوظيفي وحالة التدخين ودخول المستشفى واستخدام الأكسجين ومستوى تشبع الأكسجين >93% والإصابة بمرض كورونا فايروس المستجد-19 أكثر من مرة.

**الاستنتاجات:** كانت نسبة العاملين في مجال الرعاية الصحية الذين لم يكن لديهم اكتئاب منخفضة، وكان أقل من النصف مستوى القلق لديهم طبيعيًا على الرغم من وجود مساعدة نفسية حكومية لـ 80.2% من العينة. يجب تقديم استراتيجيات خاصة لتعزيز الرفاهية العقلية للعاملين في مجال الرعاية الصحية المعرضين لكورونا فايروس-19 على الفور.

**مفتاح الكلمات:** كورونا فايروس -19، الاكتئاب، القلق، العاملين في مجال الرعاية الصحية.