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Prevalence of depression and anxiety among healthcare providers during the COVID-19 era in Egypt – a cross-sectional study

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ABSTRACT

Background: The COVID-19 pandemic exposed healthcare providers to a psychological burden, especially those on the front lines. **Objective:** This study aimed to highlight the risk factors contributed to psychological pain among healthcare providers (HCP) during the COVID-19 pandemic in Egypt. **Methods:** This cross-sectional study was conducted on 430 pediatric HCP (from March 2021 to January 2022) who responded to an online survey that included general questions (sociodemographic information, the professional role, and possible changes in job duties), and validated psychometric tools: General Health Questionnaire-12 Items (GHQ-12), the Beck Anxiety Inventory, and the Beck Depression Inventory-II. **Results:** The prevalence of anxiety and depression among pediatricians was 28% and 23.7% respectively, among nurses was 53.4% and 52.6% respectively and among other included HCP it was 18.6% and 23.7% respectively. **Discussion:** This study showed a high prevalence of anxiety and depression among HCP during the COVID-19 pandemic. Females and nurses were the most vulnerable. Reduction of the monthly income and insufficiency of personal protective equipments (PPE) were of the highest risk factors creating psychological burden. **Conclusion:** Regular psychological risk assessments of healthcare staff should be conducted, particularly during crisis situations.

Introduction

Coronavirus disease 2019 (COVID-19) outbreak caused by a severe acute respiratory syndrome-associated coronavirus (SARS-CoV2) enveloped the world in fear and distress as it resulted in high death tolls worldwide [1].

COVID-19 has been closely associated with a decline in mental health since its declaration as a pandemic by the World Health Organization (WHO) on March 11, 2020. It swept the whole

world at an alarming pace with the severity of the disease [2]. Globally, the prevalence of depression, anxiety, and stress in the general population was 29.6%, 31.9% and 33.7%, respectively during the pandemic, according to a recent meta-analysis [3].

Healthcare providers have been the core force in fighting the pandemic and are also a high-risk group for viral infection. Among them, frontline healthcare providers must always face the

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virus directly, mostly in a high-pressure environment, to carry out rescue and other work [4].

COVID-19 may also have an impact on the mental health and well-being of healthcare professionals, particularly those who work as frontline providers [5]. Healthcare providers faced many challenges while dealing with difficult conditions such as the increased risk of COVID-19 infection and lack of adequate protection from infection, very long working hours, frustration, discrimination, family isolation, patients with negative emotions, and exhaustion. In summary, these resulting psychological problems affect health workers' attention, understanding, and decision-making ability, which could prevent them from effectively combating COVID-19. In addition, these factors could also permanently affect their general well-being [6].

This study aimed to investigate the prevalence of anxiety and depression among pediatric healthcare providers and to highlight the risk factors contributed to psychological pain among them during the COVID -19 pandemic in Egypt.

Methods

Study design and setting:

This is a cross-sectional study conducted at Cairo University Children's Hospital (Abu-El Rish) and a private hospital for children (kid's hospital) from March 2021 to January 2022.

Study population

430 hospital staff dealing with pediatric patients including 94 pediatricians, 229 nurses and 107 others healthcare providers like (pharmacists, pharmacy aides, dentists, lab technicians, emergency medical technician, Office workers) shared in our study. Those who had history of addiction and received drugs or had major psychiatric disorders according to the General Health questionnaire were excluded.

Sample size:

Using open Epi version 3 software, an estimated prevalence of anxiety among doctors during the COVID-19 pandemic in secondary and tertiary hospitals is 64% [7] and a 10% non-response rate, with a 95% confidence interval and power 80% the minimum required sample size was 385. Using this equation Sample size $n = [DEFF * Np(1-p)] / [(d2/Z21-\alpha/2*(N-1) + p*(1p)]$.

Data collection tool and technique:

An online and written questionnaire was distributed to a convenience sample of healthcare providers via email, WhatsApp groups, and face-to-face.

All the participants were subjected to:

a. General Health Questionnaire (GHQ): is a self-administered questionnaire aimed at detecting individuals with a diagnosable psychiatric disorder. GHQ-12 consists of 12 items, each one assessing the severity of a mental problem over the past few weeks using a 4-point Likert-type scale (from 0 to 3). The score was used to generate a total score ranging from 0 to 36. The positive items were corrected from 0 (always) to 3 (never) and the negative ones from 3 (always) to 0 (never). As the mean score of GHQ-12 was 19.75 ± 3.58 , high scores indicate worse health [8].

b. Beck depression inventory II (BDI-II): used to assess depression, it is a self-report rating scale measuring the emotional, cognitive, and motivational symptoms of depression. The BDI scores are classified as (0–9) indicates minimal depression, (10–18) indicates mild depression, (19–29) indicates moderate depression (30–63) indicates severe depression [9].

c. The Beck Anxiety Inventory (BAI): is used for the assessment of anxiety and consists of 21 items. The BAI scores are classified as minimal anxiety (0 to 7), mild anxiety (8 to 15), moderate anxiety (16 to 25), and severe anxiety (30 to 63). BAI was translated into Arabic and validated [10].

Ethical considerations

The study was carried out following the ethical standards of the institutional committee. The study received the approval of the ethical committee of the Faculty of Medicine, Cairo University (Code: MD-177-2021)

Informed consent was signed by all participants before enrollment in the written form of the questionnaire, while in the online form, the form only opened with who agreed to participate. A plain-language information statement was given to them describing the purpose of the study and their free participation with all participants' data to be extremely confidential and only utilized for the research purpose.

Statistical analysis

All the collected data were revised for completeness and logical consistency. Pre-coded data was entered on the computer using Microsoft Office Excel Software Program 2019. Pre-coded data was then transferred and entered into the Statistical Package of Social Science Software program, version 26 (SPSS) to be statistically analyzed. For quantitative variables, data was summarized as mean, standard deviation, median, and IQR. Groups were compared using Kruskal Wallis test. The p value was significant if less than 0.05. For qualitative variables, data was summarized as frequency and percentage. Groups were compared using Chi-square test. The p value was significant if less than 0.05.

Results

In our study 430 hospital staff dealing with pediatric patients were included: 21.9% were pediatricians, 53.3% were nurses and 24.9% were other healthcare providers as (pharmacists, pharmacy aides, dentists, lab technicians, emergency medical technician, Office workers). Their average age was 31.3 ± 8 years, where 244 (56.7%) of the participants were females and 186 (43.3%) males, their marital status differed as 244 (56.7%) of them were married while 176 (40.9%) were single and 10 (2.3%) were divorced. In terms of residency, 321 (74.7%) lived in urban areas while 109 (25.3%) were from rural areas.

The participants' sociodemographic characteristics during the COVID-19 pandemic were documented in table 1, including: 60.7% working ≥ 12 hours, 29.1% dealing with critical patients in critical care units, 58.6% suffered from insufficient personal protective equipment (PPE), 70% their monthly income was reduced, 13.3% having a chronic illness, and 64% living with elderly.

We used the Beck Anxiety Scale to determine the prevalence and severity of anxiety caused by the COVID-19 pandemic among the participants. We found that 54% of participants had anxiety, with mild anxiety being more common (43.1%) Shown in Table 2.

On comparing between groups of participants with and without anxiety we discovered that females were more prone to anxiety than males shown in table3.

We noticed that nurses, working in critical care units ($p=0.009$), insufficiency of PPE ($p=0.004$), affection of social relationships ($p = 0.008$), and fluctuating monthly income ($p = 0.001$) were the most significantly relevant risk factors in participants suffering of anxiety as in table 3.

Severity of anxiety (mild, moderate, or severe) was significantly affected by occupation as nurses were more prone to severe anxiety than pediatricians and other health-care providers ($p < 0.001$), showing other factors to be non-significant.

The Beck Depression Inventory was utilized to identify the prevalence and severity of depression caused by COVID-9 pandemic among the participants. We discovered that 66.3% of them had depression, with mild depression (52.7%) being more prevalent, shown in table 2.

We noticed that females ($p=0.019$) were more prone to depression and participants experiencing risk factors of being a nurse ($p < 0.001$), working in critical care units ($p=0.046$), working ≥ 12 hours ($p=0.026$), fluctuating monthly income ($p < 0.001$), having chronic disease ($p < 0.001$) and insufficient PPE ($p = 0.005$) were at higher risk of depression shown in table 4.

Depression severity (mild, moderate, or severe) was significantly affected by occupation, the working place, availability of PPE, and having a chronic disease, showing other factors to be non-significant.

Table 1. The sociodemographic characteristics of included participants during the COVID-19 pandemic.

Variables		Total (n=430)	
Working place n, %	Emergency	87	20.2%
	Critical care units	125	29.1%
	Inpatients	111	25.8%
	Others	107	24.9%
Working hours n, %	< 12 hours	169	39.3%
	≥ 12 hours	261	60.7%
Change in job duties, n, % (as increased workload or additional tasks)		206	47.9%
Personal protective equipment n, %			
Sufficient		178	41.4%
Insufficient		252	58.6%
Living with elderly, n, %		275	64.0%
Living with children, n, %		353	82.1%
Social relationships affection n, %		286	66.5%
Monthly income affection n, %		301	70.0%
Chronic disease, n, %		57	13.3%

Values are presented as numbers (%)

Table 2. Prevalence of anxiety and depression in included participants.

Variables		Total (n=430)	
Beck Anxiety Scale, median (IQR)		9 (3-18)	
Anxiety n, %			
Normal		198 (46%)	
Anxiety		232 (54%)	
Beck Anxiety Scale n, %	Mild	100	43.1%
	Moderate	75	32.3%
	Severe	57	24.6%
Beck Depression Inventory, median (IQR)		12 (6-21)	
Depression n, %			
Normal		147 (33.7%)	
Depression		283 (66.3%)	
Beck Depression Inventory n, %	Mild	149	52.7%
	Moderate	104	36.7%
	Severe	30	10.6%

Values are presented as numbers (%)

Table 3. Comparison between groups of participants without and with different levels of anxiety regarding the risk factors.

Variables		Beck Anxiety								p value
		Normal(n=198)		Mild(n=100)		Moderate(n=75)		Severe(n=57)		
Age mean \pm sd, median (IQR)		32 \pm 9	29 (25, 36)	31 \pm 7	29 (26, 35)	30 \pm 7	28 (25, 34)	32 \pm 9	30 (25, 36)	0.783 ^a
sex n, %	Male	110	59.1%	34	18.3%	28	15.1%	14	7.5%	<0.001 ^{b*}
	Female	88	36.1%	66	27.0%	47	19.3%	43	17.6%	
Marital status n, %	Married	108	44.3%	55	22.5%	44	18.0%	37	15.2%	0.398 ^b
	Single	84	47.7%	41	23.3%	31	17.6%	20	11.4%	
	Divorced	6	60.0%	4	40.0%	0	0.0%	0	0.0%	
Occupation n, %	Physician	29	30.9%	36	38.3%	23	24.5%	6	6.4%	<0.001 ^{b*}
	Nurse	105	45.9%	38	16.6%	39	17.0%	47	20.5%	
	Others	64	59.8%	26	24.3%	13	12.1%	4	3.7%	
Residency n, %	Urban	138	43.0%	79	24.6%	55	17.1%	49	15.3%	0.058 ^b
	Rural	60	55.0%	21	19.3%	20	18.3%	8	7.3%	
Hospital working n, %	Emergency	34	39.1%	19	21.8%	17	19.5%	17	19.5%	.009 ^{b*}
	critical care units	50	40.0%	27	21.6%	25	20.0%	23	18.4%	
	Wards	50	45.0%	28	25.2%	20	18.0%	13	11.7%	
	Others	64	59.8%	26	24.3%	13	12.1%	4	3.7%	
Working hours n, %	<12 hours	70	41.4%	40	23.7%	38	22.5%	21	12.4%	0.137 ^b
	\geq 12 hours	128	49.0%	60	23.0%	37	14.2%	36	13.8%	
change in job duties n, %	Yes	96	46.6%	46	22.3%	35	17.0%	29	14.1%	0.936 ^b
	No	102	45.5%	54	24.1%	40	17.9%	28	12.5%	
Living with elderly n, %	Yes	138	50.2%	59	21.5%	45	16.4%	33	12.0%	0.150 ^b
	No	60	38.7%	41	26.5%	30	19.4%	24	15.5%	
Living with children n, %	Yes	163	46.2%	80	22.7%	59	16.7%	51	14.4%	0.389 ^b
	No	35	45.5%	20	26.0%	16	20.8%	6	7.8%	
Social relationships affection n, %	Yes	117	40.9%	76	26.6%	49	17.1%	44	15.4%	.008 ^{b*}
	No	81	56.3%	24	16.7%	26	18.1%	13	9.0%	
Affected monthly income n, %	Yes	120	39.9%	82	27.2%	56	18.6%	43	14.3%	.001 ^{b*}
	No	78	60.5%	18	14.0%	19	14.7%	14	10.9%	
chronic disease n, %	Yes	31	54.4%	7	12.3%	8	14.0%	11	19.3%	0.084 ^b
	No	167	44.8%	93	24.9%	67	18.0%	46	12.3%	
personal protective equipment n, %	Sufficient	98	55%	40	22.5%	21	11.8%	19	10.7%	0.004 ^{b*}
	Insufficient	100	39.7%	60	23.8%	54	21.4%	38	15.1%	

Values are presented as mean \pm SD or number (%); *P value is significant if <0.05

^aKruskal Wallis test, ^bChi square test

Table 4. Comparison between groups of participants without and with different levels of depression regarding the risk factors.

Variable		Beck Depression Inventory								p value
		Normal(n=147)		Mild(n=149)		Moderate(n=104)		Severe(n=30)		
Age mean \pm sd, median (IQR)		30 \pm 8	28 (24, 33)	32 \pm 8	30 (26, 35)	32 \pm 8	30 (26, 37)	31 \pm 8	29 (24, 39)	0.12 ^a
sex n, %	Male	76	40.9%	62	33.3%	41	22.0%	7	3.8%	.019 ^{b*}
	Female	71	29.1%	87	35.7%	63	25.8%	23	9.4%	
Marital status n, %	Married	74	30.3%	89	36.5%	63	25.8%	18	7.4%	0.4 ^b
	Single	67	38.1%	58	33.0%	39	22.2%	12	6.8%	
	Divorced	6	60.0%	2	20.0%	2	20.0%	0	0.0%	
Occupation n, %	Physician	27	28.7%	47	50.0%	20	21.3%	0	0.0%	<.001 ^{b*}
	Nurse	80	34.9%	60	26.2%	61	26.6%	28	12.2%	
	Others	40	37.4%	42	39.3%	23	21.5%	2	1.9%	
Residency n, %	Urban	103	32.1%	120	37.4%	76	23.7%	22	6.9%	0.21 ^b
	Rural	44	40.4%	29	26.6%	28	25.7%	8	7.3%	
Hospital working n, %	emergency	29	33.3%	21	24.1%	28	32.2%	9	10.3%	.046 ^{b*}
	Critical care unit	38	30.4%	42	33.6%	32	25.6%	13	10.4%	
	Wards	40	36.0%	44	39.6%	21	18.9%	6	5.4%	
	Others	40	37.4%	42	39.3%	23	21.5%	2	1.9%	
Working hours n, %	<12 hrs	45	26.6%	60	35.5%	48	28.4%	16	9.5%	.026 ^{b*}
	\geq 12 hrs	102	39.1%	89	34.1%	56	21.5%	14	5.4%	
change in job duties n, %	Yes	63	30.6%	74	35.9%	58	28.2%	11	5.3%	0.123 ^b
	No	84	37.5%	75	33.5%	46	20.5%	19	8.5%	
Living with elderly n, %	Yes	93	33.8%	94	34.2%	66	24.0%	22	8.0%	0.745 ^b
	No	54	34.8%	55	35.5%	38	24.5%	8	5.2%	
Living with children n, %	Yes	122	34.6%	121	34.3%	83	23.5%	27	7.6%	0.614 ^b
	No	25	32.5%	28	36.4%	21	27.3%	3	3.9%	
Social relationships affection n, %	Yes	91	31.8%	99	34.6%	79	27.6%	17	5.9%	0.076 ^b
	No	56	38.9%	50	34.7%	25	17.4%	13	9.0%	
monthly income affected during covid era n, %	Yes	86	28.6%	110	36.5%	78	25.9%	27	9.0%	0.001 ^{b*}
	No	61	47.3%	39	30.2%	26	20.2%	3	2.3%	
chronic disease n, %	Yes	20	35.1%	11	19.3%	13	22.8%	13	22.8%	<.001 ^{b*}
	No	127	34.0%	138	37.0%	91	24.4%	17	4.6%	
personal protective equipment n, %	Sufficient	76	42.7%	58	32.6%	29	16.3%	15	8.4%	0.005 ^{b*}
	Insufficient	71	28.2%	91	36%	75	29.8%	15	6%	

Values are presented as mean \pm SD or number (%); *P value is significant if <0.05

^a Kruskal Wallis test, ^b Chi square test

Discussion

COVID-19 emerged and spread globally in December 2019, causing a pandemic. Numerous studies found a high incidence of anxiety and depression among healthcare providers (HCP). In this study, we intended to determine the prevalence of anxiety and depression, as well as their associated risk factors, among Egyptian HCPs caring for

pediatric cases with suspected or confirmed COVID-19.

In this study, 60.7% of the participants worked \geq 12-hour shifts, with 47.9% of the responders experienced change in job duties by an increased workload or additional tasks due to the COVID-19 pandemic. This was greater than the previous study by Elmahdy & Shebl, in which 7-10 hours of work per day were reported [11] and consistent with the findings of Gambaro et al., who

reported that 50.7% of HCPs have modified their job duties during the pandemic [12].

This can be explained by a shortage of healthcare professionals in Egypt, particularly those who treat pediatric patients. In Egypt, the physician shortage is estimated to be 1.3 physicians per 1,000 people, which is nearly half the WHO-recommended average of 2.3 physicians per 1,000 people. Working long hours and overtime can lead to fatigue, which leads to patient care errors and increases mortality [13].

As COVID-19 is an airborne infection that spreads readily through social contact, 66.5% of participants' social relationships were disrupted during the pandemic as they prefer social distancing to protect their relatives. Kang et al. 2020 have claimed that in the COVID-19 pandemic, health practitioners are handling the high risk of getting infected, isolation, exhaustion and not being able to contact their families [6].

In Egypt, the COVID-19 pandemic had a huge impact on the country's healthcare system and health workers. More than 605 doctors have lost their lives to COVID-19 by the end of 2021. In addition, a large proportion of healthcare workers suffered from mental health problems, including stress, anxiety, and depression [14].

The total prevalence of anxiety and depression among health care providers participating in our study and dealing with pediatrics during COVID-19 pandemic was higher than other global studies (54% and 66.3% respectively). For instance, it was higher than a meta-analysis of prevalence of anxiety (43%) and depression (45%) among healthcare workers during the COVID-19 pandemic reported by Chen et al. [15]. This can be explained by the variability of the study locations and time lapses since the start of the pandemic, also due to differences in disease severity, mortality rates, availability of PPE, and availability of vaccines.

We found that females, fluctuation of monthly income and insufficiency of PPE was significantly associated with risk of anxiety and depression in all participants with p -value < 0.001 which come in agreement with studies done by Pappa et al. 2020, Cai et al., 2020 and Li et al., 2022 [16-18]. This could return back to females' thorough control strategies and metacognitive beliefs, which lead them to emotional problems [19]. As for the changes in monthly income, it brings huge economic pressure, which makes individuals face more

psychological crises such as anxiety, loneliness, and sensitivity to human relationships especially in low-income countries.

While inadequate and shortage of PPE, lead to compromised working conditions, a sense of insecurity and increased exposure to infections. Consequently, the current guidelines regarding PPE utilization recommend the use of medical masks, gowns, gloves, and facemasks when caring for COVID-19 patients, based on droplet and contact precautions [20].

We also found that prevalence of anxiety and depression with increased severity of both was more among nurses (53.4%, 52.6% respectively) and participants suffering from disrupted social relationships (72.8%, 68.9% respectively), this could be due to nurses spending more time on wards with patients and are responsible for collecting sputum for virus detection. In addition, they may be more susceptible to moral harm resulting from exposure to suffering, mortality, and ethical dilemmas [21]. While disrupted social relationships created a risk factor among HCPs as some of them tend to leave their homes to avoid transmitting COVID-19 to their parents and children. This social isolation can lead to loneliness, which is associated with anxiety, anger, and emotional instability, and activates the sympathetic nervous system, resulting in hypertension, inflammation, and elevated stress hormones which can increase the mortality [22].

In conclusion, COVID-19 pandemic caused a significant impact of the psychological status of the HCWs especially females and nurses. The main risk factors of anxiety and depression were female gender, being a nurse, working for extended periods, lack of PPE, and fluctuation of monthly income.

Recommended regular psychological risk assessments of healthcare staff should be conducted, particularly during crisis situations.

Conflict of interests

The authors report no conflicts of interest.

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