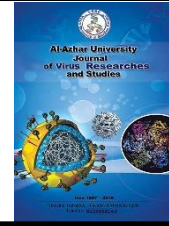




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Mental Health Impact of COVID-19 Pandemic on Frontline Healthcare Workers (Medical and Paramedical Staff)

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Abstract

Healthcare workers (HCWs) experience unique workplace demands and stressors, with doctors and nurses particularly experiencing poor mental health and increased rates of occupational burnout, anxiety, depression and suicide than other occupations especially through periods of outbreaks. A cross sectional study was conducted using a survey to examine the psychological distress, depression, anxiety, and stress experienced by health care workers (Medical and paramedical). Data were collected from 300 medical and paramedical HCWs from Egypt in the middle of COVID-19 outbreak. Higher stress levels on Covid stress scale were associated with age younger than or equal 30 years, female gender, being married as social status, doctors compared to other jobs, longer work experience and increased workload. While incidences of both anxiety and depression were significantly higher among healthcare workers older than 40 years, males, with less workload, and single HCWs. Levels of burnout on Maslach inventory were significantly higher among HCWs younger HCWs, nurses, with increased workload, and single HCWs. Personal achievement levels on Maslach inventory were significantly higher among younger HCWs, males, nurses, THOSE with less work experience, and single HCWs. While levels of depersonalization on Maslach inventory were significantly higher among males, nurses, THOSE with increased workload, and single HCWs. The findings of this study showed that HCWs have a high risk for depression, anxiety, and stress during the COVID-19 pandemic. Thus, ensuring a good level of mental health for HCWs is essential for achieving good working standards and increasing the response and efficiency of the health system in case of emergencies such as pandemics.

Keywords: COVID-19, Healthcare workers, Mental health, Maslach, COVID stress scale, Egypt.

1. Introduction

In March 2020, SARS-CoV-2 was declared as a pandemic by the world health organization (WHO), while more than 200 countries are currently struggling with this infectious disease Montemurro et al, [1]. This poses a tremendous pressure on the

health care workers (HCWs) (Adams et al, [2]. Major epidemic outbreaks pose an increasing demand for healthcare workers Chen et al, [3]. It is expected of HCWs to work long hours while they are under overwhelming pressure. They are at the risk

of being infected when treating ill patients. On the other hand, like other individuals, they are exposed to a considerable amount of fake news and rumors all of which increase their anxiety Schwartz et al, [4]. The situation in Egypt is becoming more critical with the increasing number of cases and mortality with the possibility of higher actual numbers than the reported Hassany et al, [5]. The Egyptian Ministry of Health announced on March 31 that two hotlines are allocated at the General Secretariat for Mental Health in order to provide psychological support to citizens (including healthcare providers) during the COVID-19 pandemic Ahramonline [6]. So, we aimed to examine the psychological distress, depression, anxiety, and stress experienced by health care workers (Medical and paramedical) in Egypt in the middle of the outbreak. To obtain this aim, we included 300 medical and paramedical HCWs. The study included physicians and nurses in the ER, ICU, Internal medicine and Chest departments.

2. Patients and Methods

The study was performed from June 2021 to November 2021 with the following inclusion criteria: healthcare workers as doctors (ICU, internal medicine, psychiatry and chest departments), nurses, laboratory technicians and pharmacists with age between 20 and 60 years old who used all necessary personal protective equipment during their worktime e.g., facemasks and face shields and were working at El-Matar psychiatry hospital and Al-Zahraa university hospital. We excluded retired doctors, personnel with history or current mental illness, those who are working less than 6 months in hospital and personnel who refuse to take the survey from this study. HCWs in this study underwent 1- Sociodemographic data, i.e., sex, age, occupation (medical health workers, i.e., medical doctors and nurses, and nonmedical health workers), marital status (i.e., married, unmarried and emphasis on

speciality, time of work, number of shifts per month, history of previous COVID-19 infection. 2- Complete physical and neurological examination to exclude any organic disease. 3- Psychiatric evaluation using structured clinical interview (SCID) for diagnosis of depression and anxiety. 4- The Maslach Burnout Inventory (Maslach & Jackson, 1986) [7]. 5-COVID Stress Scales-Arabic version (CSS Arabic): for screening of stress due to COVID-19 among the HCW Adel Abbady et al. [8]. Written consent was taken from every attendant participating in the study. Ethical issues and privacy of attendants were taken in consideration.

3. Statistical Analysis

BM's SPSS statistics (Statistical Package for the Social Sciences) for windows (version 25, 2017) will be used for statistical analysis of the collected data. Shapiro-Wilk test will be used to check the normality of the data distribution. We will be aiming with 95% confidence interval. P (probability) value < 0.05 will be considered statistically significant. Charts will be generated using SPSS chart builder and Microsoft Excel for windows 2019.

4. Results

The mean age of the study population was 34.28 ± 6.34 years ranging between 27 and 49 years. The age of 96 (32.0%) subjects was ≤ 30 . While the age of 150 (50.0%) subjects ranged between 31 and 40 years. And 54 (18.0%) subjects were >40 years old. Out of the 300 subjects included in this study, 264 (88.0%) of them were female and 36 (12.0%) were male. Forty-eight of them (16.0%) were single and 252 (84.0%) were married. Work related data among study population is illustrated in (Table-1) showed that 180 were doctors (78 El-Matar and 102 El-Zahraa) and 120 were paramedical (66 El Matar and 54 El-Zahra).

Table (1): Work related data among study population.

		Count (%)
Place of work	El-Matar	144 (48.0%)
	El-Zahraa	156 (52.0%)
Job	Doctor	180 (60.0%)
	Nurse	84 (28.0%)
	Pharmacist	24 (8.0%)
	Technician	12 (4.0%)
Specialty	Chest	24 (9.1%)
	Clinical pathology	24 (9.1%)
	Dentist	18 (6.8%)
	Emergency	6 (2.3%)
	General	18 (6.8%)
	ICU	12 (4.5%)
	Internal medicine	30 (11.4%)
	Obstetrics and gynecology	6 (2.3%)
	Psychiatry	120 (45.5%)
	Radiology	6 (2.3%)
Experience	Below 2 years	36 (12.0%)
	Above 2 years	264 (88.0%)
Number of shifts/ months	Below 5 in month	162 (54.0%)
	Above 5 in month	138 (46.0%)

Table (2): Maslach inventory data of the study population

		Count (%)
Maslach burnout	Low	78 (26.0%)
	Moderate	36 (12.0%)
	High	186 (62.0%)
Maslach depersonalization	Low	126 (42.0%)
	Moderate	126 (42.0%)
	High	48 (16.0%)
Maslach personal achievement	Low	180 (60.0%)
	Moderate	48 (16.0%)
	High	72 (24.0%)

Covid stress scale was categorized as mild in 204 (68.0%) subjects, moderate in 66 (22.0%) subjects and severe in 30 (10.0%) subjects. Anxiety was present in 72 (24.0%) subjects and depression was present in 60 (20.0%) subjects. Maslach inventory data of the study population is illustrated in (Table 2). The correlation between age and psychological distress, depression, anxiety experienced by study population is illustrated in (Table 3). Both burnout and personal achievement levels on maslach inventory were significantly higher among healthcare workers younger than or equal to 30 years when compared to healthcare workers in other age groups ($p=0.002^*$ and 0.001^* respectively). Otherwise, there was no statistically significant difference between different age

groups regarding depersonalization level on maslach inventory. Stress level on Covid stress scale was significantly higher among females when compared to males (Severe stress level in 11.4% of female's vs 0% of males, $p=0.030^*$). While the incidences of both anxiety and depression were significantly higher among males when compared to females ($p< 0.001^*$ for both). (Table 4) illustrates the correlation between sex and stress experienced by study population. Stress level on Covid stress scale was significantly higher among healthcare workers in El-Zahraa hospital when compared to healthcare workers in El-matar hospital (Severe stress level in 19.2% of El-Zahraa HCW vs 0% of El-matar HCW, $p=< 0.001^*$).

Table (3): Correlation between age and psychological distress, depression, anxiety experienced by study population.

		Age groups			P value
		≤30	31-40	>40	
		Count (%)	Count (%)	Count (%)	
Covid stress scale	Mild	48 (50.0%)	108 (72.0%)	48 (88.9%)	< 0.001*
	Moderate	36 (37.5%)	24 (16.0%)	6 (11.1%)	
	Severe	12 (12.5%)	18 (12.0%)	0	
Anxiety	Present	30 (31.3%)	24 (16.0%)	18 (33.3%)	0.005*
	Absent	66 (68.8%)	126 (84.0%)	36 (66.7%)	
Depression	Present	18 (18.8%)	24 (16.0%)	18 (33.3%)	0.022*
	Absent	78 (81.3%)	126 (84.0%)	36 (66.7%)	

*P value is considered significant if $p < 0.05$.

Table (4): Correlation between sex and stress experienced by study population.

		Sex		P value
		Female	Male	
		Count (%)	Count (%)	
Maslach burnout	Low	66 (25.0%)	12 (33.3%)	0.252
	Moderate	30 (11.4%)	6 (16.7%)	
	High	168 (63.6%)	18 (50.0%)	
Maslach depersonalization	Low	108 (40.9%)	18 (50.0%)	0.001*
	Moderate	120 (45.5%)	6 (16.7%)	
	High	36 (13.6%)	12 (33.3%)	
Maslach personal achievement	Low	162 (61.4%)	18 (50.0%)	< 0.001*
	Moderate	48 (18.2%)	0	
	High	54 (20.5%)	18 (50.0%)	

*P value is considered significant if $p < 0.05$.

Table (5): Correlation between job and psychological distress, depression, anxiety, and stress experienced by study population.

		Job				P value
		Doctor	Nurse	Pharmacist	Technician	
		Count (%)	Count (%)	Count (%)	Count (%)	
Covid stress scale	Mild	120 (66.7%)	48 (57.1%)	24 (100.0%)	12 (100.0%)	< 0.001*
	Moderate	36 (20.0%)	30 (35.7%)	0	0	
	Severe	24 (13.3%)	6 (7.1%)	0	0	
Anxiety	Present	48 (26.7%)	18 (21.4%)	6 (25.0%)	0	0.167
	Absent	132 (73.3%)	66 (78.6%)	18 (75.0%)	12 (100.0%)	
Depression	Present	36 (20.0%)	18 (21.4%)	6 (25.0%)	0	0.313
	Absent	144 (80.0%)	66 (78.6%)	18 (75.0%)	12 (100.0%)	

Incidences of both anxiety and depression were significantly higher among healthcare workers in El-matar hospital when compared to healthcare workers in El-Zahraa hospital ($p < 0.001^*$ for both). The levels of each burnout, depersonalization and personal achievement levels on Maslach inventory were significantly higher among in El-matar hospital when compared to healthcare workers in El-

Zahraa hospital ($p = 0.009^*$, $< 0.001^*$ and $< 0.001^*$ respectively). Correlation between job and psychological distress, depression, anxiety experienced by study population is illustrated in (Table 5). The levels of each burnout, depersonalization and personal achievement levels on Maslach inventory were significantly higher among nurses when compared to other jobs ($p = < 0.001^*$ for all). Stress level on Covid stress scale was significantly higher among healthcare

workers with work experience more than 2 years when compared to healthcare workers with work experience less than 2 years ($p < 0.001^*$). (Figure 1). Personal achievement levels on Maslach inventory were significantly higher among healthcare workers with work experience less than 2 years when compared to healthcare workers with work experience more than 2 years ($p = 0.016^*$) Figure. 2. Correlation between workload and psychological distress, depression, anxiety, and stress experienced by study population is illustrated in (Table 6). Stress level on

Covid stress scale was significantly higher among married healthcare workers when compared to single healthcare workers (severe stress level in 11.9% of married vs 0% of single, $p = 0.002^*$). Incidences of both anxiety and depression were significantly higher among single healthcare workers ($p < 0.001^*$ for both). Each of burnout, depersonalization and personal achievement levels on maslach inventory were significantly higher among single healthcare workers when compared to married healthcare workers ($p = 0.008^*$, $< 0.001^*$, and 0.002^* respectively).

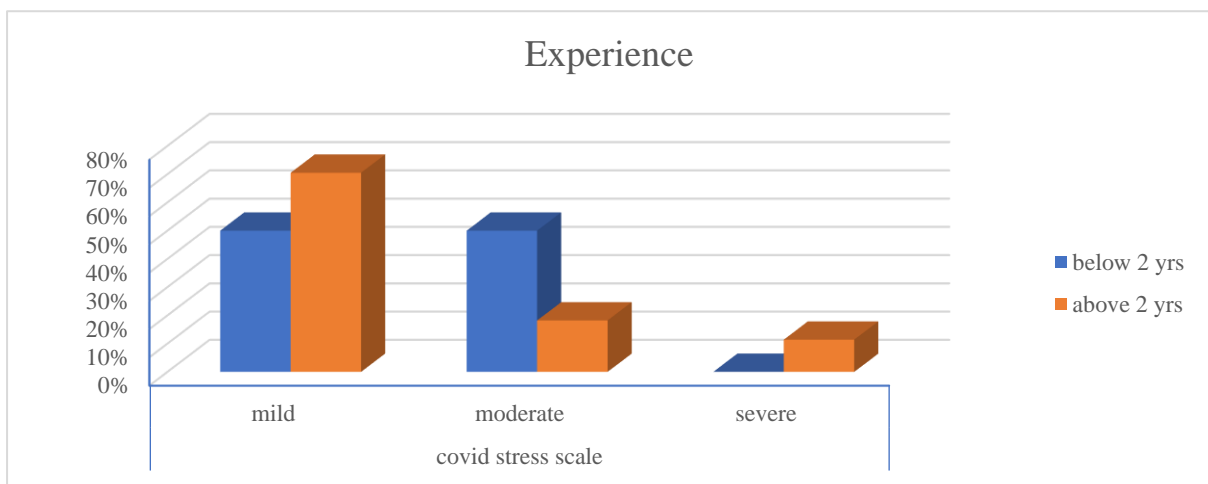


Figure (1): Correlation between work experience and Covid stress scale.

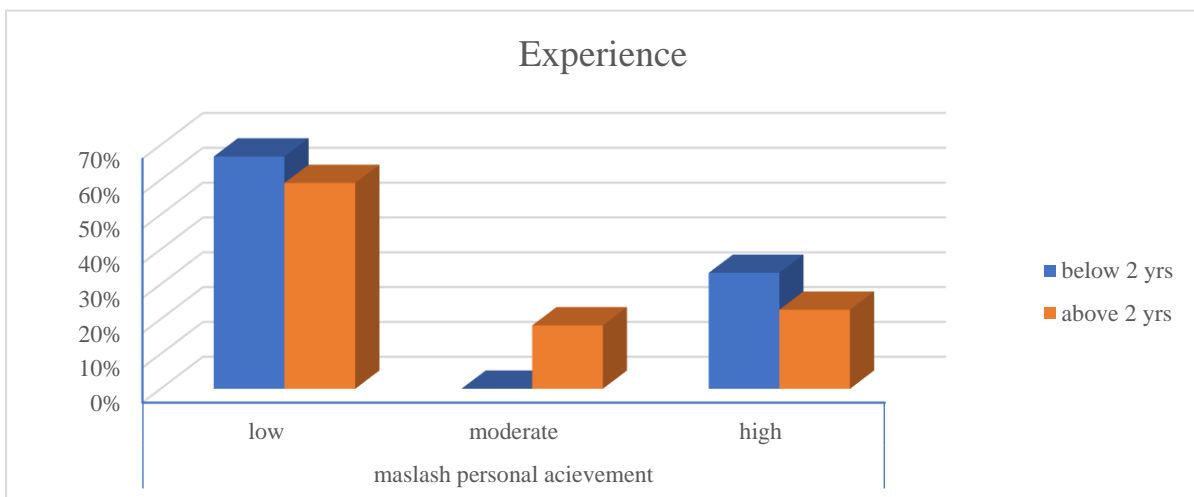


Figure (2): Correlation between work experience and Maslach personal achievement.

Table (6): Correlation between workload and psychological distress, depression, anxiety, and stress experienced by study population.

		Number of shifts/months		P value
		Below 5 shifts/ month	Above 5 shifts/ month	
		Count (%)	Count (%)	
Covid stress scale	Mild	156 (96.3%)	48 (34.8%)	< 0.001*
	Moderate	6 (3.7%)	60 (43.5%)	
	Severe	0	30 (21.7%)	
Anxiety	Present	48 (29.6%)	24 (17.4%)	0.013*
	Absent	114 (70.4%)	114 (82.6%)	
Depression	Present	42 (25.9%)	18 (13.0%)	0.005*
	Absent	120 (74.1%)	120 (87.0%)	
Maslach burnout	Low	78 (48.1%)	0	< 0.001*
	Moderate	6 (3.7%)	30 (21.7%)	
	High	78 (48.1%)	108 (78.3%)	
Maslach depersonalization	Low	84 (51.9%)	42 (30.4%)	0.001*
	Moderate	54 (33.3%)	72 (52.2%)	
	High	24 (14.8%)	24 (17.4%)	
Maslach personal achievement	Low	96 (59.3%)	84 (60.9%)	0.007*
	Moderate	18 (11.1%)	30 (21.7%)	
	High	48 (29.6%)	24 (17.4%)	

*P value is considered significant if $p < 0.05$.

5. Discussion

Many Covid stress scales were categorized in this study as mild in 204 (68.0%) subjects, moderate in 66 (22.0%) subjects and severe in 30 (10.0%) subjects. Anxiety was present in 72 (24.0%) subjects and depression was present in 60 (20.0%) subjects. Higher incidences were reported by Elkholy and colleagues [9], they reported that 83.1% of HCWs had symptoms of stress. Anxiety was present in 77.3% of HCWs, and 79.3%, of all participants reported symptoms of depression Elkholy et al, [9]. The difference may be attributed to the difference between the two studies regarding site of work, as Elkholy study targeted fever, chest and quarantine hospitals where HCWs were involved in direct care of COVID-19 patients and suspected individuals. Which increases psychological burden on HCWs. Also, the fear of getting infected at the start of the pandemic was considered as the top sources of stress and anxiety. The current study also supports the existing literature that has examined mental health of healthcare workers during previous outbreaks such as H1N1 influenza and

Severe Acute Respiratory Syndrome (SARS) Lee et al, [10]. For example, during the SARS outbreak in 2003, 18% to 57% of health professionals experienced serious emotional problems and psychiatric symptoms during and after the event in one study conducted by Lee et al, [10]. Another study conducted by Chua et al, [11]. showed that 89% of healthcare workers who were in high-risk situations reported psychological symptoms during the acute SARS outbreak. Maslach burnout inventory in this work was categorized as low in (26.0%) 78 subjects, moderate in 36 (12.0%) subjects and high in 186 (62.0%) subjects. While maslach depersonalization inventory was categorized as low in 126 (42.0%) subjects, moderate in 126 (42.0%) subjects, and high in 48 (16.0%) subjects. Maslach personal achievement inventory was categorized as low in 180 (60.0%) subjects, moderate in 48 (16.0%) subjects, and high in 72 (24.0%) subjects. Similarly, in Barello et al, [12]. online questionnaire, which included 376 Italian healthcare professionals who were reported to have directly assisted COVID-19 infected patients. A large percentage of healthcare professionals reported high scores in at

least one of the maslach burnout inventory domains: in particular, more than 1 out of 3 showed high score of emotional exhaustion and 1 out of 4 reported at high levels of depersonalization, while only around 15% reported low levels of personal gratification. These results are consistent with the data reported by Lasalvia et al, [13] which showed that working during an emergency increases the feeling of being emotionally worn out and drained Lasalvia et al, [13]. In a recent study, published by Conti et al, [14] more than one-third (39.3%) of enrolled HCWs reported their explicit need for psychological support during the COVID-19 emergency. In general, providing psychological support for health professionals can be useful in reducing the feeling of mental fatigue and mental exhaustion, and improving their working conditions. Above all, it prevents and manages the condition of burnout and the long-term psychological consequences that accompany emergency work situations Ignacio et al, [15]. When comparing HCWs according to age groups in Elkholy et al, [9] study; no statistically significance difference was found regarding 7-item generalized anxiety disorder (GAD-7). However, similar to our finding, Elkholy found a highly significant difference as regard patient health questionnaire (PHQ) for depression, as 41.3% of workers in the youngest age group (18–25) had no depression compared to only 17%, 20%, and 27% of workers in 26 to 30, 31 to 40, and >40 years groups, respectively. While in our study, incidences of both anxiety and depression in our study were significantly higher among healthcare workers older than 40 years when compared to healthcare workers in other age groups ($p=0.005^*$ and 0.022^* respectively). Both burnout and personal achievement levels on maslach inventory were significantly higher among healthcare workers younger than or equal to 30 years when compared to healthcare workers in other age groups ($p=0.002^*$ and 0.001^* respectively). Stress level on Covid stress scale in our study was significantly

higher among females when compared to males (Severe stress level in 11.4% of females' vs 0% of males, $p=0.030^*$). In concordance with our finding, Elkholy et al. [9] found that higher proportions of females expressed severe forms of stress compared to males (22.8% vs 11.1%, respectively, $p< 0.001^*$). Cabarkapa et al, [16] in a systematic review, showed evidence that female subjects appeared to have the highest mental health risks and specifically, being a female HCWs conferred greater risks for depression, anxiety, and higher levels of stress.

We found that the incidences of both anxiety and depression were significantly higher among males when compared to females ($p< 0.001^*$ for both). In discordance with our finding, Elkholy et al. [9] reported that higher proportions of females expressed severe forms of anxiety, and depression compared to males (20% vs 11.9%, and 25.1% vs 11.7%, respectively, $p< 0.001^*$ for both). Also, depressive and anxiety symptoms were more common among female HCWs as reported by the Chinese study Du et al, [17]. Another study from China found the prevalence of depression among the front-line HCWs to be 50.4% (PHQ-9) with significantly higher rates of depression in female front-line HCWs Lai et al, [18].

This study reported that both depersonalization and personal achievement levels on maslach inventory were significantly higher among males when compared to females ($p=0.001^*$ and $< 0.001^*$ respectively). In Barelllo et al, [12] study, there was a main effect of gender on Emotional Exhaustion, with females showing higher levels than male counterparts. A significant main effect emerged for gender and occupational role on experienced symptoms, with males experiencing symptoms less frequently than females and physicians less frequently than nurses. The difference between the 2 studies can be attributed to difference in countries of both studies which can affect social roles of males and females. Also, in

concordance with our study, Nishimura et al, [19] found that gender was not a significant predictor of burnout .

In the current study, stress level on Covid stress scale was significantly higher among doctors when compared to other jobs ($p < 0.001^*$). In contrary, a study from China found significantly higher rates of depression in nurses (Lai et al., 2020). While in Elkholy et al, [9] study, non-statistical significance was found on comparing the job category of the study participants with stress, anxiety or depression. From another perspective of view, Rossi et al, [20] found in their sample no specific working position (i.e., to be physician, nurse, or healthcare assistants) associated with higher odds of mental health problems. This outcome is particularly interesting because it allows us to hypothesize that the health system has gone into such a crisis that even operators not in close contact with COVID-19 patients have suffered serious psychological consequences.

Nishimura et al, [19] reported that job category was not a significant predictor of burnout. Of note, 3/11 (27.3%) of physicians and 5/21 (23.8%) of nurses were experiencing burnout in Nishimura study ($p = 0.828$). In contrary, we found that levels of each burnout, depersonalization and personal achievement levels on maslach inventory in this work were significantly higher among nurses when compared to other jobs ($p = < 0.001^*$ for all). The difference can be attributed to the difference in social culture between Egypt and Japan. HCWs (especially nursing staff and other paramedical staff) may feel that they are lacking the necessary skills to tackle such a novel infection Khee et al, [21] they often be afraid of being scrutinised by their superiors and might be blamed for any error; they also feel the necessity of handholding and role-modelling by their seniors at the workplace (Robertson et al., 2004). Further, HCWs need support from their administration concerning their family matters, finances,

incentives and recognition for their efforts Khalid et al, [22].

We found that stress level on Covid stress scale was significantly higher among healthcare workers with work experience more than 2 years when compared to healthcare workers with work experience less than 2 years ($p = < 0.001^*$). While there was statistically significant difference between both groups regarding incidences of anxiety or depression. Personal achievement levels on maslach inventory were significantly higher among healthcare workers with work experience less than 2 years when compared to healthcare workers with work experience more than 2 years ($p = 0.016^*$). Similarly, Nishimura et al, [19] reported that years of experience were not significant predictors of burnout . The scores of emotional exhaustions (EE) and depersonalization (DP) in Nishimura et al, [19] study was higher in those who engaged in care of COVID-19 patients or PUI, no statistically significant differences were noted in these scores compared to those who did not engage in the care of COVID-19 patients or PUI in the past 2 weeks. Nishimura et al, [19] found that the personal accomplishment (PA) scores (higher score suggests less feeling of better self-accomplishment) tended to be higher in those who engaged in COVID-19 patients care than those who did not, but the difference was not statistically significant. Among those who did engage in the care of COVID-19 care in the last 2 weeks, 6 (50.0%) of them were experiencing burnout. Compared to those belonging to general medicine, those in EICU were at higher risk of burnout ($p = 0.031$). Also, those who engaged in the COVID-19 care had significantly higher incidence of experiencing burnout than those who did not ($p = 0.014$) Nishimura et al, [19].

In a recent review, Ignacio et al, [15] reported that excessive stress and/or anxiety in the clinical context may affect performance and can compromise patient outcomes. In the current work, stress level on Covid stress scale was significantly

higher among healthcare workers with workload more than 5 shifts/ month ($p < 0.001^*$). Incidences of both anxiety and depression were significantly higher among healthcare workers with workload less than 5 shifts/ month ($p = 0.013^*$ and 0.005^* respectively). Both burnout and depersonalization levels on maslach inventory in this study were significantly higher among healthcare workers with workload more than 5 shifts/ month ($p < 0.001^*$ and $= 0.001^*$ respectively). While personal achievement level was significantly higher among healthcare workers with workload less than 5 shifts/ month ($p = 0.007^*$).

In 2020, Elkholy et al, [9] found non statistical significance on comparing the marital status of the study participants with stress, anxiety or depression. In contrast, we found that stress level on Covid stress scale was significantly higher among married healthcare workers when compared to single healthcare workers (severe stress level in 11.9% of married vs 0% of single, $p = 0.002^*$). Incidences of both anxiety and depression were significantly higher among single healthcare workers ($p < 0.001^*$ for both).

Each of burnout, depersonalization and personal achievement levels on maslach inventory were significantly higher among single healthcare workers when compared to married healthcare workers ($p = 0.008^*$, $< 0.001^*$, and 0.002^* respectively). While some mitigating interventions including mindfulness, counseling those at risk of burnout, and reducing workload have been proposed as measures to address the widespread burnout of HCWs Elhadi, et al, [23] given the unprecedented surge in the number of COVID-19 cases, individual efforts might not be sufficient to overcome the issue. Recently, psychological resilience has been highlighted as a protective factor against burnout Serrao et al, [24].

6. Limitations

The cross-sectional nature for this study does not allow follow up of either progression of the symptomatology or improvement of healthcare providers. It might be expected that the pandemic situation may have long term outcome that will only appear in later stages which this study design cannot detect. The lack of baseline statistics of the abovementioned symptomatology prior to the pandemic situation may raise the debate of how to assess the exact impact of the situation. The survey nature of the study allows for respondents' bias.

7. Conclusion

Taken together, the findings of this study showed that HCWs have a high risk for depression, anxiety, and stress during the COVID-19 pandemic. Thus, ensuring a good level of mental health for HCWs is essential for achieving good working standards and increasing the response and efficiency of the health system in case of emergencies such as pandemics. Further studies on larger samples are warranted to investigate the basic mental health condition of HCWs and the psychological long-term impact of COVID-19 pandemic on HCWs.

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