Sleep and emotional disturbances among the health workers during the COVID-19 pandemic in Egypt

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Background
The COVID-19 pandemic is a major health crisis facing the health system. Such widespread pandemics are associated with adverse mental health consequences, especially on the medical team.
Aims
This study aims to screen for emotional disturbances, sleep change, and stigma among Egyptian health care workers (HCWs) during the COVID-19 pandemic.
Patients and methods
A cross-sectional survey was conducted that included 621 HCWs in lower Egypt using an online questionnaire that included data about demographic characteristics, medical history, and lifestyle practices of participants. Hamilton anxiety and depression rating scales and insomnia severity index were used. The prevalence of anxiety among studied HCWs was 62%, and more than a half (57.6%) had a form of sleeping disorder. Regarding depression, 41.1% were mildly depressed, 7.6% moderately depressed, and only five of them were severely depressed.
Results
Multivariate logistic regression analysis showed that females, history of psychiatric illness, sense of stigma, affection of close relative or friend, and lack of exercise practicing were significantly associated with higher prevalence of anxiety and depression.
Conclusion
Supporting mental health of HCWs should be considered in updating the Egyptian response plan to COVID-19 epidemic and on planning response of future events.

Keywords:
anxiety, COVID-19, depression, health care workers, insomnia, sleep disorders, stigma

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Introduction

The COVID-19 pandemic is a major health crisis facing the health system worldwide, with an overload of cases and still rising deaths reported to date (World Health Organization, 2020b). Such widespread outbreaks are associated with an unprecedented workload and adverse mental and physical health consequences, especially on the medical staff (Ornell *et al.*, 2020).

At the start of the COVID-19 pandemic, there were concerns from China about mental health consequences, especially anxiety, depression, sleep disturbances, and even suicidality among the health care workers (HCWs) (Lai *et al.*, 2020).

In addition to the stressors in everyone's lifestyle with the pandemic, the challenges faced by health care professionals were numerous. Such stressors include the long working shifts; the stay in the isolation hospitals for long durations; fear of catching COVID-19 infection, especially with the close and long contact with patients; and concerns about bringing infection to family members (Qiu *et al.*, 2020; Rajkumar, 2020). One of the most challenging moments were when they treated their friends or colleagues who caught the infection or witnessed their death (Koinis *et al.*, 2015).

Moreover, scarce resources, the rapidly changing health care policies and procedures, the limitation of interpersonal relationships, and the long working hours with strict commitment with the personal protective equipment (PPE) were highly stressful for the medical staff in all hospitals (Kenber *et al.*, 2020).

Social stigmatization in our community to both patients and health care providers was reported during this pandemic. Some preferred not to declare

that they are health care professional and some changed their residency (Bagcchi, 2020).

According to the data of the Ministry of Health and population in Egypt on September 2020, the total COVID-19-affected cases approaching 1 00 000 cases, with 5.5% of deaths, and the numbers are still rising. The fixed overall percent of the health system capacity races to combat the escalation in the number of positive cases. Till 5th of June, the nationwide challenge was covered by 12 operational isolation hospitals, 47 fever hospitals, and 35 pulmonology hospitals allocated for triage and referral of coronavirus-infected patients. After that, a long list of hospitals were included in each governorate for provision of such services (Ministry of Health and Population, 2020; World Health Organization, 2020a).

Till approval of an effective vaccine and ensuring its availability or reaching a curative treatment for coronavirus, the number of cases will continue to increase, and the scenario will persist. Mental health of HCWs if remain overlooked might lead to negative consequences for health system and organizations. There will be an increase in the risk of burnout, which in turn will affect the work performance, with a subsequent reduction in the quality of patient care (Blake *et al.*, 2020).

The current study was conducted to screen for emotional disturbances, sleep change, and stigma among Egyptian HCWs during the COVID-19 pandemic and to identify its correlates, so as to be able to plan for effective strategies to support mental health of frontline HCWs in Egypt during and following the current pandemic.

Patients and methods

A cross-sectional online survey was conducted among HCWs in the Lower Egypt. The target population included all frontline HCWs, namely, physicians, nurses, pharmacists, and laboratory technicians either working in quarantined hospitals or nonquarantined health care facilities in Lower Egypt. HCWs who were on leave owing to any cause were excluded.

A snowball sampling technique was used where the link to the online survey questionnaire was sent to the frontline HCWs among the social and work networks of the investigators with request to each participant to distribute it in his own network. The data were collected during May and June 2020.

By using Epi Info 7 software for sample size calculation and based on reported 34% prevalence of insomnia among HCWs exposed to COVID-19 (Lai *et al.*, 2020), 95% confidence level, and 5% confidence limits, the estimated minimum sample size required is 345 HCWs.

The data were collected using an online self-administered structured anonymous questionnaire. The questionnaire was designed by the investigators and divided into seven sections.

The first section includes the demographic characteristics of participants, such as age, sex, marital status, job type, and place of work. The second section is designed to collect data to assess risk of exposure to infection and risk factors associated with high morbidity and mortality, namely, suffering from chronic disease, smoking, and lack of physical exercises. This is in addition to availability and use of recommended PPE at work.

Inquiry about any history of mental illnesses was added before assessing anxiety, depression, and insomnia. Moreover, each participant was asked if he/she or any of theit family members, or friends had contracted COVID-19 and if he/she was involved in their treatment.

To assess anxiety, section three was based on Hamilton anxiety rating scale (Hamilton, 1959). The original scale is composed of 14 items; the used one is modified where behavior during interview item was excluded as it is a self-administered questionnaire. Each item was scored on a Likert scale from 0 (if symptom not present) to 4 (if severe). After exclusion of one item from the original scale, the score ranged from 0 to 52. Any score above 13 was considered abnormal.

The fourth section was designed to assess depression. It was based on Hamilton depression rating scale (Hamilton, 1960). It is composed of 17 items for assessing symptoms of depression experienced by the HCWs during COVID-19 pandemic. The score of items ranges from 0 to 4. Eight items are scored from 0 to 4, and nine items are scored from 0 to 2. The total score ranges from 0 to 50. Score less than 7 is considered normal, 8–13 denotes mild depression, 14–18 moderate, and more than 18 severe depression.

Assessment of sleep disturbances in section five was based on Insomnia Severity Index (Morin, 1993). It has seven questions, scored from 0 to 4. The total score ranges from 0 to 28. Score above 7 was considered abnormal.

Section six included inquiry about exposure to stigmatization owing to working at health care facilities, as well as source and type of harm. The last section was restricted to HCWs at quarantined hospitals. It included questions about support and incentives expected and received at work, either financial incentives or psychological support.

An approval was obtained from Alexandria Faculty of Medicine Ethics Committee. The aim of the study was written clearly at the introduction of the survey questionnaire, which was designed as an anonymous questionnaire. Completing and submitting the online questionnaire was considered as a written consent for participation in the study.

Statistical analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 23 (PASW; SPSS Inc., Chicago, Illinois, USA). As all studied variables were categorical, they are presented using number and percentage. Univariate analysis to identify factors associated with emotional and sleep disorders among participants was conducted using χ^2 or Fisher exact test. Multivariate logistic regression analysis was conducted that included independent variables that showed significance in the univariate analysis to control for potential confounding variables giving results as adjusted odds ratio. Significance was judged at 5% level of significance.

Results

A total of 621 HCWs responded to the online questionnaire during a period of 2 months. Of the responders, the majority were females (72.8%). Nearly one-third aged from 20 to less than 30 years, another third from 30 to 40 years, and the last third higher than 40 years. Nearly two-thirds (67.6%) were married; however, 27.9% were single and a minority were either widowed or divorced. Most studied HCWs (72.85) had children. Physicians constituted 77.3% of responders; however, 13.2% were pharmacists, and the minority were nurses or physicians (8.7 and 8%, respectively) (Table 1).

Slightly more than a quarter (25.3%) had a chronic medical disease and 11.3% had a psychiatric illness. Only 6.9% were smokers, and less than one-third (29.6%) reported practicing exercise at least once weekly. Nearly a third (n=204) reported past COVID-19 infection of a close relative or a friend; however, only three of them got infected. Nearly two-fifths (41%) were involved in diagnosing and/or management of COVID-19 cases. Regarding PPE use, the majority (77%) reported that they were complying with it; however, 23% reported infrequent use. The majority of them attributed this to nonavailability of PPEs or pressure of work (Table 2).

Overall, 41% of studied HCWs felt a sense of stigmatization because of their job either from their family members, friends, neighbors, or persons at general places either in the form of verbal assault or social exclusion (Table 3).

The prevalence of anxiety among studied HCWs was 62% and more than a half (57.6%) had a form of sleeping

Table 1 Distribution of the studied health care workers according to their sociodemographic characteristic

Demographic characteristics	Health care workers (N=621) [n (%)]
Sex	
Male	169 (27.2)
Female	452 (72.8)
Age group	
20 to <30	186 (30.0)
30 to <40	231 (37.2)
40 to <50	133 (21.4)
50 or higher	71 (11.4)
Marital status	
Single	173 (27.9)
Married	420 (67.6)
Widow/divorced	28 (4.5)
Having sons	
Yes	452 (72.8)
No	169 (27.2)
Job	
Physician	480 (77.3)
Pharmacist	82 (13.2)
Nurse	54 (8.7)
Technician	5 (0.8)

Table 2 Medical history, lifestyle practices, and occupational characteristics

	Studied HCWs (N=621) [n (%)]
Current smoking	43 (6.9)
Presence of chronic disease	157 (25.3)
History of psychiatric illness	70 (11.3)
Previous COVID-19 infection	3 (0.5)
Infection of a close relative/friend with COVID-19	204 (32.9)
Current exercise practicing	184 (29.6)
Current smoking	43 (6.9)
Compliance with PPEs	
Rarely	27 (4.3)
Sometimes	115 (18.5)
Usually	264 (42.5)
Always	215 (34.6)

HCW, health care worker; PPE, personal protective equipment.

disorder. Regarding depression, 41.1% were mildly depressed, 7.6% moderately depressed, and only five of them were severely depressed, all being females (Table 4).

Univariate analysis showed that none of the demographic characteristics were associated with any of studied mental health problems, except sex (as females showed higher prevalence). There was no significant association of anxiety, depression, or insomnia with place of work, specialty, having a chronic disease, smoking history, or PPEs use.

Multivariate logistic regression analysis showed that females, history of psychiatric illness, sense of stigma, and affection of close relative or friend were significantly associated with higher prevalence of anxiety and depression. On the contrary, practicing exercise was associated with a lower probability of such conditions. Regarding sleeping disorders, significant predictors were sense of stigmatization and affection of a close relative or friend (Table 5).

Table 3 Sense of stigmatization and discrimination among studied health care workers

Sense of stigmatization and discrimination	Health care workers (*N*=621) [*n* (%)]
Sense of stigmatization	
Yes	257 (41.4)
No	364 (58.6)
Source of stigmatization and discrimination (*N*=257)[a]	
Family member	72 (28.0)
Friends	117 (45.5)
Colleagues at work	60 (23.3)
Neighbors	34 (13.2)
Persons at general places	114 (44.4)
Forms of discrimination	
Verbal assault	99 (38.5)
Social separation/exclusion	158 (61.5)

[a]Categories are not mutually exclusive.

Discussion

During the current pandemic, a large number of HCWs got infected. It was reported earlier that infection among HCWs reached 15–18% of the total infections, reaching in some areas to 20%. The infection in the majority of cases were contracted within the health care facilities. Some of the HCWs even died owing to the disease.

Mental and physical effect of stressors on HCWs during the pandemic must be examined in all countries. The current work included 620 HCWs of different specialties and currently working at a variety of health facilities. The results showed that half of studied HCWs (49.5%) had some sort of depressive symptoms ranged in the severity according to their score from mild to severe. Nearly two-thirds (62%) had anxiety and 57% had a sleeping disorder.

These findings are in part consistent with those reported in a study conducted in China among 1257 HCWs as a cross-sectional, hospital-based survey that was conducted from January 29, 2020, to February 3, 2020 (Lai *et al.*, 2020). The study found that half (50.4%) of the participants reported symptoms of depression, and this was consistent with the current study. On the contrary, the reported proportion of participants with

Table 4 Sleep and emotional disorders among studied health care workers

	Male HCWs (*N*=169) [*n* (%)]	Female HCWs (*N*=452) [*n* (%)]	Total HCWs (*N*=621) [*n* (%)]
Sleeping disorders	91 (53.8)	267 (59.4)	358 (57.6)
Anxiety disorders	85 (50.3)	300 (66.4)	385 (62.0)
Depressive symptoms			
No depression	100 (59.2)	214 (47.3)	314 (50.5)
Mild depression	60 (35.5)	195 (43.1)	255 (41.1)
Moderate depression	9 (5.3)	38 (8.4)	47 (7.6)
Severe depression	0	5 (1.2)	5 (0.8)

HCW, health care worker.

Table 5 Factors associated with having sleeping disorder, anxiety disorder, or depressive symptoms

Independent variables	Anxiety Adjusted odds (95% CI)	Depression Adjusted odds (95% CI)	Sleeping disorder Adjusted odds (95% CI)
Sex (male)[a]	2.333 (1.329–4.095)	2.214 (1.021–4.799)	1.307–(0.903–1.892)
Exercise practicing (no practicing)[a]	0.343 (0.191–0.615)	0.349 (0.151–0.809)	0.780 (0.54–1.117)
Sense of stigmatization (no)[a]	2.019 (1.297–3.142)	2.915 (1.564–5.341)	1.75 (1.24–2.46)
Having a psychiatric illness (no)[a]	2.068 (1.121–3.813)	2.404 (1.140–5.068)	1.34 (0.77–2.33)
Affection of a relative or a friend (no)[a]	2.126 (1.345–3.361)	2.17 (1.17–4.015)	1.611 (1.11–2.33)

CI, confidence interval. [a]Reference category.

anxiety and sleep disturbances was lower than that in the current study (44.6 and 34%, respectively).

Moreover, a meta-analysis published by Pappa *et al.* (2020) in which electronic records until April 17, 2020, were reviewed showed a pooled prevalence of anxiety of 23.2 and 22.8% for depression. However, the pooled prevalence of insomnia across five studies was at 38.9%.

Such reported figures in reviewed studies that are lower than the current figures among Egyptian HCWs could be explained on the basis of two points. Data in the current study were collected during a latter period of time (June 2020) as compared with the reviewed studies in which data were collected till the end of April. As the epidemic continues, the effect on HCWs is expected to intensify. During this period, many countries in general and Egypt in particular showed marked increase in the number of new cases. By the middle of June, Egypt confirmed the highest daily increase in both COVID-19 new cases and deaths since it reached Egypt on February 14, 2020 (World Health Organization, 2020a).

The Ministry of Health in Egypt in June 2020 expanded the list of hospitals that provide services of triage, diagnosis, and treatment of cases of COVID-19 to involve tens of hospitals in all governorates, including health insurance hospitals. After these changes and increase in the frontline health facilities, a large number of HCWs in Egypt were dealing with suspected or confirmed cases with a much higher probability of getting infected regardless of their specialty or place of work as compared with early months since the start of pandemic in Egypt (Ministry of Health and Population, 2020).

The second point is the national and global statistics about increasing mortality among HCWs during COVID-19 pandemic as a result of infection. Spread of such news through social media disseminates horror and insecure feelings among HCWs. Following social media was one of the risk factors associated with probable depression and anxiety as reported in a recent Chinese study (Ni *et al.*, 2020).

In addition to the known sources of stress among HCWs during the pandemic, the current study tried to identify factors that are significantly associated with higher probability of emotional disorders among HCWs during this period.

Female health workers in Egypt have many social stressors in addition to work-related stressors. In the current study, female health workers were found to have higher prevalence of anxiety and depression as compared with male workers. Similarly, in a systematic review publish in May 2020, the pooled prevalence of both depression and anxiety was higher among female workers. They attribute this finding to the established sex difference regarding mental health and mental illness (Pappa *et al.*, 2020). Moreover, sex is known to be an important biological determinant of vulnerability to psychosocial stress (Wang *et al.*, 2007).

Several reports showed that HCWs are facing stigma and discrimination all over the world during the current pandemic. Such stigma is attributed to public fears of contracting the virus from those with greatest exposure. Subsequently, many have been insulted, harassed, and subjected to physical violence. This feeling adds significant stress to their mental health (International Committee of the Red Cross, 2020; Wang *et al.*, 2007). In the current study, 41% of HCWs reported feeling stigmatized from the surroundings, including their friends and family members. Moreover, many were exposed to verbal insults or social exclusion. This sense of stigmatization was significantly associated with anxiety, depression, and insomnia among them.

We urgently need to intensify sense of humanity during this pandemic. People have to feel the great efforts exerted by HCWs to save their lives. Dissemination of knowledge about modes of transmission and measures of prevention of COVID-19 among the community members is recommended to protect health staff from similar acts.

Although having a chronic disease is a risk factor for mortality owing to COVID-19, it was not associated with any of studied mental illnesses in the current work except for having a preexisting psychiatric illness. This was significantly associated with higher probability of anxiety and insomnia among HCWs.

On the contrary, practicing exercise even once a week was associated with significant reduction of anxiety and depressive symptoms among HCWs. Regular exercise is one of the coping strategies recommended for HCWs to manage stress during the current epidemic. It helps them to get out of the work environment and release endorphins.

Sleep difficulties among physicians and radiologists during the current outbreak was reported particularly those dealing with COVID cases reached up to 68% as found by Abdulah and Musa (2000). In the current

study, more than half of participants were having difficulty in sleeping including insomnia. Sleep disorders might be a cause or a result of stress, anxiety, and/or depression as it can have direct consequences on both emotional functioning and well-being.

Coping of health staff with this amount of real and unusual stresses is the responsibility of the government, organizations, managers, leaders, and even community members. Health care managers can very strongly influence HCWs' experience of being supported and their exposure to workplace pressures during crisis period. Studies of HCWs dealing with previous infectious disease outbreaks showed the powerful effect that supportive managers have on the mental health of their staff (Greenberg, 2020). In a recent article, authors conducted eight listening sessions with a total of 69 physicians, nurses, advanced practice clinicians, residents and fellows during the first week of the COVID-19 pandemic. They were asked about what they need from their leaders. Responses were presented in five main requests, 'to hear me,' 'to care for me,' 'to support me,' 'to protect me,' and 'to prepare me' (Ayyala *et al.*, 2020; Shanafelt *et al.*, 2020).

In accordance, Walton *et al.* (2020) raised recommendations for the organizations to support the staff during the pandemic. They are mainly concentrated on the importance of providing praising of staff, supporting them, ensuring enough breaks, adequate communication, regular situational updates, and clear messaging (Walton *et al.*, 2020).

Regular screening of HCWs in all health care facilities to identify those developed psychological disorders is recommended with further evaluation and tailored plan for each. Protection of HCWs from infection should be ensured and considered as a priority. This could be achieved by ensuring availability of PPEs, proper training about handling patients, adequate time of rest, and reduction of workload. Once HCWs become assured, this will reduce stress and improve coping with stressors. Special considerations should be given to females, those with a preexisting psychological problem, and those with a history of affection or death of a friend or relative.

Limitations of the study

The sampling technique and data collection method used limit generalizability of the results; however, it was the only possible and safe method to collect data from health staff in these circumstances. Hamilton anxiety and depression scales were used to screen HCWs for the possibility of having such disturbances; however, the diagnosis needs to be confirmed using diagnostic tests. Modification on Hamilton anxiety scale by excluding a question about behavior during interview was mandatory as it was an online survey. No data about the baseline level of anxiety and depression among participants before the epidemic, so we were unable to compare changes in prevalence.

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Conflicts of interest

There are no conflicts of interest.

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