Sleep quality and psychological status of health professionals in Egypt during COVID-19 era

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Abstract

Background: Good quality sleep is crucial for human well-being. COVID-19 pandemic affected tremendously the quality of life in human specially the health professionals dealing with the patients with COVID-19 in difficult and unusual circumstances.

Objectives: This study aimed to assess the sleep quality among the Egyptian health professionals during the peak of the COVID-19 time and the degree of the psychological distress they have experienced using validated tools and to investigate the link between both.

Patients and methods : this is a cross sectional study. an online survey was distributed through the social media and online platforms to be filled by Egyptian health professional . The survey included the socio-demographic information, work details, Pittsburgh Sleep Quality (PSQI) and the General Health Questionnaire (GHQ-12) amid of the COVID-19 pandemic.

Results : 146 health professionals responded to the online questionnaire which included some epidemiological data, the Pittsburg Sleep Quality Index (PSQI) and General Health Questionnaire-12 (GHQ-12). 60% were females and mean age was 37.47 years. The mean PSQI and the GHQ-12 were 7.8 and 14.55 respectively. More than half of the respondents had some degree of psychological distress and about 67% of them had a poor sleep quality. Moreover, there was a positive association between the GHQ and the PSQI.

Conclusion: Sleep quality among the health professionals was affected and linked to the degree of the psychological distress they experience. This warrants the importance of the psychological support that the health professionals needs especially in the current global situation.

Trial registration: ClinicalTrial.gov, NCT04395300. Registered 19 May 2020. Retrospectively registered,https://clinicaltrials.gov/ct2/show/record/NCT04395300

Keywords: Sleep quality, general health questionnaire, health care providers

Introduction

Due to the rapidly increasing number of cases along with deficiency of the personal protective equipment, the hazard of infection among health care workers is increased and consequently the magnitude of psychological stress among them. Researchers have found that public health emergencies have its impact on the psychological well-being of the health- care providers as reported in SARS and Ebola epidemic(**Philip and Cherian, 2020**). Recently, Peeri et al. reported that the contagion rate of health professionals during the SARS and MERS epidemics extended 21% and 18.6%, correspondingly, which caused numerous opposing psychological effects, including nervousness and hopelessness (**Peeri et al., 2020**). These issues add to an augmented emotional strain of front medical employees in China, which may have further psychological magnitudes that may have physiological impact (**Esler, 2017**). Health professionals who are directly involved in the management of cases with COVID-19 are subjected to a higher emotional load which is linked to their extreme concern about possible infection, social quarantine measures, isolation of their precious ones to prevent probable viral spread, public stigma for their working circumstances, alteration in their traditional place of work, and continuous requisite for defensive measures in their work-place. Good quality sleep especially at time of stress contributes to the well-being of individuals and their resilience during stress. In addition, stressors and significant life events and sleep abnormalities contribute to an increase in depressive complaints

(**Leggett et al., 2016**). Moreover, it is considered one of the symptoms of major depression (**Leggett et al., 2016**).

The aim of this study is to assess the sleep quality of the Egyptian health professionals and the level of psychological distress among them. In addition, to investigate the link between the sleep quality and psychological distress.

Patients and methods

Study design

This cross-sectional study was conducted online from May to June2020. Egyptian health professionals including physicians, nurses, and medical technicians were invited to participate through an online survey using Google Microsoft forms. Ethical committee approval in Qena Faculty of medicine, South Valley University was obtained before starting disseminating the questionnaire online. In addition, registration in the ClinicalTrial.gov was done (identifier NCT04395300 and title of sleep quality among health care personnel during COVID-19).

Trial registration: ClinicalTrial.gov, NCT04395300. Registered 19 May 2020.Retrospectivelyregistered, https://clinicaltrials.gov/ct2/show/record/NCT04395300.

Consent in the first section of the online survey was requested from all participants before filling the questionnaire. The survey was divided into three parts, the socio-demographic information, questions assessing sleep quality using the Pittsburgh Sleep Quality (PSQI) and the general assessment of the psychological health status

using the General Health Questionnaire (GHQ-12) amid of the COVID-19 pandemic. Socio-demographic information included age, gender, marital status, level of education, current occupational status, in addition to information regarding previous exposure to COVID-19 or direct contact with cases, and protective measures taken by the participant to reduce risk of exposure to the virus.

The Pittsburgh Sleep Quality Index (PSQI)(**Al Maqbali et al., 2020; Buysse, Reynolds, Monk, Berman, and Kupfer, 1989; Suleiman, Yates, Berger, Pozehl, and Meza, 2010**) is a 19 items scale covering seven dimensions that comprised the sleep quality, the whole sleep duration, sleep latency, perceived sleep efficacy, sleep disturbance, use of sleeping prescriptions, and any daytime dysfunction. Each dimension graded between 0–3, with a total score ranging from 0–21, and a greater score denoting worse sleep quality. We adopt a score of >5 as revealing of impaired sleep quality. The PSQI is available in an Arabic version that as validated in Egyptian population.

The GHQ-12(**El-Rufaie and Daradkeh, 1996; Goldberg, 1988**)is a brief, simple, easy to complete, a measure of current mental health that has been extensively used in the research setting. The scale is a self-rated scale composed of 12 questions assessing mood state, anxiety, sleep quality, concentration, interest, and self-esteem. Each item is rated on a four-point scale (less than usual, no more than usual, rather more than usual, or much more than usual). An overall score higher than 15

denote evidence of psychological distress, and greater than 20 denotes severe distress. There is evidence that the GHQ-12 is a valid and approved tool used in the general population.It is available in the Arabic version that was proved reliable in a sample of primary health care patients.

Statistical analysis

Data was coded and analyzed using the Statistical Package of Social Science software program, version 25 (IBM SPSS 25 Statistics for windows, Armonk, NY: IBM Corp). The data were normally distributed. Data was presented as mean and standard deviation for quantitative variables meanwhile, frequency and percentage for qualitative variables. Comparison for qualitative variables was performed using Chi-square, while for quantitative variables, the comparison was conducted using student t test and One-way ANOVA test, testing for correlation was done. P values ≤ 0.05 was considered substantially significant.

Results

Our study involved 146 participants, 88 (60.3%) subjects of them were females and 58 (39.7%) were males. The mean age of the study population was 37.47±8.19. 87.7% of our participants were not smokers, 18.5% were chest physicians, and 19.2% were working in the frontline hospitals. The mean number of their medical practice experience years was 13.12±8.2.

The mean PSQI total score was 7.8±3.6. 67.1% of our participants presented with impaired sleep quality. The mean GHQ total score was 14.55±5.6. 29.45% of our participants presented with mild

physiological distress, meanwhile, 25.34% presented with severe distress. Other data regarding the history of working with COVID suspected cases, number of caffeine cups/ day, and the subjective perception of change in the sleep quality in the month preceding the survey were illustrated in **Table (1).**

Firstly, regarding the PSQI score, we classified our participants according to the current sleep quality into 2 groups (either good or poor sleep quality) with a considerable variance between them regarding smoking status, the quantity of Coffee ingestion, PSQI (total score and categories), PSQI components (1-7), and GHQ (total score and categories). Finally, regarding the GHQ results, the study population were divided into 3 groups (No distress, mild, and severe physiological distress) with a substantial variance between among regarding the mean total score of PSQI, PSQI component (2, 5, and 7) and finally the mean total scores of GHQ as shown in **Table (2).** There were mild positive correlations between age and C3 PSQI (the sleep duration component) (P-value= 0.005, r =0.229), between PSQI total score and GHQ (P- value ≤ 0.001, r =0.29), GHQ and PSQI C2 (sleep latency component) (P- value ≤ 0.001, r =0.27), GHQ and PSQI C5 (sleep disturbance component) (P- value ≤ 0.001, r =0.36), and GHQ with PSQI C7 (daytime dysfunction component) (P- value ≤ 0.001, r =0.32) as summarized in **Table (3).**

Table 1. Socio-demographic data, (PSQI) and (GHQ) of the included health-care employees providers (n= 146)

Variables	Health care providers (N=146)	Variables	Health care providers (N=146)
Age, year (mean± SD)	**37.47±8.19**	**Number of Coffee cup/ day N (%)** **None** **1-2 cups/day** **3-6 cups/day** **More than 6/day**	**24(16.4)** **76(52.1)** **44(30.1)** **2(1.4)**
Gender, N (%) **Male/ Female**	**58/88 (39.7/60.3)**	**PSQI (total score) (mean± SD)**	**7.8±3.6**
Working in Frontline Hospitals N (%)	**28(19.2)**	**PSQI categories N (%)** **Good sleep quality (score <5)** **Poor sleep quality (score ≥ 5)**	**48(32.9)** **98(67.1)**
Speciality N (%) **Chest physician** **Other specialities** **Allied health care employees**	**27(18.5)** **85(58.2)** **34(23.3)**	**GHQ total score (mean± SD)**	**14.55±5.6**
Smoking status, N (%) **Smoker**	**10(6.8)** **8(5.5)**	**GHQ categories N (%)** **No distress (score <15)** **Mild distress (score ranging**	**66(45.21)** **43(29.45)**

Ex-smoker Non-smoker	128(87.7)	from 15-20) Severe distress (score ≥ 20)	37(25.34)
Working with COVID suspected cases N (%) No direct contact but not ،Yes diagnosed Yes with confirmed cases (+ve PCR) Yes, negative results (-ve PCR)	69(47.3) 41(28.1) 13(8.9) 13(8.9)	Subjective change in the quality of sleep in the month proceeding the survey N (%) No change Mild change to better Great change to better Mild change to worse Great change to worse	45 (30.8) 12 (8.2) 7(4.8) 59(40.4) 23(15.8)

PCR; Polymerase chain reaction; PSQI: The Pittsburgh Sleep Quality Index,. GHQ: General health questionnai

Table 2. Comparison between participants regarding the results of PSQI and GHQ

Variables	PSQI			GHQ			
	Good quality (n=48)	Poor Sleep quality (n=98)	P-value	No distress (n=66)	Mild distress (n=43)	Severe psychological distress (n=37)	P-value
Age (mean± SD)	37.31±9.36	37.55±7.6	0.86	38.42±9.12	36.3±7.31	37.14±7.35	0.403
Gender N (%) Male Female	17(35.4) 31(64.6)	41(41.8) 57(58.2)	0.45	27(40.9) 39(59.1)	16(37.2) 27(62.8)	15(40.5) 22(59.5)	0.9
Working in Frontline Hospitals N (%)	7(14.6)	21(21.4)	0.3	17(25.8)	4(9.3)	7(18.9)	0.103
Smoking status N (%) Smoker Ex-smoker Non-smoker	1(2.1) 0(0) 47(97.9)	9(9.2) 8(8.2) 81(82.7)	0.02*	5(7.6) 3(4.5) 58(87.9)	4(9.3) 1(2.3) 38(88.4)	1(2.7) 4(10.8) 32(86.5)	0.383
Working with COVID suspected cases N (%)	27(56.3) 9(18.8) 7(14.6) 5(10.4)	42(42.9) 32(32.7) 16(16.3) 8(8.2)	0.297	31(47) 16(24.2) 6(9.1) 6(9.1)	21(48.8) 12(27.9) 6(14) 6(14)	17(45.9) 13(35.1) 1(2.7) 1(2.7)	0.462

No Yes, but with unknown test results Yes, and positive results Yes, but negative results							
Coffee ingestion N (%) **None** **1-2 cups/day** **3-6 cups/day** **More than 6 cups/day**	11(22.9) 30(62.5) 6(12.5) 1(2.1)	13(13.3) 46(46.9) 38(38.8) 1(1)	0.012*	12(18.2) 37(56.1) 17(25.8) 0(0)	7(16.3) 25(58.1) 10(23.3) 1(2.3)	5(13.5) 14(37.8) 17(45.9) 1(2.7)	0.231
PSQI (total score) (mean± SD)	3.9±1.13	9.6±2.9	0.0001*	6.77±3.47	8.04±3.1	9.407±4.07	0.002*
PSQI (categories)							
Good quality **Poor quality**	48(32.9)	98(67.1)	NA	27(40.9) 39(59.1)	11(25.6) 32(74.4)	10(27) 27(73)	0.10
PSQI (components) (mean± SD)							
C1 (subjective sleep quality)	0.0001	1.22±1.2	0.0001	0.61±1.1	0.95±1.17	1.05±1.26	0.123
C2 (Sleep latency)	0.93±0.8	2.3±0.84	0.0001	1.53±1.0	2.02±1.01	2.24±1.01	0.002*
C3 (Sleep duration)	0.6±0.76	1.6±0.86	0.0001	1.24±0.8	1.23±1.04	1.43±1.04	0.56
C4 (Sleep efficiency)	0.25±0.5	0.96±1.1	0.0001	0.66±0.9	0.79±1.01	0.78±1.15	0.252
C5 (Sleep disturbance)	1.18±0.49	1.66±0.59	0.0001*	1.33±0.56	1.51±0.505	1.8±0.65	0.001*
C6 (Use of sleep	0.02±0.14	0.42±0.83	0.001*	0.277±0.71	0.186±0.58	0.45±0.83	0.223

medication s)							
C7 (Day-time dysfunction)	0.93±0.69	1.47±0.77	0.0001*	1.12±0.75	1.34±0.75	1.56±0.84	0.02*
GHQ (total score) (mean± SD)	15.7±6	17.6±6.24	0.07*	11.57±2.8	18.06±1.47	25.37±3.2	0.0001*
GHQ (categories), N (%)							
No distress Mild distress Severe distress	27(56.3) 11(22.9) 10(20.8)	39(39.8) 32(32.7) 27(27)	0.17	66(45.2)	43(29.5)	37(25.3)	NA

PSQI: The Pittsburgh Sleep Quality Index. C: Component. GHQ: General health questionnaire, P-value* significant P-value

Table3. Correlations between age, sleep quality as measured by PSQI, and GHQ among Health care providers

Variables	r-coefficient	P-value
Age with C3 PSQI (the sleep duration component)	0.229	0.005*
PSQI with GHQ	0.29	0.000*
GHQ with C2 PSQI (sleep latency component)	0.275	0.000*
GHQ with C5PSQI (sleep disturbance component)	0.362	0.000*
GHQ with C7PSQI (daytime dysfunction component)	0.323	0.00*

PSQI: The Pittsburgh Sleep Quality Index. C: Component. GHQ: The General Health Questionnaire. *P-value* significant P-value*
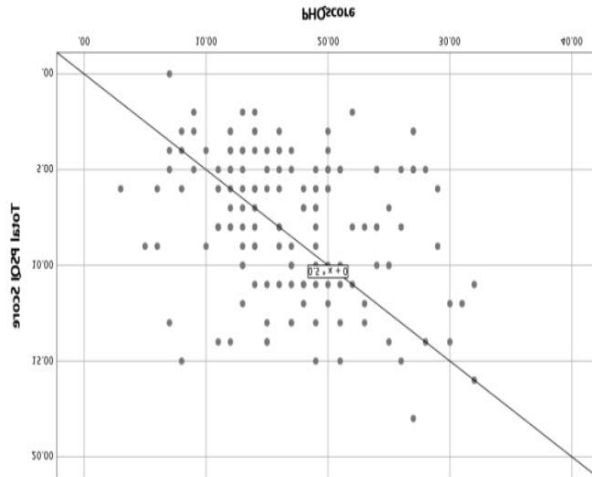
Figure 1. shows the correlation between the PSQ index with the general health questionnaire.

Discussion

Sleep is very vital for wellbeing. In this study, we evaluated the sleep quality and the degree of psychological distress in the Egyptian health professionals using the PSQI and GHQ. More than half of our participants had some degree of psychological distress with 45% of those had severe distress with the mean of the GHQ score was 14.55 ± 5.6. This is not uncommon in such global circumstances. In accordance to our results, there was no significant variation between the health workers who were directly dealt with COVID and other departments as regard the level of depression, anxiety and impaired sleep quality in China(**Liang et al., 2020)** and in Bahrain (Jahrami et al., 2020)so

essential psychological support is needed. Xu et al. reported that surgical departments health professionals and showed comparable levels of depression and anxiety(**Xu et al., 2020)**. Even in comparison to the administrative staff in the same hospital, the health care personnel showed higher level of anxiety, depression and fear from COVID-19 (**Lu et al., 2020)**. In comparison to the general population, the health professionals showed significantly higher scores of self-reported anxiety and self-rated depression with no difference in the gender and age of the participants which is in accordance to our findings(**Chen et al., 2020**) and even in relation to the stress level in those health care workers (**Mo et al., 2020)**.In harmony to our results, Kang et al. found that 63% of the surveyed health professionals showed some degree of psychological distress using the same tool used in our study (PHQ) in addition to GAD and IES-R. They found that there were 4 groups of psychological illnesses: trivial (36%), slight (34.4%), moderate (22.4%), and complex (6.2%)(**Kang et al., 2020)**. In another study, where PHQ was used as well, 49% , slightly lower percent in our study (54%), showed mild to moderate depression (**Chung and Yeung, 2020**). The high level of stress (31.6%) expressed by the PHQ, GAD and

IES-R was detected in 31.6% of the participants in large sample (about 4000 participants) with increased risk among the nurses (**Li et al., 2020**).We attribute our high rate of higher rate of psychological distress among the health professionals in our country owing to the increasing number of work hours, number of deaths among health care workers, fear from the infection, distributed life style and prohibition of work leaves in our country

As regard the sleep quality, in this study, we used the PSQI and we revealed that 67.1% % of the participants showed poor sleep quality (PSQI mean was 7.8±3.6). In accordance to our study. A study conducted in a military hospital in the Kingdom of Saudi Arabia and concluded that impaired sleep (40% reported worsening of their sleep after the COVID-19) in addition to depressive symptoms in about 20% of the participants. Moreover, Post-Traumatic features, measured by the IES-R, were associated positively with the depressive and anxiety symptoms (**Fw et al., 2020**). Moreover, Zhang et al, established that there was a negative impact of the COVID-19 outbreak on sleep quality with more than 30% of the health staff reported symptoms suggestive of lack of sleep

through the COVID-19 pandemic which was associated issues included level of education, a quarantine environment, and emotional concerns about the COVID-19 (**Zhang et al., 2020**). Furthermore, a study assessed the insomnia level in Wuhan in comparison to another district and a significantly higher degrees of insomnia was reported and the increased the general psychological manifestations in Wuhan (**Du et al., 2020**).

In this study, the components of the sleep disturbance (C5) and the sleep latency (C2) were considerably higher among the health professionals with higher level of psychological distress with a positive correlation between them. Even in a tertiary hospital in Saudi Arabia, assessment of sleep disturbances among the health care providers revealed that more than half of the participants reported sleep disturbances(**Alharbi et al., 2018**). Xu et al. evaluated the insomnia symptoms in the frontline healthcare workers and non-healthcare workers and found that the healthcare workers reported significantly higher level of insomnia (**Xue et al., 2020**). Similarly, about 65% of the studied population had some degree of disturbance using clustered psychiatric scores (**Kang et**

al., 2020). Also, a study, using the PHQ-9, GAD-7, ISI and IES-R, evaluated the depression, anxiety, insomnia and distress in the HCW and they found that 71% of participants had some degree of distress and depression in 50%. Working in a frontline hospital was associated with higher risk of insomnia and distress **(Lai et al., 2020)**.Wang et al. also reported increased prevalence of poor sleep quality and it was significantly correlated to the higher level of anxiety and depression but they concluded that being in frontline hospitals was associated as a risk factor for poor sleep quality which is in difference to our data which can be attributed to that included the Health care workers (HCW) in the paediatric department and in our study, we included the HCW of all specialities **(Wang et al., 2020)**.

In accordance to our results, Huang and Zhao et al. showed that being a health care provider was associated with increased risk of poor sleep quality **(Huang and Zhao, 2020)** . Another study which evaluated more than 2000 participants through an online survey using the ISI, PHQ, GAD, found that the levels of insomnia, depression and anxiety were significantly higher in the HCW than the

non-HCW where about 38% of the HCW reported insomnia **(Zhang et al., 2020)**. Moreover, compared to the general population using the PSQI, HCW reported significantly more poor sleep quality than the general population **(Xiao et al., 2020)**. San Martin et al. identified that front line health-care employees, during the COVID-19 outbreak, had inferior sleep quality and presented a higher prevalence of sleeplessness complaints, self-related symptoms of sleep-walking, sleep horrors and bad dream, paralleled to non-health-care employees **(Martin et al., 2020)**.Long hours of work and night shifts nature of work of the health-care providers shifts during the COVID-19 outbreak are at higher risk of psychological distress and sleep disturbances **(Zvolensky et al., 2020)**.

Limitation of our study include: First, an online questionnaire cannot provide precise data from the participants. Second, we did not measure excessive day time sleepiness among participants using a specific questionnaire although impaired sleep quality among health professionals is commonly linked to daytime dysfunction. Third, objective psychiatric assessment of the mood state of participants could not be performed.

Conclusion

The COVID-19 pandemic had a negative impact on the sleep quality of Egyptian health professionals. This impairment in their sleep quality could be linked to the associated psychological distress. Several actions should be taken by the ministry of health to improve this current situation.

Declarations

Ethics approval and consent to participants

The Research Ethics Committee at the Faculty of Medicine, South Valley University, has approved the study and the study was registered in Clinical Trial.gov:(identifier NCT04395300 and title of sleep quality among health care personnel during COVID-19).   And all patients approved to participate before starting to fill the online questionnaire.

Competing interests:

The authors declare that they have no competing interests.

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