ORIGINAL ARTICLE

Quality of Sleep and Associated Factors Among Healthcare Providers During Covid-19 in Malaysia: A Web-based Cross-sectional Study

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ABSTRACT

Introduction: COVID-19 has placed enormous strain on healthcare providers (HCPs). This study aimed to determine the quality of sleep (QoS), and associated factors, of HCPs in primary care clinics during the COVID-19 pandemic. **Methods:** This was a web-based cross-sectional study of HCPs from 30 primary care clinics in Malaysia. QoS was assessed using a validated single-item scale, and the response ranged from 0 (poor) to 10 (excellent). SPSS version 26 was used for the analysis. **Results:** Our study included 1280 respondents. The mean QoS score was 6.725 = 1.961. One demographic factor that was positively associated with QoS was age. Having one workplace, nurse, medical assistant, medical laboratory technician (or healthcare assistant compared to being a driver, were also significantly positively associated with QoS. Personality factors that were significantly positively associated with QoS were HCPs' abilities to cope with work stress and be altruistic. There were negative correlations between QoS and being a male HCP, concern about COVID-19 mortality and perceived risk of exposure to COVID-19. **Conclusion:** HCPs with clinical roles who were older, had a single workplace, were altruistic and could cope with work stress had better QoS. To maintain the QoS of HCPs, healthcare organisations should promote regular activities supporting the staffs' mental health and encourage compassion for the organisation and an altruistic work culture, especially among younger employees.
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Keywords: Quality of sleep, healthcare providers, COVID-19, factors, Malaysia

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INTRODUCTION

In March 2020, the world witnessed the outbreak of a new infectious disease, COVID-19. This disease, which can have deadly complications like pneumonia, is

caused by a new strain of coronavirus, SARS-CoV-2. Several countries implemented safety precautions, such as movement restrictions and border closures, to control the transmission of COVID-19 (1). However, with the emergence of the Omicron variant and the easing of restrictions, Malaysia experienced a significant increase in cases in February 2022. As of March 12, 2022, Malaysia had reached a cumulative 3.7 million cases of COVID-19 infection (2).

Due to the highly contagious nature of COVID-19, it placed an enormous strain on the healthcare system in many countries, including Malaysia. Healthcare providers (HCPs) involved in the management of COVID-19 patients worked under stressful conditions for extended periods of time to meet healthcare needs. In addition, they faced numerous challenges during the pandemic: not just increased workloads, but also inadequate personal protective equipment (PPE) at work and an obviously higher risk of infection (3). Ultimately, HCPs, especially those on the front lines, may experience mental distress and sleep disturbances while facing such a public health emergency (4). HCPs have reported experiencing poor QoS during the COVID-19 pandemic. A recent systematic review reported that the pooled prevalence of sleep problems among healthcare professionals was 31% during the COVID-19 pandemic (5). However, a cross-sectional study conducted by Wang, Song et al. (6) reported a high prevalence (66.1%) of sleep problems among medical staff during an early outbreak of COVID-19 in Hubei, China.

Sleep is an important part of people's everyday lives and is necessary for maintaining good physical health and mental well-being (7). Quality of sleep (QoS) is rated according to an individual's own perception of and satisfaction with sleep. Poor QoS is reported as insufficient sleep duration or awaking frequently during the night. Poor sleep can impair one's physical, psychological and social health. A recent systematic review reported that sleep problems were associated with depression and anxiety among HCPs (5). Poor or disrupted sleep could potentially affect one's immune system, increasing vulnerability to infections (8,9). These effects not only influence the physical health of HCPs but can also affect their job performance. Additionally, lack of sleep can lead to impaired cognition and reduced attention span at work, which can potentially increase medical errors performed by HCPs (10,11). Medical errors, such as needle stick injuries and misjudgement, are common reported complications of sleep deprivation in HCPs (12,13). Even if HCPs do not commit medical errors, sleep deprivation could endanger their own lives, for example by causing a motor vehicle accident. Drivers with sleep disorders are less attentive while driving and more prone to being involved in accidents (14).

Despite extensive literature reporting mental health problems, such as burnout, depression, anxiety and stress, in HCPs during the COVID-19 pandemic, most studies have been conducted in hospital settings. Very few have been conducted in primary care settings (15,16). While mental health issues among HCPs came into the public eye during the pandemic, data on QoS, especially in Malaysia, during the pandemic are still limited. We conducted this study to determine the quality of sleep, and associated factors, of HCPs in primary care clinics during the COVID-19 pandemic.

MATERIALS AND METHODS

Study setting and sample

This was a web-based cross-sectional study conducted in Selangor, Malaysia, involving HCPs from primary care clinics. The study was conducted from January to February 2022. Selangor was selected as the research location due to its status as the most populous state. Selangor was the state most affected by the COVID-19 pandemic. According to the number of new COVID-19 cases reported daily by the Ministry of Health (MOH) for the months of January and February 2022, Selangor was the state with the highest number of new cases (17,18). By December 2022, Selangor still had the third highest number of COVID-19 cases per 1000 people (19). Hence, it is reasonable to assume that HCPs in Selangor were highly burdened by caring for COVID-19 patients in addition to the state's dense population. Furthermore, because Selangor is the most developed state, its residents typically have a higher level of education and higher expectations. Consequently, HCPs in this area are more susceptible to experiencing work-related stress, which can contribute to sleep disturbances.

Inclusion criteria

The HCPs involved in the study included doctors, nurses, medical assistants, medical laboratory technicians (MLT), drivers, healthcare assistants and other personnel working in primary care clinics (21). They had to be at least 18 years old and have worked at a primary care clinic for at least a month to ensure a minimum level of familiarity with and exposure to the clinic's operations and dynamics. While a longer duration might provide more experience, a month is considered a reasonable threshold for balancing the practicality of recruitment and the objective of capturing a certain level of insight. We used Epi Info 7.0 to derive the sample size based on the prevalence of sleep problems in China, which ranged from 66–68% (6,20). The estimated sample size was 921 with 80% power and statistical significance at 5%. The total number of respondents required was 1,152 after accounting for a non-response rate of 20%.

Data collection

We randomly selected 30 public primary care clinics with family medicine specialists (FMSs) from a list of 52 clinics in Selangor as site investigators for this study. In Selangor, Malaysia, there are 53 public primary care clinics with FMSs. Because this study required a total

of 1,152 respondents and the average number of HCPs per clinic was 35, 30 clinics were randomly selected from the sample frame of 53 clinics using an online randomiser. All doctors, nurses, medical assistants, healthcare assistants, MLTs, drivers and other personnel working in those 30 clinics were approached for participation in the study (21).

This study focused exclusively on clinics with FMSs due to their essential role in handling COVID-19. As outlined by the MOH (22), FMSs play a vital role in the management of COVID-19 and in the post-COVID period. All patients with abnormal respiratory signs must be seen by an FMS (22). A clinic without an FMS will refer patients with COVID-19 to clinics with FMSs. Hence, by selecting primary care clinics exclusively with in-house FMSs, we aimed to ensure a comparable burden of COVID-19 across all clinics, given the significant responsibility these centres with FMSs have in addressing COVID-19 cases.

We collected the data via an online questionnaire (a Google form). The link to the questionnaire was sent to all investigators at a given site via WhatsApp. All the HCPs who met the inclusion criteria were invited by each site investigator to participate in the study. Respondents gave consent before completing the questionnaire, which asked about sociodemographic data (age, gender, ethnicity, occupation, years working, marital status and highest education level) and clinical characteristics (past medical history, whether staying with family members, whether a family member contracted COVID-19, number of workplaces, risk score for exposure to COVID-19, past history of contracting COVID-19, frequency of quarantine for COVID-19, concern about mortality and morbidities, personal concerns at the workplace, satisfaction with infection control, coping with stress at the workplace, knowing sources of help for managing work stress, having life insurance, altruism and QoS).

The instruments

HCPs' QoS over a 7-day period was rated as a single item with responses ranging from 0 (poor) to 10 (excellent). This was a valid and reliable questionnaire (23). Each of the following items was assessed by a scale ranging from 1 (poor) to 5 (excellent): exposure risk, ability to cope with stress, altruism and satisfaction with infection control measures. In expert-driven pretesting, the content validity of designed questionnaire is assessed. In this study, expert-driven pretesting was conducted by six experts: one psychiatrist, four FMSs and one postdoctoral researcher. They critically reviewed each item and rated its importance using a Likert scale ranging from 1–4 (1 = not relevant, 2 = not important, 3 = relevant, 4 = very important). The item content validity index (I-CVI) was then calculated by adding these scores (1–4) for each item and dividing the total score by the total number of experts (24). An I-CVI > 0.8 indicated that the items were relevant and should be retained in the questionnaire (24). In this study, the calculated I-CVI ranged from 0.875–1; therefore, all the items were retained. We also obtained consent from the original author of the questionnaire for us to use it in this study. Based on the pilot study, the instrument was reliable, as all Cronbach's alpha values were > 0.7.

Face validation was conducted with 10% of the anticipated sample population. We provided the pre-test survey to 10 HCPs, including doctors, nurses, medical assistants, healthcare assistants and drivers who matched the cultural and demographic profiles of the larger study population. During cognitive debriefing, most of the respondents had difficulty answering item 15: 'How many times have you been quarantined in the past 6 months due to close contact?' This item was revised to, 'How many times have you been quarantined for COVID-19 since the pandemic due to close contact/person under surveillance or person under investigation (PUI)?' Suggestions made post-validation were accepted before the final questionnaire was used for proper data collection. Hence, we did not modify other questionnaires.

Data analysis

We used the Statistical Package for Social Sciences (SPSS) v. 26 to perform data analysis. The descriptive data were presented as frequencies, percentages, means and standard deviations. Bivariate analysis was performed to determine the association between QoS and sociodemographic factors, as well as respondents' clinical characteristics. The determinants of QoS were examined using multiple linear regression because they satisfied all the assumptions of normality, equal variance, linearity and independence of residuals. A p-value < 0.05 was considered statistically significant.

Ethical approval

Ethical approval was obtained from the Medical Research and Ethics Committee (MREC), and this study was registered in the National Malaysia Research Registry with NMRR ID-21-02084-IUO (IIR).

RESULTS

In this study, we included a total of 1,280 respondents. The socio-demographics of the respondents are presented in Table I. The mean age of the study population was 35.0 years (SD = 9.0), and the mean working experience was 10.0 years (SD = 7.0). Almost half of the respondents were nurses. Most of the study population consisted of female respondents (82.4%) and was of Malays descent (82.3%), in good health with no comorbidities, living with family members, with knowledge of where to seek help when encountering mental health issues at work and with worry about COVID-19 mortality. A slightly larger proportion of them had taken out life insurance. The mean score for QoS was 6.725 (SD = 1.961).

Table I: Socio-demographic and clinical characteristic of the study respondents (N= 1280)

Variables		n	%	Mean ± SD
Age, year				36±7
Gender	Female	1055	82.4	
	male	225	17.6	
Race	Malay	1053	82.3	
	Chinese	43	3.4	
	Indian	118	9.2	
	Others	66	5.2	
Occupation	Doctors	332	25.9	
	Nurses	607	47.4	
	Medical assistant	152	11.9	
	MLT	82	6.4	
	Drivers	17	1.3	
	Healthcare assistant	90	7	
Education	secondary school	204	15.9	
	diploma	620	48.4	
	university	315	24.6	
	master and above	141	11	
Duration in service, years				11±6
Attachment site	Health clinic	736	57.5	
	Covid assessment centre	10	0.8	
	Quarantine centre	7	0.5	
	Vaccination centre	1	0.1	
	COVID-19 sampling centre	1	0.1	
	more than one attachment	521	40.7	
	others (hospital)	4	0.3	
Medical illness	no medical illness	1020	79.7	
	has medical illness	260	20.3	
Stay with family	No	267	20.9	
	Yes	1013	79.1	
Infected family member	No	892	69.7	
	Yes	388	30.3	
Infected with COVID-19	No	1001	78.2	
	Yes	279	21.8	
Quarantine frequency				2±2
Worry COVID-19 mortality	No	180	14.1	
	Yes	1100	85.9	
Worry yourself at workplace	No	40	3.1	
	Yes	1240	96.9	
Where to seek for help	No	155	12.1	
	Yes	1125	87.9	
Having life insurance	No	600	46.9	
	Yes	680	53.1	

SD: standard deviation
MLT: medical laboratory technician

Table II: Association of quality of sleep and sociodemographic and clinical characteristics among healthcare providers during COVID-19 pandemic using independent T-test analysis, one-way ANOVA and Pearson correlation test (N=1280)

Variables	Quality of sleep score	Correlation	p-value
Gender: Female versus Male	6.8± 1.9; 6.2± 2.2	t value =4.7	<0.001 #a
Race#: Malay	6.8± 1.9	F value=3.4	0.016 #b
Chinese	6.0± 2.4		
Indian	6.6± 2.0		
Other Races	6.3± 2.1		
Occupation#: Doctor	6.4± 2.2	F value=13.6	<0.001 #b
Nurse	7.1± 1.7		
Medical assistant	6.0± 2.0		
Medical laboratory technicians	6.9± 2.2		
Driver	5.8± 2.2		
Healthcare assistant	6.7± 2.0		
Marital status: Married versus Others	6.8± 1.9; 6.2± 2.1	t value=-3.1	0.02 #a
Tertiary versus non tertiary	6.8± 1.9; 6.5± 2.0	t value=-2.9	0.003 #a
Chronic disease/medical illness* versus no medical illness	6.7± 2.0; 6.7± 1.9	t value =0.4	0.658 #a
Worry COVID-19 mortality, no versus yes	7.2± 2.1; 6.7± 1.9	t value =3.4	0.002 #a
Worry yourself at workplace, no versus yes	7.1± 2.6; 6.7± 1.9	t value =0.8	0.424 #a
Have life insurance, no versus yes	6.7± 1.9; 6.7± 2.0	t value =0.0	0.977 #a
Infected with COVID-19, no versus yes	6.7± 2.0; 6.7± 2.0	t value =0.2	0.829 #a
Know where to seek for help, no versus yes	5.7± 2.3; 6.9± 1.9	t value =-5.9	<0.001 #a
stay with family, no versus yes	6.4± 1.9; 6.8± 2.0	t value =-3.1	0.002 #a
Infected family member, no versus yes	6.8± 1.9; 6.6± 2.0	t value =1.2	0.248 #a
more than one attachment, no versus yes	7.0± 2.0; 6.4± 2.0	t value =-5.1	<0.001 #a
Age		r= 0.143	<0.001 #c
Years of working		r=0.141	<0.001 #c
Exposure risk score		r=-0.124	<0.001 #c
Quarantine frequency		r=-0.095	0.015 #c
Satisfy with infection control		r=0.266	<0.001 #c
Ability to handle stress		r=0.453	<0.001 #c
Being altruistic		r=0.316	<0.001 #c

MLT: medical laboratory technician
#a: analysis was conducted with independent t- test
#b: analysis was conducted using one-way ANOVA;
#c: analysis was conducted using Pearson correlation test
Attachment site: health clinic, covid assessment centre, quarantine centre, Pusat Pemberian Vaksin(PPV) , work from home
Quarantine frequency:
Tertiary: University, postgraduate
Non-tertiary: secondary and primary school

Table II summarizes the results of the univariate analysis of the QoS of HCPs during the COVID-19 pandemic. We used multiple linear regression to determine the correlation of QoS in HCPs after adjusting for confounding variables. From simple linear regression results, we recruited independent variables with $p < 0.25$ or those that were clinically important for the multiple linear regression shown in Table III. There was a negative correlation between the exposure risk score and quarantine frequency ($r = -0.124$, $p < 0.001$). There was a negative correlation between QoS and quarantine frequency ($r = -0.095$, $p < 0.001$). There was a positive correlation between satisfaction with infection control and QoS ($r = 0.266$, $p < 0.001$). There was a positive correlation between ability to handle stress and QoS ($r = 0.453$, $p < 0.001$). There was a positive correlation between being altruistic and QoS ($r = 0.316$, $p < 0.001$). Based on multiple linear regression, factors with a significant positive correlation with QoS were being able to cope with work stress ($\beta = 0.42$, 95% confidence

Table III: Factors correlated with quality of sleep among healthcare providers during COVID-19 pandemic using multiple linear regression analysis (n=1280)

Variables	Simple linear regression			Multiple linear regression				p-value
	B	SE	p-value	Adjusted B	SE	95%CI		
Gender: Male	-0.337	0.071	<0.001	-0.243	0.079	-0.398	-0.088	0.002*
Female				Reference				
Race#: Malay	0.2	0.072	0.005	-				
Chinese	-0.351	0.152	0.021	-				
Indian	-0.082	0.095	0.387	-				
Other Races	-0.222	0.124	0.073	-				
Occupation#: Doctor	-0.229	0.062	<0.001	0.788	0.217	0.362	1.213	<0.001
Nurse	0.357	0.054	<0.001	0.732	0.216	0.308	1.155	0.001
Medical assistant	-0.389	0.084	<0.001	0.46	0.216	0.036	0.884	0.034
MLT	0.069	0.112	0.539	0.648	0.231	0.196	1.100	0.005
Healthcare assistant	-0.031	0.107	0.77	0.546	0.225	0.105	0.988	0.015
Driver	-0.487	0.239	0.042	Reference				
Worry COVID-19 mortality, Yes	-0.263	0.079	0.001	-0.176	0.068	-0.310	-0.042	0.010
No				Reference				
Only one attachment, Yes	0.284	0.055	<0.001	0.145	0.052	0.043	0.248	0.006
No				Reference				
Age	0.021	0.004	<0.001	0.012	0.004	0.004	0.019	0.002
Exposure risk score	-0.113	0.025	<0.001	-0.071	0.022	-0.115	-0.028	0.001
Ability to handle with stress	0.492	0.027	<0.001	0.421	0.028	0.366	0.476	<0.001
Being altruistic	0.319	0.027	<0.001	0.211	0.025	0.162	0.261	<0.001
Years of working	0.023	0.004	<0.001	-				
Marital status: married vs others	-0.246	0.092	0.007	-				
tertiary versus non tertiary	0.168	0.057	0.003	-				
Chronic disease* versus good health	-0.03	0.068	0.658	-				
Quarantine time	-0.056	0.016	0.001	-				
Satisfy score with infection control	0.306	0.031	<0.001	-				
Worry about yourself at workplace, no versus yes	-0.168	0.158	0.287	-				
Have life insurance, no versus yes	-0.002	0.055	0.977	-				
Infected with COVID-19, no versus yes	-0.014	0.066	0.829	-				
Know where to seek for help, no versus yes	0.559	0.083	<0.001	-				
Stay with family, no versus yes	0.207	0.067	0.002	-				
Infected family member, no versus yes	-0.069	0.06	0.248	-				

B=beta; SE=standard error; 95%CI: 95% confidence interval; Adjusted R square was 29.9%. MLT: Medical laboratory technicians
There was no multicollinearity as variance inflation factor <10;*Variable selection method in multiple linear regressions based on backward method to clear out those highly correlated variables.

interval (CI) [0.366, 0.476], p < 0.001); being altruistic (β = 0.21, 95% CI [0.162, 0.261], p < 0.001); age (β = 0.01, 95% CI [0.004, 0.019], p = 0.002); having only one workplace (β = 0.15, 95% CI [0.043, 0.248], p = 0.006); and working as a doctor (β = 0.79, 95% CI [0.362, 1.213], p < 0.001), nurse (β = 0.73, 95% CI [0.308, 1.155], p = 0.001), medical assistant (β = 0.46, 95% CI [0.036, 0.884], p = 0.034), MLT (β = 0.65, 95% CI [0.196, 1.100], p = 0.005) or healthcare assistant (β= 0.55, 95% CI [0.105, 0.988], p = 0.015) compared to as a driver. QoS was negatively correlated with being a male HCP (β = -0.24, 95% CI [0.398, -0.088], p = 0.002), concern about COVID-19 mortality (β = -0.18, 95% CI [-0.310, -0.042], p = 0.010) and risk of exposure to COVID-19 (β = -0.07, 95% CI [-0.115, -0.028], p = 0.001).

DISCUSSION

This study examined correlates of QoS among HCPs in Malaysia. Our cross-sectional survey of 1,280 primary HCPs yielded a mean sleep QoS of 6.725 (SD = 1.961), which is slightly higher than in another study of nurses in Australia, which had a mean score of 6.427 (SD = 2.279) (25).

Based on our results, factors that were significantly correlated with QoS were being able to cope with work-related stress and being altruistic. Previous studies have found evidence of a strong link between stress and poor QoS (26,27). However, it is noteworthy that the correlation between QoS and coping with stress, although significant, is of low strength (r = 0.3–0.5). This is, nonetheless, an important correlation because the effect of COVID-19 on one's life is so substantial that, even if HCPs were able to cope with pandemic-related stress, they were being challenged, not just with work, but in terms of their safety on a daily basis. The prevalence of insomnia among healthcare professionals was 36.36%, as reported in a meta-analysis over 13 months during the COVID-19 pandemic (28). This is obviously a higher prevalence than in the general population, owing to the more active pituitary-hypothalamic activities of HCPs during the pandemic (26). This could explain why HCPs in this study who rated their own risk of exposure at work as high and reported that they were concerned about contracting COVID-19 or spreading the disease to their family members or colleagues have lower QoS. Similarly, those concerned about mortality from COVID-19 also experienced disrupted sleep, resulting in poorer QoS. Indeed, HCPs experienced a decrease in quality of sleep, from a prevalence of poor sleep of 65.4% before the pandemic to 35.7% after the pandemic (27). Similarly, those who had a good quality of sleep before the pandemic experienced poor quality of sleep after the pandemic. HCPs with greater coping skills would experience less psychological distress due to their work, allowing them to maintain their psychological well-being and ensure good QoS.

Medicine is perceived as an altruistic profession. Altruism is a behaviour involving working with the goal of increasing the interest or well-being of others without expecting external rewards (29). However, even when HCPs show commitments to upholding beneficence in medicine (thinking and acting in the interest of patients), being altruistic requires HCPs to surpass their professional and moral obligations (30). Indeed, altruism has been associated with negative perceptions of well-being. Nonetheless, during the COVID-19 pandemic, altruistic behaviour was observed among workers who had compassion for the organisation and for providing for others (31). In fact, Lee et al. (32) demonstrated that nurses with higher levels of compassion satisfaction reported lower levels of sleep disturbance. This could be explained by having resilience to overcome situations related to the pandemic. Resilience partially mediated the relationship of pandemic fatigue and QoS (β = -0.326, p < 0.001) (21). In fact, this may explain why HCPs in this study had better QoS when they demonstrated altruism. Nevertheless, further research should determine whether compassion satisfaction or compassion for an organisation is a mediator of altruism.

Our study showed that all clinical professionals, including doctors, nurses, medical assistants, medical laboratory technicians and healthcare assistants, had a higher quality of sleep (QoS) than drivers. These results contrasted with those of previous studies, which showed that doctors and nurses treating COVID-19 patients experienced lower QoS. This was an unexpected finding, as we assumed that working on the front lines resulted in a higher risk of exposure and more anxiety, and thus more sleep disturbance. We hypothesize that, for drivers, a lower level of education is the reason for the poorer QoS. The literature has demonstrated that low educational attainment is negatively correlated with QoS (34). In addition, drivers need to work odd hours to transport patients to the hospital during emergencies. This could disrupt their normal sleep patterns and result in poorer QoS than in other people. However, because the number of drivers who participated in the study was rather small (n = 17), we need to interpret these results cautiously.

This study found better QoS in older HCPs. However, there is little interaction between QoS and age in terms of predicting health outcomes, though middle-aged people are generally good sleepers (35). Nonetheless, older HCPs may have more stable family dynamics. Indeed, older HCPs reported having the most support from family and friends during the COVID-19 pandemic (36). In addition, the QoS of older female HCPs might be better because, due to their older ages, their sleep may no longer be affected by pregnancy and breastfeeding, which were the explanations provided by some female HCPs (26,33).

This study has several strengths. First, this is the first

paper that has addressed QoS among local primary HCPs during the COVID-19 pandemic. Many local studies have instead investigated sleep patterns of nurses in hospital-based settings. The impact of the pandemic and burden of care in primary care facilities may differ from those in secondary care facilities since there is no night shift in primary care clinics. Nonetheless, primary HCPs are the front-liners and gatekeepers. Second, the sample size of this study is much larger than that of others (7). The large sample size is sufficient to provide a clear picture of the QoS of primary HCPs.

A limitation of our study is that causal relationships between QoS and associated factors could not be established due to the cross-sectional design. In addition, QoS is also influenced by other psychiatric diseases, e.g. depression, anxiety, stress, bipolar disorder and other medical conditions, that were not captured by our study. Furthermore, it is important to exclude subjects with existing sleep disorders, such as insomnia, but we were unable to do so. Therefore, we must consider these limitations when interpreting our results.

This study contributes to the literature by identifying factors associated with QoS in primary care providers during the COVID-19 pandemic. Because QoS is closely related to well-being and work performance of HCPs, the results of this study can inform clinic managers of the importance of supporting and managing QoS in high-risk HCPs to reduce medical and work-related incidents. Such support services include educating HCPs on healthy sleep habits and providing routine meditation sessions for HCPs.

CONCLUSION

Factors positively associated with QoS were clinical roles, being able to cope with stress, being altruistic, age and having only one workplace. Factors negatively associated with QoS were being a male HCP and concern about COVID-19 mortality. To ensure that the QoS of HCPs is maintained, healthcare organisations should promote regular activities supporting the mental health of their staffs. Organisations should implement strategies to encourage compassion for the organisation in order to cultivate an altruistic work culture, especially among younger staff.

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