EFFECT OF COVID-19 PANDEMIC ON SLEEP PATTERNS OF HEALTH PROFESSIONALS AND MEDICAL STUDENTS IN THE KURDISTAN REGION OF IRAQ

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Submitted: 2/6/2021; Accepted: 1/8/2021; Published: 21/12/2021

ABSTRACT

Background

Quality sleep is fundamental to human wellbeing. Healthcare providers are at the frontline of dealing with patients with COVID-19 (Coronavirus disease 2019), rendering them more susceptible to sleep disturbance by different factors.

Objectives

To observe sleep changes and the effect of lockdown on the duration and quality of sleep of health professionals and medical students during the COVI-19 pandemic in the Kurdistan Region of Iraq.

Materials and Methods

This was a descriptive cross-sectional study; a self-administered questionnaire was sent to 500 health professionals and medical students online from 2nd July 2020 to 2nd September 2020. The questionnaire used was a part of a multinational study on sleep patterns in relation to the COVID-19 pandemic (International COVID-19 sleep study, ICCOS) after permission was obtained. All methods were performed in consistence with verified regulations and guidelines. Informed consent was obtained from all participants. Data were entered by Microsoft Excel Worksheet

Results

A total of 304 individuals had responded to the online questionnaire; 53.6% were males. The mean age (in years) was 32.84 (± SD 11.65). The average night sleep and the average 24 hours sleep increased significantly during the COVID-19 pandemic and there was a significant statistical difference in "dreaming" patterns of the study sample before and after the pandemic.

Conclusion

This study concludes that the quality of sleep and daytime function of participants were not impaired despite the worldwide and national stress of the COVID-19 pandemic due to the previous lifestyle of this group of population and their ability to spend more time with their families.

Keywords: *COVID-19, Sleep, Lifestyle, Health Professionals, Medical Students.*

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https://doi.org/10.17656/jsmc.10336

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an infectious acute respiratory disease caused by a novel coronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1].

Physiologic and behavioural processes are intermingled in sleep, in which the person is unaware and unresponsive to the surroundings as a reversible condition of behaviours. Several signs, ordinarily but not every time, are related to sleeping status including closed eyes, calmness, and postural recumbence. Other physical abnormal behaviours can happen during unordinary conditions, such as sleepwalking, sleep talking, bruxism, teeth grinding ...etc. The sleep process abnormality could be due to interference of sleep or one of its components by wakefulness [2].

Quality sleep is fundamental to human wellbeing as one-third of peoples' lifetimes is spent in sleep. Recovery of the body and nervous system is maintained during sleep at least as much as the sleep is temporary rest for them [3].

Healthcare workers are at a high risk of infection and even death due to COVID-19, because of its efficient transmission [4]. A Chinese study showed that they were more prone to poor sleep quality when compared with non-healthcare professionals. Furthermore, among the Chinese population, the prevalence of poor sleep quality and Generalized Anxiety Disorders (GAD) was high during the COVID-19 outbreak [5].

Healthcare providers who work in an emergency, respiratory, and critical care facilities, in particular, are likely to develop sleep disturbance, or anxiety and depression [6].

Several factors expose healthcare workers, as compared to the public, to huge pressure from COVID-19 and to the high incidence of fear, anxiety, insomnia and depression, and hence may produce long-term health problems, and reduce the productivity of their work. The factors include fear of infection risk, work exhaustion, lack of protection and of the disease management experience, loss of control, unfavourable patients' response, disease stigma, notable lifestyle changes, isolation, and lack of support from family. This is truer for those who are in close contact with COVID-19 cases (suspected or confirmed) [7-11].

The prevalence of insomnia, time in bed (TIB), and total sleep times (TST) of nursing students of Northeastern Brazil increased during the COVID-19 pandemic. Some of the students' experienced new onset of insomnia, contrary to sleep efficiency which was reduced significantly [12].

A group of quarantined people was found to be more likely to have symptoms of insomnia during SARS (severe acute respiratory syndrome) in a study conducted in a hospital in East Taiwan [13].

Although the number of sleeping hours has increased, the quality of sleep has worsened by lockdown, owing to an increase in disorders of mental health such as depression, anxiety, and even suicidal thoughts [14,15]. The psychological effect was also evident in previous outbreaks on non-infected people, expressed in form of significant sleep disorders, negative emotions, and psychological health problems [13].

Significant high proportions of morbidity and death are related to the high prevalence of sleep abnormalities among the general population, and poor sleep quality is even higher (60% or higher) among university students [16].

During the COVID-19 lockdown period, the life and study routines of the university students were changed, which added an extra burden on the already existing changes, for example, the shifting from secondary school to university education; therefore, many students experience sleeping problems [17].

MATERIALS AND METHODS

This study was a descriptive cross-sectional study, based on a self-administered online questionnaire which was developed by Google Forms and was sent to 500 professional medical staff on WhatsApp and Viber applications which are widely used in the study region. The response rate was 60.8%.

Those staffs were working at Kurdistan Region of Iraq at the time of the data collection, including the following: medical doctors and nurses at hospitals and primary health centres and students of Medical, Nursing, and Pharmacy Colleges at Erbil, Sulaimani and Duhok.

Only 73 (24%) of the participants were students, who were involved voluntarily in health institutions to support health staff in dealing with the COVID-19 pandemic.

It was part of the multinational efforts to study the disturbances in sleep patterns in relation to the

COVID-19 pandemic under the name of ICOSS – International COVID Sleep Study. The permission was obtained from the main researchers namely Dr Markku Partinen and Professor Colin A Espieto to modify the questionnaire according to local settings and direct it towards medical staff and professions instead of the general population. It is composed of three main parts including the socio-demographic data of the participants, information about sleep patterns before the COVID-19 pandemic, and the same questions were repeated for the period of the pandemic (duration of sleep at night and 24 hours, difficulty staying asleep, inability to fall asleep again, restless feelings in legs, sleep talking and singing, laughing, shouting, speaking loudly during sleep, nightmares, acting out of dreams while asleep and its frequency and sleeping well and feeling fatigued or exhausted during daytime). The sleep patterns are evaluated according to Basic Nordic Sleep Questionnaire (BNSQ); which is the five-point scale (scale from 1 to 5) [18].

To estimate the proportion of the participant's affection by the virus, they were asked whether they had COVID-19 and had been tested positive for COVID-19 before the time of answering the questionnaire

The study started on 2nd July 2020 and extended until 2nd September 2020. Ethical approval was obtained from the Research Ethics Committee at Kurdistan Board of Medical Specialties. The purpose of the study and questionnaire was explained to all participants and informed consent was obtained from all subjects. Confidentiality and anonymity of data were ensured.

Data management and statistical analysis: Data were collected and tabulated using Microsoft Excel (2010 version). The obtained parameters and variables were compared using Statistical Package for Social Sciences, version 25.0 (2017) by an independent statistician. A P-value of ≤ 0.05 was considered statistically significant. Paired T-test, Chi-square test, and Fisher's exact tests were applied. In addition, the Wilcoxon Signed-rank test was used to compare the findings before and after the pandemic.

RESULTS

A total of 304 medical students and health professionals responded to the online questionnaire,24%of them were students and 76% were health professionals and 53.6% of them were male and 46.4% were female. Half of them were married, 49.3% were single and only 0.7% was divorced, and the mean age ± standard deviation was 32.84 ± 11.65 years. Only 6.3% of the responders had positive laboratory tests for the COVID-19.

The sleep duration and parameters were studied. The findings of Table 1 reveal that there was a significant statistical difference between the mean duration of sleep at night and 24 hours. The average night sleep has increased during the COVID-19 pandemic (7.352 hours) in comparison to periods before that pandemic (7.056 hours). In the same manner, the average 24 hours of sleep has increased during the COVID-19 pandemic (8.394 hours) in relation to times prior to it (7.911 hours).

The results of Table 2 show that there was a non-significant statistical change in sleep quality parameters before and during the COVID-19 pandemic. The respondents did not experience any change in difficulty staying asleep, inability to fall asleep again, restless feelings in legs, sleep talking and singing, laughing, shouting, speaking loudly during sleep, nightmares, acting out of dreams while asleep and its frequency and sleeping well prior and during COVID-19 pandemic.

There was a significant statistical difference in "dreaming" patterns of the study sample before and after the pandemic and generally became better after it. The respondents who were never dreaming or were dreaming less than once per week have had an increase in the rate of dreaming, while the rate of those who were dreaming more frequently before the pandemic has decreased (1-2 nights, 3-4 nights, or every night per week). The results are expressed as mean and standard deviation (SD). P-value was calculated by using a two-tailed paired t-test. The results are expressed as a number. P-value was calculated for categorized data by a Chi-square test

The data of Table 3 indicate that there was a non-statistically significant variation in feeling fatigued or exhausted during the daytime before and during the COVID-19 pandemic.

But there was a significant statistical difference in excessively sleepy during the daytime before and during the COVID-19 pandemic. Never or less than once per month parameter has increased, while parameters of less than once per week, 1-2 days per week, and 3-5 days per week have decreased. The change was also observed in falling asleep during the daytime and its measure "No chance" has increased, while "Slight and Moderate chance" has decreased during the pandemic. The results of Table 4 show that there was

a non-significant statistical change in taking sleeping pills prior to and during the COVID-19 pandemic. The results are expressed as a number. P-value was calculated for categorized data by a Chi-square test.

Table 1. Difference in night sleep and 24 hours sleep durations before and during COVID-19.

Variables	Groups	Mean	SD	p-value
Night sleep	Before the COVID-19	7.056	1.2282	0.002
	During the COVID-19	7.352	1.7862	
24 hours sleep	Before the COVID-19	7.911	1.4398	0.001
	During the COVID-19	8.394	1.7746	

Table 2. Sleep quality and disturbance of participants before and during COVID-19.

Variables	Categories	Before COVID-19	During COVID-19	p-value
Difficulty staying asleep	Never or < once per month	157	154	
	< once per week	86	78	
	1-2 days per week	34	44	0.342
	3-5 days per week	15	13	
	Daily or almost daily	12	15	
Inability to fall asleep again	Never or < once per month	137	142	
	< once per week	84	91	
	1-2 days per week	57	36	0.876
	3-5 days per week	16	18	
	Daily or almost daily	10	17	
Restless feelings in legs	Never or < once per month	188	187	
	< once per week	60	65	
	1-2 nights per week	35	29	0.903
	3-5 nights per week	8	10	
	Every night or almost night	13	13	
Sleep talking	Never or < once per month	260	263	
	< once per week	34	27	
	1-2 nights per week	5	7	0.699
	3-5 nights per week	4	5	
	Every night or almost night	1	2	

Table 2. Continued

Singing, laughing, shouting, speaking loudly during sleep	Never or < once per month	284	286	
	< once per week	15	14	
	1-2 nights per week	4	2	0.891
	3-5 nights per week	1	1	
	Every night or almost night	0	1	
Nightmares	Never or < once per month	195	194	
	< once per week	74	65	
	1-2 nights per week	22	28	0.139
	3-5 nights per week	10	11	
	Every night or almost night	3	6	
Acting out of dreams while asleep	No	274	277	0.607
	Yes	30	27	
How well have you been	Well	138	134	
	Rather well	87	81	
	Neither well nor badly	64	62	0.089
	Rather badly	10	17	
	Badly	5	10	
Dreaming	Never or < once per month	65	91	
	< once per week	84	85	
	1-2 nights per week	73	61	0.001
	3-5 nights per week	49	35	
	Every night or almost night	33	32	

Table 3. Daytime dysfunction before and during COVID-19 pandemic.

Variables	Categories	Before COVID-19	During COVID-19	p-value
Feeling fatigued/ exhausted at daytime	Never or < once per month	84	97	
	< once per week	102	96	
	1-2 days per week	68	57	0.429
	3-5 days per week	30	27	
	Daily or almost daily	20	27	
Excessively sleepy during daytime	Never or < once per month	106	129	
	< once per week	102	86	
	1-2 days per week	52	50	0.047
	3-5 days per week	26	20	
	Daily or almost daily	18	19	
Falling asleep during the daytime	No chance	135	170	
	Slight chance	139	103	0.006
	Moderate chance	22	21	
	High chance	8	10	

***The results are expressed as a number. P-value was calculated for categorized data by a Chi-square test**

Table 4. Comparison of taking sleep pills before and during COVID-19 pandemic

Variables	Categories	Before COVID-19	During COVID-19	p-value
Did you use sleeping pills	Never or < once per month	281	279	
	< once per week	11	14	
	1-2 nights per week	7	5	0.782
	3-5 nights per week	1	1	
	Every night or almost night	4	5	

DISCUSSION

In the Kurdistan Region of Iraq, like in Pakistan, the health professionals are expected to come under physical and psychological pressure during the COVID-19 period, with the possibility of significant effect on their sleep, by lack of infection protective facilities, fear of high-risk infection, quarantine, social distancing from family and high stress [19].

This study shows that both the average night sleep and the average 24 hours sleep of medical students and health professionals increased during the COVID-19 pandemic, possibly due to change of lifestyle and confinement at home (most of the days of the week except for on-call duty days) by the lockdown.

An increase in sleep duration was noticed in a multinational European study conducted in Austria, Germany, and Switzerland as a result of a discrepancy between external (social) and internal (biological) sleep-wake timing, which was recorded by the critical decrease in social jetlag and social sleep restriction [20].

This study was inconsistent with two studies, one conducted in New York and the other in Saudi Arabia. The participants of the former study were physicians, advanced practice providers, residents/fellows, and nurses. Among the participants, 75% of them had moderate to severe insomnia symptoms with a sleep duration of fewer than 6 hours per day reported by themselves [21]. However, the latter study was conducted on doctors, 38.1% of them during COVID-19 and 32.3% of them before COVID-19 had a daily sleeping duration of fewer than 6 hours [22].

In this study, the sleep quality parameters of difficulty staying asleep, inability to fall asleep again, restless feelings in legs, sleep talking and singing, laughing, shouting, speaking loudly during sleep, nightmares, acting out of dreams while asleep and its frequency and sleeping well and taking sleeping pills did not change significantly during COVID-19 pandemic as compared to before it. This might be because only a small number of health professionals at limited centres (1-2 centres allocated per each governorate to receive and treat COVID-19 patients) were involved to provide health services to those patients, while the majority of the remaining health facilities were closed, and thence most of the health professionals and medical students were off and at rest and they tended to spend more time with families and children (so less stress) and away from the stressful daily activities at health facilities. Besides, the people in the study area have been passing through stressful conditions of economic, political, and social instabilities for 6 years (after the Islamic State of Iraq and Syria - ISIS attack on Iraq cities in 2014) which rendered them to tolerate an additional stressful situation of COVID-19 pandemic. This is inconsistent with a study in China, which showed that different kinds of healthcare workers exhibited a distinct prevalence of insomnia [23], and with a study on the sleep quality of healthy healthcare workers during the COVID-19 pandemic in Tehran [24].

Reduced dreaming (including nightmares) in participants of this study during the COVID-19 pandemic is not contradictory to their quality of sleep during the same period, as sleep in people with frequent nightmares is subjectively disturbed compared to healthy controls. Individuals who suffered from nightmares reported sleep problems (e. g., impaired sleep quality and insomnia complaints) as well as daytime dysfunction (like tiredness and mood problems) [25]. Negatively toned dreams are more frequent among individuals with insomnia and other sleep-disordered persons [26,27].

In this study, both excessively sleepy during daytime and falling less asleep during the daytime occurred during the pandemic period as compared to before it, possibly because the sleep at night was refreshing and of better quality in the study participants. This finding is consistent with the results of a study carried out on school adolescents in Canada, which found that 78% of the participants (during the pandemic shutdown,) were not sleepy, and attributed this primarily to getting more sleep [28]. Another study carried on medical and health science students showed that those who reported night sleep behaviour disorders were 1.83 times more likely to get excessive daytime sleepiness than those students without night sleep behaviour disorders [28]. This might be because night sleep behaviour disorder disturbs the quality of sleep (sleep deprivation) at night, which induces excessive daytime sleepiness because of unfinished sleep periods and variations in melatonin hormone and vital hormone in circadian rhythm [29].

Limitations of the study

This study has three limitations. First, it was an observational online survey and the sample may not be well representational. Second, as there was self-reported data from participants, selection bias could not be excluded. Third, the target audience was

wide-ranged; health professionals and undergraduate students were included together as one group.

In conclusion, the study concludes that the quality of sleep and daytime function of participants were not impaired despite the worldwide and national stress of the COVID-19 pandemic due to the previous lifestyle of this group of population and spending more time with their families.

We suggest that duty days and shifts of health professionals should be re-arranged so that they could spend more time with their families.

Competing interests

The author declares that he has no competing interests.

Acknowledgements

I would like to thank Dr Rebaz Lak for providing advice on statistical aspects of this study, and Dr Rozhan Abdulbast Sharif for providing advice on the study references, and to thank the health professionals and medical students who participated in this study.

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