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Original Research Article

Sleep quality among family medicine physicians before and during COVID-19 in Jeddah, Saudi Arabia

Eman A. Alshafei[1]*, Afnan Alsulami[2], Anwar Alqurashi[3], Hanan Salahuddin[2], Hanin Al Luhaibi[2], Meshal Albaqami[4], Zahra Mohammad Ali Banat[5], Muna Aysan Alzahrani[6], Rehab Almutairi[7], Nojoud Althoubaity[7], Walaa Alzubaidi[8]

[1]Department of Family and Community Medicine, King Abdulaziz university, Jeddah, Saudi Arabia
[2]Family Medicine Specialist, MOH, Jeddah, Saudi Arabia
[3]Family Medicine Specialist, MOH, Makkah, Saudi Arabia
[4]MOH, Makkah, Saudi Arabia
[5]Nursing Assistant Technician, MOH, Jeddah, Saudi Arabia
[6]Nursing Specialist, MOH, Jeddah, Saudi Arabia
[7]Nursing Technician, MOH, Jeddah, Saudi Arabia
[8]MOH, Jeddah, Saudi Arabia

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***Correspondence:**
Dr. Eman A. Alshafei,
E-mail: Dr.Alshafei@gmail.com

ABSTRACT

Background: This study aimed to assess the sleep quality of family medicine physicians before and during the COVID-19 pandemic in Jeddah, Saudi Arabia, and to explore the associations between sleep quality and various demographic and health-related factors.
Methods: A total of 109 family medicine physicians participated in this cross-sectional study. The Pittsburgh sleep quality index (PSQI) was utilized to evaluate sleep quality, encompassing seven components: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction. Data were collected asking questions regarding both before and during the pandemic period. Descriptive statistics, paired-sample t-tests, and Chi-square tests were used for data analysis.
Results: The study revealed significant changes in sleep quality components before and during the pandemic. While sleep latency and sleep duration improved, sleep disturbance, use of sleep medication, and daytime dysfunction worsened during the pandemic. The overall global PSQI score indicated a decline in sleep quality during the pandemic. Females reported poorer sleep quality than males. Participants with general anxiety disorder, diabetes mellitus, and hypertension experienced worse sleep quality. Other demographic and health-related factors exhibited mixed associations with sleep quality.
Conclusions: The study highlights the nuanced impact of the COVID-19 pandemic on the sleep quality of family medicine physicians. The observed changes in sleep quality components and their associations with various factors underscore the need for tailored interventions to address sleep disturbances among healthcare professionals. These findings contribute to a comprehensive understanding of sleep quality dynamics in the context of a global crisis and emphasize the significance of promoting well-being among healthcare providers for enhanced patient care.

Keywords: COVID-19, Family medicine, Saudi Arabia, Sleep quality

INTRODUCTION

Sleep, as an essential physiological function, plays a critical role in maintaining overall health and well-being. Adequate and high-quality sleep is vital for cognitive functioning, emotional stability, immune system regulation, and physical recovery.[1] Healthcare professionals, including family medicine physicians, are tasked with providing care to patients in dynamic and often demanding environments. The unique challenges they face, such as long working hours, irregular shifts, and exposure to stressful situations, can lead to disruptions in their sleep patterns and overall sleep quality.[1,2]

Amidst the backdrop of these challenges, the emergence of the COVID-19 pandemic introduced an unprecedented set of stressors to healthcare professionals worldwide.[3] The pandemic's multifaceted impact encompassed heightened workloads, concerns about personal safety, fears of contagion, and constant adaptations to new guidelines and protocols. In the context of healthcare, the pandemic's implications were particularly pronounced for family medicine physicians.[3,4] These professionals often play a frontline role in patient care, diagnosing a wide range of medical conditions, and managing patient health across different age groups.[5,6]

The pandemic's profound impact on healthcare providers raised concerns about the potential implications for their sleep quality. Prior to the pandemic, studies had already highlighted sleep disturbances among healthcare professionals.[7,8] Research involving nurses, doctors, and other medical personnel indicated elevated levels of sleep disturbances, insomnia, and excessive daytime sleepiness due to the demanding nature of their work. It is evident that such sleep disruptions have far-reaching consequences for healthcare providers' physical and mental health, leading to decreased job performance, burnout, and even an increased likelihood of medical errors.[6-8]

While existing literature provides insights into sleep quality among healthcare professionals, limited research has specifically explored the sleep patterns of family medicine physicians during the COVID-19 pandemic. This gap in knowledge is crucial, as understanding the unique experiences of these physicians during the pandemic is essential for devising targeted interventions to safeguard their well-being.

This study seeks to address this gap by examining the sleep quality of family medicine physicians in Jeddah, Saudi Arabia, both before and during the COVID-19 pandemic. The PSQI, a well-validated and widely used tool for assessing sleep quality, serves as the cornerstone of this investigation.[10] The PSQI evaluates various dimensions of sleep quality, including subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. By employing the PSQI, this study aims to provide a comprehensive overview of the different facets of sleep quality experienced by family medicine physicians.[10-12]

In addition to examining the sleep quality components, this study also endeavors to understand the associations between sleep quality and various demographic and health-related factors. By exploring factors such as sex, age, marital status, average family monthly income, smoking status, depression, anxiety, obesity, diabetes mellitus, hypertension, and respiratory diseases, the study seeks to identify potential vulnerabilities or protective factors influencing sleep quality.

Aims and objectives

The primary aim of this study is to assess the sleep quality of family medicine physicians in Jeddah, Saudi Arabia, both before and during the COVID-19 pandemic, using the PSQI. The study aims to investigate potential changes in sleep quality components and their associations with various demographic and health-related factors.

The specific objectives of the study are as follows: To evaluate the sleep quality of family medicine physicians before and during the COVID-19 pandemic using the PSQI questionnaire, to compare the scores of individual sleep quality components, including subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction, before and during the pandemic, to determine the overall global PSQI score before and during the pandemic and assess the proportion of participants with poor sleep quality (global PSQI score > 5) in each period, to explore the associations between sleep quality and demographic factors, including sex, age, marital status, average family monthly income, and smoking status and to investigate the associations between sleep quality and health-related factors, including depression, general anxiety disorder, obesity, diabetes mellitus, hypertension, and respiratory diseases.

METHODS

Study design

This cross-sectional study aimed to assess the sleep quality of family medicine physicians before and during the COVID-19 pandemic in Jeddah, Saudi Arabia. The study utilized the PSQI to evaluate sleep quality and its components.

Study setting

The study was conducted in 6 primary health care centres in Jeddah, which are: King Fahd hospital, King Abdullah medical complex, Rabig hospital, Eastern Jeddah general hospital, Althaqr hospital, and King Abdulaziz hospital.

Study period

The study was conducted in a period of 6 months from 1st of May 2023 to 1st of November 2023.

Study participants

A total of 109 family medicine physicians were recruited from various healthcare centres and hospitals in Jeddah. Participants were included if they were actively practicing family medicine and voluntarily consented to participate in the study. Exclusion criteria included participants who were non-Saudi and those weren't willing to participate in the study. Ethical approval was obtained from the relevant institutional review board.

Data collection

Data collection occurred in one phase by asking questions about the ongoing sleep quality (during the pandemic (referred to as "pandemic") and before the COVID-19 pandemic (referred to as "pre-pandemic"). Participants were invited to complete the PSQI questionnaire, providing information on their sleep quality over the preceding month before the pandemic. The same questionnaire was administered to participants to assess their sleep quality during the pandemic period.

Study instrument

The PSQI is a standardized tool for evaluating sleep quality.[10] The PSQI consists of seven components, each scored on a scale from 0-3, with higher scores indicating poorer sleep quality. The components include subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction. Component scores are summed to yield a global PSQI score, ranging from 0 to 21. A global PSQI score greater than 5 suggests poor sleep quality.

Data analysis

Descriptive statistics were used to summarize participants' demographic characteristics, including sex, age, marital status, average family monthly income, smoking status, depression, general anxiety disorder, obesity, diabetes mellitus, hypertension, and respiratory diseases. Paired-sample t-tests were employed to compare sleep quality component scores before and during the pandemic. Chi-square tests were utilized to analyze the proportion of participants with a global PSQI score greater than 5 before and during the pandemic. Additionally, analysis of variance (ANOVA) was conducted to explore associations between sleep quality and participant characteristics.

Ethical considerations

The study adhered to ethical guidelines and ensured the confidentiality and anonymity of participants. Informed consent was obtained from each participant, and they were informed about their right to withdraw from the study at any point.

RESULTS

Table 1 provides a comprehensive overview of the characteristics of the participating family physicians (n=109) in the study. The sample encompassed a diverse range of demographic and health-related attributes, shedding light on the profile of family medicine practitioners in Jeddah, Saudi Arabia.

The distribution of participants according to sex revealed a balanced representation, with 53 (48.6%) identifying as female and 56 (51.4%) as male. In terms of age, the majority of participants were less than 30 years old, constituting 89 (81.7%) of the cohort, while 20 (18.3%) participants were aged 30 or more.

Marital status exhibited variability within the sample, as 65 (59.6%) participants identified as single, 42 (38.5%) as married, and a smaller proportion, 2 (1.8%), as widowed. Regarding the average family monthly income, 76 (69.7%) participants reported an income of 15000 SAR or more, 17 (15.6%) reported an income between 10000 to 14999 SAR, 13 (11.9%) reported an income up to 4999 SAR, and 3 (2.8%) reported an income between 5000 to 9999 SAR.

Exploring health-related factors, 18 (16.5%) participants were current smokers, 3 (2.8%) were ex-smokers, and 70 (64.2%) were non-smokers. An additional 18 (16.5%) participants were exposed to passive smoking. Regarding mental health indicators, 17 (15.6%) participants reported experiencing depression, while a majority of 92 (84.4%) participants reported no such symptoms. Similarly, 21 (19.3%) participants reported general anxiety disorder, with 88 (80.7%) participants not exhibiting signs of this condition.

The prevalence of physical health conditions within the sample was relatively low. Specifically, 25 (22.9%) participants were classified as obese, while the majority of 84 (77.1%) participants were not. A mere 2 (1.8%) participants had diabetes mellitus, and 3 (2.8%) had hypertension. The prevalence of respiratory diseases was reported by 7 (6.4%) participants, whereas 102 (93.6%) participants reported no such conditions.

Table 2 presents a comprehensive comparison of the PSQI scores before and during the COVID-19 pandemic (n=109) among family physicians. The study investigated seven key components of sleep quality using the PSQI. Before COVID-19, participants reported an average subjective sleep quality score of 0.97±0.73, which slightly increased to 1.1±0.79 during COVID-19. This change was statistically significant (t=-3.100, p=0.002*), suggesting a mild decline in subjective sleep quality.

Sleep latency, the time taken to fall asleep, exhibited a notable reduction from an average score of 2.93±1.73 before COVID-19 to 2.31±0.63 during COVID-19. This change was highly significant (t=4.893, p=0.000*), indicating improvement in sleep latency during pandemic.

Regarding sleep duration, average score increased from 1.42±1 before COVID-19 to 1.63±0.97 during COVID-19. This change was statistically significant (t=-4.170, p=0.000*), suggesting slight increase in the sleep duration.

Sleep efficiency, which assesses the proportion of time spent asleep while in bed, exhibited a minor increase from an average score of 1.01±1.36 before COVID-19 to 1.2±1.4 during COVID-19. This change was statistically significant (t=-3.349, p=0.001*), suggesting a marginal improvement in sleep efficiency. Sleep disturbance scores displayed a substantial increase from an average of 1.28±0.53 before COVID-19 to 2.03±0.46 during COVID-19. This change was highly significant (t=-17.676, p=0.000*), indicating a significant increase in sleep disturbances during the pandemic.

Participants' use of sleep medication saw a minor rise from an average score of 0.26±0.61 before COVID-19 to 0.46±0.83 during COVID-19. This change was statistically significant (t=-3.244 and p=0.002*), suggesting a modest increase in the utilization of sleep medication.

Daytime dysfunction, reflecting the extent of impairment in daily functioning due to poor sleep, showed a minor increase from an average score of 1.11±0.72 before COVID-19 to 1.21±0.76 during COVID-19. This change was statistically significant (t=-3.175, p=0.002*), suggesting a slight deterioration in daytime functioning. The overall Global PSQI Score increased from an average of 8.98±3.89 before COVID-19 to 9.94±3.13 during COVID-19. This change was highly significant (t=-4.611, p=0.000*), indicating a worsening of overall sleep quality during the pandemic. Furthermore, the proportion of participants with a PSQI score greater than 5 increased significantly from 83.5% before COVID-19 to 91.7% during COVID-19 (χ^2 = 49.595, p=0.000**).

Table 3 presents the association between participants' characteristics and their global PSQI scores before and during the COVID-19 pandemic. When considering sex as a factor, female participants exhibited an average PSQI score of 10.13±3.65 before COVID-19, slightly higher than male participants' score of 7.89±3.83 (F=9.743, p=0.002). Similarly, during COVID-19, females had an average score of 10.87±2.96, while males had a score of 9.07±3.06 (F=9.696, p=0.002), both indicating that females experienced poorer sleep quality.

For age, participants aged <30 years had an average PSQI score of 9.37±3.94 before COVID-19, higher than those aged 30 or more (F=5.03, p=0.027). However, during COVID-19, this difference was not significant (F=1.589, p=0.21). Marital status showed no significant associations with PSQI scores before and during COVID-19 (F values and p-values indicated). Regarding average family monthly income, no significant associations were observed between income levels and PSQI scores before and during COVID-19 (F values and p values indicated).

Smoking status also did not show significant associations with PSQI scores before and during COVID-19 (Fand p values indicated).

When considering mental health factors, participants with general anxiety disorder reported higher PSQI scores before COVID-19 (11.14±3.21) compared to those without (8.47±3.88) (F=8.584, p=0.004). This pattern persisted during COVID-19 (F=11.771, p=0.001). Participants with diabetes mellitus reported higher PSQI scores before COVID-19 (15±2.83) compared to those without (8.87±3.83) (F=5.055, p=0.027), though this difference was not significant during COVID-19 (F=3.5, p=0.064).

Similarly, participants with hypertension had higher PSQI scores before COVID-19 (13±5.29) compared to those without (8.87±3.82) (F=3.36, p=0.07), with a similar trend observed during COVID-19 (F=2.994, p=0.086). Other parameters, including obesity and respiratory diseases, did not show significant associations with PSQI scores before and during COVID-19 (F values and p values indicated).

Table 1: Characters of participating family physicians (n=109).

Parameters		Frequency (%)
Sex	Female	53 (48.6)
	Male	56 (51.4)
Age (in years)	Less than 30	89 (81.7)
	30 or more	20 (18.3)
Marital status	Widowed	2 (1.8)
	Single	65 (59.6)
	Married	42 (38.5)
Average family monthly income, (SAR)	Up to 4999	13 (11.9)
	5000 to 9999	3 (2.8)
	10000 to 14999	17 (15.6)
	15000 or more	76 (69.7)

Continued.

Parameters		Frequency (%)
Smoking status	Current smoker	18 (16.5)
	Ex-smoker	3 (2.8)
	No smoking	70 (64.2)
	Passive smoking	18 (16.5)
Depression	Yes	17 (15.6)
	No	92 (84.4)
General anxiety disorder	Yes	21 (19.3)
	No	88 (80.7)
Obesity	Yes	25 (22.9)
	No	84 (77.1)
Diabetes mellitus	Yes	2 (1.8)
	No	107 (98.2)
Hypertension	Yes	3 (2.8)
	No	106 (97.2)
Respiratory diseases	Yes	7 (6.4)
	No	102 (93.6)

Table 2: PSQI scores before and during COVID-19 (n=109).

PSQI components scores	Before COVID-19	During COVID-19	T	P value
Subjective sleep quality	0.97±0.73	1.1±0.79	-3.100	0.002*
Sleep latency	2.93±1.73	2.31±0.63	4.893	0.000*
Sleep duration	1.42±1	1.63±0.97	-4.170	0.000*
Sleep efficiency	1.01±1.36	1.2±1.4	-3.349	0.001*
Sleep disturbance	1.28±0.53	2.03±0.46	-17.676	0.000*
Use of sleep medication	0.26±0.61	0.46±0.83	-3.244	0.002*
Daytime dysfunction	1.11±0.72	1.21±0.76	-3.175	0.002*
Global PSQI score	8.98±3.89	9.94±3.13	-4.611	0.000*
PSCI score > 5, n (%)	91 (83.5%)	100 (91.7%)	X^2=49.595	0.000**

*Paired sample T test was used, *Chi-square test was used.

Table 3: Characters of participants in association with global PSQI scores before and during COVID-19 (n=109).

Parameters		Before COVID-19	F value	P value	During COVID-19	F value	P value
Sex	Female	10.13±3.65	9.743	0.002	10.87±2.96	9.696	0.002
	Male	7.89±3.83			9.07±3.06		
Age (in years)	Less than 30	9.37±3.94	5.03	0.027	10.12±3.11	1.589	0.21
	30 or more	7.25±3.23			9.15±3.18		
Marital status	Widowed	6±0	0.997	0.372	9±0	0.307	0.737
	Single	9.31±3.37			10.12±2.95		
	Married	8.62±4.63			9.71±3.47		
Average family monthly income, (SAR)	Up to 4999	9.23 ± 1.96	0.448	0.719	10±1.73	1.802	0.151
	5000 to 9999	8±0			13.33±2.08		
	10000 to 14999	9.88±4.31			10.71±2.91		
	15000 or more	8.78±4.12			9.63±3.32		
Smoking status	Current smoker	7.78±4.15	0.802	0.496	9.06±3.26	1.121	0.344
	Ex-smoker	8.33±4.04			10.33±5.77		
	No smoking	9.16±4.09			9.9±3.17		
	Passive smoking	9.61±2.64			10.94±2.21		
Depression	Yes	9.94±3.38	1.227	0.271	10.35±3.33	0.34	0.561
	No	8.8±3.97			9.87±3.1		
General anxiety disorder	Yes	11.14±3.21	8.584	0.004	11.95±3.09	11.771	0.001
	No	8.47±3.88			9.47±2.96		

Continued.

Parameters		Before COVID-19	F value	P value	During COVID-19	F value	P value
Obesity	Yes	9.4±4.25	0.373	0.543	10.16±3.82	0.152	0.697
	No	8.86±3.8			9.88±2.92		
Diabetes mellitus	Yes	15±2.83	5.055	0.027	14±1.41	3.5	0.064
	No	8.87±3.83			9.87±3.11		
Hypertension	Yes	13±5.29	3.36	0.07	13±3.46	2.994	0.086
	No	8.87±3.82			9.86±3.09		
Respiratory diseases	Yes	9.57±4.28	0.17	0.681	8.71±3.5	1.159	0.284
	No	8.94±3.88			10.03±3.1		

DISCUSSION

The current study examined the sleep quality among family medicine physicians before and during the COVID-19 pandemic in Jeddah, Saudi Arabia, utilizing the PSQI. The comprehensive investigation into sleep quality, as well as its associations with various demographic and health-related factors, has revealed valuable insights into the potential impacts of the pandemic on sleep patterns of healthcare professionals.

The analysis of PSQI scores before and during COVID-19 revealed a mixed picture of changes in sleep quality components. While some components exhibited improvement, others experienced deterioration. Notably, sleep latency decreased during the pandemic, indicating that participants were able to fall asleep more quickly. This could be attributed to factors such as reduced commute times and flexible working schedules, which may have provided family physicians with additional time for rest. Moreover, the increase in sleep duration could reflect a potential adjustment to work-from-home arrangements/ reduced demand for early morning duties.

Conversely, sleep disturbance scores significantly worsened during the pandemic, suggesting an increased prevalence of factors interrupting participants' sleep, potentially linked to heightened stress and uncertainty related to the pandemic. This finding is consistent with global trends indicating elevated levels of stress and anxiety during the pandemic.[6-9] The observed increase in the use of sleep medication also implies that a proportion of family physicians turned to pharmacological aids to manage their sleep difficulties during this challenging period.[7]

The global PSQI score, encompassing all components, demonstrated a decline in sleep quality during the pandemic. This observation aligns with reports from various global studies highlighting the negative impact of the pandemic on sleep patterns. The increase in the proportion of participants with a PSQI score greater than 5 during the pandemic underscores the widespread deterioration of sleep quality among family physicians in this study population.

The examination of participant characteristics in association with PSQI scores provided further insights. Female participants consistently reported poorer sleep quality both before and during COVID-19, which is consistent with existing literature indicating gender disparities in sleep quality.[1,7,8] Additionally, participants with general anxiety disorder experienced significantly worse sleep quality during both periods, indicating a bidirectional relationship between sleep disturbances and anxiety. This finding underscores the importance of addressing mental health concerns in conjunction with sleep-related interventions.[1]

The study also revealed intriguing associations between certain health conditions and sleep quality. Participants with diabetes mellitus and hypertension reported poorer sleep quality before COVID-19, while the associations were less prominent during the pandemic.

These observations might reflect the complex interactions between chronic health conditions, stressors, and sleep disturbances, with potential variations based on the specific circumstances of the pandemic.

It is important to acknowledge some limitations of the study. The cross-sectional design limits the ability to establish causality between variables. Additionally, the self-reported nature of data may introduce recall bias and subjectivity. Future research could consider longitudinal designs and objective sleep measurements to enhance the validity of findings.

CONCLUSION

In conclusion, the present study underscores the significance of investigating sleep quality among family physicians, especially during a global crisis such as the COVID-19 pandemic. The observed changes in sleep quality components and their associations with demographic and health-related factors provide a nuanced understanding of the multifaceted nature of sleep disturbances in this healthcare population. These findings emphasize the importance of tailored interventions to mitigate sleep difficulties and promote the well-being of healthcare professionals, which in turn could contribute to the overall quality of patient care.

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