Sleep patterns and predictors of poor sleep quality among Saudi commission residents in the Aseer region, Saudi Arabia before and during covid-19 pandemic

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ABSTRACT

Background: Sleep is an essential part of human physiology. Being a basic need for human well-being, adequate sleep is associated with good health and life quality for all individuals. Disorders of sleep may result in significant derangement in human functionality. Sleepiness among physicians affects not only their personal lives but also negatively impacts the lives of their patients. Method: This is an analytic cross-sectional study design conducted among 268 male and female Saudi commission residents working in public healthcare facilities in the Aseer region, Saudi Arabia. The study aimed to assess sleep patterns and determine predictors of poor sleep quality among Saudi commission residents of the Aseer region, Saudi Arabia. Result: The study reported that before COVID 19 pandemic, 85.1% of Saudi commission residents had poor sleep quality; however, during the pandemic, the percentage increased to 92.5% who showed poor sleep quality. Also, we found there was a significant association between different self-reported morbidities among Saudi commission residents and sleep disturbance (p < 0.05). Conclusion: The study revealed that the percentage of the Saudi commission residents had poor sleep quality during pandemic higher than before with significant difference, which indicates the relation between COVID 19 pandemic and sleep quality among Saudi commission residents.

Keywords: Covid-19, predictors, quality, sleep

Introduction

Background: Sleep is an essential part of human physiology. Being a basic need for human well-being, adequate sleep is associated with good health and life quality among individuals. Studies have revealed that poor sleep quality is linked to the negative impact on psychophysiological health as depression, body fatigue, poor professional performance, and excessive daytime sleepiness in college students. Lack of sufficient sleep can affect cognitive, behavioral abilities. It can contribute

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to weight gain, neurologic disorders as Alzheimer’s disease, cardiometabolic disorders, and even increased mortality. Poor sleep also depresses immunity and results in loss of memory, which, among healthcare professionals, can be alarming. On March 11, 2020, the novel coronavirus (COVID-19) outbreak has been declared a global pandemic by the World Health Organization (WHO). As part of the global response to contain the pandemic, governments have been informed to maximize measures for reducing the spread of the emerged public health disease. The major emphasis was placed on the healthcare system, which entitles healthcare providers in the isolation hospitals to show optimum performance around the clock. As of April 5, 2020, the confirmed cases of COVID-19 in Saudi Arabia reached 2,370 cases. Feeling under pressure is a likely experience during the current circumstances. This, along with other factors associated with the situation, may lead to psychological stress that can impair productivity. Many studies have shown an association between psychological stress and sleep efficiency. This study aims to assess sleep patterns and determine predictors of poor sleep quality among Saudi commission residents of the Aseer region, Saudi Arabia using the Pittsburg Sleep Quality Index (PSQI).

Poor sleep quality among healthcare providers had been reported by many authors. A cross-sectional study assessed the sleep quality of 334 junior physicians in Pakistan using PSQI. Of all participants, 36.8% were classified as “poor sleepers.” Poor sleep was significantly associated with female gender, lower total sleep time, excessive daytime sleepiness, increased latency of sleep onset, and an increase in the frequency of sleep disturbance.

Another study run in Madrid, Spain, included 240 physicians, of which 18.8% met the criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition for insomnia diagnosis. The study also concludes support for the relationship between burnout and disturbed sleep.

Another study conducted in Madrid, Spain, run by Rodríguez-Muñoz et al. employed the PSQI questionnaire. The study showed that 35% of primary care physicians were poor sleepers with a higher frequency among females (23%) than males (9.6%).

In Pakistan, a study has been conducted to assess sleep deprivation among trainee physicians. The study showed marked sleep deprivation in 79% of participants. The significant difference between this finding and the other study conducted in Pakistan 16 (79% and 36.8%) might be due to the use of a non-validated questionnaire. It could also be caused by the inclusion of postgraduate residents who might have a greater degree of sleep deprivation.

In Saudi Arabia, a study aimed to identify the prevalence of and risk factors for poor sleep quality among residents in Saudi Arabia using the PSQI questionnaire found that there was a high prevalence (86.3%) of poor sleep quality among residents. Anesthesia residents constituted the highest prevalence of poor sleep (96%), whereas the lowest prevalence was among residents of pathology (68.7%). The commonest contributor to poor sleep was increased sleep latency (68.4%) at least once a week.

Another cross-sectional study conducted in Riyadh city, Saudi Arabia, on 518 healthcare providers found that the prevalence of sleep disorders among the sample was 55.2%. Even though most studies conducted in the Saudi region reported that insomnia is the most prevalent sleep disorder, this study found that the most common sleep disorders included sleep scheduled disorders and wake up, insomnia, and partial fatigue. Among participants, 85.9% of healthcare providers had poor quality of sleep.

According to dramatic changes that have taken place recently, many factors can affect the daily routine and sleep patterns of physicians. Poor sleep quality can directly affect cognitive and memory function. Moreover, it can cause mood changes, inability to concentrate for a long duration, and predispose comorbidities. The result of the study will help in understanding the sleep patterns of Saudi commission residents with different responsibilities. According the researcher’s study, no similar studies have been conducted in Aseer city, Saudi Arabia.

This study aims to assess sleep patterns and determine predictors of poor sleep quality among Saudi Commission residents of the Aseer region, Saudi Arabia.

Objectives
1. To assess the patterns of sleep of Saudi commission residents in the Aseer region, Saudi Arabia
2. To assess the sleep quality and determine the predictors of poor sleep among Saudi commission residents in the Aseer region, Saudi Arabia.
3. To explore other factors that may affect sleep quality, namely diabetes, hypertension, respiratory diseases, heart diseases, depression, general anxiety disorder, and obesity.

Material and Methodology

Analytic cross-sectional study design. Male and female Saudi Commission residents working in public healthcare facilities in the Aseer region, Saudi Arabia, were active during the data collection period. The sample size was calculated using the following formula:

\[ n = \left[ \frac{Z_{a/2}}{E} \right]^2 \times P(1-P) \]

Where:
- \( n \) = sample size
- \( Z_{a/2} = 1.96 \) (The critical value that divides the central 95% of the Z distribution from the 5% in the tail)
P = 85% (Prevalence of poor sleep quality among physicians in Saudi Arabia 20-21).

E = the margin of error (=width of confidence interval)

By calculation, the sample size is equal to 231 physicians with 10% as drop-out rate, so a total sample size of 255 physicians was estimated.

Exclusion Criteria:
• Inability to understand the objective and sign the consent form
• Failure to complete the questionnaire

Inclusion Criteria:
• All saudi commission residents in Aseer region.
• Female and male.
• Working in a public healthcare facility during at least the last three months
• Ability to communicate and fill out the questionnaire

Study area
Aseer region, Saudi Arabia.

Study time
The data collection period is during April 2020.

Ethical consideration
• Individual consents were filled by participants in the questionnaire.
• No names were registered.
• Approval by research and the ethical committee was obtained.
• Confidentiality was maintained all through the research steps.
• There is no conflict of interest.

A self-administered questionnaire consisting of four sections was distributed. The first section is an introduction to the study purpose and reassurance of confidentiality. The second section is the demographic data. The third section is the PSQI to evaluate sleep quality before the COVID-19 pandemic. The fourth section is the PSQI to evaluate sleep quality during the pandemic of COVID-19.

Pittsburgh sleep quality index (PSQI) 12
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The PSQI is a standardized measure of sleep quality. The PSQI contains seven assessment indicators include (1) subjective sleep quality, (2) sleep latency, (3) habitual sleep efficiency, (4) sleep duration, (5) sleep difficulties, (6) daytime functional impairment, and (7) use of sleeping pills.

To calculate the score of the questionnaire, each question is assigned a score from 0 to 3. The item scores are used in calculating the 7 component scores, which are then added to produce a total score, which can range from 0 to 21. If the total score obtained is 5 or greater, then it suggests poor sleep quality. Moreover, if it was less than 5, then this is considered to be good sleep quality.

The collected data was entered and analyzed using the Statistical Package for the Social Science (SPSS Inc. Chicago, IL, USA) version 23. Descriptive statistics were performed. Percentages were given for qualitative variables. The determinant factors were determined using the Chi-square test. The P value was considered significant if P < 0.05.

Results
Table 1 shows the socio-demographics of the participating medical doctors. Males constituted 63.8% of the sample. Age ranged from 26-37 years, where 76.5% were aged 26-29 years, and 21.3% were aged 30-33 years. Half (50.7%) of the participants were single, and 47.8% were married. All participants (100.0%) had an average monthly income of over 15000 SAR. One-fourth of participants (25.4%) specialized in internal medicine, whereas 26.1%, 14.9%, and 9.0% specialized in family medicine, general surgery, and obstetrics & gynecology, respectively.

| Parameter                      | Frequency | Percentage |
|--------------------------------|-----------|------------|
| Age                            |           |            |
| 26-29 years                    | 205       | 76.5%      |
| 30-33 years                    | 57        | 21.3%      |
| 34-37 years                    | 6         | 2.2%       |
| Mean±S.D.                      | 28.4±1.9  |            |
| Sex                            |           |            |
| Male                           | 171       | 63.8%      |
| Female                         | 97        | 36.2%      |
| Marital status                 |           |            |
| Single                         | 136       | 50.7%      |
| Married                        | 128       | 47.8%      |
| Divorced                       | 2         | 0.7%       |
| Widowed                        | 2         | 0.7%       |
| Average monthly income         |           |            |
| <5000 SAR                      | 0         | 0.0%       |
| 5000-10000 SAR                 | 0         | 0.0%       |
| 10000-15000 SAR                | 0         | 0.0%       |
| >15000 SAR                     | 268       | 100.0%     |
| Specialty                      |           |            |
| Dermatology                    | 11        | 4.1%       |
| Emergency medicine             | 10        | 3.7%       |
| Ear, Nose & Throat             | 6         | 2.2%       |
| Family medicine                | 70        | 26.1%      |
| General surgery                | 40        | 14.9%      |
| Internal medicine              | 68        | 25.4%      |
| Obstetrics & Gynecology        | 24        | 9.0%       |
| Ophthalmology                  | 4         | 1.5%       |
| Orthopedics                    | 5         | 1.9%       |
| Pediatrics                     | 25        | 9.3%       |
| Psychiatry                      | 5         | 1.9%       |
Table 2 presents the means and standard deviation of the PSQI global score, as well as individual components, before and during the COVID-19 pandemic. Pearson correlation test shows that all component score means before and during the pandemic were positively correlated. A significant correlation ($P = 0.000$) was present with all components. The majority (85.1%) had disturbed sleep before the pandemic, whereas the value increased to 92.5% during the pandemic ($P = 0.000$).

Figure 1 illustrates the mean global PSQI score among different specialties before and during the pandemic. The sleep quality decreases among almost all specialties during the pandemic (blue) than before (green). It is noticeable that the mean score among Otorhinolaryngologist ENT doctors did not change, and the sleep quality improved among orthopedic doctors.

Table 3 shows the mean PSQI global score and associated self-reported morbidities among physicians. The mean score increased among those who reported depression, obesity, and general anxiety disorder ($P = 0.000$), and decreased among hypertensive and diabetic medical doctors ($P = 0.002$ and $P = 0.000$, respectively).

**Discussion**

Sleep is a biological necessity.\[23\] It is important for maintaining good physical, mental, and emotional health,\[24\] and it is one of the most important factors that establish the quality of life.\[25\] Therefore, disorders of sleep may result in significant derangement in human functionality. Health care providers are no exception to this fact. Sleepiness among physicians affects not only their personal lives but also negatively impacts the lives of their patients.\[26\] Several well-designed studies have documented adverse consequences of poor sleep compromising health care delivery, such as increased error rates, impaired electrocardiogram interpretation, poor communication, and less empathy.\[27-29\]

The severe status during any infection outbreak may develop many mental health issues, including stress, anxiety, depressive symptoms, anger, insomnia, fear, and sleep disorders.\[30\] There were several factors that may have resulted in reduced sleep quality in the medical staff. Doctors and nurses had to wear protective clothing every day, including hazardous materials (HazMat) suits. The staff worked continuously in isolation, wards with high work intensity, and under pressure.\[31\]

| Parameter | Mean±SD Before | Mean±SD During | Pearson Correlation (r) | P |
|-----------|----------------|----------------|--------------------------|---|
| Component 1: Subjective sleep quality | 1±10.82 | 1.29±0.86 | 0.824 | 0.000* |
| Component 2: Sleep latency | 3.0±2.0 | 2.35±0.66 | 0.787 | 0.000* |
| Component 3: Sleep duration | 2.0±1.0 | 1.82±0.88 | 0.804 | 0.000* |
| Component 4: Sleep efficiency | 1.09±1.34 | 1.29±1.35 | 0.859 | 0.000* |
| Component 5: Sleep disturbance | 1.34±0.59 | 2.05±0.51 | 0.670 | 0.000* |
| Component 6: Use of sleep medication | 0.46±0.82 | 0.71±0.97 | 0.693 | 0.000* |
| Component 7: Daytime dysfunction | 1.32±0.78 | 1.42±0.78 | 0.873 | 0.000* |
| Global PSQI Score | 9.90±4.44 | 10.94±3.36 | 0.892 | 0.000* |
| Global PSQI score >5 (%) | 85.1% | 92.5% | - | 0.000** |

*Pearson correlation significance. **Chi-square test was used

| Parameter | Yes (%) | PSQI Global before COVID-19 | PSQI Global during COVID-19 | P |
|-----------|---------|-----------------------------|-----------------------------|---|
| Diabetes | 2.2% | 14.67±1.86 | 14.00±0.89 | 0.002 |
| Hypertension | 3.0% | 13.75±4.23 | 13.25±2.66 | 0.000 |
| Heart diseases | 0.0% | - | - | - |
| Respiratory disorders | 3.7% | 10.60±3.69 | 10.00±2.98 | 0.000 |
| Depression | 11.9% | 11.63±3.46 | 12.19±3.49 | 0.000 |
| General Anxiety Disorder | 18.7% | 10.72±4.10 | 11.44±3.33 | 0.000 |
| Obesity | 24.3% | 10.65±3.91 | 11.35±3.37 | 0.000 |
Both frontline (FLHCW) and no frontline health care workers (NFLHCW) were found to experience stark levels of stress and poor sleep quality amid the coronavirus disease 2019 (COVID-19) pandemic. However, the researchers noted that few studies have concentrated on the sleep quality of health care workers during COVID-19 or other pandemic events.\textsuperscript{[32]}

This is an analytic cross-sectional study design conducted among 268 male and female Saudi commission residents in public healthcare facilities in the Aseer region, Saudi Arabia. The study aimed to assess sleep patterns and determine predictors of poor sleep quality among Saudi commission residents before and during COVID-19 in the Aseer region, Saudi Arabia.

Our study used the Pittsburgh sleep quality index (PSQI) to measure sleep quality. The sleep quality is based on the Pittsburgh Sleep Quality Index – PSQI. It is a self-rated questionnaire that measures subjective sleep quality and disturbances over the previous month and discriminates between normal and poor sleepers.\textsuperscript{[32]} Participants with a global score of ≥5 were classified as poor sleepers. Those with a score of <5 were classified as good sleepers. As regards PSQI, our study found that before COVID 19 pandemic, 85.1% of physicians had poor sleep quality with a score of 9.90 ± 4.44, during the pandemic, the score increase to 10.94 ± 3.36 and 92.5% of the physician had poor sleep quality, and the difference was significant (P < 0.05). Another cross-sectional study included 257 health care workers (FLHCW, NFLHCW) from facilities of the Ministry of Health, Bahrain. Participants completed an online questionnaire that included socio-demographics, the PSQI; in fact, both groups exhibited high levels of poor sleep quality (75% and 76%, respectively); the study authors concluded that poor sleep quality among physicians is common during the COVID-19 crisis.\textsuperscript{[32]} Also, in China, a web-based cross-sectional survey was conducted among 7,236 self-selected volunteers to assess the mental health burden of the Chinese public during the COVID 19 outbreak. Among these samples, 2,250 (31.1%) of participants were healthcare workers; compared with other occupational groups, healthcare workers reported the highest rate of poor sleep quality (P < 0.001).\textsuperscript{[33]} In Wuhan, China, another study was carried out 180 medical staff who treated patients with COVID-19 infection; the findings from the study showed that the sleep quality of the medical staff was low with a mean PSQI score of 8.583, compared with the normal Chinese PSQI score of 7 points, the sleep quality of medical staff who treated COVID-19 was relatively low.\textsuperscript{[34]} Another study included 268 physicians from different medical settings during the COVID-19 outbreak; the study used the Athens Insomnia Scale to measure the severity of sleep difficulty; the mean sleep score of the physicians was 8.43 of 24, and more than two-thirds of the physicians were sleepless during the COVID-19 outbreak with a significant positive correlation with the number of days dealt with the suspected/confirmed cases of the COVID-19.\textsuperscript{[34]} The physicians reported that they had a slightly unsatisfactory quality of sleep.\textsuperscript{[38]}

Regarding self-reported morbidities among physicians, 24.3% had obesity, 18.7% showed general anxiety disorder, 11.9% had depression, 3.7% had respiratory disorders, 3% had depression, and 2.2% had diabetes. There was a significant association between sleep disturbance before and after pandemic with morbidities among physicians (P < 0.05).

**Conclusion**

The study revealed that the percentage of physicians who had poor sleep quality during the pandemic was higher than before was significantly different, which indicates a correlation between COVID-19 pandemic and the sleep quality among physicians.

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Nil.

**Conflicts of interest**

There are no conflicts of interest

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