The association between sleep disturbance and coronaphobia among physicians in primary health care centers of Ministry of Health, Jazan Province

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Abstract

Background: Sleep disturbances are extremely common among doctors with profound effect on quality of life. Coronaphobia is the dread of COVID-19 that can affect physicians and their sleep quality.

Aim of Study: Our study aimed to assess sleep disturbance and its association with coronaphobia among primary health care (PHC) physicians in Primary Health care Centers (PHCCs) of the Ministry of Health, Jazan Province, Saudi Arabia.

Method: The study is a cross-sectional questionnaire-based observational investigation using a simple random sampling scheme. The sampling frame was all PHC physicians practicing in Jazan Province. We used the Fear-of-COVID and Pittsburgh Sleep Quality Index (PSQI) questionnaires. Poisson Regression modelling techniques were used to analyse the adjusted effect of sociodemographic factors on Fear-of-COVID and Pittsburgh Sleep Quality scores.

Results: A total of 385 physicians participated in the study. The prevalence of poor quality of sleep among our physicians was 47.3%, while prevalence of coronaphobia was 56.2%. Coronaphobia had significant negative impact on sleep quality, even with adjustment for the effect of all other clinical and demographic variables. A rise by one point in the fear of COVID questionnaire is associated with a rise by 2.3% points in the PSQI score (indicative of poorer sleep quality, p = 0.00081).

Conclusions: Coronaphobia is common and has detrimental effect of sleep quality among PHC physicians. Coronaphobia has negative impact on sleep quality. Higher burden of depressive symptoms worsens physicians' sleep quality.

Recommendations: Support for PHC physicians' psychological and physical well-being is paramount during the current COVID-19 crisis.

Keywords: Coronaphobia, sleep quality, risk factors, South-western Saudi Arabia

Introduction

Coronaphobia is the dread of COVID-19 (1) that was recognized as a significant fear as soon as the COVID-19 crisis ensued. Fear, anxiety, and worry were part of the new normal created by the successive waves of different variants of the coronavirus (2). Healthcare workers, particularly those working as frontline staff, are at increased risk of coronaphobia (3). Specifically, coronaphobia can substantially affect physicians and their sleep quality.

Sleep disturbances are considered one of the most important growing issues in public health and are associated with common complications and difficulties which adversely impact the quality of life with reduction of physical activities. Increasing the risk of obesity, heart attacks, high blood pressure, and stroke are considered the most common complications associated with sleep disturbances. The pandemic of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) showed multiple waves with varying severity over the last 50 months after it first started in Wuhan, China in December 2019. By March 2022, reported cases of Coronavirus Disease 2019 (COVID-19) have exceeded the 450 million mark worldwide with over 6 million deaths toll (4).

Sleep disturbances have an established global prevalence of 7.6% that has detrimental impact on quality of life, with increased risk for obesity, cardiovascular disorders and stroke. In addition to primary insomnia, sleep disturbances encompass several disorders that include parasomnias, and obstructive sleep apnoea (5).

Primary healthcare physicians are front-line practitioners in the health care system (6). Given their unsociable working hours and occupational stress, they are particularly vulnerable to sleep disturbance (7). The prevalence of sleep disorder among physicians was estimated at a staggering 41.6% (8). Studies showed that sleep disturbance among healthcare workers bear a strong relation to immune disorders, cardiovascular diseases, cancer (9), and anxiety disorders (10). Hence, sleep disturbance would have a profound negative impact on the quality of the health care services provided (11).

The current study aimed to assess sleep disturbance and its association with coronaphobia among PHC physicians in PHCCs of the Ministry of Health, Jazan Province, Saudi Arabia.

Methods

Design: A cross-sectional, questionnaire-based, observational study.

Study population: All PHC physicians practicing within Jazan Province in the Southwestern Region of Saudi Arabia.

Inclusion criteria: Registered physician practicing in PHCCs in Jazan, including all ranks of PHC physicians (from resident to consultant).

Exclusion criteria: Physicians in the academic capacity only. Refusal to participate in the study.

Sampling technique: A list of all practicing PHC physicians in Jazan Province was obtained from the Ministry of Health records. This constituted the sampling frame from which a multistage cluster sampling technique was constructed using random tables. Each PHC physician was contacted through their head supervisor and was then invited to take part in the online questionnaire. Receiving a response from the physician was considered as his/her consent to participate.

Data collection tool: The study tool included the following:

- **Personal characteristics:** Age, gender, years of experience, nationality, physician rank, comorbidity, and tea consumption.
- **The Pittsburgh Sleep Quality Index (PSQI):** It is a self-filled inventory that evaluates a one-month period of sleep disorder severity (12). The PSQI has 19 items, grouped together into 57 components. Each component sub-score refers to either daytime dysfunction, sleep latency, subjective sleep quality, sleep duration, sleep disturbance, habitual sleep efficiency, and use of sleeping medication. The total score is then categorized into 'poor sleep quality' or 'good sleep quality'.
- **The Fear of COVID-19 Scale:** This is a seven-item scale, which has a proven one-factor structure with established reliability and validity (13). Its Arabic adaptation was found to have good psychometric properties among Saudi respondents (14).

Sample size calculation: A minimum sample size of 374 was calculated, based on the formula of Wild and Serber (15), and a prevalence of 41.6% (8), with 5% level of significance and 80% power.

Ethical consideration: The study was approved by the Jazan Health Ethics Committee, affiliated to the Ministry of Health, Kingdom of Saudi Arabia.

Data analysis: Statistical analysis was performed using the R Statistical Package (version 3.6.0). Descriptive statistics, such as frequencies and proportions (for categorical data) as well as mean and standard deviation (for continuous data) (for instance: age and count of years of experience) were used. Chi-square test was used to compare dependence of categorical data. T-test was used to analyse the association between continuous and categorical data. Generalized Linear Poisson Regression modelling techniques were used to analyse the adjusted effect of sociodemographic factors on PSQI score. The tests were all two-sided, and the significance level was set at $P<0.05$ with Bonferroni correction where applicable.

Results

The total number of physicians was (n = 385) who agreed to be included in the study and gave consent to participate, of whom there were (n = 309, 80.3%) male doctors and (n = 75, 19.5%) female doctors.

Assessment of PSQI scores among the participating physicians revealed a mean of 5.9 points (SD = 2.29 points), ranging between a minimum score of 1 point and a maximum score of 14 points. Note that higher scores indicate poor quality of life (cut-off is 5 points score). The prevalence of poor quality of sleep among our physicians was (n = 182, 47.3%).

Assessment of fear of COVID results indicated a mean of 16.7 points (SD = 4.36 points), ranging between 7 and 25 points. The median score was 17 points. The prevalence of moderate coronaphobia was (n = 36, 9.4%), and for mild coronaphobia was (n = 180, 46.8%). There were (n = 168, 43.6%) participants with no coronaphobia.

Figures (1-7) show the PSQI scores according to different characteristics of participant PHC physicians.

Table (1) shows that the higher the physician rank, the worse the sleep quality, and being Saudi was associated with better sleep quality. Also, tea drinking led to poorer sleep quality, as did arrhythmia, allergic rhinitis and diabetes.

Table (2) shows that the odds ratio for the effect of coronaphobia on PSQI score was 1.023, indicating that a rise by one point in the fear of COVID questionnaire is associated with a rise by 2.3% points in the PSQI score (indicative of poorer sleep quality, p= 0.00081). Also, a higher burden of depressive symptoms worsened physicians' sleep quality (odds = 1.076, p = 0.0187). Diabetes was associated with poorer sleep quality (odds = 1.374, p = 0.0074). Moreover, two non-consultant ranks were associated with better sleep quality, senior registrar odds = 0.782 (p = 0.0444), and resident odds = 0.763 (p = 0.0299). The longer the clinical experience the better the sleep quality, (odds = 0.976, p = 0.0160).

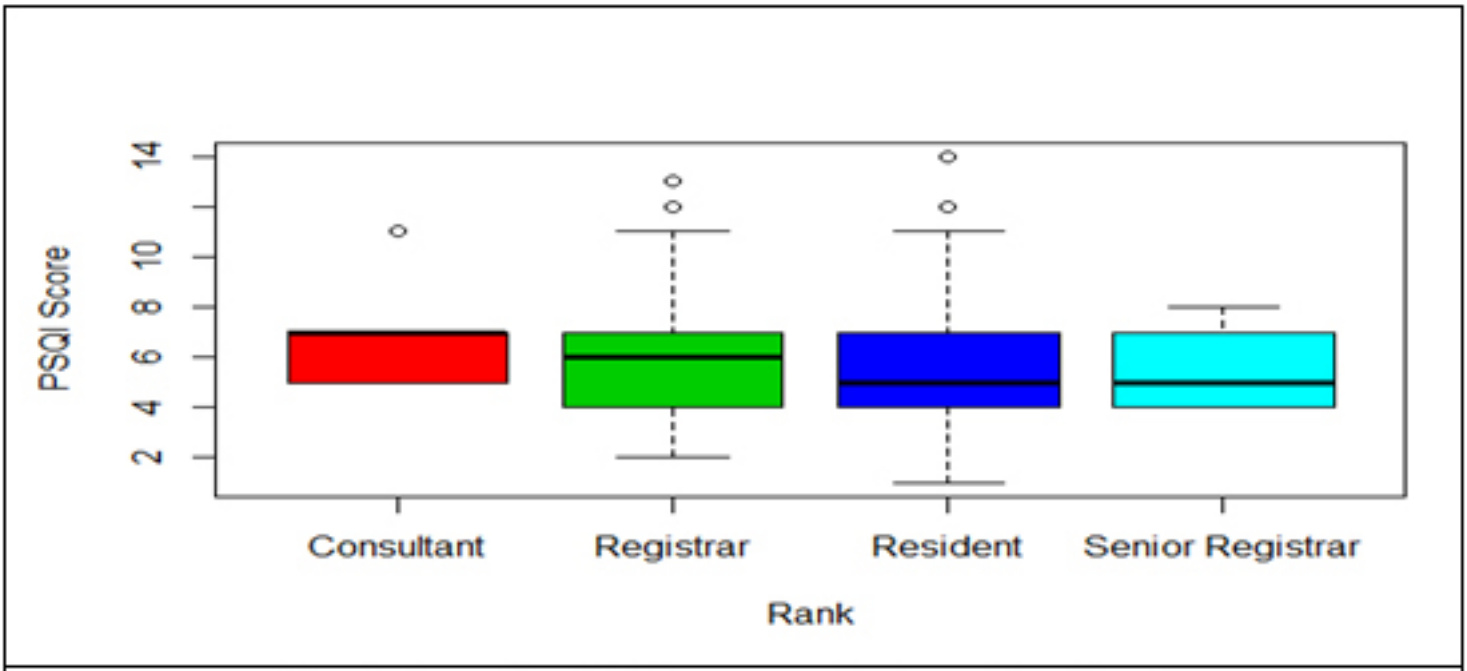

Figure 1. Comparison of PSQI scores according to participants' ranks

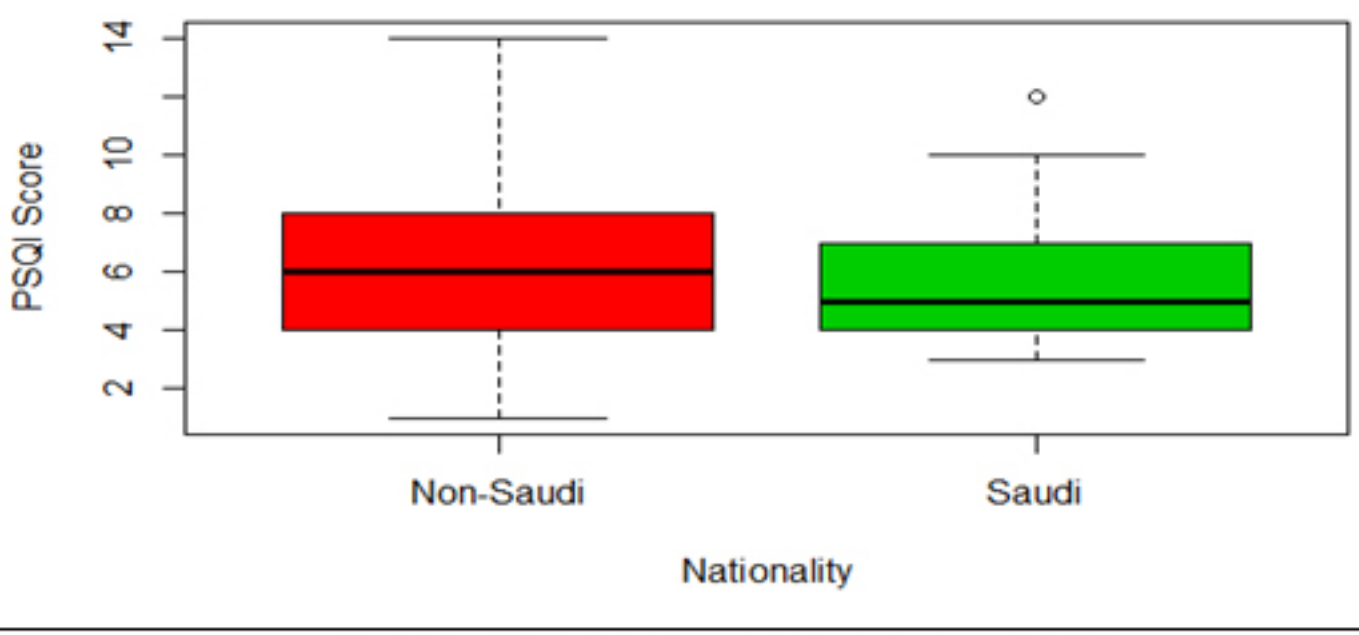

Figure 2. PSQI scores according to participants' nationality

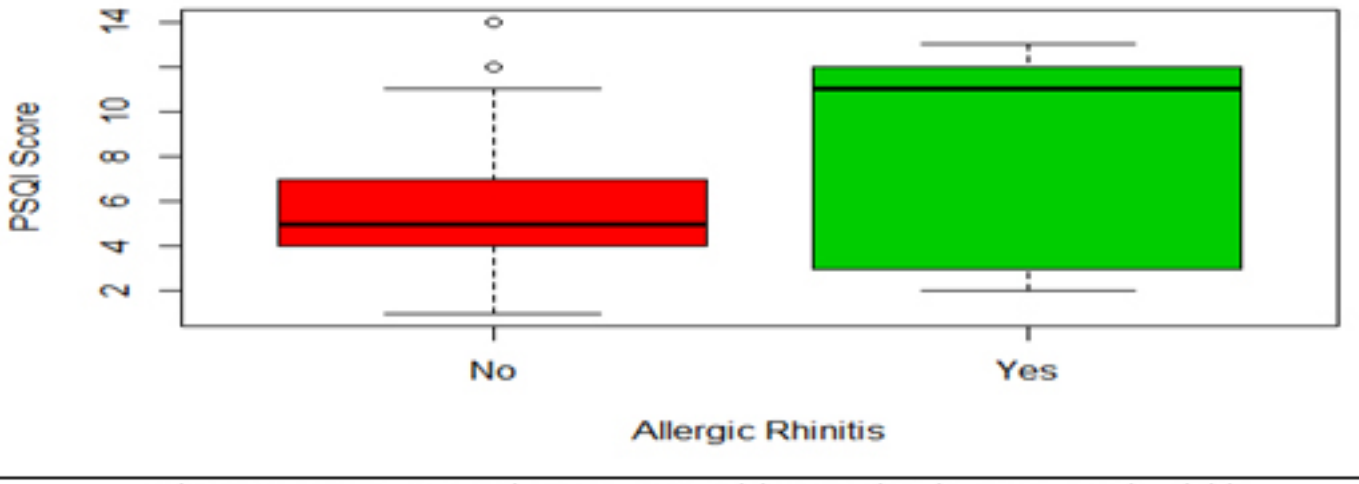

Figure 3. PSQI scores are higher among participants with history of allergic rhinitis

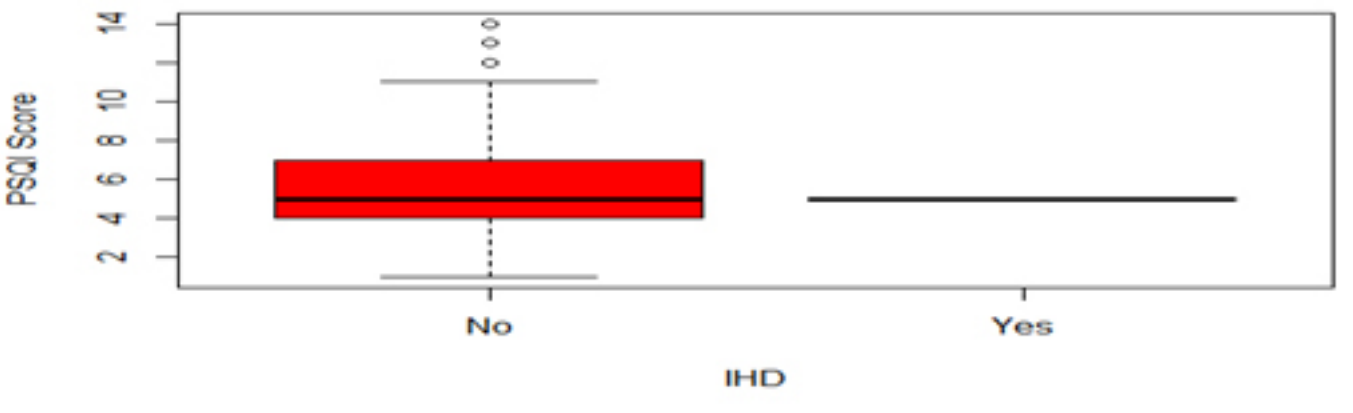

Figure 4. PSQI scores are higher among participants with no history of IHD

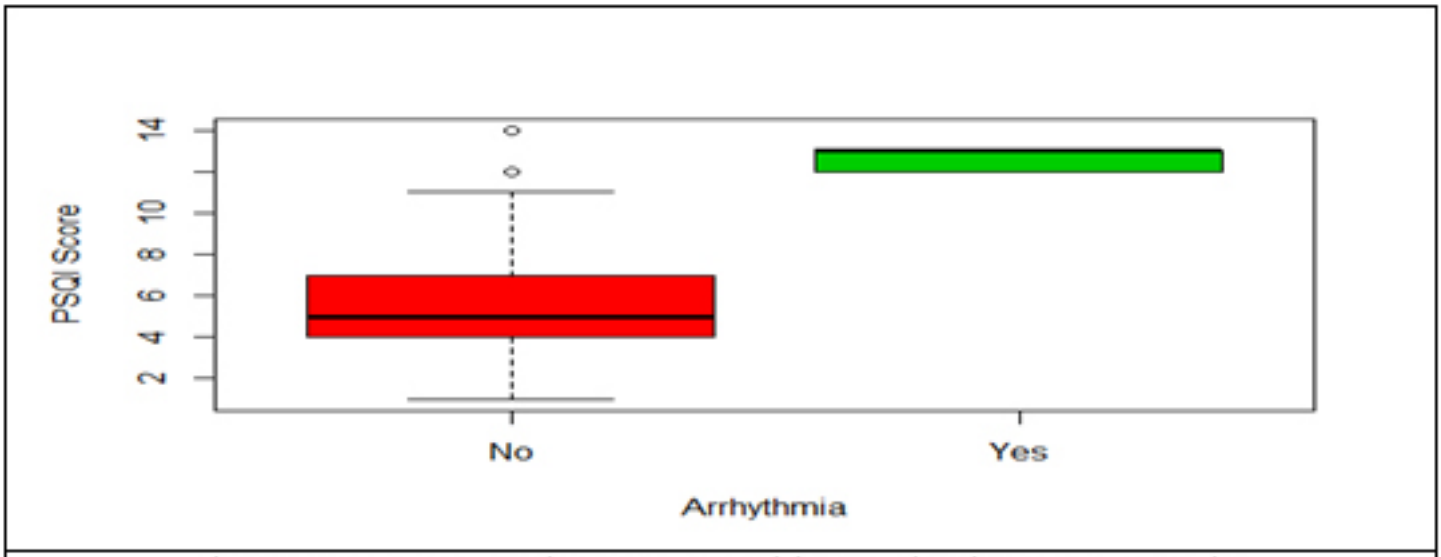

Figure 5. PSQI scores are higher among participants with history of arrhythmias

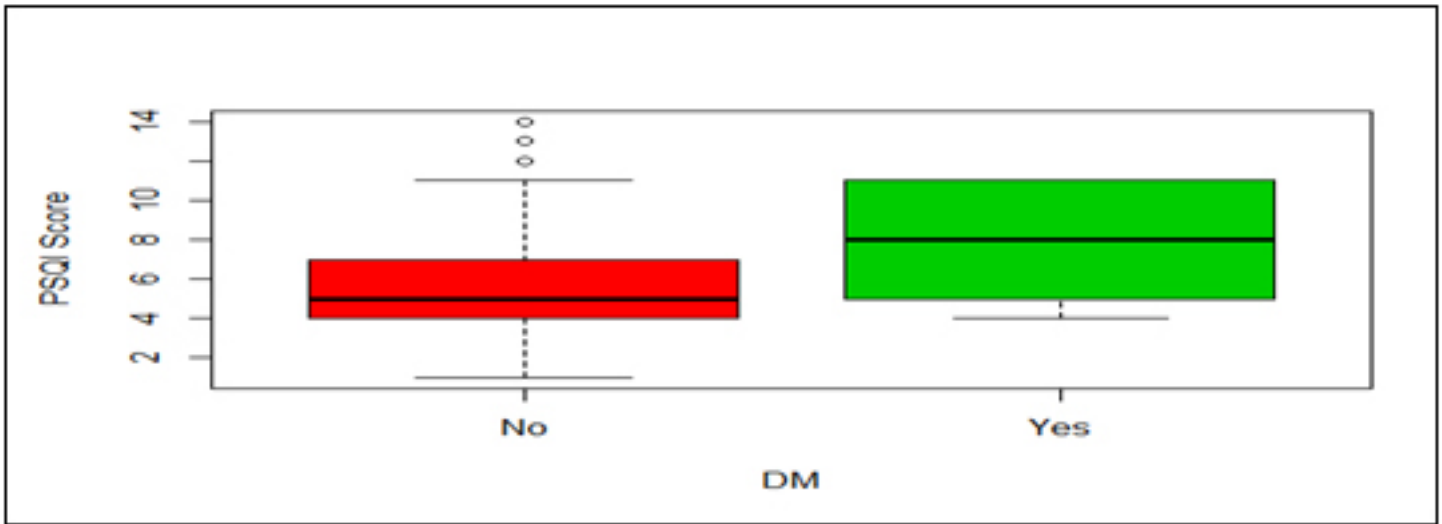

Figure 6. PSQI scores are higher among participants with diabetes

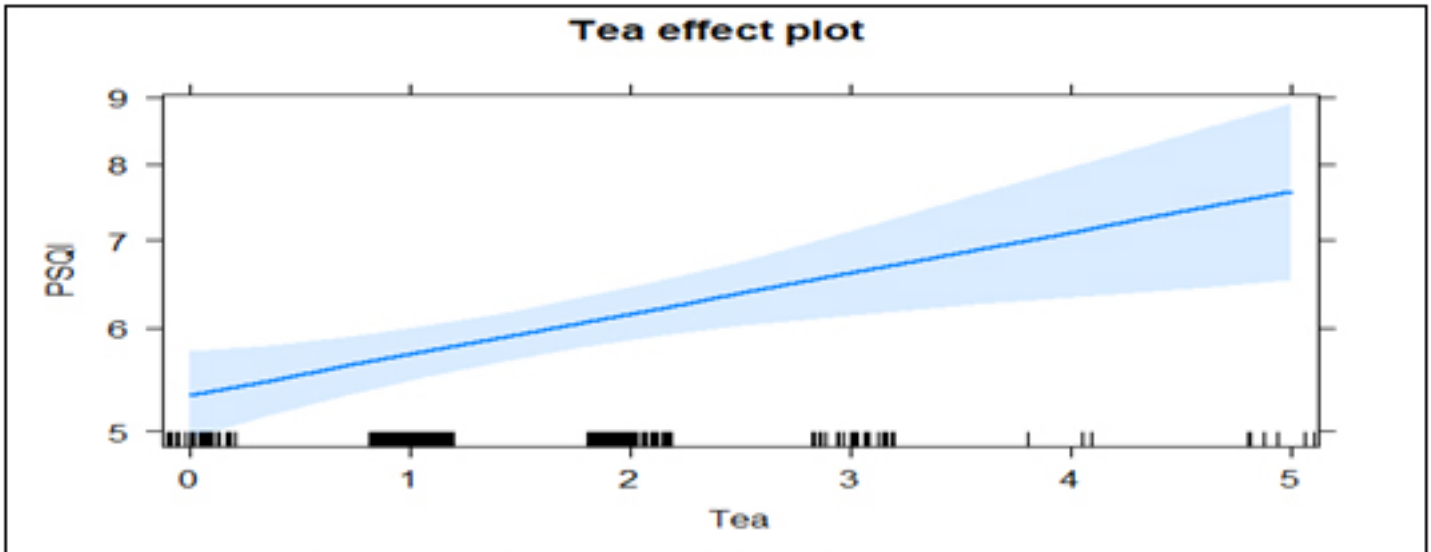

Figure 7. PSQI scores are higher among participants with higher tea intake

Table 1. Baseline demographics of the study participants

Factor	Count (n)/ mean	Percentage /SD	Mean PSQI score/ β estimate	t-test/ F-test	P-value
Overall mean PSQI	μ = 5.9 points, median = 5.0 points				
Age (in years)	33.2	8.4	β = -0.005	z = -0.371	0.711
Gender					
• Male	309	80.3%	μ = 5.8	t = 1.697	0.093
• Female	75	19.5%	μ = 6.4		
Marital					
• Married	299	77.7%	μ = 6.0	t = 0.673	0.502
• Single	85	22.1%	μ = 5.8		
Number of kids	2.1	1.5	β = 0.014	z = 0.991	0.322
Rank					
• Consultant	16	4.2%	μ = 7.0	F = 5.141	0.0017
• Senior Registrar	48	12.5%	μ = 5.3		
• Registrar	84	21.8%	μ = 6.6		
• Resident	236	61.3%	μ = 5.7		
Nationality					
• Saudi	235	61%	μ = 5.6	t = 3.393	0.0008
• Non-Saudi	149	38.7%	μ = 6.5		
Experience years	6.7 years	6.16 years	β = -0.0007	z = -0.205	0.838
On calls					
• Yes	31	8.1%	μ = 5.8	t = 1.737	0.092
• No	353	91.7%	μ = 7.0		
Workplace type					
• Hospital	7	1.8%	μ = 6.4	t = 0.322	0.758
• Health Centre	377	97.9%	μ = 5.9		
History of COPD					
• Yes	0	0%	-	-	-
• No	384	99.7%			
History of Asthma					
• Yes	4	1.0%	μ = 6.0	t = 0.036	0.973
• No	380	98.7%	μ = 5.9		
Allergic rhinitis					
• Yes	18	4.7%	μ = 8.8	t = 2.974	0.00837
• No	366	95.1%	μ = 5.8		
History of IHD					
• Yes	5	1.3%	μ = 5.0	t = 7.838	< 0.00001
• No	379	98.4%	μ = 5.9		
Hypertension					
• Yes	21	5.4%	μ = 7.2	t = 1.743	0.096
• No	363	94.3%	μ = 5.8		
Arrhythmia					
• Yes	7	1.8%	μ = 12.6	t = 29.501	< 0.00001
• No	377	97.9%	μ = 5.8		
Myocardial dysfunction					
• Yes	0	0%	-	-	-
• No	384	99.7%			
History of stroke					
• Yes	0	0%	-	-	-
• No	384	99.7%			
History of DM					
• Yes	31	8.1%	μ = 7.5	t = 3.495	0.001354
• No	353	91.6%	μ = 5.8		
Arrhythmia					
• Yes	7	1.8%	μ = 12.6	t = 29.501	< 0.00001
• No	377	97.9%	μ = 5.8		
Hypothyroidism					
• Yes	0	0%	-	-	-
• No	384	99.7%			
Tea cups	1.4 cups	0.92 cups	β = 0.071	z = 3.275	0.001057
Fizzy drinks	0.7 drinks	0.60 drinks	β = 0.035	z = 1.100	0.271

Table 2. Adjusted effects of the clinical and demographic variables on the score of PSQI sleep quality

Variables	Odds	95% CI odds	β estimate	SE	P value
Fear of COVID Total	1.023	1.010 to 1.037	1.873	0.268	0.00081 ***
Daytime Sleepiness	1.004	0.985 to 1.024	0.023	0.007	0.69365
Restless Leg Scale	1.028	0.978 to 1.080	0.004	0.010	0.27427
Sleep Apnoea Scale	0.949	0.832 to 1.083	0.027	0.025	0.44003
Insomnia	0.999	0.983 to 1.016	-0.052	0.067	0.91795
Depression	1.076	1.012 to 1.143	-0.001	0.008	0.01871 *
Diabetes	1.374	1.089 to 1.733	0.073	0.031	0.00741 **
Arrhythmia	1.411	0.948 to 2.100	0.318	0.119	0.08996 .
Hypertension	1.297	0.968 to 1.738	0.344	0.203	0.08106 .
Ischemic heart disease	1.713	0.986 to 2.976	0.260	0.149	0.05627 .
Allergic Rhinitis	1.069	0.782 to 1.460	0.538	0.282	0.67678
Fizzy drinks	1.056	0.963 to 1.158	0.066	0.159	0.24715
Asthma	0.691	0.432 to 1.107	0.054	0.047	0.12409
Teacups	1.050	0.991 to 1.114	-0.369	0.240	0.09994 .
Workplace: Hospital	0.836	0.566 to 1.234	0.049	0.030	0.36721
Age	0.992	0.981 to 1.004	-0.179	0.199	0.18612
Marital Status: Single	1.044	0.883 to 1.234	-0.008	0.006	0.61317
Kids	1.011	0.952 to 1.073	0.043	0.085	0.72466
Rank: Registrar	0.862	0.678 to 1.095	0.011	0.030	0.22261
Rank: Resident	0.763	0.597 to 0.974	-0.149	0.122	0.02994 *
Rank: Senior Registrar	0.782	0.615 to 0.994	-0.271	0.125	0.04440 *
Nationality: Saudi	0.877	0.779 to 0.987	-0.246	0.123	0.03000 *
Sex: Male	0.935	0.799 to 1.095	-0.131	0.061	0.40561
Experience	0.976	0.957 to 0.995	-0.067	0.080	0.01604 *
On-call shifts	1.101	0.889 to 1.363	-0.024	0.010	0.37794

Discussion

The current investigation surveyed 385 PHC physicians in order to assess the effect of coronaphobia on sleep quality amongst PHC physicians practicing in the southwestern region of Saudi Arabia.

We found that almost half of PHC physicians had poor quality of sleep. This is not a unique finding among Saudi doctors. A recent survey indicated a prevalence of over 43% for sleep disorders in Saudi medics during the COVID-19 pandemic (16). Also, a regional study that evaluated poor sleep among healthcare workers reported the same figure (43%) (17). Similar results were also reported by several international studies (18-21).

This consistent finding is extremely alarming since physicians are responsible for several important clinical decisions that could potentially impact the quality of lives of their patients. Most clinical decision-making abilities require heightened alertness and optimum neurocognitive abilities that could be jeopardized in clinicians by poor sleep quality (22). Errors in medical practice were found to be higher among sleep deprived doctors (23). Furthermore, away from clinical settings and workplaces, sleep deprivation puts doctors at a huge risk of road traffic accidents and personal injury (24). Poor work life balance in the realm of the medical profession has an established relationship with poor sleep quality (25).

The present study showed that more than half of physicians passed the cut-off for coronaphobia. This finding is close to the 66% figure reported among the US and Canadian public (1). Such anxiety symptoms were reported to have progressed to full-blown COVID-19 stress syndrome as the pandemic progressed (26). Lee and Crunk (27) stated that coronaphobia is one of the main factors, beside neuroticism and hypochondriasis, that aggravate the burden of COVID-19-related psychological distress. However, how pandemic-related distress develops among healthcare professional remains a very complex process that involves aspects of fearful attachment and emotional stability personality traits (28).

The prevalence of moderate coronaphobia in our participating physicians was 9.4%, while that for mild coronaphobia was 46.8%. This is in line with the substantial psychological distress caused by the COVID-19 pandemic globally (29) and in Saudi Arabia (2). In Mexico, healthcare workers in emergency departments and intensive care units have shown the highest prevalence for coronaphobia (30).

Among our surveyed physicians, coronaphobia was associated with a significantly negative impact on sleep quality. We found that a rise by one point in the fear of COVID questionnaire is associated with a rise by 2.3% points in the PSQI score (indicative of poorer sleep quality). This is a unique result. To our knowledge no previous studies have attempted to evaluate the link between coronaphobia and sleep quality among physicians. One Turkish study found a link between musculoskeletal pains and coronaphobia, but failed to relate symptoms of coronaphobia with sleep disorders among participants (33). However, more recent investigations among adults in the general public indicated a strong link between coronaphobia and sleep disorders (34). A study in Russia showed that COVID-19 resulted in substantial sleep disturbances in terms of initial insomnia rates and poor satisfaction with sleep quality during the pandemic (35).

We found that a higher burden of depressive symptoms worsened physicians' sleep quality. The relationship between COVID-19, depressive symptoms, and sleep disturbance among the general public was well-documented in the above Russian study (35). Although a barrage of studies investigated the effect of COVID-19 pandemic on sleep quality among different groups of professionals and general public (36-38), none attempted to evaluate the effect of coronaphobia on sleep quality. Over 50% of resident doctors in India indicated that sleep disturbances were a significant issue for them post-COVID (39).

Diabetes was associated with poorer sleep quality among our PHC physicians. Prevalence of poor sleep among patients living with diabetes was estimated to be nearly 60%, with poor glycemic control and longer duration of diabetes as risk factors (40).

Counter-intuitively, two ranks were associated with better sleep quality, namely: senior registrars and residents. This was an unexpected finding. Many previous researchers asserted that non-consultant doctors would have inturrepted sleep because they carry out first on-call duties (41). This could be true in specialties that require oncall cover. A very recent study indicated that across medical specialties, residents and consultants in Saudi Arabia tend to have the worst sleep patterns (16). However, in our sample, about 8% were doing night shifts. Also, consultants and senior registrars do not engage in out-of-hours on-call activities. It is therefore difficult to give a concrete reason for the discerpancy of sleep pattern among different ranks in our sample. This remains to be elucidated by further focused research.

Another important finding from our current investigation of our physicians is that the longer the clinical experience, the better the sleep quality. However, the relationship between years of experience and risk of coronaphobia is still far from settled. Some studies indicated that younger professionals with little experience are at increased risk of coronaphobia (30), whereas others indicated the contrary (3). Certainly, future qualitative research could elucidate some of the underpinnings in terms of the effect of longer clinical experience on virus anxiety.

The present study had several points of strength. It comprised a large data set that included information from over 380 physicians. However, one limitation of the study is the low participation from female physicians as they constituted under a fifth of all of those who were surveyed. Another limitation of our current work is brought on by the cross-sectional design of our research and reliance on an online survey. Hence, causal relationships are difficult to ensure, and social desirability or response bias cannot be eliminated.

In conclusion, coronaphobia is common among PHC physicians in Saudi Arabia. Educational workshops should focus on prevention and treatment of such an important psychological disorder in order to improve care delivery in PHCCs in Saudi Arabia. Coronaphobia among PHC physicians is associated with substantial worsening in their sleep quality. Therefore, support should be provided to physicians with heightened fear of COVID-19 to minimize the risk of sleep difficulties and subsequent clinical under-performance.

Future research should attempt to investigate the effectiveness of targeted psychological interventions that could relieve the burden of coronaphobia among family physicians in Saudi Arabia. Moreover, personality factors that potentiate development of fear of COVID-19 should be explored in more detail among Saudi family physicians.

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