



Research Article

## Assessment of Sleep Problems among Healthcare Providers in a Tertiary Care Hospital in Riyadh

Abeer M Alharbi<sup>1\*</sup>, Rayan Saad Aldusari<sup>2</sup> and Nazish Masud<sup>3</sup>

### Abstract

**Background:** Sleep disturbance occur in 10%-15% of the general population. This study aimed to assess sleep problems, and identify the factors effecting sleep among healthcare providers in KAMC.

**Methods:** Cross-sectional study was conducted with currently working healthcare providers using self-administered questionnaire to assess sleeping habits, factors that affect sleep, specific sleep disorders. Chi square test and logistic regression was applied to assess the association between different factors with sleep disorders.

**Results:** Total 154 respondents returned the questionnaire comprising 41 males and 112 females. Sleep disorders were reported among 52.5% healthcare providers. The most common sleep problem having significant association was feeling of being tired during day time reported by 101 (90%) females (p-value=0.020). Healthcare providers who were working alternating day and night shifts were more likely to have sleep problems (OR=0.33, 95% CI=0.13–0.82, p-value=0.017).

**Conclusion:** Sleep disorders are very common among healthcare providers. Irregular work schedules often result in disruption of normal circadian rhythm, which effect performance. Presence of sleep problems affects the day time performance due to feeling of tiredness and sleepiness. More focus on arrangement of suitable working shifts for the healthcare workers is needed.

### Keywords

Sleep problems; Health care workers; Cross sectional survey; Night workers; Alternating shift workers

### Introduction

Sleep is a "Natural periodic suspension of consciousness during which the powers of the body are restored". Normally humans sleep at night around six to nine hours [1]. Sleep disorders refer to difficulty in sleeping, whether it is a difficulty in falling or staying asleep, falling asleep at inappropriate times, excessive sleep time, or abnormal behaviours associated with sleep [2]. Sleep disorders are mainly grouped into four main categories, insomnia which is problems with falling asleep, excessive daytime sleepiness, sleep rhythm problems

and sleep-disruptive behaviours [2]. Sleep disturbance occur in about 10% to 15% of the general population [3]. A number of factors contribute to sleep disorders that include physical illness, depression, anxiety and stress, inappropriate environment such as excessive light or noise. Apart from this consumption of caffeine, alcohol, certain medications and drugs, heavy smoking, daytime napping, physical discomfort, and counterproductive sleep habits may also cause sleep problems [2]. Sleep-disordered breathing is a group of disorders that are characterized by abnormal breathing pattern during sleep caused by obstruction to the upper airways. One of which is obstructive sleep apnea, the patient will have abnormal pauses in breathing or low breathing rate during sleep. They can be isolated or coexist with other medical conditions [4].

Health care providers like doctors and nurses are known to have tough work schedules; this greatly affects their sleep and performance, as well as the safety of their patients. Long working hours >12.5 h/day and on-call shifts (more than 24 h) greatly increase the risk of experiencing motor vehicle accidents while driving back home, additionally the risk of making serious and fatal medical errors also increases [5,6]. A study was conducted on Saudi medical and paramedical personnel reported high prevalence of daytime sleepiness among Saudi population compared to other populations using a Western Epworth Sleepiness Scale (ESS) [7]. The study also highlighted that the problem is not well understood by the healthcare workers that's why it's not yet recognized [6].

Identifying how common the sleep disorders are among health care providers is the first step in resolving the problem. Controlling the factors that affect their work and providing a good healthy environment will greatly improve the outcomes. Current research aimed to identify the sleep disorders among health care providers and the factors that affect their sleep, also assess the gender differences in sleep disorders among healthcare providers.

### Methods

#### Study design and participants

A cross-sectional study was conducted in King Abdulaziz Medical City (KAMC) Riyadh, Saudi Arabia. All healthcare workers (doctors, nurses, pharmacy, dentist) both males and females working in the hospital during the Study period were included. A convenience sample of 155 was taken and paper based self-administered questionnaire was given to the study participants inside the hospital premises during their routine work hours. Participants were given time and filled questionnaires were collected back later after two weeks.

#### Data collection tool and validation processes

Sleep disorder 20-item questionnaire was designed in English based on the aims and objectives for data collection for this study. The questionnaire consisted of three sections: first section consisted of the demographic variables of study participants (age, gender, marital-status, and work shifts, etc). Second section was about the sleep problems which was assessed using 3 point Likert scale with 1 as never, 2-as sometimes and 3 as always. The third section was related to general health history and habits i.e. smoking and caffeinated drinks use and consisted of yes/no response to the items. The content and

\*Corresponding author: Dr. Abeer M Alharbi, Pediatrics Department, King Abdullah Specialized Children Hospital, King Abdul-Aziz Medical City, Ministry of National Guard Health Affairs Riyadh, Saudi Arabia, E-mail: Abeerallharbi@hotmail.com; Harbia2@ngha.med.sa

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face validity of the questionnaire was done by the research team members which were from clinical and academic background, also by the medical education specialists from college of medicine, KSAU-HS. An initial pilot study was conducted in the same hospital with the participants other than included in the final study. The questions identified as confusing were rephrased and final questionnaire was designed for the data collection. For testing the internal consistency of sections two and three Cronbach's  $\alpha$  was calculated as 0.74 for both sections.

### Statistical analysis

Statistical Package for Social Sciences (SPSS) version 21 was used for analysis. Descriptive analyses statistics were presented as frequency and percentages for the categorical variables, i.e., (gender, job type, work shifts, etc.) while the continuous variables like age, working hours per day and experience was reported as mean  $\pm$  SD. Chi-square test and Fisher exact test were used where applicable to compare the categorical variables the differences by gender were also measured. Also, multivariate logistic regression analysis was carried out, and the variables which showed significant results with the univariate analysis were tested in the model for significance; odds ratio (OR) was reported at 95% of confidence interval (CI). All the tests were considered significant with the p-value of 0.05 or less.

### Ethical considerations

The study was approved by ethical review board of King Abdullah International Medical Research Centre, Riyadh, Saudi Arabia. Informed consent form was provided to each participant prior to the data collection. Those who agreed to be part of the study were given the questionnaires only. Participation in the study was voluntary; they could withdraw from the study at any time. The confidentiality and anonymity was maintained always during the study period and all the data was safe guarded by the research team.

### Results

Total of 200 questionnaires were distributed but only 154 could be collected back and included finally, the response rate was 77%. Majority of respondents were females 112 (73%) and mean age of males and females was almost similar, i.e.  $36.26 \pm 7$  and  $37.98 \pm 5$ , respectively. Half of the study participants were Filipino nationality followed by 42 (27%) Saudi nationality. Alternating day and night shifts was reported by 103 (69.6%) participants (Table 1).

The study explored different sleep related problems including, sleep paralysis, fatigue, breathing pauses during sleep which are summarised in Table 2. The most common reported problem was fatigue during day time reported by 97 (63.4%) while always having difficulty with waking up faced by 22 (15%) of the healthcare workers. It was interesting that 132 (86%) of the study participants reported never taking sleeping pills for inducing sleep (Table 2).

Almost all the sleep related problems were more common among females than males, except for use of sleeping pills and having breathing pauses during sleep which was reported by 19 (46%) and 12 (29%) males respectively. The most common sleep problem having significant association was feeling of being tired during day time reported by 101 (90%) females (p-value=0.020). Of note 72 (64%) females reported having freighting nightmares with significant difference among males and females (p-value=0.023) (Table 3).

The bivariate analysis of the demographic and other general history related variables showed that marital status was one of the factors for having sleep problems, amongst those who were married 39 (53.4%) reported having sleep problems (p-value=0.026). The gender, smoking and consumption of caffeinated drinks showed no significant association with presence of sleep problems amongst the studied group. Nevertheless, those having alternating duty shift and night shifts were more prone to having sleep disorders 59 (82%) (p-value<0.05). Of note the presence of anxiety and depression during

Table 1: Baseline characteristics of participants (N=154).

Variables	Categories	Frequency N	Percentage %
Age in years	(mean $\pm$ SD)	37.52 $\pm$ 9 years	
Working hours per day	(mean $\pm$ SD)	11 $\pm$ 1.7 Hours	
Working experience	(mean $\pm$ SD)	10 $\pm$ 7.6 years	
Sex	Male	41	26.8%
	Female	112	73.2%
Marital status	Married	93	62%
	Un Married	57	38%
Duty shifts	Day	43	29.1%
	Night	2	1.4%
	Alternating (day and night)	103	69.6%
Job type	Doctor	48	31.2%
	Nurse	90	58.4%
	other	9	5.8%
Nationality	Saudi	42	27.3%
	Filipino	76	49.4%
	Others	36	23.3%
Smoking	Yes	14	9%
	No	140	91%
Caffeinated drinks intake	Yes	94	61%
	No	56	36.4%

**Table 2:** Sleep problems among the study sample (N=154).

Variables	Never		Sometimes		Always	
	N	%	N	%	N	%
Do you use sleeping pills to help you sleep?	132	85.70%	21	13.60%	1	0.60%
Have you had breathing pauses during sleeping?	116	76.80%	34	22.50%	1	0.70%
Have you felt paralyzed, unable to move, but mentally alert while falling asleep or awaking?	100	65.40%	52	34.00%	1	0.70%
Do you have difficulty staying awake while driving?	95	76.00%	29	23.20%	1	0.80%
Have you had repeated twitching or movements of legs during sleep?	88	59.90%	53	36.10%	6	4.10%
Do you snore loudly during sleep?	80	52.30%	70	45.80%	3	2.00%
Do you have difficulty staying awake during work?	79	51.30%	70	45.50%	5	3.20%
Do you have job difficulties because of sleep?	65	43.30%	79	52.70%	6	4.00%
Do you have frightening nightmares?	64	41.60%	88	57.10%	2	1.30%
Do you take naps during the day?	51	33.30%	97	63.40%	5	3.30%
Have you had morning headaches?	50	32.50%	96	62.30%	8	5.20%
Have you had difficulties waking up?	38	25.00%	92	60.50%	22	14.50%
Do you feel fatigue/tired during the day?	21	13.70%	112	73.20%	20	13.10%

**Table 3:** Comparison of sleep problems by gender.

Variables	Categories	Male		Female		P-value
		N	%	N	%	
Have you had difficulties waking up?	No	12	29%	26	23%	0.443
	Yes	29	71%	86	77%	
Do you use sleeping pills to help you sleep?	No	22	54%	73	65%	0.193
	Yes	19	46%	39	35%	
Do you have frightening nightmares or dreams?	No	23	56%	40	36%	0.023*
	Yes	18	44%	72	64%	
Do you have morning headaches?	No	16	39%	33	30%	0.262
	Yes	25	61%	79	71%	
Have you had breathing pauses during sleeping?	No	29	71%	86	77%	0.443
	Yes	12	29%	26	23%	
Do you snore loudly during sleep?	No	20	49%	60	54%	0.599
	Yes	21	51%	52	46%	
Have you had repeated twitching or movements of legs during sleep?	No	27	66%	60	54%	0.174
	Yes	14	34%	52	46%	
Have you felt paralyzed, unable to move, but mentally alert while falling asleep or awaking?	No	32	78%	67	60%	0.037*
	Yes	9	22%	45	40%	
Do you feel fatigue/tired during the day?	No	10	24%	11	10%	0.020*
	Yes	31	76%	101	90%	
Do you have job difficulties because of sleep?	No	21	51%	44	39%	0.186
	Yes	20	49%	68	61%	
Do you take naps during the day?	No	17	42%	34	30%	0.197
	Yes	24	59%	78	70%	
Do you have difficulty staying awake during work?	No	24	59%	55	49%	0.301
	Yes	17	42%	57	51%	
Do you have difficulty staying awake while driving?	No	22	54%	73	65%	0.193
	Yes	19	46%	39	35%	

\*The Chi-square statistic is significant at p-value<0.05

day time was also significantly associated with higher sleep disorders among study participants (p-value<0.05) (Table 4).

The multivariate analysis showed that those healthcare providers who were working alternating day and night shifts were more likely to have sleep problems (OR=0.33, 95% CI=0.13-0.82, p-value=0.017). Also, those feeling anxious during day time were more likely to have sleep problems (OR=0.31, 95% CI=0.10-0.989, p-value=0.030). However other demographic variables like gender and marital status which showed significant results on bivariate analysis did not show

any significant findings on multivariate analysis (Table 5).

## Discussion

This study was done to focus on the healthcare providers and presence of sleep problems amongst currently working healthcare providers in King Abdulaziz Medical City. Almost half 52% of respondents had perceived sleeping problems. The percentage was greater women compared to men. Notably those who are working in alternating day and night shifts reported were more likely to

**Table 4:** Association of sleep problems with baseline profile.

Do you have any sleep related problem? (N=154)						
Variables	Categories	No		Yes		P-value
		N	%	N	%	
Sex	Male	21	32.30%	17	23.30%	0.236
	Female	44	67.70%	56	76.70%	
Marital status	Married	46	71.90%	39	53.40%	<b>0.026*</b>
	Un-Married	18	28.10%	34	46.60%	
Duty shifts	Day	28	43.80%	13	18.10%	<b>0.001*</b>
	night	2	3.10%	0	0.00%	
	Alternating (Both)	34	53.10%	59	81.90%	
Smoking	No	60	92.30%	67	91.80%	0.909
	Yes	5	7.70%	6	8.20%	
Caffeinated drinks intake	No	24	36.90%	22	31.40%	0.501
	Yes	41	63.10%	48	68.60%	
Do you feel anxious during the day?	No	55	85.90%	45	62.50%	<b>0.002*</b>
	Yes	9	14.10%	27	37.50%	
Do you feel depressed during the day?	No	60	93.80%	56	78.90%	<b>0.013*</b>
	Yes	4	6.30%	15	21.10%	

\*The Chi-square statistic/Fisher's exact significant at p-value<0.05

**Table 5:** Multivariate analysis of sleep problem predictors.

Variables	$\beta$	95% C.I		Odd Ratio	P-Value
		Lower	Upper		
Gender	-0.162	0.33	2.19	0.85	0.737
Marital status	-0.658	0.23	1.16	0.51	0.111
Duty Shifts	-1.107	0.13	0.82	0.33	<b>0.017*</b>
Anxiety feeling	-1.162	0.10	0.89	0.31	<b>0.030*</b>
Depression feeling	-0.512	0.04	1.14	0.22	0.072

\*p-value significant at 0.05

have sleep problems (OR=0.33, 95% CI=0.13-0.82, p-value=0.017). The study provides a baseline data on the current situation of sleep problems among the healthcare providers and will serve as a basis for the future research. The results of this study can be used for future planning and addressing the occupational health of the doctors and nurses themselves.

As the tough routine and life style is a known phenomenon amongst healthcare providers the only way to cope with the tough routine is having a sound sleep to be able to work effectively the next morning. The presence of sleep problems can be dangerous especially considering the patient safety as tiredness and lack of sleep can be a reason for human errors [7]. Further studies exploring the effects of sleep related problems on the actual performance of healthcare providers are needed to ensure safe medical practices. Also, behaviour and attitudes of the healthcare providers having sleep problems should be studied, to identify if they seek medical advice for their problem.

Although many studies have shown that disrupted sleep routine can be a reason for hypertension, breathing problems, stress and anxiety among workers [7-11]. Our study also showed the presence of anxiety and depression during day time was also significantly associated with higher sleep disorders among study participants (p-value<0.05). Those feeling anxious during day time were more likely to have sleep problems (OR=0.31, 95% CI=0.10-0.989, p-value=0.030). Almost all the sleep related problems were more common among females than males, except for use of sleeping pills and having breathing pauses during sleep which was reported by 19

(46%) and 12(29%) males, respectively. Other studies also support our findings and report higher prevalence of sleep problems among female workers [9].

The study was done on a small population in a single hospital which is one of the limitations of the study. The selection of participants was non-random but advanced statistics was applied to cater for the issue to some extent. Self-reported nature might have led to response bias which is another limitation. Although, response rate was considerably low at 77% but as healthcare providers are very busy and the survey was given during the routine working hours, this might have led to low response rate. But this does not affect the generalisability of the study as the other population based studies have also reported response rate up to 70% [10]. The study although conducted on smaller population of healthcare workers from a single tertiary care hospital which is one of the busiest and very popular health facility in the capital city of Riyadh, thus these findings can be considered applicable to similar hospital setting.

### Conclusion

The overall results showed slightly high rate of propranolol inappropriate use among medical and dental students. Despite the fact that the majority are aware about the risks and potential side effects of self-prescribing medications, the anxiety relieving effect that follows the administration of propranolol increased its use prior to oral exams and presentations. With the majority admitting that they would recommend it for their colleagues, this should trigger wider education about the medical consequences that could result

from inappropriate use of propranolol. The overall results showed presence of sleep disorders among more than half of the healthcare providers. Unlike other studies the majority of the participants were using caffeinated drinks still; smoking and caffeinated drinks showed no significant association with inducing sleep problems among the study group [12]. The intriguing finding was the higher presence of sleep problems among women. Also, those who were married and working alternative day and night shifts were more likely to have sleep problems compared to their other colleagues. Almost one third reported the day time fatigue which can be trigger for medical errors and patient safety can be jeopardised. Awareness campaigns about the medical consequences that could result from sleep related problems should be conducted for healthcare providers working in the hospital setting who are frequently in contact with patients.

## Contributors

### Disclosure

Ethical approval was granted by the ethical review board of King Abdullah International Medical Research Center, Riyadh Saudi Arabia.

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### Competing interests

The study was done as part of undergraduate student's research project for completion of MBBS degree. All the authors of the study declare that there is no conflict of interest for this research.

### Authors' contributions

AMH: Study concept, study design, proposal finalisation, manuscript preparation and manuscript review RSD: study design, proposal preparation, questionnaire design, data collection and entry, initial data analysis. NM: inferential statistics, manuscript preparation, and critical revision and editing of final manuscript. All authors read and approved the final manuscript.

### Participant consent

Informed consent obtained.

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### Author Affiliations

[Top](#)

<sup>1</sup>Department of Paediatrics, King Abdulaziz Medical City Riyadh, King Saud bin Abdulaziz University for Health Sciences Riyadh, Saudi Arabia

<sup>2</sup>King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia

<sup>3</sup>Department of Medical Education, King Saud bin Abdulaziz University for Health Sciences Riyadh, Saudi Arabia