

# Emergency Medicine Personnel's Preparation, Performance and Perception of Their Night Shifts: A Cross-Sectional Study from Saudi Arabia

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**Purpose:** This study aimed to investigate the perceptions and habits of different emergency department (ED) workers (nurses, residents, and attending physicians) and their pre- or post-shift routines. The study also examined the effect of night shifts on personal life, social life, and health.

**Patients and Methods:** An anonymous, online, cross-sectional, multiple-choice, self-rating (5-point Likert scale) survey was administered to the participants. All analyses were performed using the SPSS version 22.0. Ethical approval was obtained from the Institutional Review Board (IRB) of King Saud University Medical City (KSUMC) in Riyadh, Saudi Arabia.

**Results:** Thirty-three nurses, 51 residents, and 39 attending physicians participated in the survey (response rates of 21%, 100%, and 100%, respectively). A significant difference was noted in the need to use physical sleeping aids between the three groups ( $P < 0.003$ ), with more nurses using humidifiers as a sleeping aid (21.2%) than residents or attending physicians. However, there was no difference in the use of pharmacological aids between the three groups. All groups utilized coffee as the preferred stimulant, especially residents (76.5%,  $P < 0.032$ ). Nurses and attending physicians wake up 2 hours before their shift, while residents prefer 3 hours ( $P < 0.001$ ). Attending physicians reported the highest accident rates post-night shifts of 17.9% ( $P < 0.001$ ). Residents reported satisfaction while working night shifts and were least in agreement with night shifts reducing life span. Attending physicians were more in agreement with the increasing risk of drug/alcohol misuse and the incidence of depression in relation to night shifts.

**Conclusion:** Participants shared many commonalities, yet residents were less likely to use sleeping aids and enjoy night shifts more than the other groups. All groups consumed coffee for stimulation. Attending physicians reported the highest accident rates post night shifts.

**Keywords:** night shifts, emergency department, Riyadh, residents, nurses, attending physicians

## Introduction

Humans naturally display a diurnal circadian rhythm, demonstrating daylight activity and requiring sleep during the night as part of their normal physiology. The emergency department (ED) operates 24 hours a day, 7 days a week. Physicians and nurses who repeatedly work night shifts to provide continuous care to patients represent an abnormal physiological state owing to their disrupted circadian rhythm and the challenges in maintaining optimal sleep.<sup>1</sup> Multiple studies have suggested a negative impact of increased shift duration on patient care.<sup>2,3</sup> While the negative connotations of night shift work are widely known, past studies have highlighted the correlation between night shift work and quality of life, job dissatisfaction, poor quality of sleep, and physical and mental exhaustion.<sup>4</sup> The detrimental effects of night shift work have been associated with an increased risk of cardiovascular disease, gastrointestinal disease, specific cancers, metabolic abnormalities, workplace errors, and motor vehicle accidents.<sup>5</sup> Other effects include suppression of

immunity, early aging, hormonal imbalances such as melatonin suppression, and susceptibility to neuropsychiatric conditions, including depression, generalized anxiety, chronic fatigue, and substance abuse.<sup>1,6,7</sup> Night shift workers, whether working isolated night shifts or career night shift workers, require preparation and acclimation; therefore, physicians and nurses often involve a routine: sleeping during daylight hours pre- or post-shift, using sleeping aids, and specific meal and beverage choices prior to and during shifts such as caffeine consumption.<sup>8,9</sup> To the best of our knowledge, no study has been conducted in Saudi Arabia comparing emergency medicine physician and nurse preferences regarding these factors, along with the risks of motor vehicle accidents while driving home from shifts, and insight into the possible physical, mental, and emotional health effects associated with working night shifts. Our study aimed to compare night shift habits among emergency medicine residents, nurses, and attending physicians working in the same ED, and determine the differences among them regarding night shift planning, execution, recovery, and their insight into the associated emotional and physical health effects. We also wanted to explore the potential adverse effects associated with working the night shift, such as fatigue during or after night shifts and the risk of motor vehicle accidents while driving.

## Materials and Methods

### Design and Setting

An anonymous, online, cross-sectional, multiple-choice, self-rating (5-point Likert scale) survey was distributed among health care providers working in the ED of King Saud University Medical City (KSUMC) in Riyadh, Saudi Arabia. KSUMC is a tertiary referral center serving both the northern and central Riyadh region. Its ED provides care and opens its doors for the immediate treatment of any medical, surgical, or psychiatric emergency cases.

The study took place during September and November 2020, and was approved by the Institutional Review Board (IRB) at King Saud University Medical City (IRB Reference Number E-20-5357).

### Participants

The targeted healthcare providers in this study included all nurses, residents, and attending physicians who worked night shifts in the KSUMC ED. The night shift for nurses is a 12-hour period from 7:00 p.m. to 7:00 a.m. However, residents and attending physicians' night shift duration is 8 hours from 11:00 p.m. to 7:00 a.m. The objectives of this study were to compare emergency medicine nurses', residents, and attending physicians' preferences regarding their pre- and post-shift routine, use of sleeping aids, and specific meal and beverage selection during or before their duty, in addition to their perception of fatigue during and after their night shift, risk of motor vehicle accidents while driving home, and their opinions on the potential emotional and physical health effects associated with working night shifts. Thus, healthcare providers who do not work in the ED and those who cover daytime shifts were excluded from this study.

### Survey

The emergency medicine personnel included in this study were requested to voluntarily complete an anonymous online survey using the online tool Google forms. All participants were fully informed about the purpose of the study, of the right to abstain from participation in the study or to withdraw consent to participate at any time without reprisal. An informed consent for participation in the study was obtained from all participants prior to starting the questionnaire in accordance with the Declaration of Helsinki. The survey was constructed based on previously published research conducted in the United States.<sup>10</sup> Permission was obtained from the author to use the questionnaire as an outline for our study.

The survey was administered to obtain data on the three groups with regard to their night shift habits, such as the use of physical and pharmacological aids, the meals eaten before shifts, the use of caffeine during shifts, risk of motor vehicle accidents while driving home after a shift, the perception of night shifts, and its effect on physical and emotional health.

## Statistical Analysis

Different tests and analyses were used, such as the Kruskal–Wallis test, chi-square test of independence, chi-square goodness-of-fit test, Fisher’s exact test, and ANOVA.

All analyses were performed using the SPSS for Windows (version 22.0; IBM Corp., Armonk, NY, USA).

The 95% confidence intervals were computed using RStudio and, in particular, Wilson’s confidence intervals for single proportions.

## Results

The survey response rate was 21% for nurses, 100% for residents, and 100% for attending physicians, with a total of 123 participants. Thirty-three nurses, 51 residents, and 39 attending physicians completed the survey. The gap difference in participation with nurses compared to attending physicians and residents could be owing to the fact that it was easier to reach and communicate with attendings and residents. In addition, the proportion of nurses to physicians is much higher, thus making it harder to directly reach them; as a result, the charge nurse was asked to distribute the survey.

The age range for nurses was 29–40 years, residents 26–27 years, and attending physicians 33–53 years. There were significant differences in age between nurses, residents, and attending physicians ( $P < 0.001$ ), with residents being generally younger. The majority of nurses were females (31 [93%]), while most residents and attending physicians were male (72.5% and 87.2%, respectively;  $P = 0.001$ ). Nine (27.3%) nurses, 19 (37.3%) residents, and 18 (46.2%) attending physicians identified themselves as primarily working night shifts (Table 1).

There was no significant difference when asked if the participants had a pre-night shift routine ( $P = 0.257$ ). Nonetheless, residents were significantly less likely to need physical sleeping aids after the night shift ( $P < 0.003$ ). However, more nurses (21.2%) preferred to use humidifiers as physical sleeping aids.

Most of the participants (109 [88.6%]) did not use any pharmacological sleeping aids, and no significant difference in the routine use of pharmacological sleeping aids between the groups. When asked about sleeping aids that had been tried in the past but are not routinely used, antihistamines and melatonin were frequently cited. Attending physicians were more likely to try drug combinations (28.2%) than residents (9.8%) and nurses (3%) (Table 1).

Pre-night shift meal habits are described in Table 2. Coffee was the beverage of choice before and during the night shift in all groups. This was more prominent in the residents’ group (39 [76.5%]) (Table 2).

Despite all preparations, about half of the participants (50.4%) reported feeling fatigued from time to time. Participants’ energy was lowest before the handover at the end of the shift (41.4%). Half of the participants reported that the minimum hours of sleep needed for them to be mentally and physically prepared for a night shift ranged from 5 to 7 hours.

The majority of participants (63.4%) reported that 5 to 7 hours of sleep was the minimum duration needed for them to be fully functional after an isolated night shift, and there was no difference between the groups in this regard.

Attending physicians reported higher motor vehicle accident rates post-night shifts by 17.9% compared to nurses (3%) and residents (0%) ( $P < 0.001$ ) (Table 2).

A self-reported Likert scale of participants’ perception of specific statements shed light on the effect of night shift work on emotional and physical health (Table 3). Residents agreed the most compared to nurses and attending physicians with the statement “I enjoy working night shifts” ( $P < 0.001$ ). In addition, they were less inclined ( $P < 0.003$ ) than nurses and attending physicians to agree with the statement “Career night shift workers have shorter life spans than day shift workers.” Attending physicians were more likely to agree with the statement “Career night shift workers have a higher prevalence of depression than day shift workers” ( $P < 0.003$ ) compared to residents and nurses. In addition, they were also the most likely to agree with the statement “Career night shift workers are more likely to depend on drugs and alcohol than day shift workers” ( $P < 0.001$ ).

## Discussion

To the best of our knowledge, no study exists in Saudi Arabia that sheds light and focuses on comparing emergency medicine nurses, residents, and attending physicians from the same ED’s preferences regarding their pre- and post-shift routines, and their opinions on the potential emotional and physical health effects associated with working night shifts.

**Table I** Demographics and Sleep Aids

	Survey Question*	Nurses (n= 33)	Residents (n= 51)	Attending Physicians (n= 39)	P-value
1	Age (yr)	33.0 (29.0–40.0)	26.0 (26.0–27.0)	36.0 (33.0–53.0)	< 0.001 <sup>a)</sup>
2	Female	31 (93.9%, 80.4–98.3)	14 (27.5%, 17.1–41.0)	5 (12.8%, 5.6–26.7)	< 0.001 <sup>b)</sup>
3	The majority of my shifts are nights (yes)	9 (27.3%, 15.1–44.2)	19 (37.3%, 25.3–51.0)	18 (46.2%, 31.6–61.4)	0.256 <sup>b)</sup>
4	Do you have a pre-night shift routine? (yes)	19 (57.6%, 40.8–72.8)	20 (39.2%, 27.0–52.9)	18 (46.2%, 31.6–61.4)	0.257 <sup>b)</sup>
5	Do you use				
	Blackout curtains	18 (54.5%, 38.0–70.2)	31 (60.8%, 47.1–73.0)	31 (79.5%, 64.5–89.2)	0.121 <sup>c)</sup>
	Cold room	0	2 (3.9%, 1.1–13.2)	0	–
	Dark room	0	0	1 (2.6%, 0.5–13.2)	–
	Earplugs	2 (6.1%, 1.7–19.6)	3 (5.9%, 2.0–15.9)	4 (10.3%, 4.1–23.6)	0.717 <sup>c)</sup>
	Humidifier	7 (21.2%, 10.7–37.8)	2 (3.9%, 1.1–13.2)	1 (2.6%, 0.5–13.2)	0.045 <sup>c)</sup>
	Background noise	6 (18.2%, 8.6–34.4)	10 (19.6%, 11.0–32.5)	7 (17.9%, 9.0–32.7)	0.568 <sup>c)</sup>
	Sleep mask/blindfold	0	0	0	–
	Special pillows (anatomic)	7 (21.2%, 10.7–37.8)	3 (5.9%, 2.0–15.9)	12 (30.8%, 18.6–46.4)	0.062 <sup>c)</sup>
	None	1 (3.0%, 0.5–15.3)	9 (17.6%, 9.6–30.3)	1 (2.6%, 0.5–13.2)	0.003 <sup>c)</sup>
6	Preferred bedroom temperature (°F)				
	20–25 degrees	25 (75.8%, 59.0–87.2)	28 (54.9%, 41.4–67.7)	21 (53.8%, 38.6–68.4)	0.255 <sup>d)</sup>
	Less than 20 degrees	7 (21.2%, 10.7–37.8)	20 (39.2%, 27.0–52.9)	16 (41.0%, 27.1–56.6)	
	More than 25 degrees	1 (3.0%, 0.5–15.3)	3 (5.9%, 2.0–15.9)	1 (2.6%, 0.5–13.2)	
	None	0	0	1 (2.6%, 0.5–13.2)	
7	What pharmacological sleep aid do you use consistently before a night shift?				
	Antihistamine	1 (3.0%, 0.5–15.3)	0	2 (5.1%, 1.4–16.9)	0.363 <sup>d)</sup>
	Melatonin	0	2 (3.9%, 1.1–13.2)	2 (5.1%, 1.4–16.9)	
	Melatonin & antihistamine	1 (3.0%, 0.5–15.3)	1 (2.0%, 0.4–10.3)	3 (7.7%, 2.7–20.3)	
	Paracetamol & caffeine	0	2 (3.9%, 1.1–13.2)	0	
	None	31 (93.9%, 80.4–98.3)	46 (90.2%, 79.0–95.7)	32 (82.1%, 67.3–91.0)	
8	What sleep aids have you tried?				
	Medication combination	1 (3.0%, 0.5–15.3)	5 (9.8%, 4.3–21.0)	11 (28.2%, 16.5–43.8)	< 0.001 <sup>d)</sup>
	Alcohol	0	1 (2.0%, 0.4–10.3)	0	
	Antihistamine	9 (27.3%, 15.1–44.2)	2 (3.9%, 1.1–13.2)	2 (5.1%, 1.4–16.9)	
	Benzodiazepine	0	0	0	
	Melatonin	0	8 (15.7%, 8.2–28.0)	2 (5.1%, 1.4–16.9)	
	None	23 (69.7%, 52.7–82.6)	35 (68.6%, 55.0–79.7)	24 (61.5%, 45.9–75.1)	

**Notes:** <sup>a)</sup>Kruskal–Wallis (median and interquartile range given), <sup>b)</sup>chi-square test of independence, <sup>c)</sup>chi-square goodness-of-fit test, <sup>d)</sup>Fisher's exact test. \*Survey questions adapted from: Richards JR, Stayton TL, Wells JA, Parikh AK, Laurin EG Night shift preparation, performance, and perception: are there differences between emergency medicine nurses, residents, and faculty? *Clin Exp Emerg Med*. 2018;5(4):240–248. doi: 10.15441/ceem.17.270.10.<sup>10</sup> Copyright © 2018 The Korean Society of Emergency Medicine. Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>).

**Table 2** Meals, Beverages, Fatigue and Sleep

	Survey Question*	Nurses (n= 33)	Residents (n= 51)	Attending Physicians (n= 39)	P-value
1	Do you eat just before going to sleep?				
	None	6 (18.2%, 8.6–34.4)	14 (27.5%, 17.1–41.0)	8 (20.5%, 10.8–35.5)	0.096 <sup>a)</sup>
	Regular meal	8 (24.2%, 12.8–41.0)	20 (39.2%, 27.0–52.9)	10 (25.6%, 14.6–41.1)	
	Small meal	14 (42.4%, 27.2–59.2)	10 (19.6%, 11.0–32.5)	9 (23.1%, 12.7–38.3)	
	Snack	5 (15.2%, 6.7–30.9)	7 (13.7%, 6.8–25.7)	12 (30.8%, 18.6–46.4)	
2	Stimulant preference before/during a night shift				
	None	2 (6.1%, 1.7–19.6)	4 (7.8%, 3.1–18.5)	6 (15.4%, 7.3–29.7)	0.032 <sup>b)</sup>
	Coffee	18 (54.5%, 38.0–70.2)	39 (76.5%, 63.2–86.0)	23 (59.0%, 43.4–72.9)	
	Combination	2 (6.1%, 1.7–19.6)	5 (9.8%, 4.3–21.0)	5 (12.8%, 5.6–26.7)	
	Energy Drink	0	0	0	
	Tea	11 (33.3%, 19.8–50.4)	3 (5.9%, 2.0–15.9)	5 (12.8%, 5.6–26.7)	
3	Despite these preparations, do you consistently experience fatigue during a night shift?				
	Yes	12 (36.4%, 22.2–53.4)	9 (17.6%, 9.6–30.3)	13 (33.3%, 20.6–49.0)	0.058 <sup>a)</sup>
	No	3 (9.1%, 3.1–23.6)	17 (33.3%, 22.0–47.0)	7 (17.9%, 9.0–32.7)	
	Sometimes	18 (54.5%, 38.0–70.2)	25 (49.0%, 35.9–62.3)	19 (48.7%, 33.9–63.8)	
4	When is your energy level lowest?				
	2 hours after the shift starts	2 (6.1%, 1.7–19.6)	2 (3.9%, 1.1–13.2)	1 (2.6%, 0.5–13.2)	0.461 <sup>b)</sup>
	4 hours after the shift starts	4 (12.1%, 4.8–27.3)	4 (7.8%, 3.1–18.5)	2 (5.1%, 1.4–16.9)	
	6 hours after the shift starts	9 (27.3%, 15.1–44.2)	9 (17.6%, 9.6–30.3)	13 (33.3%, 20.6–49.0)	
	Before the handover	12 (36.4%, 22.2–53.4)	22 (43.1%, 30.5–56.7)	17 (43.6%, 29.3–59.0)	
	It does not change	6 (18.2%, 8.6–34.4)	14 (27.5%, 17.1–41.0)	4 (10.3%, 4.1–23.6)	
5	Please estimate the minimum hours of sleep you need to be functional the day after your night shift?				
	4 hours or less	0	0	1 (2.6%, 0.5–13.2)	0.812 <sup>b)</sup>
	5–7 hours	22 (66.7%, 49.6–80.3)	31 (60.8%, 47.1–73.0)	25 (64.1%, 48.4–77.3)	
	8–12 hours	11 (33.3%, 19.8–50.4)	19 (37.3%, 25.3–51.0)	12 (30.8%, 18.6–46.4)	
6	Please estimate the minimum hours of sleep you need to be mentally and physically functional for a night shift?				
	4 hours or less	1 (3.0%, 0.5–15.3)	4 (7.8%, 3.1–18.5)	1 (2.6%, 0.5–13.2)	0.334 <sup>b)</sup>
	5–7 hours	22 (66.7%, 49.6–80.3)	22 (43.1%, 30.5–56.7)	20 (51.3%, 36.2–66.1)	
	8–12 hours	10 (30.3%, 17.4–47.3)	23 (45.1%, 32.3–58.6)	17 (43.6%, 29.3–59.0)	
7	What is your preferred time to wake up before a night shift?	2.0 (2.0–3.0)	3.0 (3.0–5.0)	2.0 (2.0–5.0)	<0.001 <sup>c)</sup>
8	Have you ever fallen asleep while driving home after a night shift? (yes)	12 (36.4%, 22.2–53.4)	15 (29.4%, 18.7–43.0)	13 (33.3%, 20.6–49.0)	0.795

(Continued)

Table 2 (Continued).

	Survey Question*	Nurses (n= 33)	Residents (n= 51)	Attending Physicians (n= 39)	P-value
9	Have you ever been in a post-night shift accident? (yes)	1 (3.0%, 0.5–15.3)	0	7 (17.9%, 9.0–32.7)	0.001 <sup>b)</sup>

**Notes:** <sup>a)</sup>chi-square test of independence; <sup>b)</sup>Fisher's exact test; <sup>c)</sup>Kruskal–Wallis test. Values are presented as number (%; 95% confidence interval) or mean  $\pm$  standard deviation, unless otherwise indicated. a) Fisher's exact test b) Kruskal–Wallis test. c) ANOVA. \*Survey questions adapted from: Richards JR, Stayton TL, Wells JA, Parikh AK, Laurin EG Night shift preparation, performance, and perception: are there differences between emergency medicine nurses, residents, and faculty? *Clin Exp Emerg Med.* 2018;5(4):240–248. doi: 10.15441/ceem.17.270.10.<sup>10</sup> Copyright © 2018 The Korean Society of Emergency Medicine. Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>).

Table 3 perception

Survey Question*	Nurses (n= 33)	Residents (n= 51)	Attending Physicians (n= 39)	P-value
I enjoy working night shifts	3.0 (2.0–4.0)	4.0 (4.0–5.0)	3.0 (2.0–4.0)	< 0.001 <sup>b)</sup>
Night shifts do not alter my normal sleep cycle	2.4 $\pm$ 1.3	3.0 $\pm$ 1.3	2.4 $\pm$ 1.4	0.047 <sup>a)</sup>
Career night shift workers have shorter life spans than day shift workers	3.4 $\pm$ 1.3	3.1 $\pm$ 1.1	4.0 $\pm$ 1.2	0.003 <sup>a)</sup>
Career night shift workers are more susceptible to illness than day shift workers	3.5 $\pm$ 1.4	3.1 $\pm$ 1.1	3.7 $\pm$ 1.2	0.064 <sup>a)</sup>
Career night shift workers age faster than day shift workers	3.4 $\pm$ 1.4	3.4 $\pm$ 1.1	3.9 $\pm$ 1.2	0.160 <sup>a)</sup>
Career night shift workers experience higher overall levels of stress in their personal lives than day shift workers	3.4 $\pm$ 1.1	3.4 $\pm$ 1.0	3.9 $\pm$ 1.1	0.076 <sup>a)</sup>
Career night shift workers have a higher prevalence of depression than day shift workers	2.8 $\pm$ 1.2	3.1 $\pm$ 1.0	3.7 $\pm$ 1.2	0.003 <sup>a)</sup>
Career night shift workers are more likely to depend on drugs and alcohol than day shift workers	1.9 $\pm$ 1.0	2.6 $\pm$ 1.2	3.4 $\pm$ 1.2	< 0.001 <sup>a)</sup>

**Notes:** <sup>a)</sup>ANOVA, <sup>b)</sup>Kruskal–Wallis test. Values are presented as median (interquartile range). Likert scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. a) Kruskal–Wallis test. \*Survey questions adapted from: Richards JR, Stayton TL, Wells JA, Parikh AK, Laurin EG Night shift preparation, performance, and perception: are there differences between emergency medicine nurses, residents, and faculty? *Clin Exp Emerg Med.* 2018;5(4):240–248. doi: 10.15441/ceem.17.270.10.<sup>10</sup> Copyright © 2018 The Korean Society of Emergency Medicine. Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>).

A job in the ED mandates a switch from day to night shift on a regular basis, making it difficult to preserve the circadian rhythm, ultimately leading to abnormal sleep patterns and extreme fatigue.<sup>10</sup>

Overall, prescription sleeping aids were not frequently utilized by most of the three groups in our study; however, over the counter medicines were used mostly by residents and nurses. However, the attending physicians used medication combinations. For many years, melatonin has been used for sleep disorders, sleeplessness, and jetlag;<sup>11,12</sup> Jockovich et al studied the effect of melatonin administered to emergency medicine physicians 30 to 60 minutes prior to their daytime sleep session.<sup>13</sup> Moreover, three separate studies investigated the use of melatonin by emergency medicine physicians, all of which used subjective measures and showed no significant effect.<sup>14–16</sup> In addition, participants in all three groups tried some sleeping aids, yet, not routinely using any of them.

Caffeine is the most commonly used psychoactive ingredient internationally.<sup>17</sup> It has established outcomes on energy levels, cognitive behavior, fatigue, exhaustion, and vigilance. It is widely consumed among shift workers such as ED personnel working when the rest of the world is resting.<sup>18</sup> Coffee consumption before or during the shift was used extensively by all three groups in our study, followed by tea, especially among nurses, which supports previous studies.<sup>17</sup> Caffeine consumption increases vigilance, reaction time, and decreases exhaustion or sleepiness. However, other studies



have shown that a higher caffeine intake can cause a decrease in work outcomes by causing anxiety. Furthermore, it affects sleep quality and duration.<sup>18</sup> Future studies need to assess the impact of caffeine on the performance of EM personnel, especially EM workers who clearly rely on caffeine to keep themselves alert during shifts.

In our study, there was a statistically significant difference in the preferred time to wake up before a shift. Most residents wake up before the nurses and attending physicians. This might be because residents are in a training program in which they have to prepare and present during academic days, journal clubs, and need to prepare themselves for exams, thus waking up 3 hours prior a shift can help them accomplish more and help them research topics before a shift.

Driving home from night shifts has shown itself to be a significant occupational risk for ED attending physicians, residents, and nurses, which can potentially be a public health hazard.<sup>19</sup> Our results show that most healthcare workers do not fall asleep while driving home after a night shift. This could be because the majority of nurses in the setting of this study returned home in groups by buses which they were not required to drive themselves. Moreover, attending physicians have been shown to have the most post-night shift accidents in comparison to other groups. We hypothesize that this may be owing to the attending physicians having served for more years (during and after residency); therefore, they have worked more night shifts than the other groups, thus increasing the probability of road traffic accidents. Moreover, it may also be owing to the attending physicians as decision makers having more responsibility, thus, leading to overthinking and getting distracted on their way home.

While all three groups agreed that career night shift workers age faster than day shift workers, only the residents believed that night shift workers do not have a shorter life span with respect to day shift workers. There is a general consensus among attending physicians, residents, and nurses that night shift workers are more susceptible to illnesses, and the deleterious effects of night shift work on healthcare workers are widely known. Studies have shown that healthcare workers who continually work night shifts are at an increased risk of an elevated heart rate, elevated blood pressure, and an increased prevalence of tachyarrhythmias.<sup>20–22</sup> Career night shift workers have an increased risk of developing a wide variety of health conditions, including obesity, diabetes, gastrointestinal diseases, cardiovascular diseases, myocardial infarctions, and certain cancers.<sup>5</sup> Thus, until further research shed more light into this issue, we recommend limiting the number/duration of scheduled night shifts per person to the lowest possible number.

All three groups remained relatively neutral regarding night shift work altering their sleep cycle; however, residents reported enjoying working the night shift significantly more than attending physicians and nurses. A possible explanation as to why attending physicians report not enjoying the night shift could be that they bear the responsibility of providing continuous care and needing to swiftly and adequately manage a large number of ill or wounded patients with suboptimal preparations and multiple interruptions.

While the majority of nurses and residents did not agree, the majority of the attending physicians agreed with the statements regarding the mental and emotional health effects associated with night shift work. Chronic disruption of the circadian rhythm may result in neuropsychiatric disorders, such as depression, social detachment, and anxiety.<sup>23</sup> Acute sleep deprivation and prolonged fatigue among night shift workers results in a decrease in attentiveness and focus, which has been shown to significantly increase medical errors.<sup>24</sup> Despite the fact that the majority of residents who took our survey did not agree with the statements regarding the effects of night shift work on mental health and wellbeing, studies have shown that residents tend to face a tremendous amount of stress caused by the influx of new information along with the transition and adaptation to working in shifts. Furthermore, many residents deal with the burden of social isolation owing to changing work schedules and family stress. When residents were compared to the rest of the population, it was proven that they manifested higher risks of suicide and depression. Costa et al studied the effects of shift work on mood and cognitive levels and recommended that mentors and program directors should help their trainees identify early alarming signs and symptoms of mental illness such as depression, suicidal ideation, and sleep disorders.<sup>25</sup>

Attending physicians agreed that career night shift workers are more likely to become dependent on alcohol and drugs, while residents and nurses are not. Although some studies have highlighted the correlations between night shift work and alcohol consumption,<sup>26,27</sup> none of these investigations specifically involved the field of emergency medicine. Given that alcohol consumption is prohibited in Saudi Arabia, it seems less likely that healthcare workers with dependence and addiction problems would be able to work under the influence.

## Conclusion

Attending physicians, residents, and nurses mostly use caffeine to keep them alert during night shifts. Attending physicians were involved in more road traffic accidents post-night shifts, believed in the chronic mental and emotional adverse effects of working night shifts, and believed that night shift workers were more likely to depend on alcohol and drugs. Therefore, until further evidence emerges, we recommend limiting the number/duration of scheduled night shifts per person to the lowest possible number. Further studies should examine the appropriate number and duration of night shifts per person on a monthly basis.

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## Disclosure

The authors report no conflicts of interest in this work.

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