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Prevalence and impact of sleep disturbances on burnout among emergency medicine residents in Riyadh, Saudi Arabia

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ABSTRACT

Background: Emergency medicine (EM) is a high-stress specialty associated with burnout and sleep disturbances. Burnout is characterized by emotional exhaustion (EE), depersonalization (DP), and reduced personal accomplishment, while sleep disturbances impair cognitive and physical performance. We aimed to assess the prevalence of sleep disturbances and their relationship with burnout among EM residents in Riyadh, Saudi Arabia.

Methods: A cross-sectional study was conducted over 6 months among 182 EM residents in Riyadh. Data were collected using an online survey, including demographic and professional information, the Pittsburgh Sleep Quality Index (PSQI) for sleep assessment, and the Abbreviated Maslach Burnout Inventory for burnout evaluation. Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 27.0. (Armonk, NY: IBM Corporation), with multiple linear regression exploring variable relationships.

Results: Most participants (57.7%; *n* = 105) reported sleep problems, with 22.5% (*n* = 41) experiencing severe sleep disturbances (PSQI score 15-21) and 19.8% demonstrating good sleep quality (*n* = 36; PSQI score 0-6). The mean global PSQI score was 10.7 ± 4.3. Burnout prevalence was high, with 81.3% (*n* = 148) exhibiting high EE scores and 66.5% high DP scores (*n* = 121). DP significantly predicted poor sleep quality (*R* = 0.42, 95% confidence interval [CI]: 0.3-5.6; *p* = 0.001), while gender also showed a significant association (*R* = 0.16, 95% CI: 0.3-2.5; *p* = 0.01).

Conclusion: Sleep disturbances and burnout are highly prevalent among EM residents in Riyadh, with poor sleep quality significantly linked to higher DP levels. Targeted interventions are needed to improve residents' well-being and prevent adverse outcomes.

Keywords: Sleep disturbance, burnout, PSQI, aMBI, prevalence, emergency medicine.

Introduction

Continuous work-related stress can result in burnout, a syndrome characterized by three key components: depersonalization (DP), cynicism, and emotional exhaustion (EE). Burnout reduces personal efficacy and achievement [1,2]. It is prevalent across various professions, including healthcare [3].

Sleep is essential for regulating emotions, cardiovascular metabolism, motor and mental health, and learning

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processes [4,5]. Adequate sleep facilitates the removal of neurotoxic waste products from the central nervous system that accumulate during wakefulness [6]. Sleep disturbances impair cognitive functions, memory, and performance and may disrupt the cardiovascular autonomic response [4,7]. These disturbances are also linked to burnout and energy depletion [8].

Both burnout and sleep disturbances have similar adverse health effects, including insomnia, irritability, excessive sleepiness, mood and behavioral changes, fatigue, disorientation, and reduced concentration [7]. These conditions contribute to severe personal consequences such as drug addiction, relationship failure, and suicidal behavior, as well as professional consequences, including decreased quality of healthcare, medical errors, malpractice, and patient dissatisfaction. Together, these issues impose significant economic burdens [9-11].

Emergency medicine (EM) is a particularly high-stress specialty. Emergency room physicians and nurses frequently encounter challenging situations, such as making critical decisions with limited information, overcrowding, patient deaths, and shift work, all of which contribute to burnout [12,13]. According to the American College of Chest Physicians, inadequate sleep negatively affects physicians' performance, with 43% of doctors reporting insufficient sleep due to work demands [14].

Emergency physicians are at higher risk for burnout syndrome compared to other specialties [15]. Contributing factors can be classified into two categories: (1) work environment factors, including long work hours, administrative duties, professional responsibilities, educational activities, and relationships with colleagues and staff, and (2) personal factors, such as demographic and lifestyle characteristics, including age, sex, and marital status [16]. For this reason, researchers have focused on work environment and sociodemographic factors as potential predictors of burnout among healthcare providers [17].

Despite these efforts, healthcare institutions lack sufficient evidence to identify the precise factors contributing to burnout. Consequently, they cannot accurately predict which individuals are at greater risk or implement effective preventative strategies [12]. Understanding the factors that lead to burnout is essential for developing measures to mitigate its impact. Currently, no data regarding burnout and its causes among EM residents in Riyadh, Saudi Arabia (SA), are available. This study aims to assess the extent of sleep disturbances and their potential association with burnout among EM residency training residents in Riyadh, SA.

Subjects and Methods

Study design and participants

This cross-sectional study was conducted over 6 months and included 182 EM residency training residents working in multiple emergency departments in Riyadh, SA. Participants were eligible if they were EM residents currently living and working in Riyadh. Healthcare workers not working as EM residents or practicing outside SA were excluded from the study.

Study objectives

The study's primary objective was to determine the prevalence of sleep disturbances and burnout among EM residency training residents in Riyadh. Secondary objectives included identifying risk factors associated with sleep disturbances and exploring the relationship between sleep disturbances and burnout in this population.

Data collection

Data were collected through a voluntary internet-based survey distributed via Google Forms. The survey link was shared through social media platforms such as WhatsApp, X app, and Facebook. Additionally, researchers directly distributed the link by visiting emergency departments and attending EM conferences in Riyadh.

Study instruments

The survey consisted of three sections. The first section captured demographic and professional information, including gender, nationality, hospital type, residency year, number of monthly shifts, and chronic medical conditions. The second section assessed sleep quality and disturbances using the Pittsburgh Sleep Quality Index (PSQI). The third section focused on burnout, utilizing the Abbreviated Maslach Burnout Inventory (aMBI).

Pittsburgh sleep quality index

The PSQI is an open-access tool designed to evaluate sleep quality over the past month. It includes 24 self-rated items categorized into seven components: sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component is scored from 0 to 3, and the total global score ranges from 0 to 21, with higher scores indicating poorer sleep quality. As suggested by the developers, a global score cutoff of 5 demonstrated 88.5% accuracy in identifying individuals with poor sleep in the original validation study. The PSQI has been shown to have strong psychometric properties, including a Cronbach's alpha of 0.83 for internal consistency, a test–retest reliability of 0.85, and sensitivity and specificity values of 89.6% and 86.5%, respectively [18].

Abbreviated Maslach burnout inventory

The aMBI, a copyrighted tool developed by Mind Garden, is a 9-item instrument used to assess burnout. It includes three subscales: EE, which measures work-related emotional depletion; DP, which reflects an indifferent attitude toward service recipients; and personal accomplishment (PA), which evaluates individual skill, achievement, and job satisfaction. Each subscale contains three items rated on a seven-point Likert scale, with scores ranging from 0 (never) to 6 (every day). Subscale scores range from 0 to 18. Higher scores on the EE and DP subscales indicate a greater likelihood of burnout, while higher PA scores suggest lower burnout

[19]. Reported Cronbach's alpha values were 0.89 for EE, 0.76 for DP, 0.72 for PA, and 0.81 for overall burnout [15]. Overall burnout was calculated by summing the EE and DP scores, with scores of 0-9 classified as "no to low burnout" and scores of 10-18 classified as "moderate to severe burnout" [20].

Sample size and sampling technique

According to the Saudi Commission for Health Specialties, the total population of EM residency training residents in Riyadh was approximately 322. A minimum sample size of 176 participants was required for the study. A nonprobability convenience sampling technique was employed to recruit participants.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 27.0. (Armonk, NY: IBM Corporation). Categorical data were summarized as numbers and percentages. Data normality was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Continuous data were represented as medians and interquartile ranges. Multiple linear regression analysis was conducted to explore the relationships between study outcomes and various independent variables. The statistical significance was set at $p \leq 0.05$.

Results

General characteristics of the participants

The study included 182 Saudi EM residents, 56% of whom were men (n = 102). Most participants were in their second year of residency, with a majority working in Ministry of Health hospitals. Many residents (84.1%, n = 153) reported working 13-16 shifts per month. The most common comorbidities among participants were anxiety disorders, asthma, and diabetes (Table 1).

Sleep quality and disturbances

The mean global PSQI score among participants was 10.7 ± 4.3, with scores ranging from 2 to 21 (Table 2). Of the participants, 36 (19.8%) demonstrated good sleep quality, defined as a PSQI score of 0-6, while 41 participants (22.5%) experienced severe sleep difficulties, indicated by a PSQI score of 15-21.

Burnout levels

Burnout was assessed using the aMBI. The mean (EE) score was 9 ± 4, with 148 participants (81.3%) displaying high burnout scores for this subscale. The mean scores for DP and PA were 6.6 ± 4.1 and 10 ± 4, respectively. A high level of burnout was observed in 66.5% of participants based on DP scores, while 54.4% exhibited low burnout levels in terms of PA (Table 3).

Factors influencing sleep quality and the relationship between sleep quality and burnout

The analysis of factors affecting sleep quality is summarized in Table 4. DP scores were a significant

Table 1. *General characteristics of included participants.*

Parameter		*N* (%)
Sex	Male	102 (56%)
	Female	80 (44%)
Type of hospital	University hospitals	47 (25.8%)
	Private hospitals	8 (4.4%)
	Military hospitals	55 (30.2%)
	Ministry of health hospitals	72 (39.6%)
Residency year	Year 1	50 (27.5%)
	Year 2	65 (35.7%)
	Year 3	32 (17.6%)
	Year 4	35 (19.2%)
Number of shifts per month	12 or fewer shifts	4 (2.2%0
	13-16 shifts	153 (84.1%)
	17 or more shifts	25 (13.7%)
Chronic diseases	No medical illness	137 (75.3%)
	Anxiety disorders	16 (8.8%)
	Asthma	11 (6%)
	Asthma and anxiety disorders	4 (2.2%)
	Diabetes	8 (4.4%)
	Hyperlipidemia, obesity	1 (0.5%)
	HTN and asthma	1 (0.5%)
	Hypothyroidism	1 (0.5%)
	Mood disorders	3 (1.6%)

Abbreviations: HTN, hypertension.

Table 2. *Sleep quality and disturbances among study participants.*

PSQI score		Results
Mean (± SD)		10.7 (±4.3)
Median (IQR)		10.5 (7)
Global PSQI Type	Good sleep quality (0-6), *n* (%)	36 (19.8%)
	Some sleep problems (7-14), *n* (%)	105 (57.7%)
	Severe sleep difficulties (15-21), *n* (%)	41 (22.5%)

Abbreviations: PSQI: Pittsburgh Sleep Quality Index, SD, standard deviation; IQR, interquartile range.

Table 3. *Description of aMBI scores among participants.*

Variables		Results
Mean EE score (±SD)		9 (±4)
Median EE score (IQR)		9 (6)
EE subgroups	Low burnout, *n* (%)	17 (9.3%)
	Moderate burnout, *n* (%)	17 (9.3%)
	High burnout, *n* (%)	148 (81.3%)
Mean DP score (±SD)		6.6 (±4.1)
Median DP score (IQR)		7 (7)
DP subgroups	Low burnout, *n* (%)	33 (18.1%)
	Moderate burnout, *n* (%)	28 (15.4%)
	High burnout, *n* (%)	121 (66.5%)
Mean PA score (±SD)		10 (±4)
Median PA score (IQR)		10 (6)
PA subgroups	Low burnout, *n* (%)	99 (54.4%)
	Moderate burnout, *n* (%)	22 (12.6%)
	High burnout, *n* (%)	60 (33%)

Abbreviations: aMBI, Abbreviated Maslach Burnout Inventory; EE, emotional exhaustion; DP, depersonalization; PA, personal accomplishment.

Table 4. *Factors affecting sleep quality.*

Parameter	Sleep quality		
	Coefficient	*p*-value	CI for the coefficient
DP	0.421	0.001	(0.3-5.6)
PA	-0.061	0.4	(-0.2 to 0.1)
EE	0.151	0.07	(-0.01 to 0.3)
Gender	0.165	0.01	(0.3 to 2.5)
Type of hospital	0.131	0.05	(0.001-1)
Residency year	0.081	0.24	(-0.2 to 1)
Number of shifts per month	0.082	0.21	(-0.5 to 2.4)
Chronic diseases	-0.057	0.4	(-0.5 to 0.2)

Abbreviations: CI, confidence interval; EE, emotional exhaustion; DP, depersonalization; PA, personal accomplishment.

predictor of sleep quality (R = 0.42, 95% confidence interval [CI]: 0.3-5.6; p = 0.001). Gender also played a significant predictive role (R = 0.16, 95% CI: 0.3-2.5; p = 0.01). However, no significant associations were identified between sleep quality and other variables.

Discussion

This study highlights the prevalence of sleep disturbances and their relationship with burnout among EM training residents in Riyadh, SA. More than half of the participants (57.7%) reported sleep problems, with 22.5% experiencing severe sleep disturbances. Only 19.8% of residents demonstrated good sleep quality. In comparison, a study conducted in Najran, SA, found that approximately 25% of physicians had poor sleep quality based on the PSQI [21]. AlSaif [22] reported an even higher prevalence, with 86.3% of residents in various medical and surgical specialties exhibiting poor sleep quality, including 91.67% of emergency department residents, with significant differences observed across specialties (p = 0.008). Similarly, studies from other Arab countries reported higher rates of poor sleep quality. Among Egyptian residents, 96.7% had poor sleep quality, according to the PSQI, with no significant differences between specialties (p = 0.65) [23]. Likewise, 90% of Jordanian residents exhibited poor sleep quality [24].

Regarding burnout, most participants showed high levels of EE (81.3%) and DP (66.5%), as measured by the aMBI. Conversely, only 33% of residents exhibited high burnout on the PA subscale. In contrast, a study in Iran among EM residents and attending physicians reported lower rates of high burnout in EE (37%) and DP (39%), but a higher percentage of participants demonstrated high burnout in PA (46%) [25]. Similarly, in the United States, EM residents showed lower prevalence rates of burnout in EE (17.4%) compared to our findings but higher rates in DP (73.9%) and PA (82.6%) [26]. In Jamaica, EM residents reported lower levels of high burnout across all subscales than our population: EE (50%), DP (20%), and PA (26.7%) [27].

Regarding the relationship between sleep quality and burnout, we found that DP scores significantly predicted poor sleep quality (R = 0.42, 95% CI: 0.3-5.6; p = 0.001). This finding aligns with results of Weaver et al. [28] who reported that physicians with poor sleep quality were at a higher risk for DP (odds ratio [OR] = 3.32, 95% CI: 2.30-4.79). However, Weaver et al. [28] also identified associations between poor sleep quality and other burnout dimensions, including EE (OR = 3.67, 95% CI: 2.75-4.91), lack of PA (OR = 2.00, 95% CI: 1.45-2.76), and overall burnout (OR = 3.67, 95% CI: 2.75-4.89), which were not observed in our study.

In addition to burnout, gender was significantly associated with sleep quality in our study (R = 0.16, 95% CI: 0.3-2.5; p = 0.01). This contrasts with findings of Jaradat et al. [24], who reported no significant association between gender and sleep quality (p = 0.14) but found that self-reported fatigue and lack of concentration were significantly correlated with poor sleep quality (p = 0.004 and p = 0.001, respectively). Conversely, Hendawy et al. [23] identified male gender as a significant predictor of poor sleep quality (p < 0.001) and also noted that the number of days off and sleep habits before residency significantly influenced sleep quality (p < 0.001).

While our study offers important insights into the prevalence of sleep problems and their relationship to burnout among EM training residents from multiple centers in Riyadh, the study has several limitations. Its cross-sectional design precludes causal inferences, and the relatively small, convenience-based sample size limits the generalizability of findings, particularly as the study was restricted to Riyadh. The reliance on self-reported data introduces potential biases, while the absence of objective measures like actigraphy and the exclusion of external factors, such as workload variations and institutional support, restricts the comprehensiveness of the analysis. Additionally, the study did not account for lifestyle factors or include other healthcare professionals, further limiting its applicability. Future research should address these issues by employing longitudinal designs, larger and more diverse samples, and objective assessment tools to better understand the relationship between sleep quality and burnout.

In conclusion, poor sleep quality is a common issue among EM residency training residents in Riyadh, SA, and is significantly associated with higher DP levels. Addressing these challenges through targeted policies and interventions is essential for improving the healthcare system in SA and ensuring the well-being of its healthcare providers.

List of Abbreviations

aMBI	Abbreviated Maslach burnout inventory
CI	Confidence interval
DP	Depersonalization
EE	Emotional exhaustion
EM	Emergency medicine
OR	Odds ratio
PA	Personal accomplishment
PSQI	Pittsburgh Sleep Quality Index
SA	Saudi Arabia

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The authors declare no conflicts of interest.

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All participants provided informed consent.

Consent for publication
All authors consent to the publication of this manuscript.

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