

ORIGINAL ARTICLE

Burnout and stress among emergency physicians in the Kingdom of Bahrain

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ABSTRACT

Background: Emergency physicians (EPs) are exposed to various stressors that lead to burnout. No studies to date have examined these factors in the emergency departments (EDs) of the Kingdom of Bahrain.

Objective: The study aims to identify the prevalence rates, associated variables, and predictors for burnout and stress among EPs in Bahrain's EDs.

Methods: A cross-sectional study involving 134 EPs working in the ED of 3 major tertiary hospitals completed an electronic survey, which included the Copenhagen Burnout Inventory and Stress Overload Scale-Short Form.

Results: The survey had a response rate of 86.7% ($n = 116$). EPs reported a prevalence rate of 81.0% for personal burnout, 69.8% for work-related burnout, and 40.5% for patient-related burnout. Approximately 23.9% EPs were at high risk for illness. Our measures illustrated that higher personal, work-related, and patient-related burnout was associated with higher personal vulnerability, event load, and stress overload. Other contributing factors for burnout and stress were being female, Bahraini, Chief Resident or Consultant, working >50 hours per week, taking at least one sick leave in the last year. Experiencing sleep disturbances and workplace violence were all contributing factors to higher burnout and stress levels.

Conclusions: The prevalence of burnout and stress among EPs in Bahrain is high and reflects a significant problem. Several demographic and occupational factors are closely related to burnout and stress, and need to be addressed to higher authorities in order to implement protective measures.

Keywords: Emergency physician, burnout, stress overload, Copenhagen Burnout Inventory, physician well-being, Bahrain.

Introduction

Emergency medicine (EM) is a specialty characterized by its dynamic, critical, and stressful working environment. In the US, emergency physicians (EPs) are three times more likely to develop burnout than other professions [1] with a burnout rate of 65%. This is considerably higher than other specialties [2]. From the EM perspective, burnout is a propagating problem globally, with the call to invest more in research to identify the causes and find solutions to help resolve this syndrome [3-5].

In the Gulf Cooperation Council (GCC) countries, five studies have looked at the burnout of EPs; the first explores levels of burnout and depression in a residency program in the United Arab Emirates which included EM residents [6], while the other four were conducted in Saudi Arabia, which looked at the burnout of EPs in

different settings [7-10]. This will be the first study to examine the level of burnout and stress among EPs in the Kingdom of Bahrain. We hope that these results will provide the evidence to develop targeted policies for improving the wellbeing of EPs and retention rate within the country.

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Burnout and stress

Burnout is defined as “physical, mental, and emotional exhaustion secondary to stress” that must be chronic, persistent, and unresolved to cause burnout [11]. The French Santé Et Satisfaction des Médecins au Travail study found that EPs develop these stress factors at a higher rate compared to other physicians [12]. Burnout exposes EPs to consequences such as reduced job satisfaction and productivity, depression and substance abuse, early retirement or career termination, compromised patient safety, and increased medical errors [11].

Measuring burnout and stress

The Copenhagen Burnout Inventory (CBI) measures burnout across three domains: personal, work-related, and client-related [13]. The CBI has been translated into several languages and applied in a wide range of work settings, particularly among EPs [11,12,14]. The CBI is suitable for health professionals because it focuses on the causes of burnout rather than just the symptoms [15]. These include factors in work, personal, and client related settings [16]. Cronbach’s α for internal reliability of the three domains are high (0.85-0.87) [14].

The Stress Overload Scale (SOS) is a psychometric scale used to calculate stress overload, which predicts illness [17]. Its scores reflect good internal consistency ($\alpha = 0.94$), Cronbach’s alpha ($\alpha > 0.86$), and adequate test-retest reliability ($r = 0.75$ over 1 week) [17]. A Short Form Stress-Overload Scale (SOS-S) version of the scale (SOS-S; 10 items) was created and validated to be just as effective as the full version [18]. The SOS-S will help to further validate the levels of burnout, as it specifically measures the individual’s perceived ability to handle stressors (external/internal), i.e., their personal vulnerability (PV) to stress, and event load (EL) (level of external stressors) [19]. It also predicts illness more accurately than traditional stress measures [20].

By adding the SOS-S to the study, the aim was to: (1) further validate the levels of burnout by correlating it with an internationally recognized stress scale, (2) identify a unique type of stress among EPs that demonstrates novelty, (3) predict illness more accurately amongst EPs, and (4) identify participants at risk for illness according to four categories: high risk, challenged, fragile, and low risk.

Methodology

Study design and setting

This is a multi-center, cross-sectional study involving three major governmental hospitals in the Kingdom of Bahrain: Salmaniya Medical Complex (SMC), Bahrain Defense Force Hospital (BDFH), and King Hamad University Hospital (KHUH). Data were collected between February and March 2020. The primary outcome measures being assessed in the study were stress overload, personal burnout, work-related burnout, patient-related burnout, demographics, and occupational variables that were determined to be significant in predicting stress and

burnout. The assessment tools used to measure are listed in the study protocol.

Selection of participants

A list of physicians’ names and their emails were collected from the emergency department (ED) of each hospital: SMC (65 physicians), KHUH (37 physicians), and BDFH (32 physicians). Given the population of ED physicians was 134, a sample size of 100 was calculated using a sample size calculator following the defined parameters of 95% confidence interval (CI) and a 5% margin of error to get significant results. Keeping in mind the potential of incomplete data points, the survey was sent to the whole population to attain the target size. No ED physicians were excluded.

The study protocol

An electronic survey composed of 43 questions was distributed by email to all physicians currently working in the ED in the three main hospitals (a total of 134). The survey was created on the Survey Monkey platform where the first page included a brief explanation of the study, informed consent, and contact information of the primary investigator. Participants are taken to the survey after ticking the following statement, “By choosing yes, I am attesting that I have read and understand the information above and I freely give my consent/assent to participate in this research study.” If they choose not to participate, they would be directly taken to the last page of the survey thanking them for their time. The questions were randomized to enhance response rate, eliminate order bias, and were split into three sections.

Section I

Demographic data and the occupational data.

Section II

The CBI consists of 19 items divided into 3 domains: personal burnout as related to somatic and emotional exhaustion, work-related burnout due to the working environment, and patient-related items related to the interaction with patients.

All items have five response categories in a Likert scale, ranging either from “to a very low degree” to “to a very high degree” or from “never” to “always.” Each scale ranges from 0 to 100 points, with high scores indicating higher levels of burnout. Total score on the scale is the average of the scores on the items. If less than three questions were answered in any of the domains (less than four items in the work-related burnout), the respondent was classified as a non-responder.

Section III

The SOS-S includes 10 questions graded on a five-point Likert scale ranging from not at all (1) to a lot (5). Overall mean scores were computed to measure the level of stress overload, the mean of odd-numbered items measured PV and the mean of even-numbered items measured EL.

Higher scores reflect higher levels of stress overload, PV, and EL.

Data Analysis

Statistical Package for the Social Sciences software version 25.0 was used to determine quantitative and descriptive statistics. Logistic regression was used for multivariate analysis to explore correlations between certain demographic and occupational variables, PV, and EL. Binary logistics regression analysis was performed to define significant predictors of personal, work-related, and patient-related burnout. The coded variables used for regression analysis were the following: gender, age, marital status, job position, nationality, working hours, sick leave status, sleep disturbances status, short/staggered meals status, violence at workplace status, PV scores, EL scores and total SOS-S scores. A p -value of <0.05 was considered to be statistically significant.

Results

Participant characteristics

The survey was sent to 134 EPs: 121 completed the survey and 5 out of 121 were considered incomplete. As such, only 116 responses were considered for analysis, demonstrating a response rate of 86.7%. It is important to note these 116 responses were included based on participants completing at least ninety percent of the survey (100% of 116 completed the SOS-S and CBI, whereas 90% completed the majority of the demographic items). Table 1 summarizes demographic and

Table 1. Socio-demographic and occupational characteristics of Bahrain's EPs ($n = 116$).

Characteristics	Frequency	Percentage	Total (n)
1. Age			
25-34	35	30.2	116
35-44	49	42.2	
45-54	25	21.6	
55-64	5	4.3	
≥65	2	0.2	
2. Sex			
Male	81	69.8	115
Female	34	29.3	
3. Hospital affiliation			
Bahrain Defence Force	27	23.3	111
KHUH	30	25.9	
Salmaniya Medical Centre	54	46.6	
4. Marital status			
Single	17	14.7	116
Married	94	81.0	
Divorced	4	3.4	
Widowed	1	0.9	
5. Nationality			
Bahraini	68	58.6	116
Non-Bahraini	48	41.4	
6. Number of children			

Characteristics	Frequency	Percentage	Total (n)
0	28	24.1	116
1	13	11.2	
2	39	33.6	
3	20	17.2	
4	14	12.1	
5	1	0.9	
>5	1	0.9	
7. Job position			
Resident	24	20.7	116
Senior resident	49	42.2	
Chief resident	30	25.9	
Consultant	13	11.2	
8. Residency year			
Completed within last 6 months	27	23.3	81
Year 1	9	7.8	
Year 2	7	6.0	
Year 3	10	8.6	
Year 4	28	24.1	
9. Years of experience			
1-4	21	18.1	116
5-9	33	28.4	
10-14	25	21.6	
15-19	17	14.7	
20-24	13	11.2	
25-39	7	6.0	
10. Hours of work per week			
~40 hours	45	38.8	116
~50 hours	49	42.2	
~60 hours	13	11.2	
~70 hours	6	5.2	
~80 hours	3	2.6	
11. Have you taken at least one sick leave during the last year?			
Yes	61	52.6	116
No	55	47.4	
12. Have you personally dealt with sleep disturbances?			
Yes	102	87.9	116
No	14	12.1	
13. Do you tend to take short meals, staggered, or not eat all?			
Yes	95	81.9	116
No	21	18.1	
14. Have you been exposed to violence in the workplace at least once in the last year?			
Yes	74	63.8	116
No	42	36.2	
15. If you answered yes to Q14, number of times of exposure to violence?			
1	9	7.7	74
1 ≤ 5	43	37.1	
6 ≤ 10	22	18.9	

occupational characteristics. The majority of participants (42.2%) were aged 35-44 years old, residents (42.2%), married (81%), male (69.8%), and worked for 50 hours or more per week (61.2%). There was an equal distribution among physicians regarding years of experience ranging from 1 to 39 years, and across residency years from first year to those who had completed it within the past 6 months. Sleep disturbance occurred among 102 (87.9%) EPs, and 74 (63.8%) had been exposed to violence in their workplace at least once in the last year.

Prevalence and distribution of burnout and stress rates

Tables 2 and 3 provide the prevalence of each type of CBI and SOS-S domains of PV ($M: 13.89$, $SD: 5.04$), EL ($M: 16.73$, $SD: 4.80$), full SOS-S ($M: 30.57$, $SD: 9.37$) and its related items for EPs. The prevalence of burnout among EPs was 81.0% for personal burnout ($M: 63.0$, $SD: 22.4$; $CI: 67.0\%-83.3\%$), 69.8% for work-related burnout ($M: 60.3$, $SD: 21.6$; $CI: 60.6\%-78.0\%$), and 40.5% for patient-related burnout ($M: 43.1$, $SD: 25.4$; $CI: 31.5\%-50.0\%$).

Table 3 uses a mean score of 50 as the cut-off point for the presence of burnout in each scale [21,22]. In Figure 1, categorical SOS-S scores were determined by splitting each SOS-S subscale at its mean (PV-S mean = 13.89; EL-S mean = 16.73) and crossing the scales to form a 2×2 matrix. Results yielded 41.6% (47) of participants as low risk for illness (low PV, low EL), 33.6% (38) as challenged (low PV, high EL), 23.9% (27) as high risk (high PV, high EL), and 0.9% (1) as fragile (high PV, low EL).

Association between burnout, stress, demographic, and occupational variables

Table 4 shows a statistically significant correlation between the CBI and SOS-S across all subscales with Pearson coefficients ranging from 0.595 to 0.830 ($p < 0.0001$) illustrating that higher burnout (all categories) were all positively correlated with PV, EL, and stress overload.

A higher number of Bahraini nationals experienced both personal and work-related burnout ($p = 0.005$). 59% of physicians who took sick leave experienced patient-related burnout ($p = 0.005$) only, and a significant number of physicians who experienced all three types of burnout had sleep disturbances. More physicians experiencing personal burnout experienced violence at the workplace (82.4%, $p = 0.028$). There were also significant differences between the four SOS-S quadrants based on the number of working hours, sick leave status, and violence at workplace status of the physicians ($p = 0.020$, $p = 0.004$, $p = 0.048$, and 0.009 , respectively). Those who worked 50 hours or more, took sick leave, and/or suffered from violence at the workplace were more likely to be in the high-risk group (see Table 5).

In Table 6, all SOS-S categories (high risk, challenged, fragile, and low risk) reported to suffer from personal burnout and work-related burnout. A general linear model test using a univariate ANOVA showed that personal burnout had main effects for PV [$F(1,190) = 43.72$, $p <$

0.0001], EL [$F(1,288) = 52.06$, $p < 0.0001$] and for their interaction [$F(233) = 26.09$, $p < 0.0001$]. The high-risk group were most likely to suffer from higher levels of personal ($M: 83.8 \pm 14.4$), work-related ($M: 83.1 \pm 11.3$), and patient-related burnout ($M: 74.4 \pm 15.5$). Table 6 also shows that work-related and patient-related burnout had significant effects on PV, EL, and their interaction ($p < 0.0001$).

Table 7 demonstrated that Bahraini nationals suffered from higher levels of personal burnout ($p = 0.002$), work-related burnout ($p = 0.000$), PV ($p = 0.010$), EL ($p = 0.002$) and total SOS-S scores compared to non-Bahrainis. Chief residents followed by Consultants had higher levels of personal burnout ($p = 0.035$) and work-related burnout ($p = 0.035$).

EPs who worked more hours had higher levels of personal and work-related burnout ($p = 0.04$). Hours of work were also positively correlated to patient-related burnout ($r = 0.273$, $p = 0.03$), PV ($r = 0.24$, $p = 0.015$) and EL ($r = 0.20$, $p = 0.035$). EPs who had taken at least one sick leave and those who experienced sleep disturbances had significantly higher levels of personal, work-related, and patient-related burnout, as well as PV, EL and total SOS-S scores. Physicians who suffered from workplace violence were more likely to suffer from higher levels of personal ($p = 0.004$), work related ($p = 0.009$), and patient-related burnout ($p = 0.038$), and PV ($p = 0.007$).

Significant predictors of burnout

Table 8 shows that exposure to violence [Odds ratio (OR) = 3.45, 95% CI = 0.99-11.98, $p = 0.04$] and EL (OR = 1.60, 95% CI = 1.30-1.98, $p < 0.0001$) were strong predictors of personal burnout (model R^2 value = 47.1%). Being Bahraini (OR = 3.30, 95% CI = 1.26-8.63, $p = 0.015$) and EL (OR = 1.27, 95% CI = 1.13-1.42, $p < 0.0001$) were strong predictors of work-related burnout as per this model (R^2 value = 37.1%). Being female (OR = 0.21, 95% CI = 0.06-0.76, $p = 0.017$), sick leave status (OR = 5.16, 95% CI = 1.70-15.60, $p < 0.005$), and PV (OR = 1.49, 95% CI = 1.25-1.77, $p < 0.0001$) were significant predictors of patient-related burnout (R^2 value = 58.2%).

Discussion

This was a multicenter study that explored levels of burnout and stress among EPs in three major ED in the Kingdom of Bahrain and is the first to predict illness by combining CBI and SOS-S as measuring tools. The study showed high prevalence rates for burnout on the three CBI subscales: personal (81.0%), work-related (69.8%), and patient-related (40.5%). This is supported by other studies that used CBI to measure burnout [12,14], and in studies carried out in the GCC countries which focused on EPs but used the Maslach Burnout Inventory (MBI) to measure burnout [6-10]. EPs had a high score in the work-related domain, which is highly associated with burnout in the ED [5].

Pearson correlations showed a statistically significant and positive correlation between all three CBI burnout subscales, the SOS-S scale and its subscales (stress overload, PV, and EL), such that when burnout increases, stress overload, PV, and EL also increase ($p < 0.0001$).

Table 2. CBI and SOS-S items, subscales, and response frequencies for EPs.

CBI	Always or to a very high degree (scoring 100) %	Often or to a high degree (scoring 75) %	Sometimes or somewhat (scoring 50) %	Seldom or to a low degree (scoring 25) %	Never/almost never or to a very low degree (scoring 0) %	Missing <i>n</i>	Score mean (SD)	
<i>Personal burnout</i>								
How often do you feel tired?	28.4	35.3	31.0	4.3	0.9	0	71.6 (22.8)	
How often are you physically exhausted?	26.1	34.8	30.4	6.1	2.6	1	68.9 (24.9)	
How often are you emotionally exhausted?	23.3	34.5	33.6	4.3	4.3	0	67.0 (25.5)	
How often do you think: "I can't take it anymore"?	12.9	30.2	35.3	12.1	9.5	0	56.3 (28.1)	
How often do you feel worn out?	15.5	33.6	37.9	10.3	2.6	0	62.3 (24.1)	
How often do you feel weak and susceptible to illness?	12.1	25.0	34.5	15.5	12.9	0	51.9 (29.7)	
Total mean score							63.0 (22.4)	
<i>Work-related burnout</i>								
Is your work emotionally exhausting?	30.2	29.3	32.8	6.0	1.7	0	70.0 (24.9)	
Do you feel burnt out because of your work?	25.0	29.3	31.0	12.1	2.6	0	65.6 (26.7)	
Does your work frustrate you?	18.1	26.7	27.6	19.0	8.6	0	56.7 (30.3)	
Do you feel worn out at the end of the working day?	30.2	31.9	25.9	8.6	3.4	0	69.2 (27.1)	
Are you exhausted in the morning at the thought of another day at work?	13.8	28.4	33.6	14.7	9.5	0	55.6 (28.8)	
Do you feel that every working hour is tiring for you?	8.6	22.4	35.3	22.4	11.2	0	48.7 (27.9)	
Do you have enough energy for family and friends during leisure time?	14.7	25.0	40.5	11.2	8.6	0	56.5 (27.8)	
Total mean score							60.3 (21.6)	
<i>Patient-related burnout</i>								
Do you find it hard to work with clients?	6.0	6.9	37.1	25.9	24.1	0	36.2 (27.8)	
Do you find it frustrating to work with clients?	4.3	8.6	26.7	28.4	31.9	0	31.3 (28.1)	
Does it drain your energy to work with clients?	8.6	12.9	31.9	22.4	24.1	0	39.9 (30.7)	
Do you feel you give more than you get back when you work with clients?	26.7	23.3	25.0	13.8	11.2	0	60.1 (33.0)	
Are you tired of working with clients?	6.0	15.5	30.2	25.9	22.4	0	39.2 (29.3)	
Do you sometimes wonder how long you will be able to continue working with clients?	18.1	19.0	30.2	18.1	14.7	0	51.9 (32.5)	
Total mean score							43.1 (25.4)	
SOS-S	Subscale (PV or EL)	A lot %	Often %	Sometimes %	Seldom %	Not at all %	Missing <i>n</i>	Score mean (SD)
In the past week, have you felt:								
Inadequate?	PV	4.3	13.9	31.3	36.5	13.9	1	2.58 (1.03)
Swamped by your responsibilities	EL	10.5	21.1	37.7	20.2	10.5	2	3.01 (1.13)
That the odds were against you?	PV	10.5	16.7	23.7	37.7	11.4	2	2.77 (1.18)
That there wasn't enough time to get to everything?	EL	23.5	34.8	22.6	13.9	5.2	1	3.57 (1.15)
Like nothing was going right?	PV	13.0	16.5	23.5	29.6	17.4	1	2.78 (1.28)
Like you were rushed?	EL	17.4	34.8	25.3	19.1	3.5	1	3.43 (1.09)
Like there was no escape?	PV	15.7	29.6	17.4	27.8	9.6	1	3.14 (1.26)
Like things kept piling up?	EL	21.7	27.0	26.1	19.1	6.1	1	3.39 (1.20)
Like just giving up?	PV	13.9	13.0	21.7	27.0	24.3	1	2.65 (1.35)
Like you were carrying a heavy load?	EL	21.7	26.1	26.1	17.4	8.7	1	3.35 (1.24)
Total mean score: PV								13.89 (5.04)
Total mean score: EL								16.73 (4.80)
Total mean score: Full SOS-S								30.57 (9.37)

The bold values were chosen to improve legibility.

Table 3. Prevalence and distribution of burnout and stress overload among EPs based on mean scores of CBI subscales, SOS-S scale and subscales.

Type of burnout	Mean score (SD)	Prevalence (%; CI)
Personal burnout	63.0 (22.4)	94 (81.0%, CI: 67.0%-83.3%)
Work-related burnout	60.3 (21.6)	81 (69.8%, CI: 60.6%-78.0%)
Patient-related burnout	43.1 (25.4)	47 (40.5%, CI: 31.5%-50.0%)
SOS-Short (SOS-S)	Mean score (SD)	
Total personal vulnerability (PV-S)	13.9 (5.0)	-
Total event load (EL-S)	16.7 (4.8)	-
Total SOS-S	30.6 (9.4)	-

Figure 1. Chart of EPs' SOS-S categorical scoring based on the four quadrants of low risk, challenged, fragile, and high risk for illness.

		PV	
		Low	High
EL	Low	Low risk 47 (41.6%)	Fragile 1 (0.9%)
	High	Challenged 38 (33.6%)	High risk 27 (23.9%)

Table 4. Pearson correlations between the CBI dimensions and the SOS-S total scores and its subscales^a.

	Personal burnout	Work-related burnout	Patient-related burnout	PV	EL	SOS-S total
Personal burnout	-	0.830	0.700	0.616	0.622	0.650
Work-related burnout	0.830	-	0.732	0.659	0.675	0.699
Patient-related burnout	0.700	0.732	-	0.613	0.595	0.638
PV	0.616	0.659	0.613	-	0.811	
EL	0.622	0.675	0.595	0.811	-	0.949
SOS-S total	0.650	0.699	0.638	0.954	0.949	-

^aAll Pearson-correlation values show a *p*-value of <0.0001.

In terms of predicting risk for illness, 23.9% of EPs were categorized as high risk for illness and 33.6% were challenged. The high-risk group was more likely to suffer from personal, work-related, and patient-related burnout compared to the challenged, fragile and low risk groups. In France, a study using the Perceived Stress Scale demonstrated that the alleged work burden and total stress was strongly linked to working hours and had a greater influence on EPs [23].

Demographic data showed that a third of the participants were female EPs (29.3%) that reported higher personal burnout compared to their male counterparts (88.2% vs. 79%; $p = 0.034$). This is consistent with other studies, however, other studies showed that female staff suffer from higher work-related burnout instead [24,25]. Bahraini EPs were found in this study to experience higher levels of all burnout domains, PV, and EL in contrast to their non-Bahraini colleagues ($p < 0.05$). This is unlike regional studies in Saudi Arabia where there was no difference between Saudi and non-Saudi EPs in their levels of burnout [7,8].

An interesting finding in the occupational data showed that the Chief residents followed by Consultants had higher levels of personal and work-related burnout in comparison to other job positions. This could be due to the large administrative and clinical responsibilities that

ED Chief residents or Consultants have to fulfill as team leaders in Bahrain, and the burden of workplace conflicts that can affect the psychological status of EPs despite their experience in coping with stressful events in the ED [25]. In fact, burnout in senior EPs has been neglected and measures must be provided to ensure a long career for EPs of all ages and in particular for seniors [26]. A tertiary hospital in Saudi Arabia found that being a resident was more associated with burnout [7].

In our study, EPs working more than 50 hours per week had significant patient-related burnout compared to the average (40 hours per week), which is consistent with a regional study carried on resident physicians using the MBI survey [8]. EPs with sleep disturbances had higher levels of all burnout domains, PV, EL and total SOS-S. This is in line with previous studies which found that physicians suffering from burnout had a higher OR for sleep deprivation [7]. Additionally, EPs who suffer from workplace violence were more likely to suffer from higher levels of all burnout domains and PV. A Turkish study also showed a statistically significant relationship between burnout and violence experienced by EPs [27].

Though the concept of burnout has become a global concern, the precise definition and interpretation of the phenomena varies mainly due to the wide variation in

Table 5. Prevalence rates [*n* (%)] and Pearson Chi-square test (χ^2) of the CBI dimensions and SOS-S quadrants based on demographic and occupational variables.

	CBI domains			SOS-S quadrants based on categorical scoring				
	Personal burnout (score ≥ 50) <i>N</i> (%), <i>p</i> value	Work-related burnout (score ≥ 50) <i>N</i> (%), <i>p</i> value	Patient-related burnout (score ≥ 50) <i>N</i> (%), <i>p</i> value	High risk <i>N</i> (%)	Challenged <i>N</i> (%)	Fragile <i>N</i> (%)	Low risk <i>N</i> (%)	SOS categorical scores (<i>p</i> -value)
Total	94 (81.0%)	81 (69.8%)	47 (40.5%)	27 (23.5%)	38 (33.0%)	1 (0.9%)	46 (40.0%)	
Gender								
Male	64 (79.0%)	53 (65.4%)	35 (43.2%)	17 (21.0%)	27 (33.3%)	0 (0.0%)	36 (44.4%)	0.168
Female	30 (88.2%) <i>p</i> = 0.034	28 (82.4%) <i>p</i> = 0.061	12 (35.3%) <i>p</i> = 0.520	10 (29.4%)	11 (32.4%)	1 (2.9%)	10 (29.4%)	
Age								
25-34	29 (82.9%)	25 (71.4%)	12 (34.3%)	9 (25.7%)	16 (45.7%)	0 (0.0%)	10 (28.6%)	0.318
35-44	33 (67.3%)	35 (71.4%)	20 (40.8%)	11 (22.4%)	13 (26.5%)	0 (0.0%)	23 (46.9%)	
45-54	22 (88.0%)	18 (72.0%)	12 (48.0%)	7 (28.0%)	8 (32.0%)	1 (4.0%)	8 (32.0%)	
55-64	3 (60.0%)	2 (40.0%)	2 (40.0%)	0 (0%)	0 (0%)	0 (0.0%)	5 (100%)	
≥ 65	1 (50.0%) <i>p</i> = 0.178	1 (50.0%) <i>p</i> = 0.619	1 (50.0%) <i>p</i> = 0.875	0 (0%)	1 (50.0%)	0 (0.0%)	1 (50.0%)	
Marital status								
Married	70 (74.5%)	63 (67.0%)	40 (42.6%)	23 (24.5%)	28 (29.8%)	1 (1.1%)	40 (43.5%)	0.822
Single	14 (82.4%)	14 (82.4%)	4 (23.5%)	3 (17.6%)	7 (41.2%)	0 (0.0%)	6 (37.5%)	
Divorced	4 (100%)	4 (100%)	3 (75%)	1 (25%)	3 (75.0%)	0 (0.0%)	0 (0%)	
Widowed	0 (0%) <i>p</i> = 0.179	0 (0%) <i>p</i> = 0.129	0 (0%) <i>p</i> = 0.183	0 (0%)	0 (0.0%)	0 (0.0%)	1 (100%)	
Nationality								
Bahraini	58 (85.3%)	56 (82.4%)	30 (44.1%)	21 (30.9%)	23 (33.8%)	1 (1.5%)	21 (30.9%)	0.069
Non-Bahraini	30 (62.5%) <i>p</i> = 0.005	25 (52.1%) <i>p</i> = 0.005	17 (35.4%) <i>p</i> = 0.347	6 (12.5%)	15 (31.3%)	0 (0.0%)	26 (54.2%)	
Job position								
Resident	18 (75.0%)	18 (75.0%)	8 (33.3%)	5 (20.8%)	11 (45.8%)	0 (0.0%)	7 (30.4%)	0.124
Senior resident	34 (69.4%)	30 (61.2%)	15 (30.6%)	9 (18.4%)	12 (24.5%)	0 (0.0%)	27 (56.3%)	
Chief resident	26 (86.7%)	24 (80.0%)	17 (56.7%)	8 (26.7%)	11 (36.7%)	0 (0.0%)	10 (34.5%)	
Consultant	10 (76.9%) <i>p</i> = 0.384	9 (69.2%) <i>p</i> = 0.321	7 (53.8%) <i>p</i> = 0.082	5 (38.5%)	4 (30.8%)	1 (7.7%)	3 (23.1%)	
# Work hours								
~40 hours	33 (73.3%)	29 (64.4%)	14 (31.1%)	8 (17.8%)	13 (28.9%)	1 (2.2%)	22 (50%)	0.020
~50 hours	39 (76.9%)	36 (73.5%)	17 (34.7%)	7 (14.3%)	22 (44.9%)	0 (0.0%)	20 (40.8%)	
~60 hours	9 (69.2%)	9 (69.2%)	9 (69.2%)	7 (53.8%)	2 (15.4%)	0 (0.0%)	3 (25.0%)	
~70 hours	5 (83.5%)	5 (83.5%)	5 (83.5%)	4 (66.7%)	0 (0.0%)	0 (0.0%)	1 (20.0%)	
~80 hours	2 (66.7%) <i>p</i> = 0.884	2 (66.7%) <i>p</i> = 0.833	2 (66.7%) <i>p</i> = 0.016	1 (33.3%)	1 (33.3%)	0 (0.0%)	1 (33.3%)	
Sick leave								
Yes	50 (82.0%)	47 (77.0%)	36 (59.0%)	20 (32.8%)	21 (34.4%)	1 (1.6%)	16 (26.2%)	0.004
No	38 (69.1%) <i>p</i> = 0.106	34 (61.8%) <i>p</i> = 0.074	11 (20.0%) <i>p</i> = 0.005	7 (12.7%)	17 (30.9%)	0 (0%)	31 (56.4%)	
Sleep disturbances								
Yes	82 (80.4%)	75 (73.5%)	45 (44.1%)	26 (25.5%)	35 (34.3%)	1 (1.0%)	37 (36.3%)	0.05
No	6 (42.9%) <i>p</i> = 0.002	6 (42.9%) <i>p</i> = 0.019	2 (14.3%) <i>p</i> = 0.033	1 (7.1%)	3 (21.4%)	0 (0%)	10 (71.4%)	
Short/staggered/ no meals								
Yes	73 (76.8%)	68 (71.6%)	38 (40.0%)	24 (25.3%)	32 (33.7%)	1 (1.1%)	37 (39.4%)	0.175
No	15 (71.4%) <i>p</i> = 0.60	13 (61.9%) <i>p</i> = 0.382	9 (42.9%) <i>p</i> = 0.809	3 (14.3%)	6 (28.6%)	0 (0%)	10 (52.6%)	
Violence at work- place								
Yes	61 (82.4%)	56 (75.7%)	34 (45.9%)	23 (31.1%)	17 (23.0%)	1 (1.4%)	30 (42.3%)	0.009
No	27 (64.3%) <i>p</i> = 0.028	25 (59.5%) <i>p</i> = 0.069	13 (31.0%) <i>p</i> = 0.114	4 (9.5%)	21 (50.0%)	0 (0%)	17 (40.5%)	

The bold values refer to significant *p* values.

Table 6. Prevalence [*n* (%)], mean, and standard deviations of the CBI dimensions across the SOS-S categories.

	Personal burnout			Work-related burnout			Patient-related burnout		
	<i>n</i> (%)		(Mean $\pm$ SD)	<i>n</i> (%)		(Mean $\pm$ SD)	<i>n</i> (%)		(Mean $\pm$ SD)
	Yes 88 (75.8%)	No 28 (24.1%)	Kruskal-Wallis test <0.001	Yes 81 (69.8%)	No 35 (30.1%)	Kruskal-Wallis test <0.001	Yes 47 (40.5%)	No 69 (59.4%)	Kruskal-Wallis test 0.02
High risk	26 (29.5%)	1 (3.6%)	83.8 $\pm$ 14.4	26 (32.1%)	1 (2.9%)	83.1 $\pm$ 11.3	24 (51.1%)	3 (4.3%)	74.4 $\pm$ 15.5
Challenged	34 (38.65%)	4 (14.3%)	66.3 $\pm$ 16.11	30 (37.0%)	8 (22.9%)	68.3 $\pm$ 10.5	17 (36.2%)	21 (30.4%)	62.5 $\pm$ 13.3
Fragile	1 (1.1%)	0	1 (66.67)	1 (1.2%)	0	1 (66.67)	0	1 (1.4%)	1 (66.67)
Low risk	24 (27.3%)	23 (82.1%)	62.6 $\pm$ 10.9	21 (25.9%)	26 (74.3%)	60.5 $\pm$ 9.2	5 (10.6%)	42 (60.9%)	59.1 $\pm$ 13.9

Table 7. Distribution of continuous scores for the CBI subscales and the SOS-S total scores and its subscales categorized according to demographic and workplace variables.

	CBI			SOS-S		
	Personal burn-out (Mean $\pm$ SD, <i>p</i> -value)	Work-related burnout (Mean $\pm$ SD, <i>p</i> -value)	Patient-related burnout (Mean $\pm$ SD, <i>p</i> -value)	PV (Mean $\pm$ SD, <i>p</i> -value)	EL (Mean $\pm$ SD, <i>p</i> -value)	SOS-S total scores (Mean $\pm$ SD, <i>p</i> -value)
Gender						
Male	61.36 $\pm$ 23.52	59.12 $\pm$ 21.95	44.13 $\pm$ 26.74	13.55 $\pm$ 5.09	16.37 $\pm$ 4.91	29.19 $\pm$ 9.62
Female	66.83 $\pm$ 19.17 <i>p</i> = 0.15	64.07 $\pm$ 20.10 <i>p</i> = 0.24	41.17 $\pm$ 22.49 <i>p</i> = 0.62	15.00 $\pm$ 4.62 <i>p</i> = 0.057	17.87 $\pm$ 4.24 <i>p</i> = 0.118	32.71 $\pm$ 8.12 <i>p</i> = 0.058
Age						
25-34	62.14 $\pm$ 19.70	62.34 $\pm$ 18.23	40.71 $\pm$ 26.62	13.77 $\pm$ 4.35	17.91 $\pm$ 3.74	31.68 $\pm$ 7.50
35-44	63.29 $\pm$ 23.28	61.29 $\pm$ 23.05	43.96 $\pm$ 25.07	14.12 $\pm$ 5.57	16.00 $\pm$ 5.59	30.00 $\pm$ 10.82
45-54	68.33 $\pm$ 23.66	61.00 $\pm$ 21.55	47.16 $\pm$ 26.20	14.54 $\pm$ 5.24	17.48 $\pm$ 4.29	32.04 $\pm$ 9.11
>55	46.42 $\pm$ 19.07 <i>p</i> = 0.08	40.81 $\pm$ 21.01 <i>p</i> = 0.08	34.52 $\pm$ 20.51 <i>p</i> = 0.66	10.71 $\pm$ 2.69 <i>p</i> = 0.30	13.00 $\pm$ 3.00 <i>p</i> = 0.049	23.71 $\pm$ 5.28 <i>p</i> = 0.119
Marital status						
Married	63.27 $\pm$ 22.74	59.68 $\pm$ 21.75	44.14 $\pm$ 26.22	13.93 $\pm$ 5.17	16.54 $\pm$ 4.90	30.12 $\pm$ 9.65
Single	62.99 $\pm$ 19.48	61.76 $\pm$ 15.60	35.29 $\pm$ 20.94	13.50 $\pm$ 4.38	17.62 $\pm$ 3.89	31.12 $\pm$ 7.47
Divorced/ Widowed	58.33 $\pm$ 28.25 <i>p</i> = 0.99	67.14 $\pm$ 36.36 <i>p</i> = 0.99	22.82 $\pm$ 10.20 <i>p</i> = 0.34	14.40 $\pm$ 5.17 <i>p</i> = 0.85	17.20 $\pm$ 6.01 <i>p</i> = 0.612	31.60 $\pm$ 11.03 <i>p</i> = 0.770
Nationality						
Bahraini	68.46 $\pm$ 21.17	66.22 $\pm$ 20.06	46.69 $\pm$ 26.87	14.85 $\pm$ 4.89	17.86 $\pm$ 4.34	32.63 $\pm$ 8.66
Non- Bahraini	55.29 $\pm$ 21.92 <i>p</i> = 0.002	51.93 $\pm$ 21.01 <i>p</i> < 0.0001	38.02 $\pm$ 22.57 <i>p</i> = 0.097	12.53 $\pm$ 4.96 <i>p</i> = 0.006	15.16 $\pm$ 4.98 <i>p</i> = 0.003	27.65 $\pm$ 9.62 <i>p</i> = 0.002
Job position						
Resident	60.76 $\pm$ 21.24	60.26 $\pm$ 18.40	42.01 $\pm$ 26.49	13.30 $\pm$ 4.03	17.91 $\pm$ 3.55	31.21 $\pm$ 6.91
Senior resident	57.83 $\pm$ 21.61	56.19 $\pm$ 22.12	38.01 $\pm$ 24.15	12.89 $\pm$ 5.40	15.44 $\pm$ 5.19	28.31 $\pm$ 10.27
Chief resident	71.30 $\pm$ 20.92	66.66 $\pm$ 19.36	49.30 $\pm$ 24.54	14.76 $\pm$ 4.10	17.48 $\pm$ 4.46	32.06 $\pm$ 8.13
Consultant	67.62 $\pm$ 26.19 <i>p</i> = 0.035	61.26 $\pm$ 27.77 <i>p</i> = 0.035	50.00 $\pm$ 28.51 <i>p</i> = 0.14	16.61 $\pm$ 6.25 <i>p</i> = 0.068	17.76 $\pm$ 5.19 <i>p</i> = 0.092	34.38 $\pm$ 10.98 <i>p</i> = 0.074
# Working hours						
~40 hours	57.77 $\pm$ 19.83	56.26 $\pm$ 21.36	37.77 $\pm$ 24.35	12.86 $\pm$ 5.22	15.65 $\pm$ 4.75	28.52 $\pm$ 9.40
~50 hours	62.52 $\pm$ 19.35	60.64 $\pm$ 17.56	41.07 $\pm$ 23.32	13.48 $\pm$ 4.33	16.77 $\pm$ 4.68	30.26 $\pm$ 8.50
~60 hours	68.07 $\pm$ 31.86	67.03 $\pm$ 27.51	55.76 $\pm$ 28.18	17.53 $\pm$ 4.99	19.16 $\pm$ 4.36	36.50 $\pm$ 9.35
~70 hours	84.02 $\pm$ 24.91	77.38 $\pm$ 24.81	68.75 $\pm$ 29.66	18.40 $\pm$ 4.15	20.16 $\pm$ 4.91	39.20 $\pm$ 9.14
~80 hours	52.77 $\pm$ 33.67 <i>p</i> = 0.042	52.38 $\pm$ 39.82 <i>p</i> = 0.042	50.00 $\pm$ 18.16 <i>p</i> = 0.030	12.33 $\pm$ 6.42 <i>p</i> = 0.015	15.00 $\pm$ 4.35 <i>p</i> = 0.074	27.33 $\pm$ 10.69 <i>p</i> = 0.035
Sick leave						
Yes	69.63 $\pm$ 22.80	66.51 $\pm$ 20.25	50.88 $\pm$ 26.68	15.71 $\pm$ 4.65	18.10 $\pm$ 4.44	33.75 $\pm$ 8.70
No	55.68 $\pm$ 19.56 <i>p</i> < 0.0001	53.44 $\pm$ 21.05 <i>p</i> = 0.001	34.46 $\pm$ 21.05 <i>p</i> < 0.0001	11.94 $\pm$ 4.72 <i>p</i> < 0.0001	15.25 $\pm$ 4.75 <i>p</i> = 0.001	27.20 $\pm$ 8.91 <i>p</i> < 0.0001
Sleep disturbances						
Yes	65.66 $\pm$ 21.48	62.85 $\pm$ 20.92	45.46 $\pm$ 25.41	14.41 $\pm$ 5.00	17.23 $\pm$ 4.58	31.58 $\pm$ 9.10
No	43.75 $\pm$ 19.59 <i>p</i> = 0.001	41.83 $\pm$ 17.12 <i>p</i> = 0.001	25.89 $\pm$ 18.57 <i>p</i> = 0.008	10.21 $\pm$ 3.57 <i>p</i> = 0.003	13.14 $\pm$ 4.89 <i>p</i> = 0.006	23.35 $\pm$ 8.19 <i>p</i> = 0.003
Short/staggered/no meals						
Yes	63.30 $\pm$ 22.51	61.12 $\pm$ 21.84	43.81 $\pm$ 25.16	14.13 $\pm$ 4.97	17.01 $\pm$ 4.70	31.08 $\pm$ 9.18
No	61.70 $\pm$ 22.15 <i>p</i> = 0.486	56.63 $\pm$ 20.26 <i>p</i> = 0.334	39.88 $\pm$ 27.08 <i>p</i> = 0.56	12.68 $\pm$ 5.29 <i>p</i> = 0.27	15.40 $\pm$ 5.12 <i>p</i> = 0.15	28.00 $\pm$ 10.06 <i>p</i> = 0.17
Violence at workplace						
Yes	67.19 $\pm$ 22.57	64.14 $\pm$ 21.42	47.24 $\pm$ 26.39	14.80 $\pm$ 5.22	17.08 $\pm$ 4.90	31.81 $\pm$ 9.74
No	55.65 $\pm$ 20.20 <i>p</i> = 0.004	53.57 $\pm$ 20.35 <i>p</i> = 0.009	35.81 $\pm$ 22.14 <i>p</i> = 0.038	12.33 $\pm$ 4.30 <i>p</i> = 0.007	16.11 $\pm$ 4.59 <i>p</i> = 0.290	28.45 $\pm$ 8.37 <i>p</i> = 0.051

Note: significant *p*-values are listed in bold.

social, cultural, and financial factors around the world [28]. Investigators have called for the American College of Emergency Physicians Well-Being Committee to recognize causes and key resolutions for burnout in EPs [5].

Burnout and stress can be reduced by the contribution of two parties: the ED and the EPs. At the ED level, there is a need to balance the number of EPs with workload especially during night shifts, weekends, and holiday duties. This can be achieved by increasing the number of working physicians, introducing the concept of part-timers, and implementing overlap shifts during busy hours. Applying models of mentoring will also be a great source of help to the young EPs.

At the level of EPs, physicians must adapt a healthy lifestyle which includes an adequate amount of sleep, physical exercise, healthy diet, healthcare, social support through family and friends, and engaging in their ideal hobbies. EPs are encouraged to participate in resilience and stress reduction programs.

Hospitals must establish wellness programs to help mitigate burnout and stress among its physicians and create a supportive working environment with other colleagues.

Limitations

One limitation is that there are a limited number of studies using the CBI as a measuring tool compared to

Table 8. Multiple regression analysis of factors associated with each CBI subscale of burnout.

Personal burnout (model with $R^2 = 0.471$)			
Variables	OR	95% CI	p value
Violence Yes No (Ref)	3.451	0.99-11.98	0.044
EL	1.60	1.30-1.98	0.000
Work-related burnout (model with $R^2 = 0.371$)			
Variables	OR	95% CI	p value
Nationality Bahraini Non-Bahraini (Ref)	3.30	1.26-8.63	0.015
EL	1.270	1.13-1.42	0.000
Patient-related burnout (model with $R^2 = 0.582$)			
Variables	OR	95% CI	p value
Gender Female Male (Ref)	0.218	0.06-0.760	0.017
Sick leave Yes No	5.16	1.70-15.60	0.004
PV	1.49	1.25-1.77	0.000

The bold values refer to significant p values.

the MBI [29], which makes it difficult to compare results accurately in the literature. Another limitation is that EPs working in the private sector were not included in this study; this is because the majority are general physicians without formal EM training, their EDs are considered as an urgent care unit rather than a fully developed ED, the number of patients they see are small and the majority come with stable conditions, and finally they work in a different daily duty pattern [30].

Conclusion

Burnout and stress among EPs in Bahrain are concerning issues that are well demonstrated with high prevalence scores on the CBI and SOS-S, reflecting a problem that is similar to our neighboring GCC countries and worldwide. Several demographic and occupational factors are closely related to burnout and stress, in addition to other personal, work, and patient-related factors. There is a critical need to provide a greater support for EPs by targeting the risk factors for stress, including how EPs are educated and trained to perceive and deal with stress, as the problem can be improved and prevented through targeted policy changes.

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Not applicable.

List of Abbreviations

BDFH	Bahrain Defense Force Hospital
CBI	Copenhagen Burnout Inventory
CI	Confidence interval
ED	Emergency department
EL	Event load
EL-S	Total event load
EM	Emergency medicine
EP	Emergency physicians

GCC	Gulf Cooperation Council
KHUH	King Hamad University Hospital
OR	Odds ratio
PV	Personal vulnerability
PV-S	Total personal vulnerability
SESMAT	Santé Et Satisfaction des Médecins au Travail
SMC	Salmaniya Medical Center
SOS	Stress Overload Scale
SOS-S	Short Form-Stress Overload Scale

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent to participate

Written informed consent was obtained from all the participants.

Ethical approval

Ethical approval was granted by all three institutions involved: Salmaniya Medical Complex (SMC), Bahrain Defense Force Hospital (BDFH), and King Hamad University Hospital (KHUH) via Ref# 19-295, dated December 3, 2019.

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References

1. Rotenstein L, Torre M, Ramos M, Rosales RC, Guille C, Sen S, et al. Prevalence of burnout among physicians: a systematic review. *J Am Med Assoc.* 2018;320(11):1131–50. <https://doi.org/10.1001/jama.2018.12777>
2. Verougstraete D, Idrissi S. The impact of burn-out on emergency physicians and emergency medicine residents: a systematic review. *Acta Clin Belg.* 2020;75(1):57–79. <https://doi.org/10.1080/17843286.2019.1699690>
3. Smith J, Keating L, Flowerdew L, O'Brien R, McIntyre S, Morley R, et al. An emergency medicine research priority setting partnership to establish the top 10 research priorities in emergency medicine. *Emerg Med J.* 2017;34(7):454–6. <https://doi.org/10.1136/emered-2017-206702>
4. Chung A, Wong M, Sanchez L, Lu DW, Manfredi RA, Mishkin H, et al. Research priorities for physician wellness in academic emergency medicine: consensus from the Society of Academic Emergency Medicine Wellness Committee. *AEM Educ Train.* 2018;27(2):S40–7. <https://doi.org/10.1002/aet2.10211>

5. Watson A, McCoy J, Mathew J, Gundersen D, Eisenstein R. Impact of physician workload on burnout in the emergency department. *Psychol Health Med*. 2019;24(4):414–28. <https://doi.org/10.1080/13548506.2018.1539236>
6. Abdulrahman M, Nair S, Farooq M, Al Kharmiri A, Al Marzooqi F, Carrick FR. Burnout and depression among medical residents in the United Arab Emirates: a multicenter study. *J Family Med Prim Care*. 2018;7(2):435–41. https://doi.org/10.4103/jfmpc.jfmpc_199_17
7. Aldrees T, Aleissa S, Zamakhshary M, Badri M, Sadat-Ali M. Physician well-being: prevalence of burnout and associated risk factors in a tertiary hospital, Riyadh, Saudi Arabia. *Ann Saudi Med*. 2013;33(5):451–6. <https://doi.org/10.5144/0256-4947.2013.451>
8. Alsaawi A, Alrajhi K, Albaiz S, Alsultan M, Alsalamah M, Qureshi S, et al. Risk of burnout among emergency physicians at a tertiary care centre in Saudi Arabia. *J Hosp Adm*. 2014;3(4):20–4. <https://doi.org/10.5430/jha.v3n4p20>
9. Alqahtani A, Awadalla N, Alsaleem S, Alsamghan A, Alsaleem M. Burnout syndrome among emergency physicians and nurses in Abha and Khamis Mushait cities, Aseer region, southwestern Saudi Arabia. *Sci World J*. 2019;2019:1–14. <https://doi.org/10.1155/2019/4515972>
10. Alsaawi A, Alrajhi K, AlRasheed N, AlSabhan A, AlTamimi D, Alsalamah M. Burnout among emergency physicians in Saudi Arabia: a cross-sectional study. *J Health Inform Dev Ctries*. 2019;13(1). Available from: <https://jhdc.org/index.php/jhdc/article/view/235>
11. Lall M, Gaeta T, Chung A, Dehon E, Malcolm W, Ross A, et al. Assessment of physician well-being, part one: burnout and other negative states. *West J Emerg Med*. 2019;20(2):278–90. <https://doi.org/10.5811/westjem.2019.1.39665>
12. Estry-Behar M, Doppia M, Guetarni K, Fry C, Machet G, Pelloux P, et al. Emergency physicians accumulate more stress factors than other physicians—results from the French SESMAT study. *J Emerg Med*. 2011;28(5):397–410. <https://doi.org/10.1136/emj.2009.082594>
13. Kristensen T, Borritz M, Villadsen E, Christensen K. The Copenhagen Burnout Inventory: a new tool for the assessment of burnout. *Work Stress*. 2005;19(3):192–207. <https://doi.org/10.1080/02678370500297720>
14. Fernando B, Samaranayake D. Burnout among postgraduate doctors in Colombo: prevalence, associated factors and association with self-reported patient care. *BMC Med Educ*. 2019;19(1):373. <https://doi.org/10.1186/s12909-019-1810-9>
15. Creedy D, Sidebotham M, Gamble J, Pallant J, Fenwick J. Prevalence of burnout, depression, anxiety and stress in Australian midwives: a cross-sectional survey. *BMC Pregnancy Child B*. 2017;17(1):13. <https://doi.org/10.1186/s12884-016-1212-5>
16. Ruiz, E, Gómez-Quintero H, Lluís S. Validation of the Spanish version of the Copenhagen Burnout Inventory questionnaire. *Rev Esp Salud Pública*. 2013;87:165–79. <https://doi.org/10.4321/S1135-57272013000200006>
17. Amirkhan J. Stress overload: a new approach to the assessment of stress. *Am J Community Psychol*. 2012;49(1–2):55–71. <https://doi.org/10.1007/s10464-011-9438-x>
18. Bashmi L, Amirkhan J. Constructing an Arabic language version of the Stress Overload Scale (SOS). *Arab J Psychol*. 2018;5:167–206.
19. Amirkhan J, Urizar G, Clark S. Criterion validation of a stress measure: the Stress Overload Scale. *Psychol Assess*. 2015;27(3):985–96. <https://doi.org/10.1037/pas0000081>
20. Lazarus R, Folkman S. Stress, appraisal, and coping. New York, NY: Springer; 1984.
21. Ratnakaran B, Prabhakaran A, Karunakaran V. Prevalence of burnout and its correlates among residents in a tertiary medical center in Kerala, India: a cross-sectional study. *J Postgrad Med*. 2016;62:157–61. <https://doi.org/10.4103/0022-3859.184274>
22. Klein J, Frie K, Blum K, Knesebeck O. Burnout and perceived quality of care among German clinicians in surgery. *Int J Qual Health Care*. 2010;22:525–30. <https://doi.org/10.1093/intqhc/mzq056>
23. Lala AI, Sturzu LM, Picard JP, Picard JP, Druot F, Grama F, Bobirnac G. Coping behavior and risk and resilience stress factors in French regional emergency medicine unit workers: a cross-sectional survey. *J Med Life*. 2016;9(4):363–8.
24. Wilson W, Raj J, Narayan G, Ghiya M, Murty S, Joseph B. Quantifying burnout among emergency medicine professionals. *J Emerg Trauma Shock*. 2017;10(4):199–204. https://doi.org/10.4103/JETS.JETS_36_17
25. Chernoff P, Adedokun C, O’Sullivan I, McManus J, Payne A. Burnout in the emergency department hospital staff at Cork University Hospital. *Ir J Med Sci*. 2019;188(2):667–74. <https://doi.org/10.1007/s11845-018-1871-5>
26. Howard L, Wibberley C, Crowe L, Body R. How events in emergency medicine impact doctors’ psychological well-being. *Emerg Med J*. 2018;35(10):595–9. <https://doi.org/10.1136/emered-2017-207218>
27. Erdur B, Ergin A, Yüksel A, Türkçüer İ, Ayrık C, Boz B. Assessment of the relation of violence and burnout among physicians working in the emergency departments in Turkey. *Ulus Travma Acil Cerrahi Derg*. 2015;21(3):175–81. <https://doi.org/10.5505/tjtes.2015.91298>
28. Schaufeli W, Leiter M, Maslach C. Burnout: 35 years of research and practice. *Career Dev Int*. 2009;14(3):204–20. <https://doi.org/10.1108/13620430910966406>
29. Perera R, Van Aarsen K, Foxcroft L, Lim R. Burnout among emergency physicians working at a large tertiary centre in Ontario. *J Wellness*. 2019;1(1):10. <https://doi.org/10.18297/jwellness/vol1/iss1/1030>. Abuzeyad F, Alqasem L, Al Farras M, Al Jawder SS, Al Qasim G, Alghanem S. Emergency medicine in the Kingdom of Bahrain. *Int J Gen Med*. 2018;11(1):1–8. <https://doi.org/10.1186/s12245-018-0163-1>