Research Square

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Burnout and Stress Among Emergency Physicians in the Kingdom of Bahrain Using the Copenhagen Burnout Inventory (CBI) and Short Form-stress Overload Scale (SOS-S)

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Abstract

Background: Emergency physicians (EPs) are exposed to various stressors that lead to burnout, and these factors have never been examined in the emergency departments (EDs) of the Kingdom of Bahrain. The study identifies the prevalence rates and associated variables for burnout and stress among EPs in Bahrain's EDs.

Methods: A cross sectional study involving 134 EPs working in the ED for the three major tertiary hospitals completed the Copenhagen Burnout Inventory (CBI) and Stress Overload Scale-Short Form (SOS-S).

Results: The survey had a response rate of 86.7% (n=116). The prevalence rate 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%). Approximately 23.9% EPs were at high risk for illness. The CBI and SOS-S subscales had statistically significant correlations, illustrating that higher personal, work-related, and patient-related burnout was associated with higher personal vulnerability, event load, and stress overload. Being female, Bahraini, Chief Resident or Consultant, working >50 hours per week, taking at least one sick leave in the last year, and experiencing sleep disturbances and workplace violence were all contributing factors to higher burnout and stress levels.

Conclusion: The prevalence of burnout and stress among the 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.

Background

The Emergency Medicine (EM) specialty is characterized by its dynamic, critical, and stressful working environment, in which emergency physicians (EPs) are exposed to various stressors[1-4], including multitasking work they have to perform and master in their career, which itself can be stressful and compromise patient's safety.[4,5] This unique, demanding, and time dependent system has resulted in high levels of stress and burnout among the EPs and has been reviewed in the literature in detail.[6-10] There is a wide discrepancy in the burnout prevalence rates for physicians and especially EPs across the world.[8,11,12] In the US, EPs are three times more likely to develop burnout than other professions[13]; with a burnout rate of 65%, this is also considerably higher than other specialties.[14] From the emergency medicine (EM) perspective, burnout has become an unsolved propagating problem globally, with the need to invest more in research to identify the causes and find solutions to help resolve this syndrome.[1,15,16,17]

BURNOUT AND STRESS:

Burnout is simply defined as "physical, mental, and emotional exhaustion secondary to stress".[10] The syndrome is caused by multiple factors, but commonly starts with work-related stress that must be chronic, persistent, and unresolved to cause burnout.[3,6,7,10,18] The French SESMAT study found that EPs develop these stress factors at a higher rate compared to other physicians.[19] Burnout exposes the EPs to grave consequences that include: reduced job satisfaction and productivity, depression and substance abuse, early retirement or career termination, and compromising patient safety and increased medical errors.[3,7,10,18]

Chronic stress has been documented in the literature as having the strongest causal relationship to burnout.[20-22] According to the Appraisal Theory, stress occurs when the perceived demands exceed the resources of an individual, thus affecting their wellbeing.[23] Prolonged exposure to severe stressors can develop into a full-blown burnout syndrome. Stress overload is a unique type of stress that is able to predict illness measured by the Stress Overload Scale (SOS).[24] It assesses this by measuring the perceived inability to meet perceived demands through these two components of the SOS: Personal Vulnerability (individual resources) and Event Load (environmental demands).

MEASURING BURNOUT AND STRESS:

Among the various tools to measure burnout, Maslach Burnout Inventory (MBI) survey is the most commonly used.[10,11] However, it was criticized for the inconsistency between its three components resulting in prevalence rates variation[11,20,21] and can only be obtained commercially.[20] As such, we selected the Copenhagen Burnout Inventory (CBI), which measures burnout in three burnout domains: personal-related, work-related, and client-related burnout.[22] The CBI has been validated, translated into several languages, applied in a wide range of work settings, and encourages burnout research as it is obtained free of charge.[18,25] The CBI has several advantages and has been used in several studies to measure burnout in physicians including EPs.[19,20,25-32]

Stress overload, as measured by the SOS-short form (SOS-S) in this study, will help identify a unique type of stress among EPs and further validate the levels of burnout by correlating the CBI with this stress scale. It will also be able to predict illness more accurately than traditional stress measures and categorize participants at risk for illness according to 4 categories: High Risk, Challenged, Fragile, and Low Risk.[24,33,34]

Furthermore, the SOS-S specifically measures the individual's perceived ability to handle stressors (external/internal), i.e. their personal vulnerability to stress, which is not captured by the CBI. This will allow for more advanced statistical analyses and a valuable discussion.

AIM OF THIS STUDY

A review of the latest literature found only three burnout studies conducted on healthcare providers in Bahrain: healthcare staff in psychiatric facility[35], secondary care physicians[36], and medical students[37]. In the Gulf Cooperation Council (GCC) countries, there were several studies that measured burnout in healthcare providers, including medical residents[38], physicians[39], and EPs[40-42]. However, burnout was measured using the MBI, which has several disadvantages. This will be the first study within the GCC assessing burnout and stress levels of EPs in Bahrain using the CBI and SOS-S.

Methodology

Study Design and Setting

The Kingdom of Bahrain is a small state made up of 33 islands and is a member of the GCC countries. It is located in the Arabian Gulf with a total area of about 770 km² and a population of 1,315,000.[43] Healthcare is provided through the three major governmental hospitals: Salmaniya Medical Complex (SMC), Bahrain Defence Force Hospital (BDFH), and King Hamad University Hospital (KHUH), all of which have well-established EDs, in addition to 27 local health centers.[43]

An ethical approval was acquired prior to conducting this multi-center cross-sectional study from the concerned bodies: The Institutional Review Board at KHUH, Secondary Health Care Research Study Sub Committee at SMC, and research ethical committee at BDF hospital.

Selection of Participants:

In our study, we defined "EP" as any physician who was working in any of the three EDs, and this included: residents, senior residents, chief residents, and consultants in the field of EM. Any physicians rotating in the EDs from other specialties were excluded. A list of physicians' names and their emails were collected from the ED of each hospital: SMC (65 physicians), KHUH (37 physicians), and BDFH (32 physicians). An electronic self-administered survey was distributed by email to all physicians currently working in the ED in the three main hospitals (a total of 134).

Measures:

Burnout

The Copenhagen Burnout Inventory (CBI) was selected to measure burnout in this study. It consists of 19-items measuring burnout in three burnout domains: personal-related, work-related, and client-related burnout.[20] The CBI has several advantages: 1- It is easy to use, noting that the prevalence scores can be calculated as a percentage or as to whether or not there is a presence of burnout;[22] 2- it is more comprehensive in its definition of burnout, because it focuses on both causes and symptoms of burnout unlike other burnout scales;[25,26] and 3- it has been validated in measuring burnout in various settings, including work, personal and client settings, which provides more specific information.[20] Cronbach's α for internal reliability of the three domains are high (0.87 for personal burnout, 0.87 for work burnout, and 0.85 for client burnout).[20,26]

The personal burnout subscale includes six items related to somatic and emotional exhaustion that an EP can experience. The work-related burnout subscale includes seven items related to somatic and emotional exhaustion that a person can experience due to their working environment. Last, the patient-related subscale includes six items related to somatic and emotional exhaustion that an EP can experience due to their interaction with patients.

The CBI follows a 5-point Likert scale format, 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 3 questions were answered in any of the domains (less than 4 items in the work-related burnout), the respondent was classified as a non-responder. A mean score of 50 was used as the cut-off for the presence of burnout for each subscale based on previously validated studies.[44,45]

Stress Overload

The Stress Overload Scale (SOS) is a psychometric scale calculating stress overload, which predicts illness[24], and its scores have proven good internal consistency (α= .94) and adequate test–retest reliability (r = .75 over one week).[24,33,34,46] A short version (SOS-S; 10 items) has been validated and shown to be as effective in predicting illness as the full version in several populations that have been exposed to laboratory and

real-world stressors.[34,47-49] The SOS-S was utilized in this study as it has good internal consistency reliability (α > .86) and requires less time from participants.[34,47-49]

Response options were on a five-point Likert scale that ranged from not at all (1) to a lot (5). Odd-numbered items measured personal vulnerability, whereas even numbered items measured event load. Mean scores for the entire scale were computed to measure the level of stress overload, whereas the mean of the odd-numbered items was computed to measure personal vulnerability levels and the mean of even-numbered items were computed to measure event load levels. Higher scores reflect higher levels of stress overload, personal vulnerability, and event load.

While there are no cutoff scores for the SOS-S, categorical scores can be determined by splitting each SOS-S subscale at its mean and crossing the scales to form a 2 x 2 matrix. This matrix provides four subgroups categorized according to participants' risk of illness: High Risk (High PV, High EL), Fragile (High PV, Low EL), Challenged (Low PV, High EL), and Low Risk (Low PV, Low EL).[24,34]

Demographic and Occupational Variables

The demographic variables collected in this study included: age, gender, nationality, marital status, current hospital, number of kids. The occupational variables that was collected included: position, years of experience, number of hours worked per week, experience of violence, number of sick leaves, eating and sleep disturbances. These demographic and occupational variables have been identified in the literature as having a significant effect on burnout and stress levels and were believed important to collect in order to control for potential confounding variables.[18,19,24,33,34,39-42,47]

The Study Protocol:

An electronic self-administered survey was developed and distributed using the online platform Survey Monkey. The survey was distributed by email to all EPs currently working in the three EDs in Bahrain, and data collection was between February and March 2020. Participating EPs were asked to complete an informed consent before joining the study and were informed that their responses would be confidential, anonymous, and that they could withdraw at any point if they decided to do so. Contact details of the main investigator was provided to participants on the first page of the online survey in case participants had any questions. No personal identifiers were obtained and all data was kept confidential through password protection. Physicians were notified to check their emails and email reminders were sent once a week to increase response rate. No incentives or other methods of coercion were given to potential participants when asking them to join the study.

Overall, the survey was composed of 43 questions listed following a brief explanation of the study and the informed consent form. The questions were set to appear in random sequence to enhance response rate and eliminate order bias, and were split into three sections:

Section I: The demographic and occupational variables.

Section II: The CBI, which consisted of 19 items and divided into three domains: personal, work-related, and patient-related.

Section III: The SOS-S, which included 10 items.

DATA ANALYSIS:

Data transferred into SPSS software version 23.0 to determine quantitative and descriptive statistics. Descriptive statistics were calculated and 95% confidence intervals are presented. The CBI and SOS-S have been analyzed as both continuous and dichotomous variables. Pearson correlation coefficients were estimated and a generalized linear model was used. Factors significantly associated with each subscale of burnout in the bivariate analysis were included as independent variables in the binary logistic regression models. Logistic regression was used for multivariate analysis to explore correlations between certain demographic and occupational variables, personal vulnerability and event load. 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, personal vulnerability scores, event load scores and total SOS-S scores. A p-value of < .05 was considered statistically significant and p < .01 was considered to be highly significant.

Results

Participant characteristics

The survey was sent to 134 EPs, of which 121 completed the survey, but 5 surveys were considered incomplete. As such, only 116 responses were considered for analysis, demonstrating a good response rate of 86.7%. The demographic and occupational characteristics of the participants are summarized in Table 1. The majority of participants (42.2%) were in the age group of 35-44 years old followed by 30.2% who were 25-34 years old. Eighty-one participants (69.8%) were male. Most participants were based in SMC (46.6%), followed by KHUH and BDF

(25.9% and 23.3% respectively), where 5 participants did not state their affiliation. In terms of marital status, 81% were married, 14.7% were single, and 4.3% were widowed or divorced. Twenty-four (20.7%) participants were residents, 49 (42.2%) were senior residents, 30 (25.9%) were chief residents, and 13 (11.2%) were Consultants. Of the 81 participants who provided a response on their residency year, 23.3% had completed their residency within the past 6 months, 22.4% were between their first and third year of residency, and 24.1% were in their fourth year. There was an equal distribution among physicians among the categories for years of experience, where 18.1% of EPs had 1 to 4 years' experience, 28.4% had 5 to 9 years, 21.6% had 10 to 14 years, 14.7% had 15-19 years, 11.2% had 20 to 24 years, and 6.0% had 25 to 39 years. Regarding the hours of work per week, 45 (38.8%) EPs worked 40 hours, whereas 61.2% were working for 50 hours or more. Sixty-one physicians (52.6%) had taken at least 1-day sick leave in past year. 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, of which 43 (37.1%) had been exposed to violence 1-5 times in their workplace last year.

Table 1. Socio-demographic and occupational characteristics of Bahrain's Emergency Physicians (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**
King Hamad University Hospital	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			
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 six 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 1 sick leave during the last year?			
Yes			**116**
No	61	52.6%	
	55	47.4%	
12. Have you personally dealt with sleep disturbances?			
Yes			
No	102	87.9%	**116**
	14	12.1%	
13. Do you tend to take short meals, staggered, or not eat all?			
Yes			
No	95	81.9%	**116**
	21	18.1%	
14. Have you been exposed to violence in the workplace at least once in the last year?			
Yes			
No	74	63.8%	**116**
	42	36.2%	
15. If you answered yes to Q14, number of times of exposure to violence?			
1			
1 ≤ 5	9	7.7%	**74**
6 ≤ 10	43	37.1%	
	22	18.9%	

Prevalence and distribution of burnout and stress rates among EPs

Tables 2 and 3 provide descriptive statistics of scores obtained and the prevalence of each type of CBI. 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% (M: 60.3, SD: 21.6; CI: 60.6%- 78.0%) for work-related burnout, and 40.5% (M: 43.1, SD: 25.4; CI: 31.5% - 50.0%) for patient-related burnout. The data for the SOS-S subscales and its related items for the EPs are displayed in Tables 2 and 3, with personal vulnerability (M: 13.89, SD: 5.04), event load (M: 16.73, SD: 4.80), and full SOS-S (M: 30.57, SD: 9.37).

Table 3 combined the descriptive data from both the CBI and the SOS-S using a mean score of 50 as the cut-off for the presence of burnout for each scale based on previously validated studies.[44,45] While the SOS-S does not have cut-off scores to determine whether participants are stressed, it categorizes participants based on categorical scoring within four quadrants of risk: High Risk (high PV, high EL), Challenged (low PV, high EL), Fragile (high PV, low EL), and Low Risk (low PV, low EL). In Figure 1, EPs 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 x 2 matrix. Out of 113 responses, results yielded 41.6% (47) of participants as Low Risk (Low PV, Low EL), 0.9% (1) as Fragile (High PV, low EL), 33.6% (38) as Challenged (low PV, high EL), and 23.9% (27) as High Risk for illness (High PV, high EL), and all the figures are highlighted in Figure 1.

Table 3. Prevalence and distribution of burnout and stress overload among Emergency Physicians

Type of Burnout	Mean Score (SD)	Prevalence (%, Confidence Interval)
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 (EV-S)	16.7 (4.8)	-
Total SOS-S	30.6 (9.4)	-

Association between burnout, stress, and demographic and occupational variables

As per Table 4, Pearson correlations showed a strong and statistically significant correlation between the CBI and SOS-S across all their subscales with Pearson coefficients ranging from 0.595 to 0.830 between the SOS-S subscales and the CBI dimensions ($p < 0.0001$), illustrating that higher personal, work-related, and patient-related burnout were all positively correlated with personal vulnerability, event load, and stress overload.

Table 4: Pearson Correlations between the CBI dimensions and the SOS-S total scores and its subscales*****

	Personal Burnout	Work-related Burnout	Patient-related Burnout	Personal Vulnerability (r)	Event Load (r)	SOS-S Total (r)
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
Personal Vulnerability	0.616	0.659	0.613	-	0. 811	
Event Load	0.622	0.675	0.595	0. 811	-	0.949
SOS-S Total	0.650	0.699	0.638	0.954	0.949	-

All Pearson-correlation values show a p-value of <0.0001.

Table 5 analyses the differences in the CBI dimensions and SOS-S categorical scores (High Risk, Challenged, Fragile, and Low Risk groups) according to the demographic and occupational variables. A higher number of Bahraini nationals were experiencing personal and work-related burnout (p= 0.005). The 59% of physicians who took sick leave were also experiencing patient-related burnout (p=0.005). A significant number of

physicians experiencing personal burnout, work-related and patient-related burnout had sleep disturbances. More physicians experiencing personal burnout have 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 were more likely to work 50 hours or more, take sick leave, and/or suffered from violence at the workplace were more likely to be in the High-Risk group.

Table 5: Chi-square test for CBI and SOS-S domains based on demographic / occupational variables

	CBI Domains			SOS-S Categories (Risk for Illness)				
	Personal Burnout (score ≥ 50) N (%), p-value	**Work-related burnout (score ≥ 50) N (%), p-value**	**Patient-related burnout (score ≥ 50) N (%), p-value**	**High risk N (%)**	**Challenged N (%)**	**Fragile N (%)**	**Low Risk N (%)**	**SOS Categorical Scores (p-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 %)	28 (82.4 %)	12 (35.3 %)	10 (29.4 %)	11 (32.4%)	1(2.9%)	10 (29.4 %)	
	p = 0.034	p = 0.061	p = 0.520					
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%)	1 (50.0%)	1 (50.0%)	0 (0%)	1 (50.0%)	0 (0.0%)	1 (50.0%)	
	p= 0.178	p= 0.619	p= 0.875					
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 %)	0 (0 %)	0 (0 %)	0 (0 %)	0 (0.0%)	0 (0.0%)	1 (100 %)	
	p = 0.179	p = 0.129	p = 0.183			0 (0.0%)		
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%)	25 (52.1%)	17 (35.4%)	6 (12.5%)	15 (31.3%)	0 (0.0%)	26 (54.2%)	
	p = 0.005	**p = 0.005**	p = 0.347					
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%)	9 (69.2%)	7 (53.8%)	5 (38.5%)	4 (30.8%)	0 (0.0%)	3 (23.1%)	
	p= 0.384	p= 0.321	p= 0.082					

						1 (7.7%)		
# 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%)	2 (66.7%)	2 (66.7%)	1 (33.3%)	1 (33.3%)	0 (0.0%)	1 (33.3%)	
	p = 0.884	p = 0.833	**p = 0.016**			0 (0.0%)		
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%)	34 (61.8%)	11 (20.0%)	7 (12.7%)	17 (30.9%)	0 (0%)	31 (56.4%)	
	p= 0.106	p= 0.074	**p= 0.005**					
Sleep disturbances								0.05
Yes	82 (80.4%)	75 (73.5%)	45 (44.1%)	26 (25.5%)	35 (34.3%)	1 (1.0%)	37 (36.3%)	
No	6 (42.9%)	6 (42.9%)	2 (14.3%)	1 (7.1%)	3 (21.4%)	0 (0%)	10 (71.4%)	
	p= 0.002	**p= 0.019**	**p= 0.033**					
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%)	13 (61.9%)	9 (42.9%)	3 (14.3%)	6 (28.6%)	0 (0%)	10 (52.6%)	
	p= 0.60	p= 0.382	p= 0.809					
Violence at workplace								
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%)	25 (59.5%)	13 (31.0%)	4 (9.5%)	21 (50.0%)	0 (0%)	17 (40.5%)	
	p= 0.028	p= 0.069	p= 0.114					

In Table 6, based on the SOS-S categorical scores, all four groups (High Risk, Challenged, Fragile, Low Risk) reported to suffer from personal burnout and work-related burnout. In terms of patient-related burnout, all four groups reported to suffer from this except the Fragile group, which was represented by 1 participant only.

In Table 6, results of a General Linear Model Test using a univariate ANOVA across the four SOS-S quadrants (High Risk, Challenged, Fragile, Low Risk) can be viewed. Results showed that personal burnout had main effects for personal vulnerability [F (1,190) = 43.72, p < .0001], event load [F (1,288) = 52.06, p < .0001] and for their interaction [F (233) = 26.09, p < .0001]. There was also a significant difference in the means of personal burnout across all four quadrants. There were significant differences in the burnout levels of each CBI dimension between the

quadrants. The high-risk group was more likely to suffer from significantly higher levels of personal burnout (M: 83.8 ± 14.4), work-related burnout (M: 83.1 ± 11.3), and patient-related burnout (M: 74.4 ± 15.5), followed by the Challenged, Fragile, and Low Risk groups.

A similar pattern was seen for work-related burnout, with effects for personal vulnerability [F (1,241) = 57.40, p < .0001], event load [F (1,284) = 64.54, p < .0001] and for their interaction [F (240) = 35.18. p < .0001]. Patient-related burnout displayed the same pattern with effects for personal vulnerability [F (440) = 39.47, p < .0001] and event load [F (405) = 48.42, p < .0001] and for their interaction [F (50) = 26.23. p < .0001]. Significant differences in all four quadrants for work-related and patient-related burnout is indicated in Table 6.

Table 6: Prevalence, mean, and standard deviations of the CBI dimensions across the SOS-S categories

	Personal burnout			**Work-related burnout**			**Patient-related burnout**		
	n (%)		**(Mean ± SD)**	**n (%)**		**(Mean ± SD)**	**n (%)**		**(Mean ± SD)**
	Yes	**No**	Kruskal-Walis test <0.001	**Yes**	**No**	Kruskal-Walis test <0.001	**Yes**	**No**	Kruskal-Walis test 0.02
	88 (75.8%)	**28 (24.1%)**		**81 (69.8%)**	**35 (30.1%)**		**47 (40.5%)**	**69 (59.4%)**	
High risk	26 (29.5%)	1 (3.6%)	83.8 ± 14.4	26 (32.1%)	1 (2.9%)	83.1 ± 11.3	24 (51.1%)	3 (4.3%)	74.4 ± 15.5
Challenged	34 (38.65)	4 (14.3%)	66.3 ± 16.11	30 (37.0%)	8 (22.9%)	68.3 ± 10.5	17 (36.2%)	21 (30.4%)	62.5 ± 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 ± 10.9	21 (25.9%)	26 (74.3%)	60.5 ± 9.2	5 (10.6%)	42 (60.9%)	59.1 ± 13.9

Data in Table 7 demonstrates the distribution of the continuous scores for the CBI subscales and the SOS-S total scores and its subscales categorized according to the demographic and occupational variables. Bahraini nationals suffered from higher levels of personal burnout (p=0.002), work-related burnout (p= 0.0001), personal vulnerability (p=0.010), event load (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) in comparison to other job positions. There were no significant differences based on patient-related burnout and job position. In terms of work hours, physicians who worked more hours had higher levels of personal and work-related burnout with a weak positive correlation coefficient of 0.18 (p=0.04). However, only those who worked 60 hours or more suffered from work-related burnout.

Table 7. Distribution of continuous scores for CBI, SOS-S and its subscales by demographic and occupational variables

	CBI			SOS-S		
	Personal burnout (Mean ± SD, p-value)	Work-related burnout (Mean ± SD, p-value)	Patient-related burnout (Mean ± SD, p-value)	Personal vulnerability (Mean ± SD, p-value)	Event load (Mean ± SD, p-value)	SOS-S Total Scores (Mean ± SD, p-value)
Gender						
Male	61.36 ± 23.52	59.12 ± 21.95	44.13 ± 26.74	13.55 ± 5.09	16.37 ± 4.91	29.19 ± 9.62
Female	66. 83 ± 19.17	64.07 ± 20.10	41.17 ± 22.49	15.00 ± 4.62	17.87 ± 4.24	32.71 ± 8.12
	p = 0.15	p = 0.24	p = 0.62	p = 0.057	p = 0.118	p = 0.058
Age						
25-34	62.14 ± 19.70	62.34 ± 18.23	40.71 ± 26.62	13.77 ± 4.35	17.91 ± 3.74	31.68 ± 7.50
35-44	63.29 ± 23.28	61.29 ± 23.05	43.96 ± 25.07	14.12 ± 5.57	16.00 ± 5.59	30.00 ± 10.82
45-54	68.33 ± 23.66	61.00 ± 21.55	47.16 ± 26.20	14.54 ± 5.24	17.48 ± 4.29	32.04 ± 9.11
>55	46. 42 ± 19.07	40.81 ± 21.01	34.52 ± 20.51	10.71 ± 2.69	13.00 ± 3.00	23.71 ± 5.28
	p = 0.08	p = 0.08	p = 0.66	p = 0.30	p = 0.049	p = 0.119
Marital Status						
Married	63.27 ± 22.74	59.68 ± 21.75	44.14 ± 26.22	13.93 ± 5.17	16.54 ± 4.90	30.12 ± 9.65
Single	62.99 ± 19.48	61.76 ± 15.60	35.29 ± 20.94	13.50 ± 4.38	17.62 ± 3.89	31.12 ± 7.47
Divorced/ Widowed	58.33 ± 28.25	67.14 ± 36.36	22.82 ± 10.20	14.40 ± 5.17	17.20 ± 6.01	31.60 ± 11.03
	p = 0.99	p = 0.99	p = 0.34	p = 0.85	p = 0.612	p = 0.770
Nationality						
Bahraini	68.46 ± 21.17	66.22 ± 20.06	46.69 ± 26.87	14.85 ± 4.89	17.86 ± 4.34	32.63 ± 8.66
Non- Bahraini	55.29 ± 21.92	51.93 ± 21.01	38.02 ± 22.57	12.53 ± 4.96	15.16 ± 4.98	27.65 ± 9.62
	p = 0.002	**p < 0.0001**	p = 0.097	**p = 0.006**	**p = 0.003**	**p = 0.002**
Job Position						
Resident	60.76 ± 21.24	60.26 ± 18.40	42.01 ± 26.49	13.30 ± 4.03	17.91 ± 3.55	31.21 ± 6.91
Senior Resident	57.83 ± 21.61	56.19 ± 22.12	38.01 ± 24.15	12.89 ± 5.40	15.44 ± 5.19	28.31 ± 10.27
Chief Resident	71.30 ±20.92	66.66 ± 19.36	49.30 ± 24.54	14.76 ± 4.10	17.48 ± 4.46	32.06 ± 8.13
Consultant	67.62 ± 26.19	61.26 ± 27.77	50.00 ± 28.51	16.61 ± 6.25	17.76 ± 5.19	34.38 ± 10.98
	p = 0.035	**p = 0.035**	p = 0.14	p = 0.068	p = 0.092	p = 0.074
# Working Hours						
~ 40 hours	57.77 ± 19.83	56.26 ± 21.36	37.77 ± 24.35	12.86 ± 5.22	15.65 ± 4.75	28.52 ± 9.40
~ 50 hours		60.64 ± 17.56	41.07 ± 23.32	13.48 ± 4.33	16.77 ± 4.68	

~ 60 hours	62.52 ± 19.35	67.03 ± 27.51	55.76 ± 28.18	17.53 ± 4.99	19.16 ± 4.36	30.26 ± 8.50
~ 70 hours	68.07 ± 31.86	77.38 ± 24.81	68.75 ± 29.66	18.40 ± 4.15	20.16 ± 4.91	36.50 ± 9.35
~ 80 hours	84.02 ± 24.91	52.38 ± 39.82	50.00 ± 18.16	12.33 ± 6.42	15.00 ± 4.35	39.20 ± 9.14
	52.77 ± 33.67	**p = 0.042**	**p = 0.030**	**p = 0.015**	p = 0.074	27.33 ± 10.69
	p = 0.042					**p = 0.035**
Sick Leave						
Yes	69.63 ± 22.80	66.51 ± 20.25	50.88 ± 26.68	15.71 ± 4.65	18.10 ± 4.44	33.75 ± 8.70
No	55.68 ± 19.56	53.44 ± 21.05	34.46 ± 21.05	11.94 ± 4.72	15.25 ± 4.75	27.20 ± 8.91
	p< 0.0001	**p = 0.001**	**p < 0.0001**	**p < 0.0001**	**p = 0.001**	**p < 0.0001**
Sleep disturbances						
Yes	65.66 ± 21.48	62.85 ± 20.92	45.46 ± 25.41	14.41 ± 5.00	17.23 ± 4.58	31.58 ± 9.10
No	43.75 ± 19.59	41.83 ± 17.12	25.89 ± 18.57	10.21 ± 3.57	13.14 ± 4.89	23.35 ± 8.19
	p = 0.001	**p = 0.001**	**p = 0.008**	**p = 0.003**	**p = 0.006**	**p = 0.003**
Short/Staggered/ no meals						
Yes	63.30 ± 22.51	61.12 ± 21.84	43.81 ± 25.16	14.13 ± 4.97	17.01 ± 4.70	31.08 ± 9.18
No	61.70 ±22.15	56.63 ± 20.26	39.88 ± 27.08	12.68 ± 5.29	15.40 ± 5.12	28.00 ± 10.06
	p= 0.486	p= 0.334	p= 0.56	p= 0.27	p= 0.15	p= 0.17
Violence at work place						
Yes	67.19 ± 22.57	64.14 ± 21.42	47.24 ± 26.39	14.80 ± 5.22	17.08 ± 4.90	31.81 ± 9.74
No	55.65 ± 20.20	53.57 ± 20.35	35.81 ± 22.14	12.33 ± 4.30	16.11 ± 4.59	28.45 ± 8.37
	p= 0.004	**p= 0.009**	**p= 0.038**	**p= 0.007**	p= 0.290	p= 0.051

Note: significant p-values are listed in bold.

Hours of work was also positively correlated to patient-related burnout (r=0.273, p=0.03), personal vulnerability (r=0.24, p=0.015) and event load (r=0.20, p=0.035). In other words, those who worked for longer hours were more likely to report higher external workload, higher likelihood of perceiving their workload as stressful, and also higher patient-related burnout. The physicians who had taken at least one sick leave had a higher mean of personal burnout score (p<0.0001), work-related burnout (p=0.001), patient-related burnout (p< 0.0001), personal vulnerability (p< 0.0001), event load (p= 0.001) and total SOS-S scores (p< 0.0001). As expected, physicians with sleep disturbances had higher levels of personal burnout (p= 0.001), work-related burnout (p=0.001), patient-related burnout (p= 0.008), personal vulnerability (p= 0.003), event load (p= 0.006) and total SOS-S scores (p=0.003). The physicians who suffered from workplace violence were more likely to suffer from higher levels of personal burnout (p= 0.004), work related burnout (p=0.009), patient-related burnout (p= 0.038), and personal vulnerability (p= 0.007).

Significant Predictors of Burnout

Factors associated with personal burnout

Factors that were significantly associated with each burnout subscale (based on bivariate analysis) were included as independent variables in the binary logistic regression models. Table 8 lists the significant predictors of each CBI subscale. Exposure to violence and Event Load were strong predictors of personal burnout as per this model. Physicians who reported having experienced violence at the workplace were more likely to suffer from personal burnout (OR = 3.45, 95 % CI = 0.99 – 11.98, p = 0.04). Event load (having high external stressors) was also a strong predictor of personal burnout, where those who reported higher event load were more likely to suffer from personal burnout (OR = 1.60, 95 % CI = 1.30 – 1.98, p <0.0001). This model for personal burnout showed a R^2 value of 47.1%.

Factors associated with work-related burnout

Nationality and Event Load were strong predictors of work-related burnout as per this model, with a R^2 value of 37.1%. Physicians of Bahraini nationality suffered from higher work-related burnout than non-Bahrainis (OR = 3.30, 95 % CI = 1.26– 8.63, p = 0.015). Event load was also a strong predictor of work-related burnout (OR = 1.27, 95 % CI = 1.13 – 1.42, p <0.0001).

Factors associated with patient-related burnout

Sick leave status and personal vulnerability were significant predictors of patient-related burnout as per this model, which had a R^2 value of 58.2%. EPs who had taken sick leave were 5.16 times more likely to have patient-related burnout than those did not take sick leave (OR = 5.16, 95 % CI = 1.70– 15.60, p <0.005). Personal vulnerability was also a strong predictor of patient-related burnout (OR = 1.49, 95 % CI = 1.25 – 1.77, p <0.0001). Those who perceived demands as more stressful (high PV) were more likely to suffer from patient-related burnout.

In summary, Event Load was a predictor of both personal and work-related burnout, whereas Personal Vulnerability was a predictor of patient-related burnout. However, the total stress overload score was not a significant predictor of any of the three CBI dimensions of burnout.

Table 8. Multiple regression analysis of factors associated with CBI subscales

PERSONAL BURNOUT (Model with R^2 = 0.471)						
Factor	Unadjusted			Adjusted		
	OR	95% CI	P value	OR	95% CI	P value
Bahraini Nationality	3.45	1.42 – 8.47	0.006			
Lack of sleep	5.46	1.70- 17.54	0.04			
Violence at work place	2.60	1.09 – 6.22	0.03	3.45	0.99 – 11.98	**0.044**
PV	1.32	1.15- 1.51	0.00			
EL	1.43	1.24 – 1.66	0.00	1.60	1.30 – 1.98	**0.000**
WORK – RELATED BURNOUT (Model with R^2 = 0.371)						
Factor	Unadjusted			Adjusted		
	OR	95% CI	P value	OR	95% CI	P value
Bahraini Nationality	4.29	1.84 – 9.96	0.001	3.30	1.26 – 8.63	0.015
Lack of sleep	3.70	1.17 – 11.65	0.02			
PV	1.30	1.15 – 1.47	0.00			
EL	1.30	1.16- 1.45	0.00	1.270	1.13 – 1.42	**0.000**
PATIENT–RELATED BURNOUT (Model with R^2 = 0.582)						
Factor	Unadjusted			Adjusted		
	OR	95% CI	P value	OR	95% CI	P value
>60 working hours	5.41	1.93 – 15.21	0.01			
Sick Leave	5.76	2.50 – 13.27	0.00	3.71	1.32 – 10.39	0.12
Lack of sleep	4.73	1.0 – 22.25	0.05			
PV	1.41	1.21 – 1.62	0.00	1.41	1.22 – 1.63	**0.00**
EL	1.35	1.20 – 1.53	0.00			

Discussion

This was a multicenter study that explored the levels of burnout and stress among the EPs in three major EDs in the Kingdom of Bahrain and is the first to combine 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.[19,20, 25-30] The EPs had a high score in the work-related domain, a domain that is highly associated with burnout in the ED.[17] The Pearson correlations showed a strong and statistically significant positive correlation between all three CBI burnout subscales and the SOS-S scale and its subscales (stress overload, personal vulnerability, and event load), such that when burnout increases, stress overload, personal vulnerability, and event load also increase ($p<0.0001$).

In terms of the four SOS-S quadrants to predict risk for illness (High Risk, Challenged, Fragile, Low Risk), 23.9% of EPs were categorized as high risk for illness and 33.6% were challenged (i.e., dealing with high event load). The high-risk group was also more likely to suffer from significantly higher levels of personal burnout, work-related burnout, and patient-related burnout compared to the challenged, fragile and low risk groups (Table 6). A review article concluded that ED staff face multiple stressors, which affected their working environment, and that these stressors could be improved via knowledge and autonomy with various tools used to measure those stressors, making it hard to compare them with the current study.[2] In France, a study using the Perceived Stress Scale (PSS-10) demonstrated that the alleged work burden and total stress was strongly linked to working hours and had a greater influence on the EPs.[50]

The demographic data showed that a third of the participants were female (29.3%), and only they reported higher personal burnout compared to their counterpart male EPs (88.2% vs. 79%; $p = 0.034$). This was consistent with other studies in terms of prevalence, however, other studies showed female staff suffered from higher work-related burnout rather than personal burnout.[51,52] Furthermore, age and marital status did not have significant correlations with burnout or stress. The data also reflected that Bahraini EPs were experiencing higher personal burnout, work-

related burnout stress overload, personal vulnerability, and event load in contrast to their non-Bahraini colleagues (p< 0.05; see Table 7). This was unlike findings in the literature, where regional studies from Saudi Arabia showed that there was no difference between the Saudi and non-Saudi EPs in their levels of burnout.[39,40]

An interesting finding in the occupational data showed that the Chief Residents followed by Consultants had higher levels of personal burnout (p= 0.035) and work-related burnout (p=0.035) in comparison to other job positions. This could be due to the large administrative and clinical responsibilities that the ED Chief Residents or Consultants have to fulfill as team leaders in Bahrain. The burden of responsibilities and workplace conflicts can affect the EPs psychological status despite their accumulative experience in coping with stressful events in the ED.[53] In fact, burnout in senior EPs has been neglected and measures to prevent and treat it must be provided to ensure maintaining a long career for the EPs of all ages and in particular for the seniors.[54] In contrast, Aldrees et al. study in a tertiary hospital in Saudi Arabia stated that being a resident is one of the factors associated with burnout with OR=4.9.[39]

EPs working more than 50 hours per week had significant patient-related burnout (p = 0.016) compared to the average 40 hours per week. This is consistent with a regional study carried on resident physicians who working more hours than the average (40 hours per week) using the MBI survey.[38]

Also, the EPs who took at least one sick leave in the last year were experiencing greater burnout and stress (p<0.005; see Table 7). Durand et al. found that taking one or more sick leave during the last year was associated with high levels of burnout and stress with OR=3.5.[55]

The study demonstrated that EPs with sleep disturbances had higher levels of personal burnout (p= 0.001), work-related burnout (p=0.001), patient-related burnout (p= 0.008), personal vulnerability (p= 0.003), event load (p= 0.006) and total SOS-S scores (p=0.003). This is in line with two other studies which found that physicians suffering from burnout were having a higher odds ratio for sleep deprivation (OR=2.2 and 2.9 respectively)[39,55], and another study found about 42% of ED staff taking medications for sleep disorder had higher levels of burnout.[41]

Our results showed EPs who reported workplace violence were more likely to suffer from higher levels of personal burnout (p= 0.004), work related burnout (p=0.009), patient-related burnout (p= 0.038), and personal vulnerability (p= 0.007). This is supported by results from a Turkish study that showed a statistically significant relationship between burnout and violence experienced by EPs working in the EDs.[56]

Our current study had a relatively good sample size and response rate, and it is among the few attempts to use the CBI to measure burnout in EPs, and to add the SOS-S as an additional stress measuring tool for construct validity purposes. We aimed to compare our data with the local GCC countries and international literature.

Finally, though the burnout concept has become a global concern, the precise definition and interpretation of the phenomena varies, where some countries consider it as a medical illness while others as a work-related hazard. This is mainly due to the wide variation in the social, cultural, and financial aspects in different parts of the world[57], and investigators has been called by the American College of Emergency Physicians (ACEP) Well-Being Committee to recognize causes and key resolutions for the EPs burnout.[17]

Limitations

One limitation is that about 80% of burnout studies in EM studies had used MBI [11,12] and there are a limited number of studies using the CBI as a measuring tool, which makes it difficult to make an accurate comparison of results in the literature. The sample size was relatively small, which makes results not necessarily generalizable to the total population. 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.[43]

Conclusion

Burnout and stress among the 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 other parts of the world. Several demographic and occupational factors are closely related to burnout and stress including position, number of working hours, and exposure to violence, in addition to other personal, work, and patient-related factors. Additionally, Event Load was a predictor of both personal and work-related burnout, whereas Personal Vulnerability (how an individual perceives stress) was a predictor of patient-related burnout. Finally, study results demonstrate that the CBI and SOS-S are valid, reliable, simple and free tools for measuring burnout and stress among EPs.

IMPLICATIONS

Results provide implications for future studies such as involving leadership to acknowledge burnout and initiate the development of a wellness reduction intervention with the objective of reducing burnout and stress among EPs based on the risk factors for burnout and stress identified in this study.[58] For example, how EPs are educated and trained to perceive and deal with stress would be an important risk factor to consider.

Abbreviations

ACEP: American College of Emergency Physicians

BDFH: Bahrain Defense Force Hospital

CBI: Copenhagen Burnout Inventory

ED: Emergency Department

EL: Event Load

EM: Emergency Medicine

EP: Emergency Physician

GCC: Gulf Cooperation Council

KHUH: King Hamad University Hospital

MBI: Maslach Burnout Inventory

OR: Odds Ratio

PV: Personal Vulnerability

SD: Standard Deviation

SMC: Salmaniya Medical Complex

SOS-S: Stress Overload Scale-Short Form

Declarations

Ethics approval and consent to participate:

An ethical approval was acquired prior to conducting this multi-center cross-sectional study from the concerned bodies: The Institutional Review Board at KHUH, Secondary Health Care Research Study Sub Committee at SMC, and research ethical committee at BDF hospital.

Consent for publication:

Not applicable

Availability of data and materials:

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request. The data generated and analyzed during this study are included in this published article.

Competing interest:

The authors declare that they have no competing interests

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Authors' contribution:

- Authors who have made substantial contributions to conception and design: Dr. Feras H. Abuzeyad, Ms. Luma Bashmi, and Dr. Abrar Al Ansari.

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- Authors involved in drafting the manuscript or revising it critically for important intellectual content: Dr. Feras H. Abuzeyad, Ms. Luma Bashmi, Dr. Priya Das, and Dr. Abrar Al Ansari.
- All authors have given final approval of the manuscript version to be published.
- All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Figures

		Personal Vulnerability (PV)	
		Low	High
Event Load (EL)	Low	Low Risk 47 (41.6%)	Fragile 1 (0.9%)
	High	Challenged 38 (33.6%)	High Risk 27 (23.9%)

Figure 1

Emergency Physicians' SOS-S categorical scoring based on the four illness risk quadrants

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- AppendixITable2EDPhysicianBurnout.docx