ORIGINAL ARTICLE
Volume 15 Issue 2 2023
DOI: 10.21315/eimj2023.15.2.3
ARTICLE INFO
Received: 29-05-2022
Accepted: 30-08-2022
Online: 30-06-2023

Burnout and Stress Among Residents in Four Gulf Cooperation Council Countries Using the Copenhagen Burnout Inventory and Stress Overload Scale-Short Form

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To cite this article: Abuzeyad FH, Bashmi L, Alqasem L, Al-Refae F, Al Balushi A, Al Saywid B, Hashem R, Ali A, Almusalam A, Das P, Hsu S. Burnout and stress among residents in four Gulf Cooperation Council countries using the Copenhagen Burnout Inventory and Stress Overload Scale-Short Form. Education in Medicine Journal. 2023;15(2):29–48. https://doi.org/10.21315/eimj2023.15.2.3

To link to this article: https://doi.org/10.21315/eimj2023.15.2.3

ABSTRACT

Physician burnout and stress can have consequential effects on healthcare services and are a leading cause for medical errors and lower quality of care. This is the first study to assess the prevalence rates and associated variables for burnout and stress levels of medical residents in four Gulf Cooperation Council (GCC) countries by combining the Copenhagen Burnout Inventory (CBI) and Stress Overload Scale-Short Form (SOS-S) as assessment tools. A cross-sectional, quantitative research method design using an online survey. This online survey was distributed to second year and above medical residents training in tertiary healthcare centres in four GCC countries (Saudi Arabia, Kuwait, Bahrain, and Oman). Eligible residents (n = 16,686) were recruited via convenience sampling. Out of 2,886 respondents, 996 responses were excluded due to incomplete information. The data was collected from 13th September 2020 to 15th November 2020. Of 1,890 included medical residents, 961 (50.8%) were females, and the mean (SD) age was 29.5 (3.2) years old. Personal burnout prevalence rates were the highest, followed by work-related and patient-related burnout (98.4%, 97.8%, and 79.3%, respectively). Arab and Kuwait Board residents had the highest rates of burnout across all domains. Stress overload scores were high with 51.6% of residents at high risk for illness, with Saudi Board residents most likely to be at high risk and Oman Medical Specialty Board residents at low risk. Burnout predictors included: no access to a wellness programme (p = 0.000), longer shifts (p = 0.000), high personal vulnerability (p = 0.000), and intention to leave (p = 0.05). Our findings show that burnout and stress rates are high for GCC residents, suggesting a significant problem for

residents to provide the highest quality of healthcare possible. Further research is needed to evaluate the efficacy of residency wellness interventions to address this issue.

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Keywords: *Copenhagen Burnout Inventory (CBI), Stress Overload Scale-Short Form (SOS-S), Gulf Cooperation Council (GCC) residents*

INTRODUCTION

Physicians in residency programmes are unique and are an essential part of the healthcare system, in which they are both learning and providing services at the same time. For many residents, burnout is a consequence of the stress factors which become accumulative and persistent during their residency training period (1–3). The World Health Organization (WHO) recognised burnout as a syndrome resulting from enduring workplace stress, listing it as an occupational phenomenon in the International Classification of Diseases (ICD-11) (4). Burnout in the physician workforce is substantial as established in literature being one of the leading causes for medical errors, lower quality of care, higher costs, and overall worse outcomes (5). As such, it is crucial to identify the stress factors and burnout levels among residents during training that can be targeted within interventions to deal with this global issue. Multiple studies have shown that resident physicians are prone to high rates of burnout (6–10), ranging between 27% to 75% in different specialties (11). To our knowledge, no previous multi-centre study examining burnout and stress among residents in various residency training programmes in the Gulf Cooperation Council (GCC) countries has been published. This multi-centre cross-sectional study measured the prevalence rates for burnout in residency programmes in four GCC countries including Kingdom of Bahrain, Sultanate of Oman, State of Kuwait, and Kingdom of Saudi Arabia. The participating programmes were Arab Board (AB), Saudi Board (SB), Oman Medical Specialty Board (OMSB), and the Kuwait Board Medical Training Program (KBMTP). The study's secondary objectives were to identify modifiable factors related to burnout and stress that could be targeted within resident wellness programmes, and compare stress, burnout, and related factors across the residency programmes. Acknowledgement and awareness of burnout and stress levels among residents will help guide the residency training programmes in GCC countries in implementing strategies to tackle this vital issue, reducing its negative impact on healthcare services.

METHODS

This study was conducted by distributing an electronic self-administered survey to residents who met the inclusion criteria. Data collection was conducted between 13 September and 15 November 2020. Each training programme distributed the survey to all residents in their second year of residency and above (total n = 16,686): AB (n = 226), KBMTP (n = 829), OMSB (n = 431), and SB (n = 15,200). Samples required to compute statistically significant results at 95% CI and 5% margin of error for each board were: AB (n = 143), KBMTP (n = 263), OMSB (n = 204), and SB (n = 376). Responses received from AB = 145, KBMTP = 326, OMSB = 225 and SB = 2,190, hence the sample size requirement was met for each

board. The total response rate was 17.3% (n = 2,886) where AB (64.1%), KBMTP (39.3%), OMSB (52.2%) and SB (14.4%), respectively.

Newly joined first-year residents were excluded from the study as data was collected at the start of the academic year and these residents did not have sufficient exposure to the programme to reflect burnout and stress levels directly related to the programme. In addition, responses with incomplete information (e.g., completed only one of the two scales) were excluded from statistical analysis.

Overall, the survey was composed of 44 questions divided into four sections following a brief explanation of the study and the informed consent form. Residents were notified by their respective programme director to participate and email reminders were sent to increase response rates on a weekly basis over eight weeks. Sociodemographic data collected included age, gender, nationality, current hospital, marital status, number of kids, living environment, residency programme name, specialty, year, whether a wellness programme exists, history of probation, remediation, interruption, transfer, or withdrawal during training, number of hours worked per week, number of sick and missed days (not related to sickness), and intention to leave training. The sequence of the two scales (Copenhagen Burnout Inventory [CBI] and Stress Overload Scale - Short Form [SOS-S]) were set to appear in random sequence to enhance response rate and eliminate order bias.

Research Instruments

The Copenhagen Burnout Inventory (CBI)

The 19-item CBI was used to evaluate burnout over three domains: personal (6-item), work-related (7-item), and patient-related (6-item). Personal burnout items relate to somatic and emotional exhaustion that a resident can experience. Work-related burnout assesses somatic and emotional exhaustion that a resident can experience due to their working environment. Patient-related burnout assesses somatic and emotional exhaustion due to resident interaction with patients. All items have five response categories in a Likert scale, ranging either from "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. The CBI has been validated and translated into eight languages; it is suitable for healthcare professionals because it focuses on the source of burnout rather than its symptoms. Although the Maslach Burnout Inventory (MBI) has been more commonly used worldwide, cross-cultural studies and a recent systematic review found that CBI was superior to MBI when measuring the psychometric properties of burnout across various settings and countries (12–19). An Arabic version of the CBI was used to assess the burnout among community pharmacists (CPs) in Lebanon (20). Their results provided evidence for the validity and reliability of the Arabic CBI as a valid tool to measure burnout among CPs. English-version of the CBI scale has been earlier validated in GCC populations (21–22).

The Stress Overload Scale-Short Form (SOS-S)

The Stress Overload Scale (SOS) has demonstrated effectiveness in predicting pathology in various populations, including English, Arabic, Spanish, and Korean populations exposed to a laboratory and real-world stressors (23–25). A short version (SOS-S; 10 items) has been validated among English and Arabic populations and shown to be as effective in predicting illness as the full version and included a representative sample from the GCC (25).

The SOS-S is a 10-item stress measurement tool. Responses are on a 5-point Likert scale that ranged from "not at all = 1" to "a lot = 5" Odd-numbered items measured personal vulnerability (PV), whereas even numbered items measured event load (EL). Mean scores for the entire scale were computed to measure stress overload levels, whereas the mean of the odd-numbered items was computed to measure PV levels and the mean of even-numbered items were computed to measure EL levels. Higher scores reflect higher levels of stress overload, PV, and EL. 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 × 2 matrix. This matrix provides four subgroups categorised 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).

Data Analysis

Data was transferred into SPSS software version 25.0 to determine quantitative and descriptive statistics. Binary logistic regression was used for multivariate analysis to predict significant demographic and residency variables for PV and EL. The coded variables which were significant on a bivariate analysis was used for regression analysis to define significant predictors of personal, work-related and patient-related burnout. A p-value of < 0.05 was considered statistically significant and $p < 0.01$ was highly significant.

RESULTS

In total, 1,890 responses were valid and considered for statistical analysis. The gender distribution was relatively equal with a mean age of 29.51 ± 3.22 years old. Around 50% of residents were married and 42.5% were single, where 36.5% had children. Most residents were from the SB (69.1%), followed by the KBMTP (14.5%), OMSB (9.5%), and AB (6.8%). The top three residency specialties were medical (25.9%), surgical (18.8%), and family medicine (18.0%). Residents were almost equally distributed across the second (29.4%), third (20.7%), and fourth year (21.2%). Almost a quarter of residents (24.8%) had access to a wellness programme, but only 6.2% participated in it. Intention to leave represented 19% of residents. Within the sick and missed days' breakdown, seven respondents reported taking sick leave due to quarantining during the COVID-19 pandemic and as such, were removed from analysis for that factor. As for missed days, 11 respondents were excluded as six of them missed days due to maternity/postpartum and five respondents had three to seven missed days due to an emergency (death in family) or study reasons (see Table 1).

Prevalence of Burnout and Stress Overload among GCC Residents

Personal burnout prevalence rates were highest, followed by work-related and patient-related burnout (98.4%, 97.8%, and 79.3%, respectively; see Table 2). Stress overloads mean scores were high, followed by EL and PV (31.87 ± 11.04, 17.08 ± 5.63, 14.78 ± 5.81, respectively). There were 51.6% residents who were at high risk for illness, 30.3% who were low risk, 17.2% fragile (i.e., showing higher levels of PV than average), and only 0.7% were challenged (i.e., having higher EL levels, but low PV levels).

The relationship between burnout, stress, and their subscales demonstrated low to medium correlations, ranging from 0.364 to 0.743 (significant at the 0.01 level, 2-tailed). Personal burnout and stress overload had the strongest correlation (see Table 3).

Burnout and Stress Overload across Gender, Marital Status and Boards

A chi-square test showed gender differences were statistically significant for personal

burnout and SOS-S, where more female residents reported personal burnout (p = 0.01). Female residents were also at higher risk for illness due to stress overload (p = 0.003) (see Table 4).

There were significant differences between boards in burnout prevalence rates. AB and KBMTP residents had the highest rates of burnout across all domains (p = 0.000) (Figure 1). SB residents were most likely to be at high risk for illness, whereas OMSB residents were most likely to be low risk (p = 0.000) (Figure 2). Significant differences in work-related burnout rates (p = 0.05) and risk for illness were found between residency specialties, with paediatric residents suffering from the highest burnout rates and OBGYN, surgical and radiology residents being at higher risk for illness (60.4%, 55.2%, and 54.5%, respectively; p = 0.016).

Table 1: Sociodemographic and work-related characteristics of GCCresidents (n = 1,890)

Characteristics	Frequency	%
Age		
24–28	669	35.4
29–33	712	37.7
≥34	143	7.6
No response	366	19.4
Gender		
Male	927	49.0
Female	961	50.8
No response	2	0.1
Marital status		
Single	804	42.5
Engaged	83	4.4
Married	962	50.9
Divorced	36	1.9
Widowed	2	0.1
No response	3	0.2
Have children		
No	1193	63.1
Yes	690	36.5
No response	7	0.4
Living environment		
Alone	214	11.3
Alone with relatives nearby	111	5.9
With partner	392	20.7
With family	1,173	62.1
Residency programme		
AB	129	6.8
SB	1,306	69.1
OMSB	179	9.5
KBMTP	274	14.5
No response	2	0.1

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Table 1: (*Continued*)

Characteristics	Frequency	%
Residency programme specialty		
Anesthesia	74	3.9
Emergency medicine	72	3.8
Family medicine	340	18.0
Medical (includes internal medicine)	490	25.9
OBGYN	164	8.7
Pathology/laboratory	41	2.2
Paediatrics	238	12.6
Radiology	101	5.3
Surgical	355	18.8
No response	15	0.8
Residency year		
First year	300	15.9
Second year	555	29.4
Third year	391	20.7
Fourth year	400	21.2
Fifth year	183	9.7
No response	61	3.2
Do you have a wellness programme?		
Yes	468	24.8
No	1419	75.1
No response	3	0.2
Participated in a wellness programme		
Yes	117	6.2
No	1,220	64.6
No response	553	29.3
Have you been placed on probation, remediation status, been interrupted from training, transferred between different specialties, or temporarily withdrew from training during your residency programme?		
Yes	335	17.7
No	1,531	81.0
No response	24	1.3
Shift/work schedules per week		
< 40 hours a week	304	16.1
41–60 hours a week	729	38.6
51–70 hours a week	418	22.1
> 71 hours a week	430	21.8
No response	9	0.5

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Table 1: (*Continued*)

Characteristics	Frequency	%
Sick days per year		
0–1	680	36.0
2–7	740	39.2
> 7	265	14.0
No response	205	10.8
Missed days per year (not related to sickness)		
0–1	1,132	59.9
2–7	349	18.5
> 7	112	5.9
No response	297	15.7
Do you have an intention to leave your training in the next year?		
Yes	364	19.3
No	1,525	80.7
No response	1	0.1

Table 2: Mean scores and prevalence of burnout and stress

Burnout and stress scales	Mean score (SD)	Prevalence (%, confidence interval)
CBI		
Personal burnout	66.75 (22.52)	1,860 (98.4%, CI: 97.9%–99.0%)
Work-related burnout	60.47 (20.12)	1,849 (97.8%, CI: 97.1%–98.4%)
Patient-related burnout	38.50 (25.89)	1,498 (79.3%, CI: 77.4%–81.0%)
SOS-S	31.87 (11.04)	High risk (high PV and high EL): 975 (51.6%)
PV	14.78 (5.81)	Challenged (low PV, high EL): 13 (0.7%)
EL	17.08 (5.63)	Fragile (high PV, low EL): 326 (17.2%) Low risk (low PV, low EL): 576 (30.5%)

Table 3: Pearson's correlations between the CBI dimensions and the SOS-S total scores and its subscales*

Burnout and stress scales	Personal burnout	Work-related burnout	Patient-related burnout	PV(r)	EL (r)	SOS-S Total (r)
Personal burnout	–	0.790	0.435	0.696	0.737	0.743
Work-related burnout	0.790	–	0.507	0.646	0.668	0.681
Patient-related burnout	0.435	0.507	–	0.317	0.384	0.364
PV	0.696	0.646	0.317	–	0.862	0.964
EL	0.737	0.668	0.384	0.862	–	0.966
SOS-S total	0.743	0.681	0.364	0.964	0.966	–

Note: *Correlation is significant at the 0.01 level (2-tailed).

Table 4: Chi-square test for CBI and SOS-S domains based on demographic and other variables

Demographic	CBI domains			SOS-S categories (risk for Illness)				SOS categorical scores (*p*-value)
	Personal burnout (score ≥ 50) *n* (%), *p*-value	Work-related burnout (score ≥ 50) *n* (%), *p*-value	Patient-related burnout (score ≥ 50) *n* (%), *p*-value	Low risk *n* (%)	Fragile *n* (%)	Challenged *n* (%)	High risk *n* (%)	
Total	**1,860 (98.4)**	**1,849 (97.8)**	**1,498 (79.3)**	**975 (51.6)**	**326 (17.2)**	**13 (0.7)**	**576 (30.5)**	
Age								
24–28	662 (99.0)	661 (98.8)	526 (78.6)	189 (28.3)	120 (17.9)	4 (0.6)	356 (53.2)	
29–33	698 (98.2)	692 (97.2)	562 (78.9)	224 (31.5)	123 (17.3)	5 (0.7)	360 (50.6)	$p = 0.57$
≥34	139 (97.2)	137 (95.8)	110 (76.9)	53 (37.1)	25 (17.5)	0 (0.0)	65 (45.5)	
	$p = 0.38$	$p = 0.06$	$p = 0.50$					
Gender								
Male	906 (97.7)	905 (97.6)	744 (80.3)	317 (34.2)	158 (17.0)	8 (0.9)	444 (47.9)	$p = 0.003$
Female	952 (99.2)	942 (98.0)	752 (78.3)	259 (27.0)	168 (17.5)	5 (0.5)	529 (55.0)	
	$p = 0.01$	$p = 0.63$	$p = 0.30$					
Marital status								
Single	792 (98.5)	788 (98.0)	635 (79.0)	221 (27.5)	135 (16.8)	12 (1.5)	436 (54.2)	
Engaged	83 (100.0)	83 (100.0)	68 (81.9)	19 (22.9)	16 (19.3)	0 (0.0)	48 (57.8)	$p = 0.001$
Married	945 (98.3)	939 (97.6)	765 (79.5)	324 (33.7)	168 (17.5)	0 (0.0)	470(48.9)	
Divorced/widowed	37 (97.4)	36 (94.7)	28 (73.7)	12 (31.6)	6 (15.8)	1 (2.6)	19 (50.0)	
	$p = 0.070$	$p = 0.27$	$p = 0.76$					
Have children								
No	1,178 (98.7)	1,172 (98.2)	957 (80.2)	341 (28.6)	202 (16.9)	13 (1.1)	637 (53.4)	$p = 0.004$
Yes	675 (98.0)	670 (97.1)	535 (77.5)	232 (33.6)	124 (5.2)	0 (0.0)	334 (48.4)	
	$p = 0.24$	$p = 0.13$	$p = 0.17$					

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Table 4: (*Continued*)

Demographic	CBI domains			SOS-S categories (risk for Illness)				SOS categorical scores (*p*-value)
	Personal burnout (score ≥ 50) *n* (%), *p*-value	Work-related burnout (score ≥ 50) *n* (%), *p*-value	Patient-related burnout (score ≥ 50) *n* (%), *p*-value	Low risk *n* (%)	Fragile *n* (%)	Challenged *n* (%)	High risk *n* (%)	
Living environment								
Alone	210 (98.1)	166 (76.5)	86 (39.3)	58 (27.1)	35 (16.4)	3 (1.4)	118 (55.1)	
Alone with relatives nearby	111 (100.0)	76 (66.7)	41 (36.0)	38 (34.2)	12 (10.8)	2 (1.8)	59 (53.2)	$p = 0.17$
With partner	387 (99.0)	302 (76.8)	150 (38.1)	112 (28.6)	73 (18.6)	0 (0.0)	207 (52.8)	
With family	1,152 (98.2)	893 (72.7)	453 (36.8)	368 (31.4)	206 (17.6)	8 (0.7)	591 (50.4)	
	$p = 0.38$	$p = 0.092$	$p = 0.874$					
Residency programme								
Arab Board	128 (99.2)	–	104 (80.6)	32 (24.8)	32 (24.8)	1 (0.8)	64 (49.6)	
Saudi Board	1,290 (98.8)	–	1,054 (80.7)	340 (26.0)	214 (16.4)	11 (0.8)	741 (56.7)	$p = 0.000$
Omani Board	168 (93.9)	–	113 (63.1)	112 (62.6)	25 (14.0)	1 (0.6)	41 (22.9)	
Kuwaiti Board	272 (99.6)	–	225 (82.1)	91 (33.2)	55 (20.1)	0 (0.0)	128 (46.7)	
	$p = 0.000$	$p = 0.000$	$p = 0.000$					
Residency year								
First year	298 (99.3)	293(97.7)	236 (78.7)	84 (28.0)	59 (19.7)	2 (0.7)	155 (51.7)	
Second year	545(98.2)	541 (97.55)	436 (78.7)	175 (31.5)	97 (17.5)	3 (0.5)	280 (50.5)	
Third year	388 (99.22)	385 (98.5)	313 (80.1)	119 (30.4)	49 (12.5)	5 (1.3)	218 (55.8)	$p = 0.32$
Fourth year	388 (97.2)	391 (97.8)	328 (82.0)	125 (31.3)	72 (18.0)	3 (0.8)	200 (50.0)	
Fifth year	182 (99.5)	179 (97.8)	142 (77.6)	54 (29.5)	38 (20.8)	0 (0.0)	91 (49.7)	
	$p = 0.06$	$p = 0.89$	$p = 0.65$					

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Table 4: (*Continued*)

Demographic	CBI domains			SOS-S categories (risk for Illness)				SOS categorical scores (*p*-value)
	Personal burnout (score ≥ 50) *n* (%), *p*-value	Work-related burnout (score ≥ 50) *n* (%), *p*-value	Patient-related burnout (score ≥ 50) *n* (%), *p*-value	Low risk *n* (%)	Fragile *n* (%)	Challenged *n* (%)	High risk *n* (%)	
Residency specialty								
Anesthesia	74 (100.0)	73 (98.6)	57 (77.0)	21 (28.4)	14 (18.9)	0 (0.0)	39 (52.7)	
Emergency medicine	70 (97.2)	69 (95.8)	56 (77.8)	32 (44.4)	7 (9.7)	0 (0.0)	33 (45.8)	
Family medicine	331 (97.6)	331 (97.4)	281 (82.6)	132 (38.8)	57 (16.8)	2 (0.6)	149 (43.8)	
Medical	483 (98.6)	473 (98.5)	392 (80.0)	141 (28.8)	82 (16.7)	5 (1.0)	262 (53.5)	
OBGYN	164 (100.0)	162 (98.8)	134 (81.7)	40 (24.4)	24 (14.6)	1 (0.6)	99 (60.4)	$p = 0.016$
Laboratory	39 (95.1)	40 (97.6)	28 (68.3)	17 (41.5)	11 (14.6)	0 (0.0)	13 (31.7)	
Paediatrics	234 (98.3)	238 (100.0)	189 (79.4)	62 (26.1)	50 (21.0)	3 (1.3)	123 (51.7)	
Radiology	100 (99.0)	100 (99.0)	82 (68.3)	30 (29.7)	16 (15.8)	0 (0.0)	55 (54.5)	
Surgical	351 (98.9)	349 (98.3)	267 (75.2)	93 (26.2)	64 (18.0)	2 (0.6)	196 (55.2)	
	$p = 0.06$	$p = 0.05$	$p = 0.39$					
Do you have a wellness programme?								
Yes	456 (97.4)	447 (95.5)	364 (77.7)	187 (40.0)	84 (17.9)	4 (0.9)	193 (41.2)	$p = 0.000$
No	1,401 (98.8)	1,399 (98.6)	1,131 (79.7)	389 (27.4)	242 (17.1)	9 (0.6)	779 (54.9)	
	$p = 0.04$	$p = 0.000$	$p = 0.39$					
Have you participated in a wellness programme?								
Yes	113 (96.6)	113 (96.6)	95 (81.2)	38 (32.5)	18 (15.4)	1 (0.9)	60 (51.3)	$p = 0.97$
No	1,503 (98.2)	1,194 (97.9)	957 (78.4)	379 (31.1)	200 (16.4)	8 (0.7)	633 (51.9)	
	$p = 0.13$	$p = 0.32$	$p = 0.55$					
Have you been placed on probation, remediation status, been interrupted from training, transferred between different specialties, or temporarily withdrew from training during your residency programme?								
Yes	333 (99.7)	332 (99.1)	282 (84.2)	80 (23.9)	52 (15.5)	3 (0.9)	200 (59.7)	$p = 0.007$
No	1,200 (98.4)	1,493 (97.5)	1,198 (78.2)	490 (32.0)	270 (17.6)	10 (0.7)	761 (49.7)	
	$p = 0.04$	$p = 0.09$	$p = 0.017$					

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Table 4: (*Continued*)

Demographic	CBI domains			SOS-S Categories (risk for Illness)				SOS Categorical scores (*p*-value)
	Personal burnout (score ≥ 50) *n* (%), *p*-value	Work-related burnout (score ≥ 50) *n* (%), *p*-value	Patient-related burnout (score ≥ 50) *n* (%), *p*-value	Low risk *n* (%)	Fragile *n* (%)	Challenged *n* (%)	High risk *n* (%)	
Sick days								
0–1	663 (97.5)	666 (97.9)	529 (77.8)	22 (32.6)	128 (18.8)	1 (0.1)	329 (48.4)	
2–7	732 (99.1)	727 (98.2)	592 (80.0)	215 (29.1)	143 (19.3)	6 (0.8)	376 (50.8)	$p = 0.000$
> 7	262 (98.9)	257 (97.0)	214 (80.8)	65 (24.5)	36 (13.6)	2 (0.8)	162 (61.1)	
	$p = 0.08$	$p = 0.55$	$p = 0.68$					
Missed days								
0–1	1,108 (97.9)	1,107 (97.8)	883 (78.0)	352 (31.1)	223 (19.7)	4 (0.4)	553 (48.9)	
2–7	347 (99.7)	342 (98.0)	288 (82.5)	97 (27.8)	54 (15.5)	4 (1.1)	194 (55.6)	$p = 0.003$
> 7	111 (99.1)	110 (98.2)	88 (78.6)	28 (25.0)	19 (17.0)	1 (0.9)	64 (57.1)	
	$p = 0.07$	$p = 0.98$	$p = 0.30$					
Shift/work schedules per week								
< 40 hours a week	291 (95.7)	282(92.8)	221 (72.7)	152 (50.05)	34 (11.2)	0 (0.0)	118 (38.8)	
41–60 hours a week	715 (98.2)	717 (98.4)	584 (80.1)	251 (34.4)	149 (20.4)	5 (0.7)	324 (44.4)	
51–70 hours a week	417 (99.8)	414 (99.0)	331 (79.2)	97 (23.2)	74 (17.7)	6 (1.4)	241 (57.7)	$p = 0.000$
> 71 hours a week	428 (99.5)	427 (99.3)	356 (82.8)	74 (17.2)	68 (15.8)	2 (0.5)	286 (66.5)	
	$p = 0.000$	$p = 0.000$	$p = 0.009$					
Do you have an intention to leave your training in the next year?								
Yes	361 (99.4)	362 (99.5)	318 (87.4)	40 (11.0)	36 (17.3)	3 (0.8)	285 (78.3)	$p = 0.000$
No	1,498 (98.2)	1,486 (97.4)	1,179 (77.3)	536 (35.1)	290 (19.0)	10 (0.7)	689 (45.2)	
	$p = 0.09$	$p = 0.015$	$p = 0.000$					

Note: $p < 0.05$ are statistically significant

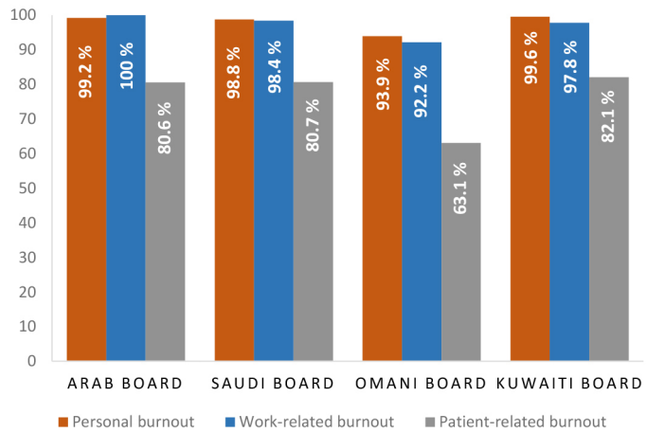

Figure 1: Bar graph illustrating the prevalence of personal burnout, work-related burnout, patient-related burnout among GCC residents.

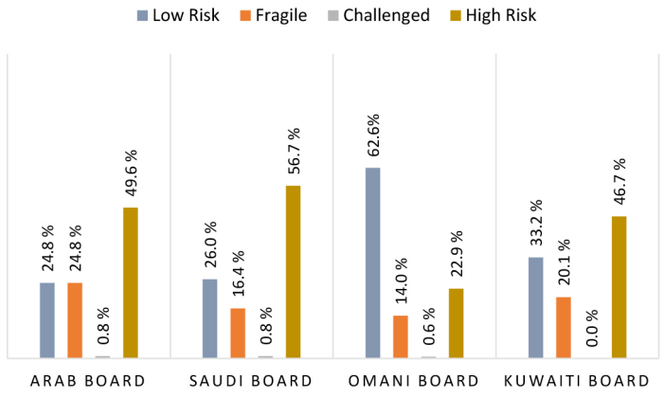

Figure 2: Bar graph illustrating the prevalence of PV, EL, and total stress overload (SOS-S) among GCC residents.

Burnout and Stress' Relationship with Wellness Programmes and Other Work-Related Factors

Rates of personal and work-related burnout were lower among residents who had a wellness programme (p = 0.04 and p = 0.000). Also, residents with no wellness programme were more likely to be at high risk for illness (p = 0.000).

Personal and patient related burnout were higher among residents who were on probation, remediation status, were interrupted from training, transferred between different specialties, or temporarily withdrew from training during their residency programme (p = 0.04 and p = 0.017). Residents in these categories were also more likely to be at high risk for illness (p = 0.007). Residents who took more sick leave or missed days were also more likely to be at high risk for illness (p = 0.000).

Prevalence of personal, work-related, and patient-related burnout was highest among residents working > 71 hours per week (p = 0.000 to p = 0.009, respectively). Prevalence of work and patient related burnout was higher among residents who had an intention to leave training in the next

year (p = 0.015 and p = 0.000). Residents with longer work shifts and an intention to leave were also more significantly at high risk for illness (p = 0.000).

Predictive Factors for Burnout and Stress Overload

Predictive factors of personal and work-related burnout included work hours per week (p = 0.01–0.03, p = 0.000–0.021, respectively) and PV (p = 0.03, p = 0.000, respectively). Predictive factors of patient-related burnout included residency board (p = 0.002 to p = 0.045), PV (p = 0.000), and EL (p = 0.007) (see Table 5A).

Predictive factors for PV included gender (p < 0.001), access to a wellness programme (p = 0.01), work hours per week (p = 0.01 to 0.03), and intention to leave (p < 0.001). Predictive factors for EL were gender (p < 0.001), residency programme (p < 0.001 to 0.001), access to a wellness programme (p = 0.003), sick days > 7 (p = 0.006), and intention to leave (p < 0.001) (see Table 5B).

Table 5: Regression analysis model considering significant predictors of (A) burnout and (B) stress

(A) Significant predictors of burnout

Factor	Adjusted		
	Odds ratio	95% CI	*P*-value
Personal burnout (Model with R^2 = 0.385)			
Shift/work schedules per week			
< 40 hours a week	–	–	–
41–60 hours a week	2.68	1.1–6.6	0.03
51–70 hours a week	13.71	1.6–112.4	0.01
> 71 hours a week	9.89	1.2–82.9	0.03
PV	9.09	1.18–69.6	0.03
Work related burnout (Model with R^2 = 0.277)			
Shift/work schedules per week			
< 40 hours a week	–	–	–
41–60 hours a week	4.10	1.9–8.7	0.000
51–70 hours a week	5.13	1.6–15.6	0.004
> 71 hours a week	4.44	1.2–15.6	0.021
PV	12.96	4.4–37.4	0.000
Patient related burnout (Model with R^2 = 0.086)			
Residency programme			
AB	1.76	1.0–3.07	0.045
SB	1.67	1.18–2.3	0.004
OMSB	–	–	–
KBMTP	2.02	1.29–3.16	0.002
PV	2.06	1.5–2.8	0.000
EL	1.55	1.1–2.1	0.007

(*Continued on next page*)

Table 5: (*Continued*)

(B) Significant predictors of stress

Factor	Adjusted		
	Odds ratio	95% CI	*P*-value
PV (Model with $R^2 = 0.142$)			
Gender			
Male	–	–	–
Female	1.79	1.41–2.28	< 0.001
Do you have wellness programme?			
Yes	–	–	–
No	1.40	1.80–1.83	0.01
Shift/work schedules per week			
< 40 hours a week	–	–	–
41–60 hours a week	2.68	1.1–6.6	0.03
51–70 hours a week	13.71	1.6–112.4	0.01
> 71 hours a week	9.89	1.2–82.9	0.03
Do you have an intention to leave your training in the next year?			
Yes	3.32	2.28–4.81	< 0.001
No	–	–	–
EL (Model with $R^2 = 0.151$)			
Gender			
Male	–	–	–
Female	1.62	1.30–2.02	< 0.001
Residency programme			
Arab Board	2.55	1.44–4.51	0.001
Saudi Board	4.04	2.61–6.24	< 0.001
Omani Board	–	–	–
Kuwaiti Board	2.81	1.72–4.59	< 0.001
Do you have wellness programme?			
Yes	–	–	
No	1.477	1.14–1.90	0.003
Sick days			
0–1	–	–	–
2–7	1.35	1.06–1.72	0.07
> 7	1.57	1.13–2.18	0.006
Do you have an intention to leave your training in the next year?			
Yes	3.54	2.62–4.78	< 0.001
No	–	–	–

Note: R^2 = the coefficient of determination

DISCUSSION

This is the first study to assess burnout and stress levels of residents in the GCC by combining the CBI and SOS-S as assessment tools. Our findings illustrate that burnout prevalence rates are very high in all three CBI burnout dimensions across all residents of participating countries. Prevalence rates for personal burnout ranged from 93.9% to 99.6%, 92.2% to 100% for work-related burnout, and 63.1% to 82.1% for patient-related burnout. The KBMTP scored the highest in both personal (99.6%) and patient-related burnout (82.1%), whereas the AB scored highest in work-related burnout (100%). Compared to other countries, resident burnout rates have been reported as 27.9% in Brazil (27), 21% in The Netherlands (28), 27% in Lebanon (29) 14.4% in Greece (30), and 65% (male residents) and 73% (female residents) in a United States General Surgery programme (31). In another study in the US, 76% of residents met the criteria for burnout (32). Our results showed that residents were also highly susceptible to illness, with the SB having the highest percentage of residents at high risk for illness (56.7%), followed by the AB (49.6%), while the OMSB had the lowest (22.9%).

There were statistically significant gender differences for personal burnout only (higher among females), residency programme (KBMTP residents reported the highest burnout across all domains), wellness programme (availability of wellness programmes showed lower personal and work-related burnout), probation/ remediation status (higher personal and patient related burnout for this status), shift length (longer shifts reflected higher burnout across all domains), and intention to leave (those with intention to leave had higher personal and patient related burnout) (p-values = 0.000 to 0.05). Predictors of personal and work-related burnout included shift length per week and PV (p-values = 0.000 to 0.021). Patient-related burnout predictors included residency programme, shift length, PV, and EL (p-values = 0.000 to 0.045).

Stress overload amongst GCC residents showed statistically significant differences across gender, marital status, having children, residency programme, specialty, wellness programme availability, probation/ remediation status, number of sick or missed days, shift length, and intention to leave (p-values ranged from 0.000 to 0.016). PV predictors included gender, wellness programme availability, shift length, and intention to leave (p-values < 0.001 to 0.03). EL predictors included gender, residency programme, wellness programme availability, sick days, and intention to leave (p-values < 0.001 to 0.003).

Our results are in line with the existing literature globally. Several studies have shown that higher levels of burnout are associated with longer working hours, more working days, and shift work (33–34). Extended and irregular work shifts have also been found to contribute to burnout and depression in medical residents in the UAE (33), Saudi Arabia (34) and India (35). There is conflicting data about the relationship between marriage and burnout among residents. Burnout was reported higher in married residents in one study (36). Another study reported that married or engaged residents showed higher emotional exhaustion and depersonalisation (37), whereas other studies reported no relation between marital status and burnout (10, 33). Female residents with children reported the highest levels of emotional exhaustion. Male residents with children reported lower levels of emotional exhaustion compared to male residents without children (38). The lower levels of burnout among married residents and those with children in this study may be attributed to the social support received by partners and family members as several studies have shown its importance (39–41).

Additionally, the predictors we listed for burnout and stress overload illustrate the significance of wellness programmes and shift length as factors to consider when aiming to reduce burnout and stress overload in residency programmes. For

example, as the OMSB residents reported the lowest burnout and stress rates, one can attribute this to the early development and implementation of the wellness programme by the board in 2012 (42). It must be noted that although SB launched a wellness programme called "Daem" in early 2019 (43), no assessment has been made of its effectiveness. Wellness as a concept is "a dynamic process involving self-awareness that results in healthy choices" (44). The importance of wellness programmes and their effect on reducing burnout in residents is well-established (45–48). Two studies that assessed the same programme found that 64% of participants had improved health and mental wellbeing (49) and 91% reported improved team building and friendship (49).

This study reported much higher prevalence rates of burnout and stress among residents than other studies. A possible explanation for the discrepancy may be the measures used to assess burnout. Another explanation is that rates were inflated as data was collected during a peak period of the COVID-19 pandemic in the region. A study conducted in Saudi Arabia suggested that training residents are especially susceptible to COVID-19 infections, with an elevated proportion of them experiencing moderate to severe depression and anxiety. The study also listed possible dissatisfaction with residents' respective training programmes and delays in the delivery of the curriculum material due to the COVID-19 pandemic as another reason for these high rates (49).

Strengths and Limitations

The results are in accordance with studies published regionally and globally. However, direct comparison with other studies may be limited due to differences in settings of residency training programmes and participation rates. For example, SB residents represented a large percentage of our participants; residency programmes from Qatar and UAE did not participate (both countries are GCC members), which may bias the results. However, we had a sufficient representative sample from each board. Our response rates were low, but still in line with the burnout literature (8, 50–52). Several strengths were identified: (a) this study can be considered the largest multinational multi-centre study in the GCC focusing on stress and burnout in residents; and (b) the application of the CBI and SOS-S on a large scale for the first time in the GCC. These tools are becoming more commonly used globally and have shown improved reliability and validity compared to their counterparts (16, 50, 52–56).

CONCLUSION

Burnout and stress are highly prevalent among physician residents in the four GCC countries included in the study, especially in Bahraini, Kuwaiti, and Saudi Arabian residents. Findings highlight the importance of measuring burnout and stress overload using standardised and validated assessment methods to better understand their effects on medical residents. Our findings also provide useful information to guide and support medical education endeavours to target factors associated with burnout and stress overload. Intervention programmes to help combat burnout and stress overload should be implemented by the various medical institutions in the GCC dedicated to the advancement of medical education. Further research is needed to evaluate the effectiveness of residency wellness programmes.

ETHICAL APPROVAL

An ethical approval was obtained from the responsible entity in each participating country: Arab Board (Kingdom of Bahrain): IRB# 20-337; Saudi Board (Kingdom of Saudi Arabia): IRB#5/20. September.2020, Protocol No. SRP-000037; Oman Medical Specialty Board (Sultunate of Oman): REC/05/2020;

Kuwait Board Medical Training Program (State of Kuwait): #1463. In addition, participants were informed of the choice to withdraw from the study at any point without any risks, no personal identifiers would be collected, responses would remain anonymous and kept with the investigators for research purposes only.

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