Demographics, Activities, and Environmental Factors Impact Burnout in a National Survey of Emergency Medicine Residents

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ABSTRACT

Introduction: Burnout in emergency medicine and in residency training has been well-described. The impact of demographic, individual, and programmatic factors on burnout have not previously been determined in a national survey of emergency medicine residents. This study aimed to identify personal and environmental factors impacting resident burnout in a national sample of emergency medicine residents.

Methods: A prospective Emergency Medicine Resident Wellness Survey was administered in 2017. We surveyed respondents on demographic, personal, and environmental factors; each respondent also completed the Maslach Burnout Inventory - Human Services Survey. Linear regressions were used to identify variables associated with the Maslach Burnout Inventory's subscales of burnout (depersonalization, emotional exhaustion, and personal achievement).

Results: The survey was completed by 1,522 of 7,186 (21.2%) eligible EM residents. Respondents represented 193 of 247 (78.1%) Emergency Medicine residency programs. Increased levels of depersonalization were associated with graduation from a US medical school, female gender, and increase in respondent age. Trainees who were parents and who graduated from an osteopathic (vs. allopathic) medical school were found to have decreased levels of depersonalization. Emotional exhaustion was decreased in respondents who took breaks while on shift and who engaged in regular studying.

Conclusion: While some individual characteristics impact burnout, environmental factors also play a significant role, and should be a target of system-level interventions to improve trainee well-being.

INTRODUCTION

Burnout in the physician population has been well-described. It negatively impacts individual physician well-being and the quality of patient care delivered, and increases financial costs to organizations [1]. The causes of burnout are multifactorial, and medical trainees are particularly vulnerable to burnout due to a multitude of factors, including a demanding clinical schedule [2].

The prevalence of burnout in residency training is now increasingly understood. In 2017, the National Emergency Medicine Resident Wellness Survey was the first national emergency medicine (EM) cross-sectional survey on resident burnout. This survey was completed by 21.1% (1,522) of EM residents in the United States and included respondents from 78% of US programs. The study found that the prevalence of burnout among EM residents was 76% when defining burnout as high EE or DP. This finding was published in the manuscript "High Prevalence of Burnout Among US Emergency Medicine Residents: Results From the 2017 National Emergency Medicine Wellness Survey" [3]. Comparing these results to previous data across all specialties, EM residents are among those with the highest rates of burnout [4].

In 2017, the ACGME required that all residency programs implement programming with the aim of improving the wellness of trainees [5]. Various efforts have been implemented by residency programs and medical organizations with the intent to decrease burnout. However, there is a relative paucity of data on what interventions on an individual and organizational level have been efficacious in reducing burnout and improving well-being. In this manuscript, we aim to describe the association of personal factors and individual and program-level activities with trainee burnout.

METHODS

Study Design

In this survey study, US emergency medicine residents completed a self-administered, incentivized online questionnaire, conducted by the Academic Life in Emergency Medicine (ALiEM) organization and its Wellness Think Tank volunteer initiative. After initial survey creation, iterative refinements for clarity and brevity were completed. Contents of the survey included demographic information, the Maslach Burnout

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Inventory-Human Services Survey (MBI-HSS), Life Orientation Test-Revised (LOT-R) tool, and individual and program-level activities thought to impact wellness. The validated 22-item MBI-HSS includes three subscales [emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA)]. The LOT-R is a 10-item tool that measures levels of optimism [6].

The survey was hosted online on REDCap version 8.1.4 (Research Electronic Data Capture, Vanderbilt University, Nashville, TN), a secure web application for building and managing online surveys and databases. The study was granted expedited review by the institutional review board of New York Presbyterian Brooklyn Methodist Hospital.

Selection of Participants

Resident participants were recruited from the ALiEM website, social media (Twitter), and listservs (including those of the Council of EM Residency Directors and the EM Residents Association). No participants were directly recruited by the study team. Incentives for completion included a $5 Starbucks gift card and coupon codes to meal delivery services. EM residents completed the self-administered, incentivized online questionnaire from March 20 to March 31, 2017. Participant status as a current US emergency medicine resident was verified by cross-referencing resident rosters obtained from accredited emergency medicine residency programs. Duplicate submissions and trainees from combined training programs (e.g. Emergency Medicine/Internal Medicine) were excluded. All data was anonymized before analysis.

Outcome Measures

In addition to demographic questions, the MBI-HSS tool, and the LOT-R tool, survey participants were asked about activities they engaged in for their personal wellness, including social events, exercise, organized sports, outdoor activities (e.g. hiking, biking, fishing), indoor activities (e.g. playing music, drawing, writing), and studying. Participants were also asked to report the availability of institutional support for wellness including healthy food options, the presence of formal wellness programs, and the inclusion of specific wellness events.

Data Analysis

Categorical variables were described using frequencies and percentages, and continuous variables were described using medians and interquartile ranges. For the primary set of analyses, linear regressions were used to identify variables that were associated with the subscales of burnout (Emotional Exhaustion [EE], Depersonalization [DP], and Personal Accomplishment [PA]). All variables available in the data set were evaluated as possible predictors including personal characteristics, individual practices, characteristics of the training environment, and the respondent's score on the LOT-R. Predictors were evaluated using regression slopes, p-values, and 95% confidence intervals. P-values and 95% CIs were computed using bias-corrected and accelerated bootstrapping (5,000 resamples). For a gentle introduction to bootstrapping, please see the paper by Wehrens, Putter, & Buydens [7]. In order to identify the most prominent risk and protective factors and help future researchers and program directors focus their efforts, secondary analyses were conducted with the aim of evaluating the incremental importance of each predictor. In this analysis, variables were added to the model sequentially on the basis of the Akaike Information Criterion (AIC). The AIC is an estimate of how well the model will perform in a new sample such that lower AIC values indicate better performance. At each step, the change in adjusted R^2 was recorded. The adjusted R^2 is the proportion of variance in the outcome accounted for by the predictors. Analyses were conducted using SPSS (v.25, Armonk, NY).

RESULTS

A total of 1,522 of 7,186 independently verified US emergency medicine residents (21.2%), representing 193 of 247 residency programs (78.1%), participated in the survey. Geographic distribution of participants was similar to that of emergency medicine residency programs according to the 2016-2017 American Board of Emergency Medicine Report on Residency and Fellowship Training Information [8]. Demographics of the study sample are presented in **Table 1** below.

Table 1: Respondent Demographics and Characteristic

Characteristic	N or Median	% or IQR
Age, M/IQR	30	28-32
Gender, N/%		
Male	879	57.8
Female	643	42.2
Marital Status, N/%		
Divorced	16	1.1
Married	698	45.9
Committed Relationship	283	18.6
Single	525	34.5
Has Children, N/%	260	17.1
Degree, N/%		
MD	1179	77.5
DO	343	22.5
Foreign Medical Graduate, N/%	88	5.8
Years of Training, N/%		
PGY-1	523	34.4
PGY-2	437	28.7
PGY-3+	562	36.9

Table 2 contains the respondents' perceptions of the maturity and offerings of their respective residencies' wellness programs. 40.2% of respondents perceive that their residency program had no dedicated wellness program, whereas 5.8% of residents report an established program of four or more years.

Table 2: Institutional Wellness Activities

Characteristic	N	%
Wellness Program Maturity, N/%		
No Program	612	40.2
Less than 1 Year	311	20.4
1-2 Years	359	23.6
3-4 Years	152	10.0
4+ Years	88	5.8
Adequate Wellness Services, N/%	1213	79.7
Program Hosts Wellness Events, N/%	678	44.5
Program-Directed Wellness Activities, N/%		
Group Outdoor Events	664	43.6
Group Indoor Events	814	53.5
Group Retreats Lasting One or Fewer Days	429	28.2
Group Retreats Lasting More Than One Day	512	33.6
In Hospital Day Events	951	62.5
Social/ Happy Hour	913	60.0
Wellness Lectures	101	6.6
Other or None	81	5.3

Respondents were polled on the frequency (per week) in which they participated in individual wellness activities. Respondents reported participating most frequently in studying and exercise (**Table 3**).

Table 3: Individual Wellness Activities

Self-Directed Wellness Activities	Median	IQR
Social/Happy Hour	2	1-3
Exercise	3	2-3
Group Sports	0	0-1
Outdoor Activities	0	0-1
Indoor Activities	2	1-3
Practice Mindfulness	1	0-2
Work Breaks	0	0-2
Healthy Food at Work	2	1-3
Studying	3	2-3

Personal Characteristics

A progressive increase in post graduate year was significantly associated with an increase in EE and DP and decrease in PA. Thus, residents were more likely to suffer from symptoms of burnout as they progress from year to year.

We also examined the relationship between a Respondent's medical training background and the three subscales of burnout. We found that being a graduate from an osteopathic (vs allopathic) program significantly decreased DP. Additionally, Foreign Medical Graduates (FMGs) were associated with decreased levels of DP when compared to graduates from US medical schools.

Our data did not demonstrate a statistically significant relationship between marital status and burnout in EM residents. Our study did find that being a parent decreased levels of EE and DP significantly.

Approximately 42% of respondents identified as female; we found that female respondents had statistically greater levels of DP compared to their male peers. The associations between gender and EE and PA were not statistically significant.

Individual Practices

Some self-directed wellness activities were shown to impact burnout. Specifically, engaging in group sports, social events such as happy hours, indoor activities (playing music, drawing, writing), and mindfulness exercises were all found to significantly improve at least one facet of burnout. Importantly, the individual practice of studying was found to significantly impact all three facets of burnout, leading to decreased EE and DP and increasing PA. Some individual-level activities cited in the survey (individual exercise, outdoor activities) did not significantly impact burnout. An additional individual practice that improved levels of depersonalization was that of taking breaks from work and the clinical environment.

Training Environment

Several factors related to the training environment of EM residents were related to burnout. Residents in programs which offer program-hosted social opportunities (e.g. happy hours), multiple-day resident retreats, healthy food options at work, and wellness curricula have significant improvements in at least one subscale of burnout. Program directed retreats that lasted less than one day did not have a significant impact on any of the burnout subscales. Our study did not find any statistically significant effect of the duration of a formal wellness program within the institution on the subscales of burnout.

Residents in programs providing adequate wellness services (e.g. confidential counseling, mental health services, ombudsperson) were found to have a significant decrease in EE and DP. Respondents who wanted to give additional input regarding adequacy and availability of wellness services were given the opportunity to provide open ended feedback. This study did not utilize a qualitative lens to develop themes from the free text comments; however, for research transparency these comments are provided in the supplementary material for any future investigations.

The feedback highlighted areas of concern for the resident respondents;

"If one asks for help, there is absolutely a stigma attached. I know because I have asked for help."

"Mental health services are not confidential, they even write notes in our EMR which everyone has access to. The additional military obligations come out of personal time, and nobody gives a crap if you are tired, lonely, depressed, overworked. It's all about moving bodies."

"Basic services (like an open door policy and a wellness day) are available, but the efforts can be better. There is a lot more to wellness than happy hours and figuring it out on your own with vacation time which I don't think the residency addresses because the hospitals are so dependent on residents working. I can see how it is difficult to carve out time for wellness so it feels like a lower priority."

"My program seems to think the entirety of wellness consists of providing food and drinks once in a while with an occasional lecture on mindfulness. For me, real wellness would mean a living wage, family leave, time to see my husband, minimizing noneducational work, a respectful work environment, and a supportive administration. The former is easy to provide but makes no impact; the latter, difficult but meaningful. My program and almost every other program reliably chooses the path of least resistance (and least financial expense)."

"The program has started to embrace this concept, and it's promotion has improved over the last several years, however, I would not say that our program has attained a clear culture of wellness that most or all residents understand or feel like they truly have access to."

"I think there's a concerted effort right now in our hospital, but at this point in time I still think access to resources is limited. Last year when I had a small crisis I really wanted to talk with someone but I didn't know who to turn to."

Table 4: Regression Analysis for Emotional Exhaustion

Emotional Exhaustion $R^2_{adj} = .19$					
Predictor	β	95% CI	p	ΔR^2_{adj}	AIC
Program Provides Adequate Wellness Services	-5.35	-6.71 - -3.98	**< .001**	0.088	11425.26
Self-Directed Wellness Activities: Studying	-1.78	-2.38 - -1.19	**< .001**	0.041	11355.97
Mandatory Work Breaks	-0.7	-1.12 - -0.27	**0.001**	0.018	11324.48
LOT-R	0.57	0.39 - 0.75	**< .001**	0.018	11292.09
Self-Directed Wellness Activities: Sports	-0.74	-1.32 - -0.15	**0.01**	0.007	11279.63
Self-Directed Wellness Activities: Social/Happy Hour	-0.86	-1.44 - -0.29	**0.003**	0.005	11271.87
Self-Directed Wellness Activities: Indoor Activities	-0.45	-0.88 - -0.03	**0.04**	0.004	11266.25
Number of Children	-0.97	-1.74 - -0.2	**0.01**	0.004	11260.36
Program-Directed Wellness Activities: Social/Happy Hour	-1.28	-2.4 - -0.16	**0.03**	0.004	11254.45
PGY	0.77	0.15 - 1.4	**0.02**	0.002	11250.97
Program-Directed Wellness Activities: Day Events at Hospital	-0.96	-2.05 - 0.13	0.09	0.001	11249.25
Self-Directed Wellness Activities: Mindfulness	-0.31	-0.74 - 0.12	0.16	0.001	11248.29
Self-Directed Wellness Activities: Other	-1.6	-3.58 - 0.39	0.12	< .001	11247.65
FMG	-1.68	-3.82 - 0.47	0.13	< .001	**11246.98**
Wellness Program Maturity	-0.27	-0.72 - 0.17	0.23	< .001	11247.32
Program-Directed Wellness Activities: Group Retreat (> 1 day)	-0.59	-1.72 - 0.55	0.31	< .001	11248.25
Healthy Food Options at Work	-0.14	-0.54 - 0.25	0.48	< .001	11249.56
Self-Directed Wellness Activities: Outdoor Activities	-0.2	-0.77 - 0.37	0.5	< .001	11251.04
Age	-0.05	-0.23 - 0.13	0.59	< .001	11252.57
Program-Directed Wellness Activities: Outdoor Activities	-0.18	-1.34 - 0.98	0.76	< .001	11254.39
Program-Directed Wellness Activities: Indoor Activities	-0.19	-1.33 - 0.95	0.74	< .001	11256.3
Type of Degree	0.43	-0.82 - 1.69	0.5	< .001	11257.79
Gender	0.14	-0.94 - 1.21	0.8	< .001	11259.72
Program-Directed Wellness Activities: Group Retreat (≤ 1 day)	0.17	-0.88 - 1.22	0.75	< .001	11261.55
Self-Directed Wellness Activities: Exercise	0.08	-0.45 - 0.6	0.78	< .001	11263.46
Program-Directed Wellness Activities: Wellness Lectures	0.15	-0.94 - 1.23	0.79	< .001	11265.35
Marital Status				< .001	11271.59
Divorced	-1.37	-6.37 - 3.64	0.59		
Married	-0.73	-2.15 - 0.7	0.32		
Single	-0.91	-2.33 - 0.52	0.21		

Note. R^2_{adj} - R^2 for the full model; Adjusted Coefficient - Adjusted regression coefficient when all variables are in the model; 95% CI - 95% Confidence Interval for the Coefficient; p - p value for the Coefficient; ΔR^2_{adj} - The change in the adjusted R^2 for the model when each predictor was added including the previous variables; AIC - Akaike Information Criterion for the model when each variable is added including the previous variables.

Table 5: Regression Analysis for Emotional Exhaustion

Depersonalization R^2_{adj} = .12					
Predictor	β	95% CI	p	ΔR²adj	AIC
Self-Directed Wellness Activities: Studying	-0.97	-1.36 - -0.58	**< .001**	0.038	10071.77
Mandatory Work Breaks	-0.43	-0.7 - -0.15	**0.003**	0.022	10037.64
Program Provides Adequate Wellness Services	-1.52	-2.41 - -0.63	**< .001**	0.013	10018.02
Gender	1.71	1.0 - 2.41	**< .001**	0.009	10004.32
Age	-0.19	-0.31 - -0.08	**0.001**	0.007	9993.1
PGY	0.95	0.54 - 1.35	**< .001**	0.01	9977.08
LOT-R	0.24	0.12 - 0.36	**< .001**	0.007	9966.12
Self-Directed Wellness Activities: Mindfulness	-0.34	-0.61 - -0.06	**0.02**	0.006	9957.57
Self-Directed Wellness Activities: Sports	-0.46	-0.84 - -0.08	**0.02**	0.003	9952.91
Number of Children	-0.52	-1.02 - -0.02	**0.04**	0.003	9948.64
FMG	-1.55	-2.95 - -0.15	**0.03**	0.002	9946.99
Degree	0.95	0.14 - 1.77	**0.02**	0.002	9944.86
Program-Directed Wellness Activities: Day Events at Hospital	-0.52	-1.23 - 0.19	0.15	0.001	9943.37
Program-Directed Wellness Activities: Outdoor Activities	-0.33	-1.09 - 0.43	0.39	< .001	**9942.85**
Program-Directed Wellness Activities: Group Retreat (> 1 day)	-0.46	-1.2 - 0.27	0.22	< .001	9942.89
Self-Directed Wellness Activities: Indoor Activities	-0.12	-0.4 - 0.16	0.41	< .001	9943.9
Program-Directed Wellness Activities: Social/Happy Hour	-0.27	-1 - 0.46	0.46	< .001	9945.34
Self-Directed Wellness Activities: Other	0.53	-0.77 - 1.82	0.42	< .001	9946.67
Healthy Food Options at Work	-0.11	-0.37 - 0.14	0.38	< .001	9948.07
Wellness Program Maturity	-0.1	-0.38 - 0.19	0.52	< .001	9949.73
Self-Directed Wellness Activities: Social/Happy Hour	-0.12	-0.49 - 0.25	0.53	< .001	9951.51
Self-Directed Wellness Activities: Exercise	0.19	-0.15 - 0.52	0.28	< .001	9952.48
Self-Directed Wellness Activities: Outdoor Activities	-0.04	-0.41 - 0.33	0.83	< .001	9954.42
Program-Directed Wellness Activities: Indoor Activities	-0.06	-0.8 - 0.68	0.88	< .001	9956.4
Program-Directed Wellness Activities: Wellness Lectures	0.21	-0.5 - 0.92	0.56	< .001	9960.02
Program-Directed Wellness Activities: Group Retreat (≤ 1 day)	0.01	-0.68 - 0.7	0.98	< .001	9962.02
Marital Status				< .001	9966.36
Divorced	1.93	-1.33 - 5.19	0.25		
Married	-0.14	-1.06 - 0.79	0.77		
Single	-0.05	-0.98 - 0.87	0.91		

Note. R^2_{adj} - R^2 for the full model; Coefficient - Adjusted regression coefficient when all variables are in the model; 95% CI - 95% Confidence Interval for the Coefficient; p - p value for the Coefficient; ΔR²adj - The change in the adjusted R² for the model when each predictor was added including the previous variables; AIC - Akaike Information Criterion for the model when each variable is added including the previous variables.

Secondary Analyses

In the secondary analyses, the Akaike Information Criterion was used to identify the set of variables that would likely be useful for predicting each scale in other samples. For EE, the combination of variables that resulted in the best model were: program wellness services, studying, work breaks, LOT-R, sports, happy/social hour (both self- and program-directed), indoor activities, children, PGY, day events at the hospital, mindfulness, miscellaneous self-directed activities, and FMG status. For DP, the combination of variables that resulted in the best model were: studying, work breaks, wellness services, gender, age, PGY, LOT-R, mindfulness, sports, children, FMG status, type of degree, day events at the hospital, and outdoor activities. Lastly, for PA, the combination of variables that resulted in the best model were: LOT-R, studying, healthy food at work, wellness lectures, happy/social hour (both program- and self-directed), indoor activities, wellness retreats, program wellness services, PGY, mindfulness, work breaks, outdoor activities, and exercise.

DISCUSSION

Factors contributing to physician burnout are often divided into the categories of personal demographic characteristics, individual practices, and work environment factors [9]. The underlying causes of burnout are undoubtedly complex and individual. By examining these items, we sought to understand which factors were most influential in the subscales of burnout. In past studies, personal factors that have been associated with burnout include being self-critical, engaging in unhelpful coping strategies, sleep deprivation, over-commitment, perfectionism, idealism and work–life imbalance, and an inadequate support system outside the work environment (e.g., having no spouse, partner, or children) [10, 11].

With respect to family, some prior literature supports the hypothesis that having a spouse, partner or children are protective factors against burnout, as this may signify a more robust support system [10]. Conversely, other studies have found that having a spouse who is not in the medical field increases the odds of burnout by 23% [9]. Our data did not demonstrate a statistically significant relationship between marital status and burnout in EM residents. Our study found that being a parent was associated with decreased levels of EE and DP significantly, which is in contrast to other studies which have found that having a child under the age of 21 may increase the odds of burnout by 54% [11, 12]. Interestingly, we found that increasing age was associated with decreasing levels of DP. We postulate this may be attributable to increased perspective from those who entered the field of medicine from nontraditional routes.

An additional individual practice that improved levels of depersonalization was that of taking breaks from work and the clinical environment. This bolsters the idea that those in the emergency department may benefit from taking intentional breaks while on shift to balance both basic biological needs and

JOURNAL of WELLNESS

Table 6: Regression Analysis for Personal Accomplishment

Predictor	β	95% CI	p	ΔR²adj	AIC
Personal Accomplishment R²adj = .15					
LOT-R	-0.65	-0.77 - -0.53	**< .001**	0.076	10136.0
Self-Directed Wellness Activities: Studying	0.72	0.33 - 1.12	**< .001**	0.023	10099.2
Healthy Food Options at Work	0.37	0.11 - 0.63	**0.006**	0.013	10078.41
Program-Directed Wellness Activities: Wellness Lectures	0.93	0.21 - 1.66	**0.01**	0.009	10064.19
Self-Directed Wellness Activities: Social/Happy Hour	0.5	0.12 - 0.88	**0.01**	0.008	10051.25
Self-Directed Wellness Activities: Indoor Activities	0.32	0.04 - 0.61	**0.03**	0.005	10042.7
Program-Directed Wellness Activities: Group Retreat (> 1 day)	0.79	0.04 - 1.55	**0.04**	0.005	10034.49
Program Provides Adequate Wellness Services	0.78	-0.13 - 1.69	0.09	0.003	10030.18
Program-Directed Wellness Activities: Social/Happy Hour	0.54	-0.21 - 1.28	0.16	0.002	10027.81
PGY	-0.52	-0.94 - -0.1	**0.01**	0.002	10025.91
Self-Directed Wellness Activities: Mindfulness	0.3	0.02 - 0.59	**0.04**	0.002	10024.03
Mandatory Work Breaks	-0.22	-0.51 - 0.06	0.12	0.001	10022.73
Program-Directed Wellness Activities: Outdoor Activities	0.49	-0.28 - 1.27	0.21	0.001	10021.74
Self-Directed Wellness Activities: Exercise	0.24	-0.1 - 0.59	0.17	< .001	**10021.28**
Program-Directed Wellness Activities: Day Events at Hospital	0.49	-0.24 - 1.22	0.19	< .001	10021.37
FMG	-0.99	-2.43 - 0.44	0.17	< .001	10021.87
Number of Children	0.28	-0.23 - 0.79	0.28	< .001	10022.44
Self-Directed Wellness Activities: Other	0.84	-0.49 - 2.16	0.22	< .001	10023.21
Degree	0.66	-0.18 - 1.49	0.12	< .001	10022.71
Self-Directed Wellness Activities: Outdoor Activities	0.24	-0.14 - 0.62	0.22	< .001	10023.6
Self-Directed Wellness Activities: Sports	-0.19	-0.58 - 0.2	0.34	< .001	10024.62
Age	0.02	-0.1 - 0.14	0.71	< .001	10026.53
Program-Directed Wellness Activities: Indoor Activities	0.23	-0.53 - 0.99	0.55	< .001	10028.26
Program-Directed Wellness Activities: Group Retreat (≤ 1 day)	0.12	-0.58 - 0.82	0.74	< .001	10030.19
Wellness Program Maturity	-0.1	-0.4 - 0.19	0.49	< .001	10031.73
Gender	0.11	-0.61 - 0.83	0.77	< .001	10033.64
Marital Status				< .001	10041.49
Divorced	-0.21	-3.55 - 3.13	0.9		
Married	-0.16	-1.11 - 0.79	0.74		
Single	-0.15	-1.1 - 0.8	0.75		

Note: R²adj - R² for the full model; Coefficient - Adjusted regression coefficient when all variables are in the model; 95% CI - 95% Confidence Interval for the Coefficient; p - p value for the Coefficient; ΔR²adj - The change in the adjusted R² for the model when each predictor was added including the previous variables; AIC - Akaike Information Criterion for the model when each variable is added including the previous variables.

their mental health. Studies have shown that taking dedicated time away from work can improve mental health, but residents often feel guilty for taking this time away [13, 14]. Notably, the individual practice of studying was found to significantly impact all three facets of burnout, leading to decreased EE and DP and increasing PA. This association must be evaluated more carefully as it is unclear if studying improves EE and DP or if those with lower levels of EE and DP have more mental energy to study and participate in academic endeavors.

Our study did not find a statistically significant effect of the duration of a formal wellness program within the institution on the subscales of burnout. This finding was surprising, as we hypothesized that a long-standing wellness program would be associated with parallel development of an institutional culture that places importance on the topic of wellness and self-care. Feedback from respondents suggested that the presence of a wellness programs and didactic education was not enough to meet resident needs. Many respondents indicated a lack of confidential counseling and other important services such as critical incident debriefing. Some respondents gave feedback that at their institution, counseling and mental health services were either non-confidential or utilized in a punitive way. Other feedback focused on a lack of time for personal wellness or general lack of awareness of available resources. These responses illustrate many of the gaps that exist when considering resident wellness and graduate medical education. Although this feedback is from residents in emergency medicine, this feedback may be applicable to specialties across GME.

LIMITATIONS

This study does have limitations, some of which are addressed in the original burnout publication and which include a response rate of 21.2% [3]. We did not purposefully define what constituted "adequate" wellness resources for the study questions. Whether or not services are adequate is subject to individual interpretation as trainees have distinct individual needs throughout residency. The question was meant to gauge the respondent's perception of the services offered. Additionally, the survey was conducted during the month of March, which may affect resident activity and reflect a seasonal impact on burnout. Finally, our statistical models were only able to account for a relatively small percentage of burnout (between 12% and 19% of the variance, depending on the scale). This suggests that there are contributors to burnout which are not captured by the survey items.

CONCLUSION

In this national survey, we identified various individual and environmental characteristics which significantly impact burnout in EM residents. Female gender, greater age, and graduation from a US medical school were associated with burnout. Protective factors against burnout include being a parent, graduating from an osteopathic medical school, taking breaks on shift, and

engaging in regular studying. Surprisingly, individual activities that traditionally increase wellness such as exercise and outdoor activities did not significantly affect burnout.

By identifying the personal characteristics, individual activities, and environmental factors which correlate with burnout in a large national sample of emergency medicine residents, we are able to better identify trainees for whom targeted early identification and interventions may be beneficial. Further, we have identified environmental factors which impact resident burnout as areas of potential intervention by programs. A continued focus on ameliorating burnout using data-driven approaches will drive forward evidence-based recommendations for improving well-being in emergency medicine trainees in order to improve the field of medicine and the mental health of physicians who practice it.

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