


The Implementation of a National Multifaceted Emergency Medicine Resident Wellness Curriculum Is Not Associated With Changes in Burnout

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ABSTRACT

Background: The Accreditation Council for Graduate Medical Education Common Program Requirements effective 2017 state that programs and sponsoring institutions have the same responsibility to address well-being as they do other aspects of resident competence.

Objectives: The authors sought to determine if the implementation of a multifaceted wellness curriculum improved resident burnout as measured by the Maslach Burnout Inventory (MBI).

Methods: We performed a multicenter educational interventional trial at 10 emergency medicine (EM) residencies. In February 2017, we administered the MBI at all sites. A year-long wellness curriculum was then introduced at five intervention sites while five control sites agreed not to introduce new wellness initiatives during the study period. The MBI was readministered in August 2017 and February 2018.

Results: Of 523 potential respondents, 437 (83.5%) completed at least one MBI assessment. When burnout was assessed as a continuous variable, there was a statistically significant difference in the depersonalization component favoring the control sites at the baseline and final survey administrations. There was also a higher mean personal accomplishment score at the control sites at the second survey administration. However, when assessed as a dichotomous variable, there were no differences in global burnout between the groups at any survey administration and burnout scores did not change over time for either control or intervention sites.

Conclusions: In this national study of EM residents, MBI scores remained stable over time and the introduction of a multifaceted wellness curriculum was not associated with changes in global burnout scores.

Burnout, the triad of emotional exhaustion, depersonalization, and low personal accomplishment, arises from mismatch between an individual and their work environment in six key areas: workload, control, reward, community, fairness, and values.¹ Physician burnout is widespread (45%–55%),^{2,3} with emergency

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medicine (EM) physicians reporting some of the highest levels among all specialties (55%–70%).^{2–5} Resident physicians report significantly higher levels of burnout (60%) than their age-adjusted nonphysician peers.⁶ For both attending and resident physicians, burnout negatively impacts patient care due to low professionalism as well as being associated with adverse patient safety events and low patient satisfaction.^{7–9} Burnout is associated with lower mental health,¹⁰ substance use disorders,^{11,12} and suicidal ideation.^{13,14} In residents, burnout is associated with career choice regret¹⁵ and in practicing physicians is associated with a reduction in clinical hours and intent to leave a medical practice.^{16,17}

The impact of resident burnout and the importance of wellness on resident education and training were recently reinforced by the Accreditation Council for Graduate Medical Education's (ACGME) release of new Common Program Requirements that require residency programs to regularly monitor burnout and have in place wellness promotion initiatives.¹⁸ However, methods through which programs can best monitor resident burnout and promote wellness remain unclear. In an attempt to address these issues, a consortium of content experts and graduate medical educators developed a novel and multifaceted wellness curriculum, including didactic presentations, corresponding nondidactic elements, individualized interactive instruction assignments, and additional Internet-based resources, for use among EM resident training programs.¹⁹ We aimed to determine if implementation of this wellness curriculum across multiple training programs improved resident burnout.

METHODS

Study Design

This study was a multicenter prospective educational trial performed at 10 ACGME-accredited EM residencies in the United States. Members of the Emergency Medicine Education Research Alliance (EMERA) were core faculty at the time of study initiation at all sites. The study was reviewed by each institution's institutional review board and received approval at each site prior to study initiation.

Subjects

Eligible subjects for this study were PGY-1 to 4 EM residents at the participating programs during the study period of February 2017 to 2018. There were

no further exclusion criteria. Participation in the survey study was voluntary.

Study Protocol

Survey Instrument. The survey instrument was sent to eligible participants at all study sites at three different time points in the study: February 2017, August 2017, and February 2018. The instrument was designed for completion in 15 minutes and consisted of 34 total questions, including demographic information, the Maslach Burnout Inventory,²⁰ and four additional published wellness instruments: a quality-of-life assessment, the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire 2 question depression screen (Prime-MD PHQ-2), an appraisal of career satisfaction, and a work–life balance rating.^{21–24} Informed consent was obtained from all subjects. The survey was administered either as a paper survey or via online proprietary software (SurveyMonkey) at the preference of the site study leader. Follow-up for nonresponders was program-specific, either in-person or via e-mail.

Curriculum Intervention. Prior to study initiation, each site self-selected as either a control site or an intervention site. A year-long multifaceted wellness curriculum was then introduced at five intervention sites while the other five control sites agreed not to introduce new wellness initiatives during the study period. The wellness curriculum included standardized bimonthly structured didactic elements presented by the study investigator at each site, individualized interactive instruction assignments, and additional Internet-based resources.¹⁹ Intervention sites delivered the didactic lectures and additional resources within a predetermined time frame so that each site completed their intervention prior to administration of the February 2018 survey.

Data Analysis. In addition to the questions that make up the Maslach Burnout Inventory (MBI) and wellness information in the survey instrument described above, basic demographic information was also obtained and included respondent age, sex, ethnicity, and PGY classification. Results of the components of the MBI are presented as both continuous and dichotomous data. “Global burnout” was defined as having both an emotional exhaustion score > 26 and a depersonalization score > 12 at any single survey administration.^{20,25}

Descriptive statistics are presented as total number (n) and percentages with 95% confidence intervals (CIs) for categorical variables. Continuous variables are displayed as either means with standard deviation for normally distributed variables or as medians with interquartile ranges (IQR) for nonnormally distributed variables. Univariable analyses were performed using chi-square or Student’s t-test as appropriate for continuous or categorical variables. Logistic regression was performed to obtain adjusted odds ratios (ORs) for burnout at each survey administration for intervention and control site respondents. Analysis was performed using a statistical package program (R version 3.3.2 [2016-10-31]).

RESULTS

The response rate for the February 2017 data collection was 285 of 382 (75%), for August 2017 was 247 of 386 (64%), and for February 2018 was 228 of 386 (59%). Of a total 523 potential respondents at the 10 different study sites, there were a total of 437 individuals who completed at least one survey (83.5%, 95% CI = 80.32% to 86.68%). A total of 769 completed surveys were collected across the three different survey administrations; 85 residents (16.3%, 95% CI = 13.1% to 19.4%) completed all three. There were no significant differences in age, sex, ethnicity, or PGY training year distribution between the control and intervention sites (Table 1).

Mean component scores and proportions of residents meeting criteria for global burnout were compared between control and intervention groups at each

of the survey administration times (Table 2). There was a significant difference in MBI scores between intervention and control groups at baseline with a higher mean depersonalization score at the intervention sites (13.68 vs. 11.87, $p = 0.02$). At the second data collection, the only significant difference between sites was a higher mean personal accomplishment score at the control sites (40.26 vs. 38.50, $p = 0.02$). At the conclusion of the study, the only significant difference was a higher mean depersonalization score in the intervention sites (13.37 vs. 11.69, $p = 0.04$) (Table 3). When assessing burnout as a dichotomous variable, there was no difference in

Table 1
Demographics of Respondents

Variable	Control	Intervention
Age (years), median (IQR)	29 (28–32)	29 (27–31)
Sex, % female (95% CI)	35.3% (28.1%–42.5%)	29.1% (22.4%–35.7%)
Ethnicity, % underrepresented in medicine (95% CI)	10.3% (5.4%–15.3%)	6.4% (2.4%–10.5%)
PGY, n		
1	112	89
2	68	53
3	54	51
4	0	10

IQR = interquartile range.

Table 2
MBI Components of Burnout by Study Group

	Control	Intervention
Emotional exhaustion		
Survey 1 (continuous)	21.1 (±9.1)	21.9 (±9.9)
Survey 2 (continuous)	21.0 (±9.3)	19.5 (±10.4)
Survey 3 (continuous)	21.3 (±9.5)	21.2 (±11.1)
Depersonalization		
Survey 1 (continuous)	11.9 (±6.2) [†]	13.7 (±6.6) [†]
Survey 2 (continuous)	11.2 (±6.5)	11.7 (±7.8)
Survey 3 (continuous)	11.7 (±5.9) [†]	13.4 (±6.5) [†]
Personal accomplishment		
Survey 1 (continuous)	38.8 (±5.8)	39.5 (±5.8)
Survey 2 (continuous)	40.3 (±5.2) [†]	38.5 (±6.5) [†]
Survey 3 (continuous)	39.1 (±5.9)	38.7 (±6.2)

Data are reported as mean (±SD).
MBI = Maslach Burnout Inventory.
[†] $p < 0.05$.

Table 3
Proportion of Respondents Screening Positive for MBI Components of Burnout by Study Group

	Control	Intervention
Emotional Exhaustion		
Survey 1 (dichotomous)	28.1 (±7.3)	28.2 (±7.6)
Survey 2 (dichotomous)	25.5 (±7.0)	21.4 (±7.9)
Survey 3 (dichotomous)	28.1 (±7.5)	29.9 (±9.1)
Depersonalization		
Survey 1 (dichotomous)	42.5 (±8.0)	52.6 (±8.4)
Survey 2 (dichotomous)	38.3 (±7.8)	37.8 (±9.4)
Survey 3 (dichotomous)	41.0 (±8.2)	46.4 (±9.9)
Personal accomplishment		
Survey 1 (dichotomous)	15.1 (±5.8) [†]	7.4 (±4.4) [†]
Survey 2 (dichotomous)	6.0 (±3.8)	10.7 (±6.0)
Survey 3 (dichotomous)	12.2 (±5.4)	14.4 (±7.0)

Data are reported as % (±SD).
MBI = Maslach Burnout Inventory.
[†] $p < 0.05$.

Table 4
Proportion (%) of Respondents Screening Positive for Global Burnout by Study Group

Global Burnout	Control	Intervention
Survey 1	17.1 (±6.1)	25.9 (±7.4)
Survey 2	18.8 (±6.3)	19.4 (±7.6)
Survey 3	21.6 (±6.4)	26.8 (±8.8)

Data are reported as % (±SD).

Table 5
Adjusted ORs[†] (95% CI) for Global Burnout Among Respondents at Intervention Sites Compared to Control Sites

	Adjusted OR	p-value
Survey 1	0.62 (0.32–1.15)	0.13
Survey 2	0.89 (0.39–2.03)	0.78
Survey 3	1.05 (0.46–2.44)	0.91

[†]When controlling for age, sex, and ethnicity with control sites being the reference.

burnout between the intervention and control groups at any of the survey administrations (Table 4). In addition, average burnout scores did not change significantly over time for either the intervention or the control sites. When controlling for age, sex, and ethnicity using logistic regression, there remained no significant difference between intervention and control sites for odds of global burnout (Table 5).

DISCUSSION

In this year-long national study of EM residents, the introduction of a multifaceted wellness curriculum was not associated with changes in burnout scores. MBI scores remained stable over time. This study represents the first EM multicenter educational intervention trial to assess the effects of implementation of a formalized wellness curriculum on EM resident burnout.

The authors conducted a systematic literature review and drew upon previously published experience when creating the first published multifaceted EM wellness curriculum. From a systems standpoint, work hour limits have been associated with positive effects on burnout scores.²⁶ Other attempts at mitigating resident burnout at an individual level have been restricted by small sample size and single residency program design. Positive effects from self-care workshops and meditation have been observed.^{27,28}

More comprehensive resident wellness curricula have been published. In general, conclusions about effectiveness are limited by lack of assessment and/or

by the small number of participants and single-site design.^{29–31} A wellness curriculum developed over 6 years at the William Beaumont Family Medicine Residency Program emphasized how a curriculum including both residents and faculty members, and a “wellness champion” led to durable culture change.³² At the Oregon Health and Science University, a Resident and Faculty Wellness Program providing educational outreach and psychological counseling/psychiatric evaluation has demonstrated 10-year growth in utilization of services as well as high satisfaction from participants.³³

In the years since our curriculum was developed, academic leaders in EM, internal medicine, and pediatrics have recognized the need for a more comprehensive approach to creating and distributing well-being resources. The 2017 Emergency Medicine Resident Wellness Consensus Summit used a learning network of residents and attending physicians to create a 17 module resident wellness curriculum, educator toolkit resources, resident needs assessment, and program-level planning tool as well as a wellness-targeted technology database.^{34–37} The Collaborative for Healing and Renewal in Medicine (CHARM), supported by the Alliance for Academic Internal Medicine (AAIM) is a clearinghouse for learner wellness resources and scholarly activity.^{38,39} The American Academy of Pediatrics has developed a 14 module curriculum concentrating on the disclosure of life-altering diagnoses, provider’s response to challenging patient care experiences, and provider resilience.⁴⁰ The Pediatric Resident Burnout and Resilience Study Consortium is a collaboration of over 40 pediatric and medicine–pediatric training programs, with the aim of developing and studying best practices to prevent and mitigate burnout in pediatric residents.^{41,42} The University of Arizona Center for Integrative Medicine Pediatric Integrative Medicine in Residency includes a 100 hour self-care curriculum that has been piloted at five pediatric residency programs and emphasizes approaches to a healthy lifestyle as well as concepts of pediatric integrative medicine.⁴³

Both the ACGME and the American Medical Association have placed increased emphasis on trainee wellness and resilience.^{44,45} In addition, the Accreditation Council for Graduate Medical Education (ACGME) Back to Bedside Initiative supports resident-driven projects that augment meaning in work through humanism and connection with patients.^{46,47} Organizational strategies to reduce burnout and promote work

engagement are less common but likely more impactful than initiatives targeting individual care providers.⁴⁸⁻⁵⁰

In this study, there are a number of factors that may have contributed to the absence of an effect of the wellness curriculum on burnout and burnout scores in both intervention and control groups remaining stable over time. Following Maslach's definition, burnout was defined as both emotional exhaustion > 26 and depersonalization > 12.²⁵ The burnout prevalence in our study population was considerably lower than the approximately 50% previously reported.^{2,3} Prior studies have defined burnout somewhat inconsistently, often categorizing burnout as either high emotional exhaustion or high depersonalization, which may have led to a prevalence overestimate.²⁵ The overall lower prevalence in our study population may have contributed to difficulty detecting smaller changes in burnout. Additionally, over the past several years there has been increased promotion and awareness of resident wellness nationally, which may have decreased the impact of our wellness curriculum. There has been a particular recognition since our curriculum was introduced that burnout is driven by systems issues and, for residents, impacted by the learning environment.⁴⁸⁻⁵¹ While our curriculum included discussion on occupational wellness, the focus remained largely on the individual. Also, the control sites, though not introducing new initiatives in their programs during the study period, may have had preexisting programs or exposure to institutional initiatives that diluted differences between intervention and control sites. Three different site principal investigators, including two from intervention sites, changed institutions during the study period, which likely affected the consistency of engagement at those sites. Finally, resident compliance with the curriculum was variable. While the lectures were delivered during each program's protected weekly conference time, attendance was subject to the constraints of resident vacation and schedule. While we promoted participation in all aspects of the curriculum, individual participation in the curriculum was not rigidly enforced nor monitored, so not all aspects of the curriculum received equal involvement. Residents particularly enjoyed dedicated time for resident bonding, residency wellness activities, and a wellness retreat. Conversely, individualized interactive instruction, designating wellness champions, and assigned readings about wellness were considered less useful and not as routinely accessed.⁵²

The personal experience of the study investigators correlates with themes published in the literature over the past several years. Well-being interventions will be better received if they are personalized and encouraged but voluntary,⁵³ respect the already high time burden on residents and opportunity costs of introducing new curricular elements,²⁶ consider the culture of each program and resources of the institution, draw from a menu of possibilities, engage residents in the development and implementation of initiatives, and importantly target both the learning and the work environments as well as the individual.^{54,55} National platforms of resources, specialty specific or through organizations such as the ACGME, include standardized needs assessment surveys, well-being interventions, and implementation guidelines.^{34,39-41,44,45}

LIMITATIONS

There are important limitations to this study. While our sample is relatively large for a study of an educational intervention, it is still a convenience sample and was not subject to power analysis. No studies have defined a cutoff for a clinically significant change in MBI scores; however, studies have demonstrated associations between one-point increases in depersonalization or emotional exhaustion and the odds of self-reported medical error.^{23,56} One-point increases in emotional exhaustion have been associated with increased likelihood of decreasing professional work hours,¹⁷ and each one-point increase in burnout scores on each of the MBI subscales has been correlated with increased likelihood of reporting suicidal ideation.¹³ It is possible that the study was underpowered; however, the lack of consistent trends in the data argues against this interpretation. Of note, the initial and postintervention measurements were close to the date of the annual EM in-training examination in February. Both wellness and burnout are dynamic processes that fluctuate throughout the year and this time of year is well known to be stressful for residents. In addition, the control and intervention sites self-selected based on availability of resources and ability to introduce the year-long curriculum into their residencies. However, despite this self-selection, the intervention and control groups were well-matched. When burnout was assessed as a dichotomous variable, there was no difference in global burnout between groups at the baseline survey administration. When assessed as a

continuous variable, the only difference between groups was in the depersonalization component of burnout.

The objective of the study was a comparison of the intervention and control groups, rather than tracking individuals' changes in burnout scores over time. Only 16.3% of residents completed all three MBIs, at least in part due to the February 2017 to February 2018 research design, as a portion of the study population graduated after the February 2017 survey administration and others entered residency in the summer of 2017. This design precluded a portion of the eligible participants from completing all three survey administrations. Eligible residents who completed a portion of the curriculum were included in the corresponding data collections to maximize the power of comparisons between the intervention and control sites at each data collection point.

Optimal solutions to burnout consider both the person and the organization and address excessive workload, inefficiencies, and lack of support; improve autonomy and work-home integration; and reinforce purpose, meaning, and accomplishment.^{50,57} Future research on the impact of burnout interventions for resident physicians will benefit from longitudinal study and investigations across specialties and practice environments and evaluate the combined effects of individual and organizational strategies.⁵⁰

CONCLUSIONS

In this national study of emergency medicine residents, the introduction of a multifaceted wellness curriculum was not associated with a change in burnout scores. Maslach Burnout Inventory scores remained stable over time. Further study is needed to determine best practices to lessen resident burnout.

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