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The impact of program-driven wellness initiatives on burnout and depression among surgical trainees

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ABSTRACT

Background: The prevalence of burnout and depression are high among surgical trainees. This study examined the impact of program-driven initiatives to improve surgical trainee wellness.
Methods: A survey was administered to residents and fellows at all surgical training programs across an urban academic health system. The survey measured burnout, depressive symptoms, and perceptions of program-driven wellness initiatives.
Results: The response rate was 44% among 369 residents. Of these, 63.2% screened positively for burnout, and 36.7% for depression. Residents who were burned out were more likely to work >80 h per week, have greater clerical duties, and miss educational activities more frequently. Conversely, having opportunities for wellness activities, dedicated faculty and housestaff wellness champions, and assistance with clerical burden were all associated with lower rates of burnout and depression.
Conclusion: The presence of wellness support was associated with better outcomes, suggesting the value of initiatives to manage workload and support the well-being of surgical resident physicians.

Introduction

Burnout is highly prevalent among resident physicians, with nearly half reporting symptoms of burnout and surgical residents reporting even higher rates.[1–4] Increased physician burnout has been associated with more frequent medical errors,[5,6] suboptimal patient care attitudes and behaviors,[7,8] and attrition.[9,10] Furthermore, burnout among physicians is strongly correlated with depressive symptoms.[11,12]

In response, several formal recommendations have been made to address resident well-being nationwide. In 2008, the Institute of Medicine published a report summarizing the consequences of fatigue and lack of sleep on care quality and safety, in which they proposed limits on resident duty hours and measures to enhance supervision and team support.[13] The Accreditation Council for Graduate Medical Education (ACGME) placed the duty hour recommendations into effect in 2011.[14] While this conversion focused mainly on reducing medical errors, it brought resident well-being to attention. In 2017, the ACGME updated Section VI of its Common Program Requirements for all residency and fellowship programs to include measures to address resident psychological, emotional, and physical well-being.[15]

Residency training programs across the country have implemented various measures aimed at supporting resident well-being, including lectures and didactic sessions introducing skills to combat burnout and improve resilience,[16,17] facilitated small-group discussions incorporating elements of mindfulness and reflection,[18,19] and interventions aimed at improving residents' confidence and clinical competence.[20,21] However, the impact of these initiatives on surgical resident well-being remains poorly understood.

The objectives of this study were to: (1) characterize the prevalence of burnout and depressive symptoms among surgical trainees, (2) identify training program factors associated with poor wellness outcomes, and (3) assess the impact of program-driven initiatives aimed at improving wellness among surgical trainees.

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Methods

Wellness initiatives

In 2017, program-level wellness initiatives were initiated within the training programs in the Mount Sinai Health System in New York City, NY. These interventions fell into three categories.

The first, opportunities and activities for well-being, consisted of the implementation of three programs: (1) facilitated discussion, which consists of guided reflection of the stressors associated with patient care and the normal reaction to such exposures; (2) mindfulness training, which aims to teach simple mindfulness practices to trainees such as mindful attention and meditation in order to increase their capacity to handle workplace stress; and (3) narrative medicine, in which trainees explore art to enhance self-reflection, observation, and empathy, thereby strengthening their clinical practice. These programs were led by social workers, psychologists, or clinical faculty.

Second, dedicated faculty and housestaff wellness champions were appointed within each program. These were individuals selected by their respective departments to receive formal wellness training and serve as a liaison between trainees and their programs. They met with the Graduate Medical Education (GME) Department quarterly and were responsible for assessing the wellness offerings and needs within their departments, participating in the development and implementation of the wellness initiatives, serving as a wellness role model and resource to trainees, examining workplace factors that undermine trainee well-being, identifying ways to improve or redesign program features to promote trainee well-being, and evaluating the wellness data pertaining to their program. In order to avoid conflicts of interest, the faculty champions could not be program directors or associate program directors.

Lastly, programs were provided opportunities through a clinical intensity reduction grant from the GME Department to hire nurse practitioners, patient coordinators, scribes and dictation services, and other initiatives aimed at reducing housestaff clerical burden. Through this grant, the GME Department matched any financial commitment up to $50,000 made by training programs that hired clinical personnel for this purpose.

These wellness programs were offered to all departments; however, participation was voluntary. If a training program decided to accept the offer, they were provided with the necessary resources, including funding from the Graduate Medical Education (GME) Department, and were expected to implement all three wellness programs. To monitor the initiatives, the wellness champions met with the GME Department quarterly, and were required to provide updates regarding implementation and trainee utilization of the wellness programs. This study was granted approval by the Institutional Review Board of the Icahn School of Medicine at Mount Sinai (IF2135644).

Trainee survey

A survey was administered to residents and fellows in all general, vascular, plastic, neurologic, and orthopedic surgery, urology, and obstetrics and gynecology training programs across the Mount Sinai Health System. The survey was administered over a four-week period in February 2018. The primary outcomes of the survey were burnout, measured using the Maslach Burnout Inventory (MBI) - Human Services Survey for Medical Personnel, a validated scale for measuring burnout comprised of 3 subscales: (1) emotional exhaustion, depersonalization, and personal accomplishment[22,23]; and (2) depressive symptoms, measured using a modified version of the Patient Health Questionnaire-2 (PHQ-2).[24] Burnout was defined as a high emotional exhaustion score ($\geq$27) or a high depersonalization score ($\geq$10); respondents screened positive for depressive symptoms if they responded 'Yes' to either of the two PHQ-2 items. The survey also collected the trainees' perceptions regarding the availability of the program-driven wellness initiatives, specifically asking them to indicate, in separate survey items, whether they believed that they had access to (1) opportunities and activities for well-being and (2) dedicated faculty and housestaff champions (with possible responses of 'No, 'Not Sure', and 'Yes'), as well as (3) whether they believed that their training program helped them to unload clerical burden (with possible responses of 'No, 'Not Sure', 'Somewhat', and 'Yes'). Demographic information (age, gender, training setting) and perceptions of workload (e.g., hours per week, clerical burden) were also collected. Age groups were defined as <30 years and $\geq$ 30 years for this study; this cutoff was specified with the aim to provide balanced sample sizes across the age groups based on the age distribution of the trainees in the programs.

The survey was administered for the purpose of evaluating the wellness initiatives and was therefore completed anonymously. However, positive responses to the PHQ-2 are concerning and potentially actionable. To account for this, each training program received the aggregate burnout and depression data pertaining to the survey respondents from their program. The programs were also provided with information for connecting trainees with resources including student trainee mental health, psychologists, psychiatrists, and additional depression screening. Programs with poor burnout and depression scores were advised to ensure that their trainees were aware of these resources.

Statistical analysis

Descriptive statistics (N, %) were calculated to characterize the prevalence of the primary outcomes, burnout and depressive symptoms, among the surgical residents, as well as their demographic and workload information and their perceptions of the wellness initiatives. Univariate analyses (Chi-square tests) were performed to evaluate the association between the residents' responses and the primary outcomes. Multivariate logistic regression models were fit, and adjusted odds ratios calculated, to assess the independent association between these variables and the primary outcomes; variables that were statistically significantly associated with either outcome on univariate analysis were inserted into these models. All statistical analyses were performed using SAS version 9.4 (Cary, NC); a type and R version 3.6.1 (Vienna, Austria); a type I error rate of 0.05 was specified as the threshold for statistical significance.

Results

A total of 161 (43.6%) of 369 surgical residents and fellows completed the survey. Of these, 155 had complete responses on the MBI; 98 (63.2%) screened positive for burnout. All respondents had complete responses on the PHQ-2, and 59 out of 161 (36.7%) screened positive for depressive symptoms.

Table 1 displays descriptive and univariate analyses of the respondents' demographic and workload information, and perceptions of the wellness initiatives, by MBI and PHQ-2 status. Respondents who reported working $\geq$ 80 h per week, having $\geq$ 60 min/day of clerical responsibilities, and missing educational activities more frequently more often reported being burned out and depressed. On the other hand, having opportunities and activities for wellness, dedicated housestaff and faculty wellness champions, and being part of a program that helps to unload clerical burden, were all associated with decreased rates of burnout and depression on univariate analysis. Additionally, older age was

Table 1
Descriptives, by MBI and PHQ-2 status.

Covariate	Total	Burnout Positive[a]		Depression Positive[b]	
	N (%)	N (%)	p-value	N (%)	p-value
Total	161	98 (63.2)		59 (36.6)	
Specialty			0.6	.	0.25
Neurosurgery	12 (7.5)	5 (50.0)		5 (41.7)	
Obstetrics and Gynecology	39 (24.2)	27 (73.0)		15 (38.5)	
Orthopedic Surgery	15 (9.3)	11 (73.3)		3 (20.0)	
Otolaryngology	20 (12.4)	11 (57.9)		4 (20.0)	
Surgery (General, Plastics, Vascular, Surgical Oncology, Colorectal, Thoracic, Transplant)	59 (36.7)	34 (58.6)		27 (45.8)	
Urology	16 (9.9)	10 (62.5)		5 (31.3)	
Age ≥ 30	73 (45.3)	37 (52.9)	0.02	23 (31.5)	0.22
Female	71 (44.1)	50 (71.4)	0.055	29 (40.9)	0.33
Setting			0.35	.	0.09
Academic	114 (70.8)	67 (60.9)		37 (32.5)	
Community/Satellite	47 (29.2)	31 (68.9)		22 (46.8)	
Opportunities and Activities for Wellness			0.002		0.0005
No	32 (19.9)	28 (90.3)		21 (65.6)	
Not Sure	45 (28.0)	25 (59.5)		14 (31.1)	
Yes	83 (51.6)	44 (54.3)		23 (27.7)	
Dedicated Faculty Wellness Champion			<.0001		0.001
No	51 (31.7)	44 (89.8)		29 (56.9)	
Not Sure	65 (40.4)	37 (58.7)		19 (29.2)	
Yes	45 (28.0)	17 (39.5)		11 (24.4)	
Dedicated Housestaff Wellness Champion			0.0001		<.0001
No	55 (34.2)	45 (86.5)		34 (61.8)	
Not Sure	74 (46.0)	37 (52.1)		19 (25.7)	
Yes	30 (18.6)	15 (50.0)		6 (20.0)	
Program Helps to Unload Burden			0.0007		0.009
No	49 (30.4)	37 (80.4)		26 (53.1)	
Not Sure	10 (6.2)	3 (33.3)		1 (10.0)	
Somewhat	53 (32.9)	36 (69.2)		19 (35.9)	
Yes	48 (29.8)	21 (44.7)		12 (25.0)	
Time on Electronic Health Record ≥ 60 min/day	52 (32.3)	34 (69.4)	0.28	24 (46.2)	0.08
Clerical Time ≥ 60 min/day	42 (26.1)	34 (81.0)	0.005	21 (50.0)	0.04
How Often Miss Educational Activities[c]			0.02		0.04
50%–70% of the time	26 (16.2)	17 (68.0)		14 (53.9)	
70% of the time, or more	15 (9.3)	14 (93.3)		8 (53.3)	
Less than 50% of the time	119 (73.9)	66 (57.9)		37 (31.1)	
Hours/Week ≥ 80	37 (23.0)	30 (81.1)	0.001	23 (62.2)	0.0002

This table provides descriptive statistics of the survey respondents by demographic variables, perceptions of the wellness initiatives, and workload information. It also characterizes and compares the rates of burnout and depression by these factors.

[a] Defined as a high emotional exhaustion score (≥27) or a high depersonalization score (≥10) on Maslach Burnout Inventory.

[b] Defined as response of 'Yes' to at least one PHQ-2 item.

[c] In the last 3 months, how often have you been unable to attend an educational activity because of work burden?.

associated with decreased burnout ($p = 0.02$); however, gender and training setting were not statistically significantly associated with burnout or depression.

Table 2 displays the results of the multivariate logistic regressions. After adjustment, trainees who reported having a dedicated faculty wellness champion were less likely to be burned out than those who reported not having one (OR 0.116, 95% CI 0.022–0.604, $p = 0.01$). The findings are summarized in Fig. 1. None of the covariates assessed were significantly associated with depression after adjustment.

Discussion

This study presents an assessment of burnout and depression among surgical trainees within a large single health system, as well as an evaluation of active initiatives in place to address their wellness. To the authors' knowledge, this is the first study of this scale to evaluate multiple wellness initiatives among surgical residents simultaneously. Additionally, this analysis simultaneously evaluated both burnout and depressive symptoms, whereas most prior studies have reported only one of these outcomes.

The results of this study confirm the already well-known link between workload and burnout among surgical trainees.[2,3,20] However, this study appears to highlight factors associated with the trainees' learning environment that may affect their wellness independent of their workload. Trainees who reported having dedicated faculty and housestaff wellness champions were less likely to be burned out than their counterparts who did not. While the mechanism of this relationship is as of yet unknown, it can be hypothesized that in addition to providing trainees with a professional resource for addressing their wellness concerns, the presence of these individuals may be indicative of a positive overall learning environment within their respective training programs. Several other studies have similarly found an inverse relationship between the learning environment and outcomes such as burnout and cynicism among trainees.[25–28] These results highlight the value of a positive learning culture in promoting and sustaining trainee wellness.

Other findings from this study are generally consistent with previously reported findings. Older age was found to be associated with decreased burnout, as has been previously shown.[29,30] On the other hand, while there was a trend toward increased burnout and depression among female trainees, these findings were not statistically significant. Previous studies examining the effect of gender on burnout have been mixed, with some showing female residents having lower burnout ratings,[30] and others showing no

Table 2
Multivariate logistic regressions.

Covariate	Burnout[a]		Depression[b]	
	OR[c] (95% CI)	p-value	OR[c] (95% CI)	p-value
Age ≥ 30 Years	0.306 (0.124, 0.758)	0.01	0.554 (0.24, 1.277)	0.17
Opportunities and Activities for Wellness (ref = No)				
Not Sure	0.763 (0.135, 4.325)	0.76	0.692 (0.201, 2.382)	0.56
Yes	0.73 (0.137, 3.889)	0.71	0.592 (0.184, 1.902)	0.38
Dedicated Faculty Wellness Champion (ref = No)				
Not Sure	0.304 (0.07, 1.327)	0.11	0.655 (0.214, 2.005)	0.46
Yes	0.116 (0.022, 0.604)	0.01	0.772 (0.213, 2.804)	0.69
Dedicated Housestaff Wellness Champion (ref = No)				
Not Sure	0.392 (0.108, 1.424)	0.15	0.351 (0.129, 0.956)	0.04
Yes	0.723 (0.157, 3.326)	0.68	0.288 (0.073, 1.136)	0.08
Program Helps to Unload Burden (ref = No)				
Not sure	0.237 (0.03, 1.858)	0.17	0.187 (0.019, 1.874)	0.15
Somewhat	0.677 (0.208, 2.205)	0.52	0.563 (0.204, 1.551)	0.27
Yes	0.448 (0.135, 1.483)	0.19	0.721 (0.244, 2.13)	0.55
Clerical Time ≥ 60 min/day	1.836 (0.58, 5.81)	0.3	1.027 (0.382, 2.764)	0.96
How Often Miss Educational Activities[d] (ref = Less than 50% of the time)				
50%–70% of the time	0.875 (0.221, 3.456)	0.85	1.699 (0.526, 5.485)	0.38
70% of the time, or more	10.06 (0.994, 101.783)	0.051	1.394 (0.362, 5.374)	0.63
Hours/Week ≥ 80	0.805 (0.236, 2.747)	0.73	1.858 (0.695, 4.968)	0.22

This table provides the results of the two multivariate logistic regressions, in which burnout and depression were the binomial response variables. Adjusted odds ratios represent the independent association of the respective covariate with the outcome measures, after adjusting for the other factors shown in the table.

[a] Defined as a high emotional exhaustion score (≥27) or a high depersonalization score (≥10) on Maslach Burnout Inventory.

[b] Defined as response of 'Yes' to at least one PHQ-2 item.

[c] Adjusted odds ratio.

[d] In the last 3 months, how often have you been unable to attend an educational activity because of work burden?.

relationship[2,31] A recent study of general surgery residents found that female residents were more likely to exceed duty-hour limitations and consequently were more likely to be burned out and fatigued, possibly due to mentorship/leadership and gender-specific differences in expectations with regards to patient care.[32]

There are several limitations to this study. First, it was cross-sectional in design. Therefore, the findings represent only correlations without evidence of a temporal relationship. Whether the wellness initiatives described here were the cause of improved trainee wellness cannot be concluded from this analysis. This

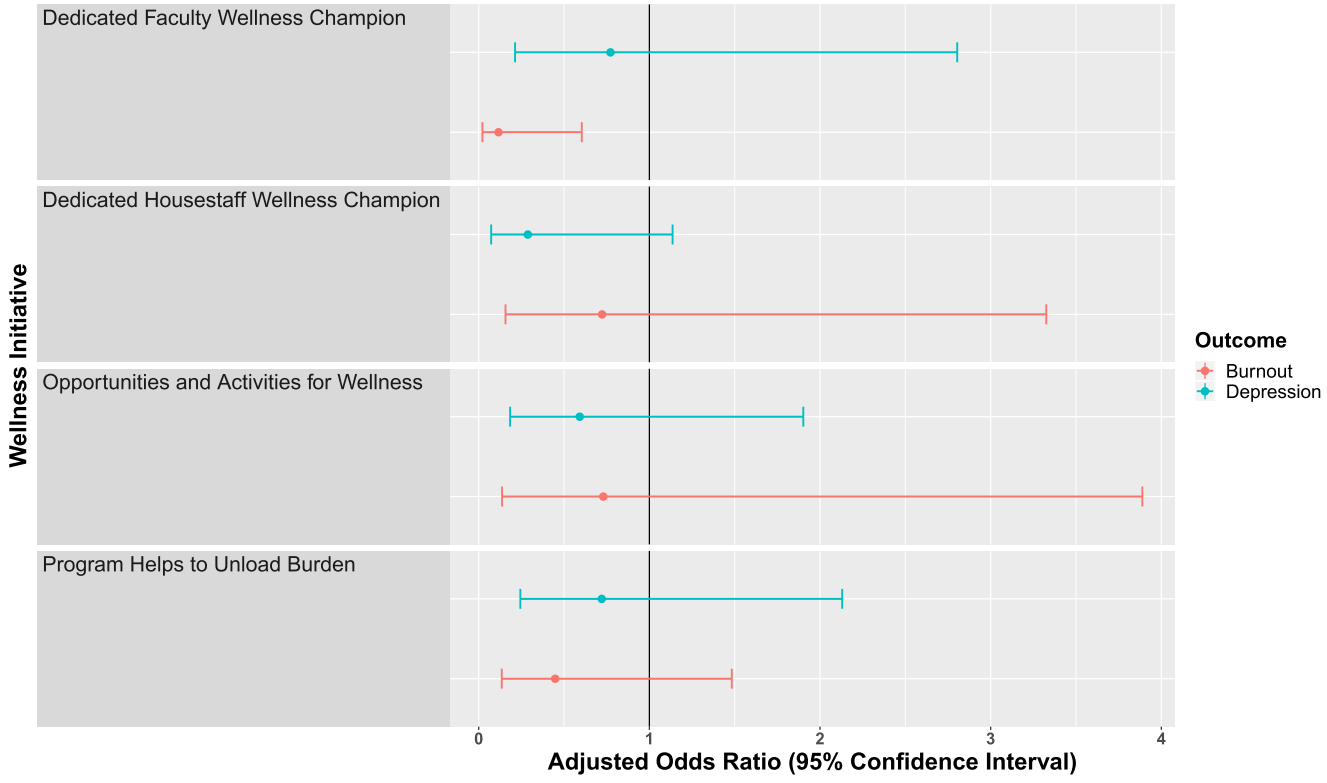

Fig. 1. Forest Plot. This plot displays the survey respondents' adjusted odds of replying "Yes" versus "No" to the presence of the corresponding wellness initiatives, given a positive screen for depression or burnout.

limitation is mitigated to a degree in that the survey addressed many factors which have been previously associated with burnout and depression, such as age, gender, and workload. As such, the mechanism for the associations between the program-level initiatives and trainee wellness measures is not clear. Future studies should include a qualitative component to elucidate these mechanisms.

Additionally, this study achieved a response rate of 43.6%. A 'good' response has been previously described as 60% or greater[33]; therefore, this study may have had suboptimal participation. This may have introduced nonresponse bias into the analysis which could have affected the validity of the results. Specifically, it is possible that trainees who were experiencing more burnout or depressive symptoms were more likely to respond to the survey, causing a "tendency-to-the-positive" effect that overestimated the prevalence of burnout and depression in this study population.[34] However, the primary goals of this study were not only to estimate the prevalence of burnout and depression within this population, but also to examine demographic and program-level factors that are associated with poor wellness outcomes. While the survey nonresponse may have resulted to a representative cohort that exhibited greater burnout than the population, this was the population that was important to sample, as they may stand to benefit most from the wellness initiatives described in this study. Indeed, this study provided useful information on what initiatives may have worked and what factors still need to be addressed. Furthermore, while the response rate in this study was fairly low, it was comparable, and even favorable, to recent national surveys of physician wellness.[35–37]

Finally, the definition of burnout used in this study warrants discussion. Burnout was defined from the MBI, according to convention, as rating of 'high' in either the emotional exhaustion or depersonalization subscales.[38–42] 'Low', 'average', and 'high' scores for these domains were defined using terciles of scores from a previous study of 1104 medical professionals.[22] It has been previously shown that a high rating in either of these two subscales correlates with clinical burnout.[38,43] However, there is not a uniform consensus regarding scoring of the MBI, with some studies requiring a 'high' rating in all three domains (emotional exhaustion, depersonalization, and personal accomplishment) and others adopting stricter cutoffs for 'high' domain scores.[44–46] It is possible that scoring the MBI according to convention may have led to overestimation of the prevalence of burnout in this study.

Conclusion

The prevalence of burnout and depressive symptoms is high among surgical trainees. Managing workload and actively supporting trainee wellness may reduce burnout. In particular, the presence of dedicated faculty wellness champions was associated with better wellness outcomes. However, depressive symptoms may be more difficult to predict and address by the training program alone. More work needs to be done to understand the mechanism of the link between having dedicated wellness champions and trainee wellness. Additionally, drivers of depressive symptoms during training should be further explored.

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