



## Burnout and gender in surgical training: A call to re-evaluate coping and dysfunction



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### ABSTRACT

**Background:** Physicians experience burnout and mental illness at significantly higher rates than the general population, with sequelae that negatively affect providers, patients, and the healthcare system at large. Gender is rarely considered in characterizing the problem or vetting interventions.

**Methods:** Using data from a recent national survey and a longitudinal pilot study of general surgery residents, we examined gender variation in burnout and distress.

**Results:** In the national survey, male residents had higher depersonalization and female residents had higher alcohol misuse, with a significant association between alcohol misuse, high depersonalization and low anxiety not seen in males. In the longitudinal pilot study, males' burnout scores were higher and had a greater contribution from depersonalization. Both males and females had increasing prevalence of high depersonalization over the intern year.

**Conclusions:** Residency affects males and females differently in ways that merit further investigation and better understanding to effectively address burnout and distress.

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### Introduction

Over the past decade, a growing body of work has shown that physicians experience burnout, depression, and suicide at significantly higher rates than the general population.<sup>1,2</sup> With broad ramifications for physicians,<sup>2–4</sup> patients,<sup>5–7</sup> and healthcare at large,<sup>8–11</sup> these growing problems have generated much interest from professional societies, training programs, and the research community. To date, a variety of strategies have been proposed for mitigating the effects of burnout, including changes to workplace culture, emphasizing transparency, promoting physician autonomy,<sup>12</sup> training in stress management and isolated programs in mindfulness.<sup>13</sup> Some have shown promise,<sup>14</sup> but overall success has been limited.<sup>13,14</sup>

Burnout is a heterogeneous phenomenon that is highly correlated with stress.<sup>15</sup> It is characterized by three distinct domains: emotional exhaustion, depersonalization, and a poor sense of

personal accomplishment.<sup>16,17</sup> These subdomains are not uniformly relevant across study populations. For example, high scores in emotional exhaustion and depersonalization are considered clinically relevant to physicians, whereas low scores in personal accomplishment are not.<sup>18</sup> Burnout is widely believed to arise from chronic dissonance between one's professional expectations and reality.<sup>2,16</sup>

Professionally, women in medicine are often held to different societal standards than men<sup>19,20</sup> and experience proven inequity in promotion, retention and compensation.<sup>21–23</sup> Psychologically, men and women experience the demands of work differently, too, with well-documented differences in stress,<sup>24</sup> anxiety,<sup>25,26</sup> and coping strategies,<sup>27,28</sup> in and out of medicine. In surgical training, gender differences are seen in reports of stereotype bias,<sup>29</sup> perceived social support,<sup>30</sup> and unequal professional expectations.<sup>31</sup> As such, it is surprising that the impact of gender is rarely considered when characterizing burnout, a work-related phenomenon. If we are to address barriers in the workplace and truly promote inclusion for women within medicine, understanding gender differences should be a priority.

We recently performed two studies related to burnout in

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surgery, one cross-sectional national survey of general surgery residents<sup>15</sup> and one longitudinal pilot study of surgical interns.<sup>32</sup> The purpose of this present study, was to analyze this data to explicitly explore the impact of gender on residents' experience of stress and burnout, and to identify any gender-based changes that emerge over the intern year.

## Materials and methods

### Study 1: national survey of burnout and distress among general surgery residents

#### Design and measures

In 2016, a voluntary and confidential 68-item survey was approved by the Association of Program Directors in Surgery and the UCSF IRB. It was sent to 246 ACGME-accredited general surgery training programs for distribution to all residents (clinical and lab).

Complete measures and scoring are described in detail elsewhere.<sup>15</sup> Briefly, the Maslach Burnout Inventory (9-item)<sup>33</sup> was used to evaluate three subscales of burnout (emotional exhaustion, depersonalization, and personal accomplishment). By convention these subscales are scored separately with high burnout defined as a high score in one or more subscales.<sup>34</sup> High burnout scores have been empirically determined in health care workers,<sup>35</sup> are set at the top 30% for emotional exhaustion and depersonalization and the bottom 30% for personal accomplishment. Scoring has been adjusted here for use with this abbreviated form.<sup>33</sup> Per convention, we defined clinically relevant burnout in surgeons as scoring high for emotional exhaustion or depersonalization.<sup>18</sup> Stress was evaluated with Cohen's Perceived Stress Scale,<sup>36</sup> anxiety with Spielberger State Anxiety Index,<sup>37</sup> and alcohol use with the WHO's Alcohol Use Dependence Inquiry Test, form C.<sup>38</sup>

#### Secondary data analysis

We assessed continuous variables such as burnout and other psychological scales in relation to gender using ANCOVA and regression methods. We also dichotomized variables such as high burnout and analyzed their association with gender using odds ratios and Fisher's exact test. Statistical significance was assessed at an alpha level of 0.05 and 95% confidence intervals are shown. All computations were performed with SAS 9.4 (2002–2012, Cary, NC).

### Study 2: longitudinal pilot study of burnout and stress in surgery interns at a tertiary academic center

#### Design and measures

In 2016, following IRB approval and informed consent, we enrolled 47% (n = 21) of in-coming surgery interns for an

exploratory longitudinal cohort study of burnout and stress. The cohort included interns from Neurosurgery, Ophthalmology, Otolaryngology, Orthopedics, Plastics, Urology and General Surgery. The study was not designed for power but rather to explore feasibility and reliability of outcome measures. Assessments were performed at baseline (before the start of internship), 3 months, and 12-months. Burnout was measured using the Maslach Burnout Inventory (9-item) and scored as described above.

#### Secondary data analysis

We calculated means and standard deviations of burnout and the percentage of burnout attributable to high depersonalization at three time points (baseline, three months, twelve months). We used t-tests to evaluate group differences between means at the three time points and between score changes from baseline to three months and baseline to 12 months. We used analysis of covariance (ANCOVA) to study effects of gender on scores at three months and 12 months while covarying for baseline score. All analyses are from R (R Core Team (2013). R Foundation for Statistical Computing) and SAS 9.4 software.

## Results

### Study 1: national survey of burnout and distress

Of the 566 general surgery trainees who participated in the survey, 51% were female, and 76% were from academic programs; the 10% response rate and training-level distribution were similar to those for other recent studies of this population.<sup>34</sup>

As reported previously,<sup>15</sup> we found that high depersonalization was significantly more prevalent in males and that alcohol misuse and abuse were significantly higher in females; there was no statistically significant relationship between gender and high emotional exhaustion, high stress or anxiety (Table 1). We do not report on personal accomplishment scores here, as the prevalence of high scores in this subdomain was exceedingly low overall (1.07% in the entire cohort) and is considered by many to be less clinically relevant in physicians.<sup>18</sup> In analyses stratified by gender, we found that alcohol misuse in females was significantly associated with higher depersonalization and lower anxiety (p = 0.02 and 0.05, respectively, Table 2).

### Study 2: longitudinal pilot study of burnout and stress

The pilot study cohort (n = 21) was predominantly white and Asian, and 38% (n = 8) were female (Table 3). Participating interns were followed for one year, with assessments at baseline (before internship began), at three months and at 12 months. There was no

**Table 1**

Gender characteristics of study sample and association with alcohol use, burnout, stress and distress.

Subgroup	n	%	EtOH n (%)	EE n (%)	DP n (%)	PS n (%)	Dep n (%)	SI n (%)	Anxiety n (%)
Female	286	50.89	138 (57.98)	127 (52.70)	122 (50.62)	144 (54.34)	46 (19.33)	25 (10.50)	100 (46.30)
Male	276	49.11	89 (40.27)	132 (59.46)	138 (62.16)	125 (52.08)	45 (20.36)	26 (11.76)	82 (42.49)
P-value			<0.01*	0.16	0.01*	0.66	0.82	0.77	0.49

\* = p-value < / = 0.05.

P-values show whether a factor differs significantly by sex.

Missing data for sex: n = 4.

EtOH = Alcohol misuse and abuse as scored on AUDIT-C: high if  $\geq 3$  (females) or  $\geq 4$  (males).

EE = High emotional exhaustion, Abbreviated MBI, score  $\geq 9$ .

DP = High depersonalization, Abbreviated MBI, score  $\geq 6$ .

PS = High perceived stress, Cohen's Perceived Stress Scale, score  $\geq 17$ .

Dep = Moderate to severe depression, PHQ-9, score  $\geq 10$ .

SI = Suicidal Ideation, PHQ-9, exists if score > 0 to single item.

Anxiety = High anxiety, Spielberger STAI, score  $\geq 40$ .

**Table 2**  
Odds ratios for burnout, stress and distress symptoms with alcohol misuse and abuse, by gender.

	EtOH (OR)	95% Confidence Intervals		P
<b>Female</b>				
Depression	0.75	0.39	1.42	0.41
Suicidal	1.62	0.67	3.91	0.39
Stress	0.95	0.56	1.59	0.90
Anxiety	0.57	0.33	0.98	0.05*
EE	1.04	0.62	1.74	0.90
DP	1.91	1.13	3.21	0.02*
<b>Male</b>				
Depression	0.77	0.39	1.52	0.50
Suicidal	1.09	0.48	2.50	0.84
Stress	1.01	0.59	1.72	1.00
Anxiety	0.99	0.55	1.76	1.00
EE	0.98	0.57	1.70	1.00
DP	1.21	0.69	2.11	0.57

\* = p-value < / = 0.05.

P-values show whether a factor differs significantly by gender.

Missing data for sex: n = 4.

EtOH = Alcohol misuse and abuse as scored on AUDIT-C: high if  $\geq 3$  (females) or  $\geq 4$  (males).

EE = High emotional exhaustion, Abbreviated MBI, score  $\geq 9$ .

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attrition and no lost data.

Although burnout scores increased overall in males and females, the increase was greater in males from baseline to three months (male delta 4.92; female delta 3.62,  $P = 0.01$ ), and from baseline to 12 months, (male delta 6.08; female delta 4.62,  $P = 0.05$ ). The least squares means shown in the ANCOVA results columns are therefore adjusted for baseline differences. We show effect sizes ( $\eta^2_{\text{partial}}$ ) for the ANCOVA results at the two later time periods (Table 4). Additionally, there was an increase in the proportion of burnout due to depersonalization in both genders over the intern year. 44% of burnout was attributable to depersonalization at baseline, 83% three months and 78% at 12 months.

## Discussion

This study contributes to our understanding of how gender affects stress, burnout and unconscious coping in surgery residency, as well as how gender influences the evolution of burnout over the intern year. Specifically, we evaluated data from two recent studies of general surgery residents and found evidence of gender influence on the experience of burnout in residency and on the development of burnout over time.

**Table 3**  
Demographic characteristics of intern pilot study.

Subgroup	Cohort (n = 21)
<b>Sex, n (%)</b>	
Male	13 (61.90)
Female	8 (38.10)
<b>Race, n (%)</b>	
White	11 (52.38)
Black	1 (11.11)
Asian	9 (43.86)
Hispanic	0
Other	0
<b>Age, mean (SD)</b>	28.2 (2.25)

The first study, a national cross-sectional survey of general surgery residents, previously reported findings of significantly more alcohol misuse among female residents and significantly more high depersonalization among males.<sup>15</sup> The new finding described here is that female general surgery residents who misuse alcohol have a greater odds of high depersonalization and lower anxiety than female residents who do not misuse alcohol. This is intriguing because, while anxiety per se has not been shown to be significantly higher in female surgery residents, correlates of anxiety have.<sup>31</sup> If the stress of residency has a uniquely high component of anxiety for females, or for some females, then perhaps the significantly higher rate of alcohol misuse in females is related. In the largest cross-sectional evaluation of well-being and burnout among general surgery residents to date, with a greater than 99% response rate from the national pool (n = 7395),<sup>31</sup> although anxiety was not assessed specifically, women reported overall worse psychological well-being than men, and in particular reported >10% higher rates of losing sleep due to worry and of having low self-confidence. These findings echo large epidemiological studies which have repeatedly shown a higher prevalence of anxiety diagnoses in females, especially when under significant stress.<sup>25</sup> This higher prevalence has been partly attributed to the use of emotion-based coping strategies, like self-blame,<sup>26</sup> that are more common in females (including female physicians), and are associated with greater anxiety.<sup>27,28</sup> In the general population, alcohol misuse and abuse is consistently higher in males than females.<sup>39</sup> Yet, heavy drinking in females is much more likely when an anxiety disorders is present, raising the question of a female tendency to self-medicate mood disorders with alcohol.<sup>40</sup> These coping tendencies, proposed in the general population of women, may be mirrored by women in surgery.

Our finding of increased depersonalization in females with higher alcohol misuse and lower anxiety is equally intriguing. Males, as opposed to females, are less prone to anxiety<sup>25</sup> and male physicians have been found to favor coping styles that provide ego-defense, such as minimization and the denial of guilt.<sup>27,28</sup> It has been proposed that depersonalization in physicians is a means of ego-defense, and depersonalization has been shown to have a mild, relatively protective effect on overwhelming stress in longitudinal studies of mixed-specialty physicians in the United Kingdom.<sup>33</sup>

Taken together, higher depersonalization in the setting of higher alcohol misuse and lower anxiety suggests the possibility of a subset of female general surgery residents who use alcohol as an adaptive coping mechanism, mitigating the overwhelming stress of residency training by changing their experience of anxiety and their use of depersonalization. These findings also raise the question of male and female residents unconsciously using depersonalization as a means of adaptive coping (through greater ego-defense) in response to the extreme stresses of training.

The causality of burnout, stress and anxiety are beyond the scope of our cross-sectional survey, but the second study discussed here, a longitudinal pilot study of burnout in surgery interns, offers a glimpse of how burnout may evolve over time. As an exploratory study, it was not powered for efficacy but rather, was meant to assess the reliability of outcome measures for stress and burnout over time. Secondary analysis of the data, accounting for gender, yielded two key findings. First, that burnout increased for both genders over the intern year, but significantly more for males, and second, that there was a striking, steady increase in the proportion of burnout due to depersonalization in both genders. These findings are compelling because to date, we are not aware of any other longitudinal studies of burnout in surgery residents. Although the small cohort size of our pilot study limits inference, the significantly greater increase in burnout among males and the increasing proportion attributable to depersonalization, lend support to the

**Table 4**  
Burnout (means and standard deviations) in males vs females at three time points.

		T1	T2	T2-T1	ANCOVA	$\eta^2$	T3	T3-T1	ANCOVA	$\eta^2$
<b>Burnout</b>	Female	20.25 (2.92)	23.88 (5.59)	3.62 (6.84)<	23.83		24.88 (6.26)	4.62 (8.99)	24.85	
	Male	27.15 (7.59)	32.08 (5.60)	4.92 (9.38)<	32.17		33.23 (8.00)	6.08 (10.27)	33.34	
<i>P</i>					0.01*				0.05*	
Effect size						0.31				0.21

\* = *p*-value < / = 0.05.

T1 = baseline, T2 = three months, T3 = one year.

*t*-test results for difference between baseline means.

ANCOVA results column shows least squares means adjusted for baseline.

Effect sizes ( $\eta^2_{\text{partial}}$ ) are for the ANCOVA results at three months and at one year.

idea that depersonalization may be an unconscious coping response, perhaps more readily adopted by males. Dahlke et al. found males slightly more likely to manifest burnout than females (OR 1.15 [95% CI 1.01–1.31]) and more likely to manifest burnout as depersonalization ( $P < 0.001$ ). Females were more likely to manifest burnout as emotional exhaustion ( $P < 0.001$ )<sup>31</sup> but when and how this evolves remains unclear. Our findings do echo those of a two-year study of 700 general practitioners in the Netherlands, which found that high depersonalization is more prevalent in male physicians, that males develop high depersonalization early, and female physicians tend to develop increasing depersonalization over time.<sup>40,41</sup>

As proposed earlier, depersonalization may confer some ego-defense in the setting of overwhelming stress, although it has been associated with poorer self-perceived quality of care among physicians.<sup>42</sup> Interestingly, though, a study in Internal Medicine residents in a longitudinal ambulatory clinic setting found higher depersonalization was associated with increased patient-perceived quality of care in terms of both empathy and empowerment.<sup>43</sup> Support for the idea of depersonalization as a means of coping is found in the concept of ‘detached concern’, a related characteristic seen in human services workers who maintained professional equipoise and effectiveness over time.<sup>16</sup> Nevertheless, while depersonalization may reside on a spectrum that includes detached concern, it is an extreme. In a longitudinal study of burnout and resilience in medical students, Dyrbye et al. found that high depersonalization was independently associated with increased odds of suicidal ideation over the following year (OR = 3.38,  $P = 0.001$ ).<sup>44</sup>

Our study has several limitations. First, the national survey is limited by its low response rate (approximately 10%), which is comparable to that for the first national survey of burnout in general surgery residents,<sup>34</sup> but still at high risk for selection bias. This concern is partly assuaged by findings from the study by Dahlke et al.,<sup>31</sup> which captures greater than 99% of all general surgery residents nationally. Dahlke et al., found a greater odds of high depersonalization in males and a strong component of anxiety in the distress felt by females. Further correlations between the two studies are limited by the use of different measures. Our national survey data is also limited by its cross-sectional design, which prevents the exploration of causal relationship and the evolution of behaviors. Our longitudinal study of general surgery interns sheds some light on the evolution of burnout, but as a pilot study, it is underpowered to detect most changes. While this makes our significant findings more striking, it raises other questions (for instance, how increased burnout scores relate to perceived stress), which our pilot study could not answer.

In summary, the results of our secondary analysis of two data sets highlight the importance of specifically evaluating gender differences in the study of burnout and the design of burnout interventions. Going forward, our results can help heighten mentors’

awareness for potential cynicism in males and anxiety or alcohol abuse in females. By reframing the issues of depersonalization and heavy alcohol use as natural (albeit maladaptive) reactions to overwhelming stress, we can target these problems directly, with frank and supportive conversations, rather than dismissing them as signs of weak character. Our results also suggest that residency programs should carefully consider the role of alcohol when planning social events for trainees. Finally, our results speak to the need for burnout interventions that account for gender differences in regard to stress, which is an independent predictor of worse burnout and less chance of recovery.<sup>35</sup> For all of us, male or female, stress is in large part a matter of perception. This makes interventions that target stress perception directly, for instance mindfulness training, worthy of more focused investment and study.

## Conclusions

Burnout and well-being among physicians and trainees are critical and complex issues that affect physicians, patients and healthcare at large. While gender differences are recognized in the experience of stress, coping, and the workplace, gender is rarely accounted for in the study of burnout or in designing burnout interventions. Our findings suggest that male and female surgery residents experience and react to the stress of residency differently. This underscores the need for large, longitudinal studies exploring the influence of gender on surgeons’ stress and burnout, as well as the need for interventions that consider gender differences in their design.

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Study conception and design: Lebares.  
Acquisition of data: Lebares, Guvva.  
Analysis and interpretation of data: Lebares, Epel, Hecht, Braun, Guvva.  
Drafting of manuscript: Lebares, Guvva, Braun, Hecht, Epel.  
Critical revision: Lebares, Epel, Hecht.

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