



# A self-selecting prophecy: prevalence of burnout in surgical fellows

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## Abstract

**Background** Burnout has become a prominent topic, yet there are limited data on the manifestation of this phenomenon among surgical fellows. The goal of this study is to elucidate the prevalence of burnout and determine if there are protective or predisposing factors in surgical fellowship training.

**Methods** A confidential electronic survey was distributed to Fellowship Council accredited fellows during the 2020–2021 academic year. Demographic information and training characteristics were queried. The fellows were then asked to complete the Maslach Burnout Inventory (MBI), Perceived Stress Scale (PSS), Short Grit Scale (SGS), Satisfaction with Life Scale (SLS), and General Self-Efficacy Scale (SE). Data were analyzed using  $p$  values of  $\leq 0.05$  as statistically significant.

**Results** At the end of the survey period, 92 out of 196 (46.9%) fellowship trainees responded. 69.6% of respondents identified as men, 29.7% as international medical school graduates (IMGs), and 15.3% non-US IMGs. Based on criteria defined by the MBI, there was an 8.4% rate of burnout. Most respondents noted low stress levels (62.3%), good satisfaction with life (58.9%), a moderate amount of grit, and a high level of self-esteem. On comparative analysis, fellows with burnout had significantly higher stress levels, lower levels of satisfaction with life, and less self-esteem.

**Conclusions** Overall, there was a low rate of burnout among fellows. We suggest this may be reflective of a self-selecting effect, as trainees who choose to undergo additional training may be less likely to experience this syndrome. In addition, there may be a protective factor during fellowship that results from inherent mentoring, increased specialization, and autonomy. Further investigation of the predisposing factors to burnout in fellowship trainees is warranted based on the results of this study.

**Keywords** Burnout · Surgical fellowship · Fellowship Council

Burnout is a psychological syndrome defined by high levels of chronic emotional exhaustion, high interpersonal job-related stress, and feelings of reduced personal accomplishment [1]. This stems from a discordance between individual and workplace values, most notably in aspects of workload, control, reward, and fairness. In a 2008 survey of the fellows of the American College of Surgeons, it was found that 40% of responding surgeons were burned out and that

the presence of burnout was the single greatest predictor of career dissatisfaction [2]. In a 2016 systematic review by Dimou et al. [3], burnout among fully trained surgeons was found to be increasing at a concerning rate, albeit under-reported. Trainees have also been found to experience burnout, with rates in surgical residency have been demonstrated to be up to 69% [4], despite systems of graduated autonomy and duty hour restrictions. Awareness of these findings has prompted interventions at all levels, such as the integration of wellness into the surgical training curriculum, time devoted to the topic at society meetings, and new initiatives on mindfulness from the highest levels of the field.

In terms of burnout in fellows, the literature is sparse and has only included respondents within a single specialty. The American Society of Transplant Surgeons Fellowship Training Committee found that 22.7% of their responding transplant fellows met criteria for burnout according to the

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Maslach Burnout Inventory (MBI) [5]. More importantly, burned out fellows were more likely to work over 100 h per week, have severe work-related stress, consider quitting fellowship, and make medical errors. In a study that involved minimally invasive gynecologic fellows, there was reported burnout in 57.9% of respondents, and 76.5% of these fellows reported not receiving support from their program for feelings of anxiety, depression, and extreme fatigue [6]. This echoes the sentiment that identifying burnout is not the only challenge; moreover, it necessitates changing the system to create a culture that integrates preventive and therapeutic resources to combat this phenomenon.

Despite the focus on burnout in the current literature and introduction of wellness initiatives across many levels, there has been little focus on elucidating burnout in fellowship trainees and minimal data on surgical fellows as an independent group. The goal of this study is to better elucidate the prevalence of burnout in surgical fellows. In addition, to determine if there are certain contributing demographics or characteristics that may be protective or predictive of burnout. These insights would provide valuable information to allow for development of targeted interventions for prevention and identification of burnout in this group of young surgeons.

## Materials and methods

With institutional review board (IRB) approval (038.HPB.2018.R), an electronic survey was distributed in December 2020 via SurveyMonkey (Momentive Inc., San Mateo CA, USA) to all fellows training in active Fellowship Council (FC) programs during the 2020–2021 academic year. These fellowship types included Advanced Gastrointestinal/Minimally Invasive Surgery (AGI/MIS), Bariatric Surgery, Hepatopancreatobiliary (HPB) Surgery, Colorectal Surgery, Thoracic Surgery, and Flexible Endoscopy. Participation in the survey was completely voluntary and confidential. A reminder email was sent each month until March 2021. Demographic information including age, gender identity, race, nationality, and immigration status were queried. Training specific questions such as type of fellowship, medical school location, gaps in training and post-fellowship goals were also asked. All fellows were then asked to complete five previously validated tools: Maslach Burnout Inventory (MBI) [7] to assess burnout, Perceived Stress Scale (PSS) [8] to determine stress levels, Short Grit Scale (SGS) [9] to measure perseverance and resilience, Satisfaction with Life Scale (SLS) [10] to gauge personal and career-related satisfaction, and General Self-Efficacy Scale (GSES) [11] to assess confidence. The MBI is a well-validated tool that measures three dimensions of burnout: emotional exhaustion (EE), depersonalization (DP), and personal

accomplishment (PA). Burnout is defined by levels of EE above the highest tertile or levels of DP above the highest tertile or levels of PA below the lowest tertile. The previously validated normative MBI data for healthcare workers were used to determine cutoffs for each tertile [12]. The PSS determines perceived stress levels, and scores 0–13 indicate low stress, scores 14–26 indicate moderate stress, and scores 27–40 indicate high stress. The SGS is measured on a scale where values of 1 suggest low grit and values closer to 5 suggest extreme grittiness. The SLS is scored from 5 to 35, where higher numbers indicate increasing levels of satisfaction. The GSES is similarly measured on a scale where higher numbers with a maximum of 40 indicate greater self-esteem. Data were accumulated, and responses were scored accordingly and then analyzed using a combination of Chi square, independent samples t test, and ANOVA with *p* values of  $\leq 0.05$  being considered statistically significant. Data analysis was done using JASP (JASP Team, Version 0.14.1). Of note, the thoracic, flexible endoscopy, and colorectal fellowship data were combined to protect the identity of fellows in these smaller groups and will be referred to as the “other” subgroup of fellows in this manuscript.

## Results

In this study, 92 of 196 (46.9%) FC fellows training during the 2020–2021 academic year participated with all components completed by 72 fellows (78%). Nine respondents were excluded from full analysis as they only provided demographic information, but the remainder of respondents with partial data were included in analysis. Table 1 demonstrates the demographics and characteristics of the respondent population. Of note, 69.6% of respondents identified as male with the predominant study population between the ages of 25–34 years (60.9%). Overall, 64.1% of respondents were white, 63% were born in the United States (US), and 59.3% were US allopathic medical school graduates. AGI/MIS trainees were the predominant respondents (41.3%). A minority of respondents (13.1%) had a gap in training between residency and fellowship years and only in one circumstance was this in a non-clinical role. There was a spectrum in terms of post-fellowship career plans, but the largest group intended to be health system supported (31.9%).

As shown in Table 2, based on criteria defined by the MBI, the presence of burnout was suggested in 8.4% of respondents in this study. On further analysis, there were no defining characteristics or demographics which had a significantly increased rate of burnout. Of note, both of the responding fellows from the other fellowship category had scores suggestive of burnout. None of the HPB trainees screened positive for burnout. When questioned about their stress levels, 48 of 77 (62.3%) respondents noted low stress

**Table 1** Characteristics of responding fellows

Characteristics of respondents (n=92)	Number of respondents (#)	Percentage of respondents (%)
<i>Age (years)</i>		
25–34	56	60.9%
35–39	29	31.5%
>40	7	7.6%
<i>Gender identity</i>		
Female	28	30.4%
Male	64	69.6%
<i>Race/Ethnicity</i>		
White	57	64.1%
Black	4	4.5%
Hispanic	6	6.7%
Asian	10	11.2%
Middle Eastern	3	3.4%
Indian	9	10.1%
<i>Place of birth</i>		
USA	58	63.0%
Canada	6	6.5%
Europe	3	3.3%
Caribbean	1	1.1%
South America	5	5.4%
Central America	1	1.1%
South Asia	7	7.6%
East Asia	3	3.3%
Middle East	6	6.5%
Africa	1	1.1%
<i>Time of arrival in the US</i>		
Native US	58	67.4%
High school	12	13.9%
College	1	1.2%
Residency	11	12.8%
Fellowship	4	4.7%
<i>Immigration status</i>		
Native US	58	68.2%
Naturalized US	12	14.1%
Green Card	2	2.4%
Non-US	13	15.3%
<i>Medical School location</i>		
US MD	54	59.3%
US DO	10	11%
Caribbean	5	5.5%
South America	3	3.3%
Europe	3	3.3%
Canada	8	8.8%
South Asia	5	5.5%
Middle East	3	3.3%
<i>Gaps in training</i>		
None	80	87.0%
Clinical	11	12.0%

**Table 1** (continued)

Characteristics of respondents (n=92)	Number of respondents (#)	Percentage of respondents (%)
Non-clinical (research)	1	1.1%
<i>Fellowship</i>		
AGI/MIS	38	41.3%
Bariatrics	32	34.8%
Hepatopancreatobiliary	19	20.7%
Other	3	3.3%
<i>Post-fellowship plans</i>		
Private	18	19.8%
Health System Supported	29	31.9%
Academic	25	27.5%
Undecided	19	20.9%

levels and 29 of 77 (37.7%) noted moderate stress levels according to the PSS (Table 3). No respondents noted high stress levels and there was no statistically significant difference between groups according to demographic characteristics nor fellowship type. When reflecting on the questions regarding satisfaction as outlined in the SLS (Table 4), 51 of 73 responses (69.9%) were those suggestive of satisfaction and 20 of 73 (27.4%) tended toward dissatisfaction. There were no significant findings in terms of demographics. In terms of grit, as displayed in Table 5, the overall score of 2.7 (1.9–3.2 ± 0.3) on the SGG is suggestive of a moderate amount of grit. When stratified by demographics, the respondents identifying as male were found to have a higher median grit score in comparison to the respondents identifying as female (2.7 vs. 2.5,  $p = 0.036$ ). The respondents indicated that they have a high degree of self-esteem, with a median score of 33.9 (17–40 ± 4.6) out of 40 points as determined by the GSES (Table 6). There were no statistically significant differences by demographic characteristics on further analysis.

When comparing those fellows who screened positive for burnout to those who did not, there was a significant difference between increased levels of stress ( $p < 0.001$ ). All seven of the fellows who were determined to exhibit burnout also were found to have moderate stress levels on the PSS. There was similarly a trend toward lower levels of satisfaction with life in fellows with burnout ( $p = 0.004$ ). There was a significantly lower measure of self-esteem when comparing fellows with burnout to those without burnout ( $p = 0.011$ ). There was no significant difference in grittiness according to the findings of the SGS when fellows with and without burnout were compared ( $p = 0.844$ ) (Table 7).

**Table 2** Maslach burnout inventory responses with analysis

Maslach Burnout Inventory (MBI) ( <i>n</i> = 83)			
Group	Yes ( <i>n</i> = 7)	No ( <i>n</i> = 76)	X <sup>2</sup> , <i>p</i> -value
<i>Gender</i>			<i>p</i> = 0.870
Male	5 (71.4%)	52 (68.4%)	
Female	2 (28.6%)	24 (31.6%)	
<i>Age (years)</i>			<i>p</i> = 0.271
25–34	3 (42.9%)	48 (63.2%)	
35–39	4 (57.1%)	22 (29%)	
≥ 40	0 (0.0%)	6 (7.8%)	
<i>Visa status</i>			<i>p</i> = 0.205
No	5 (71.4%)	61 (88.4%)	
Yes	2 (28.6%)	8 (11.6%)	
<i>Medical School</i>			<i>p</i> = 0.457
US graduate	4 (57.1%)	53 (70.7%)	
IMG	3 (42.9%)	22 (29.3%)	
<i>Place of birth</i>			<i>p</i> = 0.434
USA	3 (42.8%)	50 (65.8%)	
Canada	1 (14.3%)	5 (6.5%)	
Europe	0 (0%)	3 (4%)	
Caribbean	0 (0%)	1 (1.3%)	
South America	0 (0%)	3 (4%)	
Central America	0 (0%)	1 (1.3%)	
South Asia	1 (14.3%)	5 (6.5%)	
East Asia	0 (0%)	3 (4%)	
Middle East	2 (28.6%)	3 (4%)	
Africa	0 (0%)	1 (1.3%)	
Central Asia	0 (0%)	1 (1.3%)	
<i>Race/Ethnicity</i>			<i>p</i> = 0.521
White	5 (71.4%)	48 (64%)	
Black	0 (0%)	4 (5.3%)	
Hispanic	0 (0%)	4 (5.3%)	
East Asian	0 (0%)	9 (12%)	
Middle Eastern	1 (14.3%)	2 (2.7%)	
South Asian	1 (14.3%)	6 (8%)	
Mixed	0 (0%)	2 (2.7%)	
<i>Fellowship</i>			<i>p</i> = < 0.001
AGI/MIS	3 (42.8%)	32 (42.1%)	
Bariatric	2 (28.6%)	28 (36.8%)	
HPB	0 (0.0%)	16 (21.1%)	
Other	2 (28.6%)	0 (0%)	

## Discussion

As this study is the first of its kind to examine burnout in a multispecialty population of surgical fellows, the results are remarkable in that the rate of burnout at 8.4% is lower than that previously found among younger trainees and attending surgeons. There were no clear demographic characteristics that were correlated to burnout found in this study.

**Table 3** Perceived stress scale responses with analysis

Perceived stress scale ( <i>n</i> = 77)			
Group	Low stress	Moderate stress	X <sup>2</sup> , <i>p</i> -value
Overall	48 (62.3%)	29 (37.7%)	
<i>Gender</i>			<i>p</i> = 0.194
Male	35 (72.9%)	17 (58.6%)	
Female	13 (27.1%)	12 (41.4%)	
<i>Age (years)</i>			<i>p</i> = 0.129
25–34	28 (58.3%)	18 (62.1%)	
35–39	14 (29.2%)	11 (37.9%)	
≥ 40	6 (12.542%)	0 (0.0%)	
<i>Visa status</i>			<i>p</i> = 0.486
No	37 (88.1%)	23 (82.1%)	
Yes	5 (11.9%)	5 (17.9%)	
<i>Medical School</i>			<i>p</i> = 0.556
US graduate	31 (66%)	21 (72.4%)	
IMG	16 (34%)	8 (27.6%)	
<i>Fellowship</i>			<i>p</i> = 0.200
AGI/MIS	19 (39.6%)	14 (48.3%)	
Bariatric	20 (41.7%)	8 (27.6%)	
HPB	9 (18.8%)	5 (17.2%)	
Other	0 (0.0%)	2 (6.9%)	

Protective factors that may contribute to our findings include the predominance of male respondents (69.6%), non-US medical school graduates (30.4%), and lack of gaps in training that characterized the respondents. Prior studies have reported that female gender was identified as an associated factor for burnout development [3]. In this study, there was no significant increase in burnout rate when stratified by gender (male 8.8% vs female 7.7%, *p* = 0.870). Although the findings noted that women showed slightly less grit, the range was less variable in comparison to the men. It was also surprising to note that the self-esteem scores of responding fellows were in the low to moderate range, with more variability in range in men compared to women. The fact that a third of the respondents were non-US medical school graduates may have also impacted the low burnout scores, as these trainees have been shown to be “relentless and driven to achieve their goal” and have already traversed a difficult pathway in achieving training in the US [13]. In a similar vein, when studying burn out in critical care fellows, Kashani et al. [14] noted significantly lower rates in Asian fellows; this was attributed to cultural, religious, and spiritual factors that may play a role in resilience. This study did not find any statistically significant difference when looking at ethnicity. While the overall findings of this study group were positive, it is important to note that 27.4% of the overall respondents indicated that they were dissatisfied with life. These are not findings to be taken lightly and need to be further investigated.

**Table 4** Satisfaction with life results with analysis

Satisfaction with Life Scale ( <i>n</i> = 73)		Visa status ( $X^2$ , <i>p</i> = 0.154)		Medical school ( $X^2$ , <i>p</i> = 0.262)		
	Overall	US Citizen ( <i>n</i> = 59)	Visa ( <i>n</i> = 9)	US graduate ( <i>n</i> = 51)	IMG ( <i>n</i> = 22)	
Extremely dissatisfied	6 (8.2%)	3 (5.1%)	3 (33.3%)	2 (3.9%)	4 (18.2%)	
Dissatisfied	4 (5.5%)	3 (5.1%)	1 (11.1%)	2 (3.9%)	2 (9.1%)	
Slightly dissatisfied	10 (13.7%)	9 (15.3%)	1 (11.1%)	9 (17.7%)	1 (4.6%)	
Neutral	2 (2.7%)	2 (3.4%)	0 (0%)	2 (3.9%)	0 (0.0%)	
Slightly satisfied	8 (11%)	7 (11.9%)	0 (0%)	5 (9.8%)	3 (13.6%)	
Satisfied	24 (32.9%)	20 (33.9%)	2 (22.2%)	17 (33.3%)	7 (31.8%)	
Extremely satisfied	19 (26%)	15 (25.4%)	2 (22.2%)	14 (27.5%)	5 (22.7%)	

  

		Gender ( $X^2$ , <i>p</i> = 0.776)		Age group ( $X^2$ , <i>p</i> = 0.255)		
	Overall	Male ( <i>n</i> = 49)	Female ( <i>n</i> = 24)	25–34 ( <i>n</i> = 45)	35–39 ( <i>n</i> = 24)	≥ 40 ( <i>n</i> = 4)
Extremely dissatisfied	6 (8.2%)	3 (6.1%)	3 (12.5%)	5 (11.1%)	1 (4.2%)	0 (0.0%)
Dissatisfied	4 (5.5%)	2 (4.1%)	2 (8.3%)	2 (4.4%)	2 (8.3%)	0 (0.0%)
Slightly Dissatisfied	10 (13.7%)	6 (12.2%)	4 (16.7%)	4 (8.9%)	6 (25.0%)	0 (0.0%)
Neutral	2 (2.7%)	1 (2.0%)	1 (4.2%)	0 (0.0%)	2 (8.3%)	0 (0.0%)
Slightly satisfied	8 (11.0%)	6 (12.2%)	2 (8.3%)	3 (6.7%)	4 (16.7%)	1 (25.0%)
Satisfied	24 (32.9%)	16 (32.7%)	8 (33.3%)	17 (37.8%)	5 (20.8%)	2 (50.0%)
Extremely satisfied	19 (26.0%)	15 (30.6%)	4 (16.7%)	14 (31.1%)	4 (16.7%)	1 (25.0%)

  

Fellowship ( $X^2$ , <i>p</i> = 0.200)						
	Overall	AGI/MIS ( <i>n</i> = 33)	Bariatric ( <i>n</i> = 28)	HPB ( <i>n</i> = 14)	Other ( <i>n</i> = 2)	
Extremely dissatisfied	6 (8.2%)	3 (9.7%)	1 (3.6%)	1 (8.3%)	1 (50.0%)	
Dissatisfied	4 (5.5%)	0 (0.0%)	2 (7.1%)	1 (8.3%)	1 (50.0%)	
Slightly Dissatisfied	10 (13.7%)	5 (16.1%)	3 (10.7%)	2 (16.7%)	0 (0.0%)	
Neutral	2 (2.7%)	2 (6.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Slightly satisfied	8 (11.0%)	2 (6.5%)	4 (14.3%)	2 (16.7%)	0 (0.0%)	
Satisfied	24 (32.9%)	12 (38.7%)	9 (32.1%)	3 (25.0%)	0 (0.0%)	
Extremely satisfied	19 (26.0%)	7 (22.6%)	9 (32.1%)	3 (25.0%)	0 (0.0%)	

The timing of this study was also unique, as it was conducted through the coronavirus (COVID-19) pandemic beginning in March 2020 and therefore the experience of this fellowship class was highly variable due to travel restrictions, postponement of elective operations, and stress related to exposure risk at work, among other factors. The penultimate task of securing an attending position on completion of training was also deeply affected by hiring restrictions put in place by employers, lack of in-person networking at society meetings, and the impersonal nature of virtual interviews. Although it is difficult to assess the impact that the pandemic may have on the prevalence of burnout in this cohort of trainees directly, there is evidence that 96% of surgical trainees felt a negative impact on their clinical experience as well as personal wellness [15]. The finding of low burnout rates in surgical fellows may be an additional testament to the resilience of this group considering the increase in personal and professional stress during the study period.

In addition to the resilience of fellows, there may be a protective effect prohibiting burnout based on the structure

of fellowship programs alone. The fellowship programs within this study have 1 to 2 fellows per institution with several faculty members. This structure provides direct and uninterrupted trainee to faculty contact on a consistent basis, unlike residency where the trainee to faculty ratio is much greater. This results in dedicated mentorship, which was been found to have a protective effect in surgical residents [4]. Although this aspect may be less formal than in residency, the presence of direct faculty contact and low trainee to faculty ratios with increased levels of autonomy make mentorship an inherent attribute of surgical fellowships.

Limitations of this study include that it is limited to FC accredited programs only, excluding some of the specialties that may be considered higher stress such as cardiothoracic surgery, transplant surgery, surgical oncology, and trauma/critical care surgery. In addition, there is a wide variability in training programs within each specialty in terms of clinical volume, call responsibilities, hours worked, case types, research requirement, and length of training that make it difficult to exclude confounding

**Table 5** Short Grit scale results with analysis

Short Grit Scale (n=74)					
Group	Mean	Median	Range; IQR	Std deviation	Test, p-value
Overall	2.7	2.7	1.9–3.2; 0.3	0.3	–
<i>Gender</i>					Independent samples t test, <b>p = 0.036</b>
Male	2.7	2.7	1.9–3.2; 0.3	0.3	
Female	2.6	2.5	2.1–3.0; 0.4	0.2	
<i>Age (years)</i>					ANOVA, p=0.375
25–34	2.6	2.6	1.9–3.1; 0.3	0.3	
35–39	2.7	2.7	2.2–3.1; 0.4	0.4	
≥40	2.5	2.4	2.0–3.2; 0.4	0.4	
<i>Visa status</i>					Independent samples t test, p=0.344
No	2.7	2.7	1.9–3.2; 0.4	0.3	
Yes	2.6	2.6	2.3–2.9; 0.3	0.2	
<i>Medical School</i>					Independent samples t test, p=0.796
US graduate	2.7	2.6	1.9–3.1; 0.4	0.3	
IMG	2.6	2.6	2.3–3.2; 0.3	0.2	
<i>Fellowship</i>					ANOVA, p=0.481
AGI/MIS	2.7	2.7	2.1–3.2; 0.3	0.3	
Bariatric	2.6	2.6	1.9–3.0; 0.3	0.3	
HPB	2.7	2.8	2.2–3.0; 0.4	0.3	
Other	2.9	2.9	2.7–3.1; 0.2	0.3	

**Table 6** General self-efficacy scale with analysis

Self-esteem (n=72)					
Group	Mean	Median	Range; IQR	Std Deviation	Test, p-value
Overall	33.9	34.0	17.0–40.0; 7.0	4.6	–
<i>Gender</i>					Independent samples t test, p=0.915
Male	33.9	34.0	17.0–40.0; 6.3	5.1	
Female	34.0	34.5	28.0–39.0; 6.3	3.6	
<i>Age (years)</i>					ANOVA, p=0.648
25–34	33.9	34.0	25.0–40.0; 6.0	4.0	
35–39	33.7	34.0	17.0–40.0; 8.0	5.9	
≥40	36.0	36.0	32.0–40.0; 5.0	3.7	
<i>Visa status</i>					Independent samples t test, p=0.057
No	34.1	34.0	17.0–40.0; 7.0	4.6	
Yes	30.9	32	25.0–37.0; 7.3	4.1	
<i>Medical School</i>					Independent samples t test, p=0.792
US graduate	33.8	34.0	17.0–40.0; 6.6	4.7	
IMG	34.1	35.0	25.0–40.0; 5.6	4.5	
<i>Fellowship</i>					ANOVA, p=0.817
AGI/MIS	34.3	35.0	17.0–40.0; 4.5	5.1	
Bariatric	34.0	34.0	26.0–40.0; 6.5	4.0	
HPB	32.9	31.5	25.0–40.0; 7.8	4.9	
Other	32.5	32.5	28.0–37.0; 4.5	6.4	

factors. This survey was distributed in the fifth to eighth months of fellowship, with intent to mitigate the effects of the learning curve at the beginning of the academic year, but due to this the effects of fatigue in contributing to burnout toward the conclusion of training may not be

captured. Selection bias likely exists due to the voluntary nature of the survey, as there are likely differences between respondents and non-respondents and the small sample size contributes to this as well, especially when considering the other subgroup of fellows. Also, there was no

**Table 7** Comparative Analysis of Burnout with PSS, SLS, SGS, and GSES Outcomes

Predictors of Burnout ( <i>n</i> = 83)			
Predictor	Burnout absent ( <i>n</i> = 76)	Burnout present ( <i>n</i> = 7)	
<i>Perceived Stress Scale</i> ( <i>n</i> = 77)			
Low Stress	48 (68.6%)	0 (0%)	$X^2, p < 0.001$
Moderate Stress	22 (31.4%)	7 (100%)	
<i>Satisfaction with Life Scale</i> ( <i>n</i> = 73)			
Extremely dissatisfied	4 (6.1%)	2 (28.6%)	$X^2, p = 0.004$
Dissatisfied	2 (3.0%)	2 (28.6%)	
Slightly Dissatisfied	9 (13.6%)	1 (14.3%)	
Neutral	1(1.5%)	1 (14.3%)	
Slightly satisfied	8 (12.1%)	0 (0%)	
Satisfied	24 (36.4%)	0 (0%)	
Extremely satisfied	18 (27.3%)	1 (14.3%)	
<i>Short Grit Scale</i> (mean $\pm$ std dev) ( <i>n</i> = 74)	2.7 $\pm$ 0.26	2.7 $\pm$ 0.28	Independent samples t test, <i>p</i> = 0.844
<i>General Self-Efficacy Scale</i> (mean $\pm$ std dev) ( <i>n</i> = 72)	34.4 $\pm$ 4.2	29.7 $\pm$ 6.8	Independent samples t test, <i>p</i> = <b>0.011</b>

stratification based on fellowship year to account for two-year fellowships or include personal characteristics such as marital status, parental status, or debt burden that may be factors in burnout development. Lastly, the analysis performed was correlative in nature and did not establish causal links between factors assessed and the presence of burnout.

In conclusion, the prevalence of burnout among surgical fellows was found to be lower than previously reported among younger trainees and attendings. We propose that this is due to the aspect of self-selection in fellows actively choosing this training pathway, in contrast to younger trainees who may have feelings of helplessness when faced with a standardized curriculum. Overall, this is a positive finding in relationship to training in a FC fellowship and should be regarded as such. Additional research focusing on burnout in each fellowship subspecialty is warranted, as our study population was too limited in size to provide this insight. In addition, the integration of preventive strategies against burnout into surgical fellowship curriculum is highly recommended as prevalence of this phenomenon increases on transition to independent practice.

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## Declarations

**Disclosures** Dr. Jeyarajah is a consultant for Sirtex, Angiodynamics and Johnson & Johnson. Drs. Benzie, Logarajah, Darwish, Nagatomo, Cho, and Riall have nothing to disclose relevant to this research project.

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