



Original Research

Drivers and sequelae of burnout in U.S. dermatology trainees

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ABSTRACT

Background: Burnout is a health care epidemic. Although burnout has been shown to affect dermatologists in multispecialty studies, there are no such studies in dermatology trainees.

Objective: We conducted a survey-based study of burnout in U.S. dermatology trainees to identify its drivers and sequelae.

Methods: All residents enrolled in a U.S. dermatology training program were eligible. The 45-question survey included the Maslach Burnout Inventory, a validated quality of life index, and 31 questions based on known drivers of burnout and new research questions. No identifying data were collected.

Results: A total of 180 residents responded, for a response rate of 14.4%. Notably, an analysis of the cohort showed that our sample was not statistically different from the national complement of trainees based both on proportion of female respondents and mean age ($p = .9449$ and $.2376$, respectively). Of the respondents, 59% were female. The average age was 30.6 years. Sixty-nine percent of trainees (124 of 180) met the criteria for burnout. On univariate analysis, age, sex, training year, and relationship status were not associated with burnout. Good work–life balance ($p = .032$), autonomy in the workplace ($p = .0027$), intradisciplinary respect ($p = .022$), and increased work hours ($p = .0110$) were protective. On multivariate analysis, autonomy in the workplace (odds ratio: 3.580; confidence interval, 1.32–9.71; $p = .012$) and good work–life balance (odds ratio: 0.262; confidence interval, 0.095–0.722; $p = .0097$) remained significant.

Conclusion: Improving control over working environment, as evidenced by the impact of work–life balance and autonomy, may lessen burnout in trainees. Further studies analyzing regional and program-specific variations will help improve trainee experience.

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Introduction

Burnout, a term coined by Herbert Freudenberger (1974) and quantified by Maslach and Jackson (1981), is a work-related hazard for physicians and other hospital personnel. Burnout describes the culmination of chronic stress in the work space stemming from an imbalance of daily requirements and inadequate resources, ultimately leading to emotional exhaustion, depersonalization, and a sense of reduced personal accomplishment (Maslach et al., 2001). Burnout in physicians has been attributed to poor work–life balance (Shanafelt et al., 2012), high clerical burden (Shanafelt et al., 2016), and long work hours (Shanafelt et al., 2009) and has

been associated with decreased professionalism, career dissatisfaction, decreased clinical hours, and early retirement (Dyrbye et al., 2018; West et al., 2018). Burnout is also linked to substance use (Oreskovich et al., 2012), depression (Wurm et al., 2016), and suicidal ideation (Noseworthy et al., 2017).

Physician burnout appears to have a profound negative impact on health care systems as well. As summarized by Han et al. (2019), several systematic reviews have shown an association between burnout and both poor clinical and productivity outcomes (Dewa et al., 2014; Noseworthy et al., 2017; Panagioti et al., 2018), leading to several health care CEOs referring to burnout as a public health crisis. In a cost–consequence analysis, the study estimated that approximately \$4.6 billion a year (approximately \$7600 per employed physician each year) from physician turnover and decreased productivity is attributable to physician burnout in the United States (Han et al., 2019).

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According to the Medscape National Physician Burnout, Depression, and Suicide Report from 2019, 44% of all physicians experience burnout (Kane, 2019). The rate of burnout in dermatology in 2019 was 38% (increased from 32% in 2018; Kane, 2019). In fact, a large national study of physician burnout revealed dermatology to have the highest increase in the prevalence of burnout (32% to 57%) between 2011 and 2014 (Shanafelt et al., 2015). In a 2017 update, the burnout rate remained high at 45% (Shanafelt et al., 2019).

A recent editorial in *Cutis* suggested that burnout in dermatology is often overlooked, as other fields in medicine consider the 9-to-5 workday and free weekends to be protective. However, dermatologists face the same daily pressures (electronic health record [EHR], administrative burdens, lack of resources) as other specialties, arguably at a disproportionate rate because dermatology is a primarily outpatient and high-volume field. In fact, prior literature has shown those in ambulatory specialties to have higher emotional exhaustion scores than their inpatient colleagues (Lee et al., 2013).

There remains a paucity of burnout studies focusing on dermatology. In the only national survey-based study of academic dermatologists, dermatologists were asked to describe factors contributing to their burnout. The most common contributor was excessive documentation and time spent on EHR (22%), followed by lack of protected academic time (19%), increased administrative demand for productivity (17%), and bureaucratic demands, especially those pertaining to insurance matters (17%; Dorrell et al., 2019).

Studies on dermatology trainee burnout are similarly limited. In a prospective observational study of U.S. resident physicians, burnout prevalence in dermatology trainees was 29.6%. Career choice regret was 15.5%, but specialty choice regret was only 1.4% (Dyrbye et al., 2018). However, because the study included only postgraduate year (PGY) 2 residents, who had only just started in their specialty-specific field (after a preliminary year), these estimates may not accurately describe the dermatology trainee population as a whole. In a cross-sectional survey-based study of Canadian dermatology residents, >50% of dermatology residents experienced high levels of both emotional exhaustion and depersonalization (Shoimer et al., 2018).

Given the lack of data describing burnout in dermatology resident physicians, we conducted a national study of burnout to identify the drivers and sequela of burnout in this population.

Methods

All residents enrolled in an academic dermatology residency training program in the United States were eligible to participate in the study. In November 2018, a 45-question survey was sent to the 518 members of the Association of Professors of Dermatology listserv, asking them to distribute the survey to their residents. Subsequently, an e-mail was sent to each program director and program coordinator individually asking them to disseminate the survey. The survey was closed in March 2019. To maintain anonymity, no identifying or program-specific data were collected. The data were collected into a de-identified database using the REDCap electronic data platform supported by the MedStar Health Research Institute. An institutional review board exemption (Protocol # 2018-192) was acquired prior to study initiation. The costs of the study were funded by a grant made possible by a grateful patient donor.

The 45-question survey consisted of the Maslach Burnout Inventory (Maslach and Jackson, 1981), validated Quality of Life (QoL) Five Dimensions Index (Ventegodt et al., 2003), two questions on career and specialty choice, and questions regarding sociodemographic, program-specific, and personal characteristics. The Maslach Burnout Index consists of 22 items and measures three

dimensions of burnout: emotional exhaustion, depersonalization, and personal accomplishment. In accordance with convention, the emotional exhaustion and depersonalization domains were administered. Using the previously established scoring criteria for health care workers, we included residents meeting the criteria for high levels of depersonalization (≥ 10) and/or emotional exhaustion (≥ 27) as exhibiting symptoms of burnout. QoL was measured using the validated QoL Five Dimensions Index measurement of subjective, objective, and existential QoL (Lindholt et al., 2002).

The two questions asking about career- and specialty-choice regret were based on similar items from prior questionnaires (Dyrbye et al., 2018; Frank et al., 1999; Shanafelt et al., 2009). The remaining questions were chosen based on previously reported drivers of burnout and new research questions. Resident characteristics included sex, age, training level, and relationship status. The impact of residency on trainees' ability to make time for doctor appointments, exercise, self-care activities, romantic relationships, and children was assessed as a binary outcome. Program-specific questions involved work hours, call schedule, medical records, documentation assistance in clinic, and workspace autonomy.

Trainee demographics and program characteristics were summarized with descriptive statistics. Categorical variables were summarized as frequencies and percentages, and continuous variable were aggregated as means and standard deviations. A χ^2 or Fisher exact test was performed to compare categorical variables, and a *t* test or Wilcoxon rank sum test was conducted to detect differences of continuous variables. Multiple logistic regression was applied to identify the risk factors of burnout. The significant level was set to $p = .05$ as the threshold, and SAS version 9.4 (SAS Institute, Cary, NC) was used for the analysis.

Results

Response rate

Based on Accreditation Council for Graduate Medical Education (ACGME)-accredited programs for the 2019-2020 academic year, there were 1422 on-duty dermatology residents/fellows in a total of 142 programs. Of these currently filled dermatology residency positions, 148 were excluded due to failed e-mail delivery to the program director or coordinator, leaving 1254 participants who could have been reached by our survey. A total of 180 residents responded to the survey, for an overall response rate of 14.4%. Notably, an analysis of the cohort showed that our sample was not statistically different from the national complement of dermatology trainees (using ACGME-compiled trainee data from 2018–2019) based both on proportion of female respondents and mean age ($p = .9449$ and $.2376$, respectively).

Resident and program descriptive statistics

Of the respondents, 59% were female. The average age was 30.6 years (range, 24–46 years), and the majority were in PGY2 or PGY3. Seventy-three percent were either in a committed relationship or married, and the remainder were single. Less than 2% had been divorced. Greater than 90% of respondents strongly agreed, agreed, or were neutral about whether lifestyle was a factor in their decision to pursue dermatology.

The majority of respondents (66%) were somewhat or very satisfied with their current work-life balance. However, the satisfaction rate dropped to 25.8% at a time when their residency involved more call or longer hours. More than 50% of trainees reported that lack of support for patient-related administrative tasks (e.g., phone calls, records, insurance claims) was their greatest source of job dissatisfaction. Most respondents (66%) strongly agreed or

agreed with feeling respected by their physician colleagues outside of the field of dermatology, 24% were undecided, and the remainder disagreed or strongly disagreed. Almost 8% of respondents had thought about switching to a different specialty in the last 24 months.

The majority of trainees (60%) worked 25 to 50 hours per week, with 35% reporting working >50 hours per week. Respondents were on call an average of 1 to 2 nights per month and 2 to 3 weekends per year, with PGY2 trainees having the most intensive call requirements. Only 24% of respondents reported having staff who provide documentation assistance in clinic. More than half of respondents (53%) agreed or strongly agreed that they have significant autonomy at work, and 84% felt they did meaningful work. The majority of residents agreed that residency training had made engaging in activities outside of the workplace difficult, such as seeing friends/family (57%), exercising (72%), and scheduling medical appointments (73%). Training was also found to interfere with getting adequate amounts of sleep (40%), maintaining a romantic relationship (28%), and participating in their children's lives (11%). Career regret was seen in 14% of trainees who stated that they would not become a physician again. However, specialty-specific regret was seen in only 1% of trainees.

Burnout calculation and associations

Of those surveyed, 124 of 180 trainees (69%) met the criteria for burnout (Table 1). Of the 124 respondents with burnout, 21 (17%) demonstrated high emotional exhaustion, 35 (28%) high depersonalization, and 68 (55%) demonstrated burnout in both domains. On univariate analysis, age, sex, training year, and relationship status were not significantly different in those with burnout. Significantly lower levels of burnout were seen in trainees who reported being either somewhat or very satisfied with their work-life balance versus those who were very dissatisfied, somewhat dissatisfied, or neutral ($p=.032$). However, overall QoL scores was similar in those with and without burnout ($p=.4112$).

Respondents who agreed that dermatology residency is a necessary and temporary time of personal sacrifice were less likely to suffer from burnout ($p=.046$). However, burnout did not significantly influence residents' plan to enter private practice or academia after completion of training ($p=.089$). Residents who strongly agreed, agreed, or were neutral about feeling respected by physician colleagues in other fields were significantly less likely to be burned out ($p=.022$).

Increased work hours were associated with burnout, but hours of sleep and nights or weekends on call were not. Having documentation assistance in clinic was not significantly associated with burnout. Trainees who had difficulty scheduling doctors' appointments, seeing friends/family, exercising, engaging in self-care activities (e.g., yoga, meditation, leisure reading), and maintaining a romantic relationship had significantly higher levels of burnout ($p=.015$, < .0001, .0003, .002, < .0001, and .007, respectively). However, the ability of trainees to participate in their children's lives did not influence burnout levels ($p=.531$).

On multivariate analysis, the only predictors of burnout that remained statistically significant were autonomy in the workplace (odds ratio [OR]: 3.580; confidence interval [CI], 1.32–9.71; $p=.012$) and good work-life balance (OR: 0.262; CI, 0.095–0.722; $p=.0097$; Table 2). Meaningful work, overall QoL, intradisciplinary respect, and work hours were similar between the groups.

A subset analysis of our data showed that almost every factor that was significantly associated with burnout was also significantly associated with both emotional exhaustion and depersonalization (Supplemental Table 1). The association between ability to get an adequate amount of sleep and depersonalization did not reach statistical significance ($p=.07$).

Discussion

The present study is the first of its kind to examine the drivers and sequelae of burnout in U.S. dermatology trainees. As a high-volume field based primarily in the outpatient setting, dermatologists can be disproportionately burdened by administrative tasks. This is particularly evident in the observation that almost half of physician work hours are spent on interfacing with EHRs whereas only one-third is spent interfacing with patients. Furthermore, for every hour of clinical work, double is spent on EHR-related documentation (Sinsky et al., 2017). In our study, the prevalence of burnout was 69%. This is significantly larger than the 29.6% prevalence of burnout seen in dermatology trainees in a cross-sectional multispecialty study of U.S. trainees that included 71 dermatology residents (Dyrbye et al., 2018). However, the study was limited by its assessment of only PGY2 residents, thus only capturing residents at the very beginning of their dermatology training.

The majority of study respondents were female (59%), a rate consistent with the national complement of dermatology trainees (63%; ACGME, 2018). Although several studies have shown female surgical and nonsurgical residents to be disproportionately affected by burnout, this was not seen in our study (Dahlke et al., 2018; Dyrbye et al., 2011; McMurray et al., 2000). This result is consistent with a survey-based study of attending dermatologists by Ware et al. (2020). However, when stratifying participants by whether they had children at home, women with children had a significantly higher level of burnout ($p < .03$). This question was not addressed in our survey, but it would be an interesting topic for further research because women are disproportionately impacted by childcare-related tasks.

Relationship status and/or history of divorce were not associated with burnout rates, which is in contrast with previous research (Shanafelt et al., 2012). However, this is likely due to the low number of respondents in this category. We noted a trend of increasing burnout with each subsequent training year (61.6% in junior residents, 69.5% in PGY3, 75% in senior residents), although these findings did not reach significance ($p=.321$). This is consistent with prior studies showing an increase in depersonalization in internal medicine residents as they progress through training (West et al., 2011). Specialty selection based on lifestyle was not predictive of burnout ($p=.852$). On the other hand, residents who felt that residency is a necessary and temporary time of personal sacrifice were less likely to be burned out ($p=.046$), which we interpret as the "light at the end of the tunnel" phenomenon (Shanafelt, 2008). This mindset is concerning because it may carry over after graduation. In a study of oncology attendings, 37% considered "looking forward to retirement" as an essential wellness promotion strategy (Shanafelt et al., 2005).

Increased work hours (>50 hours/week) were predictive of burnout, a finding consistent with prior studies (Mendelsohn et al., 2019; Shanafelt et al., 2015). However, in our study, nights and weekends on call were not predictive of burnout, challenging the notion that a similar dose-response relationship is seen with nights and weekends on call. This may be due to the ability of most dermatology residents to take home call, decreasing the total amount of time spent in the clinical environment (Marchalik et al., 2019). A similar finding was seen in other specialties taking home call (Marchalik et al., 2019). Hours of sleep were not associated with burnout; however, this is most likely due to a lack of sleep deprivation in the overall cohort because both groups slept a recommended average of 6.8 to 6.9 hours per night (Panel et al., 2015).

Curiously, although scribes have been shown to increase job satisfaction among academic dermatologists (Nambudiri et al., 2018), documentation assistance was not protective from burnout in our study ($p=.540$). This could be because trainees experience

Table 1
Resident characteristics stratified by burnout

	Burnout n = 124	Nonburnout n = 56	p-value
What is your age? Mean (standard deviation)	30.64 (3.32)	30.61 (3.14)	.9546
What is your gender, n (%)			
Female	68 (55.74)	37 (66.07)	.1930
Male	54 (44.26)	19 (33.93)	
Other	0	0	
Please enter your training year, n (%)			
PGY1 + PGY2	37 (30.58)	23 (41.07)	.3218
PGY3	48 (39.67)	21 (37.50)	
PGY4 + PGY5 + PGY6 + PGY7	36 (29.75)	12 (21.43)	
What is your relationship status, n (%)			
Single	34 (27.42)	15 (26.79)	1.0000
Committed	23 (18.55)	10 (17.86)	
Married	67 (54.03)	31 (55.36)	
Have you ever been divorced, n (%)			
Yes	2 (1.63)	1 (1.79)	1.0000
No	121 (98.37)	55 (98.21)	
Currently, how satisfied are you with the balance between your personal and professional life, n (%)			
Dissatisfied	56 (45.16)	6 (10.71)	< .0001
Satisfied	68 (54.84)	50 (89.29)	
If a different period of your residency involved more call or hours, how satisfied were you with the balance between your personal and professional life then, n (%)			
Dissatisfied	97 (78.86)	35 (63.64)	.0320
Satisfied	26 (21.14)	20 (36.36)	
Dermatology residency is a necessary and temporary time of personal sacrifice, with great rewards in the end, n (%)			
True	91 (73.39)	50 (89.29)	.0456
False	12 (9.68)	3 (5.36)	
Uncertain	21 (16.94)	3 (5.36)	
Lifestyle was a factor in my decision to pursue dermatology, n (%)			
Agree	115 (93.50)	53 (94.64)	1.0000
Disagree	8 (6.50)	3 (5.36)	
Residency training has made it difficult for me to schedule doctor appointments, n (%)			
No	27 (21.77)	22 (39.29)	.0145
Yes	97 (78.23)	34 (60.71)	
Residency training has made it difficult for me to see my friends/family, n (%)			
No	41 (33.06)	36 (64.29)	< .0001
Yes	83 (66.94)	20 (35.71)	
Residency training has made it difficult for me to exercise, n (%)			
No	25 (20.16)	26 (46.43)	.0003
Yes	99 (79.84)	30 (53.57)	
Residency training has made it difficult for me to get adequate amounts of sleep, n (%)			
No	65 (52.42)	43 (76.79)	.0020
Yes	59 (47.58)	13 (23.21)	
Residency training has made it difficult for me to engage in self-care activities (e.g., yoga, meditation, leisure reading), n (%)			
No	38 (30.65)	35 (62.50)	< .0001
Yes	86 (69.35)	21 (37.50)	
Residency training has made it difficult for me to maintain a romantic relationship, n (%)			
No	82 (66.13)	48 (85.71)	.0066
Yes	42 (33.87)	8 (14.29)	
Residency training has made it difficult for me to participate in my children's lives, n (%)			
No	109 (87.90)	51 (91.07)	.5312
Yes	15 (12.10)	5 (8.93)	
In the past 24 months, have you considered switching to a different specialty, n (%)			
Yes	13 (10.66)	0 (0)	.0102
No	109 (89.34)	56 (100)	
I feel respected by my physician colleagues outside of the field of dermatology, n (%)			
Agree	106 (85.48)	56 (100)	.0010
Disagree	18 (14.52)	0 (0)	
What are your plans after completion of your training, n (%)			
Job in academic medicine	31 (25.00)	10 (18.18)	.0888
Job in private practice	45 (36.29)	19 (34.55)	
Job in hybrid private/academic medicine	28 (22.58)	8 (14.55)	
Job outside of medicine	1 (0.81)	0 (0)	
Undecided	19 (15.32)	18 (32.73)	
Would you become a physician again, n (%)			
Yes	98 (80.33)	53 (96.36)	.0053
No	24 (19.67)	2 (3.64)	
Would you choose to go into dermatology again, n (%)			
Yes	121 (98.37)	55 (100)	1.0000
No	2 (1.63)	0 (0)	

(continued on next page)

Table 1 (continued)

	Burnout n = 124	Nonburnout n = 56	p-value
I have significant autonomy in how I do my work, n (%)			
Agree	79 (63.71)	48 (85.71)	.0027
Disagree	45 (36.29)	8 (14.29)	
The work I do is meaningful to me, n (%)			
Agree	114 (92.68)	56 (100.00)	.0588
Disagree	9 (7.32)	0 (0)	
How many hours do you work per week (e.g., seeing patients, writing notes, answering phone calls; not studying), n (%)			
<25	6 (4.92)	3 (5.36)	.0110
25–50	64 (52.46)	42 (75.00)	
>50	52 (42.62)	11 (19.64)	
How many nights are you on call in a typical month	1.91 (1.81)	1.75 (1.79)	.5725
How many weekends are you on call in a typical year?	2.69 (2.25)	2.45 (1.81)	.4886
How many hours of sleep do you get in a typical night?	6.77 (0.72)	6.91 (0.75)	.2454
During what year of training is your call requirement the most intensive, n (%)			
PGY1	7 (5.74)	10 (18.52)	.0442
PGY2	70 (57.38)	23 (42.59)	
PGY3	42 (34.43)	19 (35.19)	
PGY4 + PGY5 + PGY6 + PGY7	3 (2.46)	2 (3.70)	
Your current health care records are, n (%)			
Electronic	112 (93.33)	51 (94.44)	1.0000
Paper	1 (0.83)	0 (0)	
Hybrid of electronic and paper	7 (5.83)	3 (5.56)	
Do you have staff who provides documentation assistance to you during clinic (people who help enter information into the chart during the patient visit), n (%)			
Yes	28 (22.58)	15 (26.79)	.5402
No	96 (77.42)	41 (73.21)	

PGY, postgraduate year

Table 2
Multivariable logistic regression model of association of resident and institutional characteristics with burnout, depersonalization, and emotional exhaustion

	Odds ratio	95% confidence interval	p-value
Sex			
Male	0.72	0.33–1.56	.4057
Female			
Training year			
PGY1 + PGY2	1.21	0.49–2.98	.6780
PGY3	1.65	0.61–4.50	.3255
PGY4 + PGY5			
Balance between personal and professional life			
Dissatisfied	0.26	0.10–0.72	.0097
Satisfied			
Hours of work per week			
<25	0.77	0.14–4.39	.7704
25–50	1.85	0.30–11.52	.5101
>50			
I have significant autonomy in how I do my work			
Agree	3.58	1.32–9.71	.0122
Disagree			
The work I do is meaningful to me			
Agree	2.10	0.09–47.52	.6433
Disagree			
Quality of Life Five Dimensions Index	0.66	0.29–1.52	.3284
Respected by my physician colleagues outside of the field of dermatology	7.92	0.49–128.08	.1451
Agree			
Disagree			

PGY, postgraduate year

a large administrative burden outside of encounter documentation (e.g., result callback, prior authorizations) and these tasks eclipse the documentation burden. However, specific questions related to other administrative burdens were not asked.

The protective effect of meaningful work approached, but did not reach, significance on univariate analysis ($p = .059$). This finding was consistent with past research, which has shown that time spent on a meaningful activity is one of the biggest preventers of burnout (Shanafelt et al., 2009). Trainees who did not feel respected by colleagues in other medical specialties were more likely to be burned out ($p = .001$); however, this lost significance in the

multivariate model (OR: 7.9; CI, 0.490–128.1; $p = .145$). This is a novel finding in dermatology but is congruent with previous studies of workplace culture. In a systematic review of 25 studies of the generalized working population in the Western world, low workplace support (defined as social support from colleagues) was correlated with high emotional exhaustion, depersonalization, and overall burnout scores (Aronsson et al., 2017).

In our study, work–life balance and autonomy in the work place were the most protective factors against burnout. The importance of work–life balance has been studied extensively in the burnout literature (Roberts et al., 2014; Shanafelt et al., 2012; 2017; 2019;

Starmer et al., 2016) and has been consistently found to be one of its main drivers. Indeed, both work–life balance and autonomy at work point toward control over the environment as control over schedule and work-related activities. This relationship was shown in a study of 2000 physicians, demonstrating that control over schedule was one of the strongest predictors of work–life balance (Keeton et al., 2007).

The ability of residents to find time to schedule doctor appointments ($p = .0145$), see friends and family ($p < .001$), exercise ($p = .003$), perceive that they are getting adequate amounts of sleep ($p = .0020$), and engage in self-care activities (e.g., yoga, meditation, and leisure reading; $p < .001$) was found to be significantly protective against burnout on univariate analysis. Importantly, perceived adequate sleep had a greater impact on wellbeing than actual hours of sleep. This confirms the previously established relationship between subjective sleep quality and burnout and warrants further inquiry into the subjective and objective effects of sleep disturbance on burnout (Shad et al., 2015).

Curiously, the ability to participate in children's lives was not correlated with burnout ($p = .5312$); however, we think this may be due to the small sample size of residents with children. In contrast, overall QoL scores were not significantly different between groups on univariate and multivariate analysis. This was a surprising result given the strongly significant results seen in work–life balance and self-care questions and warrants further investigation. The importance of autonomy in training echoes similar findings in a wide range of specialties (Dyrbye and Shanafelt, 2016; Golub et al., 2007; Shirom et al., 2006) and emphasizes the need for residency programs to define the amount of autonomy appropriate for trainees and to make sure those benchmarks are being met at annual reviews.

In our study, we found that almost 11% of burned-out residents had thought about switching specialties in the last 24 months versus none in the non–burned-out group ($p = .010$). This question has not previously been explored in the dermatology literature, but it remains important. Data from the 2000–2009 Graduate Medical Education census reveals a trainee attrition rate of 1.5% to 7.9% (Kennedy et al., 2013).

Burnout did not significantly influence whether residents plan to enter private practice or academia after completion of training, which is a novel finding in the dermatology literature. Of all respondents, 14% stated that they would not become a physician again. However, only 1% of trainees exhibited specialty-specific regret. These results are very similar to those seen in a national longitudinal survey of U.S. physician trainees (career regret: 15.5%; specialty regret: 1.4%; Dyrbye et al., 2018). In our population, career regret was correlated with burnout ($p = .0053$), but specialty regret was not ($p = 1.00$).

In a subset analysis of our data, almost all factors associated with burnout were also significantly associated with emotional exhaustion and depersonalization. Only the association between adequate sleep and depersonalization did not reach significance ($p = .07$). A similar phenomenon was seen in a study by Koressel et al. (2020), where respondents met criteria for burnout in both emotional exhaustion and depersonalization. These findings are unsurprising because these two entities tend to trend together. Although the association between sleep and depersonalization did not reach statistical significance, this is most likely related to our small sample size.

Limitations

This is a survey-based study, which is limited by sampling and selection bias. This is particularly true because the survey was distributed by program directors. Program directors concerned about high burnout rates in their trainees could be reticent to distribute

the survey, skewing the results. Furthermore, our low response rate may have influenced the patterns found in the survey. Because our survey was anonymous (to protect respondents), important confounders, such as geographic location, specific training program, and family structure, could not be evaluated. Although we designated certain observations as either drivers or sequelae, the cross-sectional survey-based nature of this study makes determining causation impossible.

Conclusion

Burnout affects a large proportion of dermatologists. In our study population, more than half of U.S. dermatology trainees met the criteria for burnout, which suggests that increased focus on work–life balance and workplace autonomy could be protective against trainee distress. Prospective studies that account for regional and program-specific variations will be important in understanding the drivers of burnout and improving trainee education and experience.

Conflicts of interest

None.

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Study approval

The author(s) confirm that any aspect of the work covered in this manuscript that has involved human patients has been conducted with the ethical approval of all relevant bodies.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.ijwd.2021.05.001](https://doi.org/10.1016/j.ijwd.2021.05.001).

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