

Research Article

Risk Factors for Physician Burnout in Early Career Arthroplasty Surgeons

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Introduction

We sought to identify the prevalence and risk factors for physician burnout and job satisfaction among arthroplasty surgeons within their first five years of practice.

Methods

The American Association of Hip and Knee Surgeons (AAHKS) Young Arthroplasty Group was surveyed for this study. The survey collected data regarding surgeon demographics, extracurricular activities, and job satisfaction. The abbreviated Maslach Burnout Inventory (aMBI) was utilized to evaluate emotional exhaustion, depersonalization, and personal accomplishment. Demographic and practice variables were analyzed to identify any association with aMBI scores.

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Results

82 surgeons (35%) responded to the survey with 78% satisfied with their current job. Surgeons who were satisfied with their current job were more likely to have hobbies outside of orthopedics (OR = 7.50, $p = 0.005$), be younger (OR = 11.11, $p = 0.047$), and to be employed in a physician-owned practice type (OR = 9.09, practice, $p = 0.019$). The median personal accomplishment score was higher for those reporting hobbies outside of orthopedics (16 vs. 13.5, $p = 0.040$), performing research (16.5 vs. 16, $p = 0.006$), and having less call (17 vs. 14.5, $p = 0.001$). Depersonalization and emotional exhaustion scores were not related to any characteristic measured.

Conclusion

Emotional exhaustion, depersonalization, and sense of personal accomplishment varied greatly amongst early career arthroplasty surgeons. Having hobbies outside of orthopedics was most strongly associated with a sense of greater personal accomplishment and job satisfaction. Understanding risk factors related to burnout may help improve identification and prevention of this potential cause of job dissatisfaction and turnover.

INTRODUCTION

Physician burnout is an increasingly recognized cause of job dissatisfaction, turnover, and decreased productivity (Shanafelt, Dyrbye, and West 2017; Rotenstein et al. 2018; Chopra, Sotile, and Sotile 2004). Burnout is characterized by emotional exhaustion, depersonalization and a diminished sense of accomplishment (Jackson, Schwab, and Schuler 1986). All areas of medicine appear to be impacted by burnout to some degree. While there are an increasing number of studies exploring causes of burnout in medicine, there remains a paucity of information in early career arthroplasty surgeons.

Job turnover is common among arthroplasty surgeons in the first five years of clinical practice ("High Physician Turnover Needs Early Intervention Cure," n.d.). Turnover has been attributed to numerous factors including compensation, work hours, and call responsibilities (Fibuch and Ahmed, n.d.; Pathman et al. 2002). While these factors may be associated with burnout leading to job turnover, their explicit association with job dissatisfaction among early career arthroplasty surgeons is not well-described. For this reason, we sought to evaluate burnout and job satisfaction in a cohort of early career arthroplasty surgeons.

The recently formed American Association of Hip and Knee Surgeons Young Arthroplasty Group (AAHKS YAG) offers a unique national cohort of early career arthroplasty surgeons. The AAHKS YAG is composed of arthroplasty trainees and practicing surgeons within their first five years of practice. By soliciting feedback from the AAHKS YAG membership currently in clinical practice, this study sought to investigate characteristics associated with burnout and job satisfaction among early career arthroplasty surgeons.

METHODS

We performed a cross-sectional email survey of members of the AAHKS YAG. This group consists of orthopedic surgeons in surgical training as well as arthroplasty surgeons in their first five years of clinical practice. The survey was

emailed to the 402 YAG members, 237 of which were in clinical practice. Two subsequent email reminders were sent to this same cohort to increase participation within the group. 82 of the 237 eligible surgeons responded. This study was exempt from Institutional Review Board approval as no protected health information was collected for this questionnaire-based study. No external funding was received for this study.

The survey was comprised of two domains. The first domain collected demographic information on each YAG member and his or her employment characteristics. Provider demographics included age, gender, marital status, children, and reported hobbies outside of orthopedics. Job demographic information included years in practice, whether working full-time, whether first job as arthroplasty surgeon, type of clinical practice, partnership status, work hours, call frequency, whether engaged in research, whether engaged in teaching residents or fellows, and subjective satisfaction with their current job. The second domain of the survey included a previously validated burnout questionnaire, the Maslach Burnout Inventory (Maslach, Jackson, and Leiter, n.d.). We utilized a subset of this questionnaire referred to as the abbreviated Maslach Burnout Inventory (aMBI). This survey is a nine-item scale that assesses three categories: emotional exhaustion, depersonalization, and personal accomplishment. Each category is comprised of three questions that are scored from zero (never) to six (every day). Emotional exhaustion scores ≤ 6 indicate low burnout, 7-10 indicate moderate burnout, and ≥ 11 indicate high burnout; depersonalization scores ≤ 3 indicate low burnout, 4-6 indicate moderate burnout, and ≥ 7 indicate high burnout; and personal accomplishment scores (reverse coded) ≥ 15 indicate low burnout, 13-14 indicate moderate burnout, and ≤ 12 indicate high burnout. The aMBI has been validated for use in several other specialties. Higher scores for emotional exhaustion and depersonalization are associated with burnout, whereas higher scores for personal accomplishment are associated with job satisfaction.

STATISTICAL ANALYSIS

Standard descriptive summary statistics were used to characterize the surgeon cohort. Continuous variables were tested using the Shapiro-Wilk test for normality. Given that the continuous variables – both outcomes and predictors – were not normally distributed, estimates were reported using medians and interquartile ranges (IQR). Categorical variables were reported using proportions. Associations between physician characteristics and the burnout metrics were tested using the Kruskal-Wallis Equality-of-Population Rank Test (a non-parametric test). Associations between physician characteristics and job satisfaction were tested using univariate logistic regression models to estimate odds ratios (OR) with 95% confidence intervals (95% CI), comparing different strata of physician characteristics. Given that only one participant reported not working full-time and that only three participants reported not taking call, the association between these characteristics and the outcomes were not assessed. All statistical analyses were performed using STATA 14 statistical software (StataCorp 2015) and utilized a type 1 error level of 0.05.

RESULTS

Of the 237 young arthroplasty surgeons who were invited to participate, 82 (35%) completed the survey. [Table 1](#) displays the provider demographics of the participating physicians. Participants ranged in age from 30 to 43 years, and were predominantly male (90.2%), married (90.2%), and had children (79.3%). Nearly all reported working full-time (98.8%), and that their current job was their first job as an arthroplasty surgeon (85.4%). Slightly less than half (45.1%) reported being in practice for 1 to 2 years, 34.2% reported being in practice for 3 to 4 years, and 20.7% reported being in practice for 5 years. Practice type varied among the sample: 37.8% reported being part of a physician-owned practice, 29.3% reported being a hospital employee, 24.4% reported being a university employee, and 8.5% reported being a hybrid of these. Of the total sample, 31.3% reported being a partner. Most participants reported taking call (96.3%). Slightly more than half of the sample reported performing research (51.2%) and teaching residents or fellows (51.2%). Most participants reported having hobbies outside of orthopedics (87.8%).

Rates of burnout as well as self-reported job satisfaction are summarized in [Table 2](#). As assessed using the aMBI, 24.7% of respondents reported high emotional exhaustion, 26.8% reported high depersonalization, and 11.0% reported low levels of personal accomplishment. When asked if they were satisfied with their current job, 22.0% of respondents answered “no”.

Associations between physician characteristics and burnout are displayed in [Table 3](#). There were no statistically significant associations between any of the physician characteristics measured in the survey and emotional exhaustion or depersonalization. Personal accomplishment was significantly higher among respondents who reported (1)

having hobbies outside of orthopedics, (2) being engaged in research, and (3) having lower call frequency.

Associations between physician characteristics and job satisfaction are displayed in [Table 4](#). Participants who reported having hobbies outside of orthopedics were more likely to report being satisfied with their current job compared to those who reported not having such hobbies (OR = 7.500, $p = 0.005$). Conversely, compared to participants in the youngest age category (30-33 years), those in the oldest age category (40-43 years) were slightly less likely to report being satisfied with their current job (OR = 0.092, $p = 0.047$). Participants who reported having a hybrid practice type (compared to physician-owned) were also less likely to report being satisfied with their current job (OR = 0.111, $p = 0.019$).

Table 1. Characteristics of Responding Physicians.

Characteristic	n (%)
Age	
30-33	14 (17.1%)
34-36	37 (45.1%)
37-39	20 (24.4%)
40-43	11 (13.4%)
Gender	
Male	74 (90.2%)
Female	8 (9.8%)
Married	
Yes	74 (90.2%)
No	8 (9.8%)
Children	
Yes	65 (79.3%)
No	17 (20.7%)
Years in practice	
1-2	37 (45.1%)
3-4	28 (34.2%)
5	17 (20.7%)
Full-time	
Yes	81 (98.8%)
No	1 (1.2%)
First job as arthroplasty surgeon	
Yes	70 (85.4%)
No	12 (14.6%)
Practice type	
Physician-owned	31 (37.8%)
Hospital employee	24 (29.3%)
University employee	20 (24.4%)
Hybrid	7 (8.5%)
Partner	
Yes	25 (31.3%)
No	55 (68.8%)
Take call	
Yes	79 (96.3%)
No	3 (3.7%)
Call frequency	
1/week	52 (65.0%)
1-2/week	22 (27.5%)
>2/week	6 (7.5%)
Work hours weekly	
<40	2 (2.4%)
40-60	54 (65.9%)
60-80	23 (28.1%)
>80	3 (3.7%)
Perform research	
Yes	42 (51.2%)
No	40 (48.8%)

Characteristic	n (%)
Teach residents/fellows	
Yes	42 (51.2%)
No	40 (48.8%)
Hobbies outside orthopedics	
Yes	72 (87.8%)
No	10 (12.2%)

Table 2. Burnout Subscales and Self-Reported Job Satisfaction among Responding Physicians.

Variable	Value
Emotional exhaustion	
Median score (IQR)	7 (10 – 4)
Score level [range]; n (%)	
Low burnout [≤ 6]	40 (49.4%)
Moderate burnout [7-10]	21 (25.9%)
High burnout [≥ 11]	20 (24.7%)
Depersonalization	
Median score (IQR)	3 (7 – 1)
Score level [range]; n (%)	
Low burnout [≤ 3]	45 (54.9%)
Moderate burnout [4-6]	15 (18.3%)
High burnout [≥ 7]	22 (26.8%)
Personal accomplishment	
Median score (IQR)	16 (17 – 14)
Score level [range]; n (%)	
Low burnout [≥ 15]	58 (70.7%)
Moderate burnout [13-14]	15 (18.8%)
High burnout [≤ 12]	9 (11.0%)
Satisfied with current job; n (%)	
Yes	64 (78.1%)
No	18 (22.0%)

Table 3. Relation Between Physician Characteristics and Burnout.

Characteristic	Emotional Exhaustion			Depersonalization			Personal Accomplishment		
	Median	(IQR)	<i>p</i>	Median	(IQR)	<i>p</i>	Median	(IQR)	<i>p</i>
Age			0.492			0.081			0.873
30-33	7	(8 – 3)		2	(6 – 0)		16	(18 – 15)	
34-36	6	(10 – 4)		3	(5 – 2)		16	(17 – 14)	
37-39	9	(12 – 4)		6	(9 – 3)		16	(17 – 13.5)	
40-43	9	(11 – 3)		3	(4 – 0)		17	(17 – 12)	
Gender			0.087			0.894			0.093
Male	6	(10 – 4)		3	(7 – 1)		16	(17 – 14)	
Female	10.5	(12.5 – 6.5)		3	(7.5 – 1.5)		14	(16.5 – 12)	
Married			0.421			0.487			0.292
Yes	6.5	(10 – 4)		3	(7 – 2)		16	(17 – 14)	
No	9.5	(12.5 – 4)		4.5	(10 – 1)		15	(16.5 – 14)	
Children			0.360			0.301			0.447
Yes	6	(10 – 4)		3	(5 – 2)		16	(17 – 14)	
No	8	(11 – 4)		6	(10 – 1)		16	(17 – 14)	
Years in practice			0.763			0.750			0.574
1-2	6	(10 – 4)		3	(7 – 1)		16	(17 – 14)	
3-4	6	(10 – 3.5)		4	(6.5 – 2)		16	(17 – 15)	
5	8	(10 – 6)		3	(7 – 2)		15	(17 – 14)	
First job as arthroplasty surgeon						0.974			0.240
Yes	7	(11 – 4)	0.718	3	(7 – 1)		16	(17 – 14)	
No	6.5	(9.5 – 3.5)		3.5	(5.5 – 2)		15.5	(16.5 – 14)	
Practice type			0.570			0.823			0.888
Physician-owned	6	(10 – 2)		4	(7 – 1)		16	(17 – 15)	
Hospital employee	8	(12 – 5.5)		3	(7.5 – 1)		16	(17 – 14)	
University employee	6.5	(9 – 4)		2.5	(5.5 – 1.5)		16.5	(17.5 – 13.5)	
Hybrid	5	(10 – 4)		3	(8 – 3)		16	(16 – 14)	
Partner			0.367			0.085			0.142
Yes	6	(9 – 3)		4	(8 – 3)		17	(17 – 15)	

Characteristic	Emotional Exhaustion			Depersonalization			Personal Accomplishment		
	Median	(IQR)	<i>p</i>	Median	(IQR)	<i>p</i>	Median	(IQR)	<i>p</i>
No	7	(11 – 4)		3	(7 – 1)		16	(17 – 14)	
Call frequency			0.489			0.969			0.001
1/week	6	(9.5 – 3)		3	(7 – 1.5)		17	(17 – 16)	
1-2/week	6.5	(12 – 4)		3	(7 – 1)		15	(16 – 14)	
>2/week	8.5	(10 – 4)		3	(7 – 2)		14.5	(17 – 13)	
Work hours weekly			0.461			0.594			0.915
<40	3.5	(5 – 2)		4	(5 – 3)		15	(18 – 12)	
40-60	7	(10 – 4)		3	(6 – 1)		16	(17 – 14)	
60-80	8	(11 – 5)		4	(8 – 1)		16	(17 – 15)	
>80	5	(14 – 1)		2	(8 – 0)		15	(18 – 14)	
Perform research			0.094			0.594			0.006
Yes	6	(9 – 3)		3	(7 – 1)		16.5	(18 – 15)	
No	8	(12 – 4)		3.5	(7 – 1.5)		16	(16.5 – 13)	
Teach residents/fellows			0.745			0.516			0.578
Yes	7	(11 – 4)		3	(7 – 2)		16	(17 – 14)	
No	6.5	(10 – 4)		3	(7 – 5)		16	(17 – 14)	
Hobbies outside orthopedics			0.859			0.961			0.040
Yes	7	(10.5 – 3.5)		3	(7 – 1.5)		16	(17 – 15)	
No	7	(10 – 4)		3	(8 – 1)		13.5	(16 – 12)	

DISCUSSION

Physician burnout, characterized by emotional exhaustion, depersonalization, and decreased personal accomplishment, is unfortunately common throughout all areas of medicine (Rotenstein et al. 2018; Tawfik et al. 2017). Recently, there has been increased interest in exploring physician burnout within orthopedics (Travers 2020; Siddiqui et al. 2018). Currently, limited data is available on early career arthroplasty surgeons with regards to burnout. In our current study, we have attempted to define the incidence of burnout in this cohort of providers. Additionally, we have explored provider demographics and potential risk factors for burnout.

Several studies have evaluated the incidence or risks of burnout within orthopedics (Travers 2020; Somerson et al. 2020; Siddiqui et al. 2018). Somerson et. al. performed an internet based burnout survey study to evaluate orthopedic resident burnout and included 161 accredited United States programs (Somerson et al. 2020). In their study, they noted three specific factors that were statistically associated with burnout: (1) receiving verbal abuse from faculty, (2) use of the electronic medical record more than 20 hours per week, and (3) working more than 80 hours per week. They noted that all three of these risk factors for burnout are potentially modifiable. Lichstein et. al. recently published an article evaluating burnout and drug use amongst orthopedic surgery residents (Lichstein et al. 2020). 52% of their responding residents noted burnout (342/661). Emotional exhaustion risk factors included early training year, unmanageable work volume, inability to attend health maintenance appointments, lack of exercise, and lack of program support. Depersonalization risk factors included early training year, inability to attend health maintenance appointments, and lack of co-resident support. Feelings of low personal accomplishment risk factors included lack of co-resident support and lack of program support. In our study, we identified 24.7% of respondents with high emotional exhaustion, 26.8% with high depersonalization, and 11.0% with low levels of personal accomplishment. We noted several provider demographics were significantly associated with increased sense of personal accomplishment including (1) having hobbies outside of orthopedics, (2) being engaged in research, and (3) having lower call frequency.

In our study, we utilized the abbreviated Maslach Burnout Inventory to determine provider burnout. This inventory is comprised of nine questions that evaluate three specific domains: (1) emotional exhaustion, (2) depersonalization, and (3) personal accomplishment. Numerous studies within medicine have utilized this inventory when screening burnout amongst providers (Lebares et al. 2018; Rohland, Kruse, and Rohrer 2004; Ganeshan, Wei, and Yang 2019; Vijendren, Yung, and Shiralkar 2018). We chose to utilize this index because it is easy to administer electronically in our cohort of young arthroplasty surgeons and requires less time to complete than other indices. However, there has been recent concern that the aMBI may overestimate burnout. Lim et. al. performed a burnout evalua-

tion amongst 86 anesthesiology residents (Lim et al. 2019). They noted that the incidence of burnout identified by the MBI was significantly lower than the aMBI 22.4% vs. 62.1%, ($p < 0.0001$). As discussed previously, the incidence of high emotional exhaustion, depersonalization and a diminished sense of personal accomplishment was less than 30% in each domain. We believe that this is likely a true estimation of burnout in this young cohort of arthroplasty surgeons. However, further study is necessary to corroborate our findings.

While there has been increased interest in identifying risk factors for burnout among physicians, more recent research has focused on improving burnout (Panagioti et al. 2017). In the current study, 11-27% had positive criteria for various components of burnout. Additionally, we noted protective factors for an increased sense of personal accomplishment and higher job satisfaction, including relatively younger age and having hobbies outside of orthopedics. Future studies evaluating burnout among early career arthroplasty surgeons might consider these characteristics as targets for interventions to decrease the incidence of burnout.

While our study represents the first burnout study among early career arthroplasty surgeons, there are several notable limitations. First, the response rate for our study was 35%. We made numerous attempts to try and increase participation through repetitive emails and reminders, but still only had 82 providers respond. Second, we utilized an abbreviated Maslach Burnout Index, rather than the standard-length index. There is some concern that the abbreviated version may over-estimate burnout (Lim et al. 2019). However, we did not see excessively high burnout scores for any of the three domains in our study. Third, the survey was conducted prior to the COVID-19 pandemic. It is possible that practice changes that have occurred during the pandemic may affect responses to the survey questions. Finally, the Young Arthroplasty Group is a subset of early career arthroplasty surgeons. This group is comprised of young, motivated hip and knee surgeons, and it offers mentorship and guidance as surgeons begin their practice. Therefore, the relatively low rates of burnout in this cohort may not fully represent the general population of young arthroplasty surgeons. From 2015-2020, there were approximately 844 arthroplasty fellowship spots filled. At the time of this study, 237 YAG members were in their first five years of practice. Therefore, approximately 28% of all fellowship trained arthroplasty surgeons in the first five years of practice were YAG members.

CONCLUSION

Burnout is a widely recognized source of job dissatisfaction and turnover that appears to be present in nearly all areas of medicine. Our study has evaluated the incidence of burnout in early career arthroplasty surgeons. We identified 11-27% of correspondents recording high scores on any of three burnout domains (emotional exhaustion, depersonalization, and a decreased sense of personal accomplishment). We have identified some protective factors such as having hobbies outside of orthopedics and engaging in re-

Table 4. Relation Between Physician Characteristics and Job Satisfaction.

Characteristic	Satisfied with Current Job		
	Odds Ratio	(95% CI)	p
Age			
30-33 (ref.)			
34-36	0.239	(0.027 – 2.092)	0.196
37-39	0.436	(0.041 – 4.689)	0.493
40-43	0.092	(0.009 – 0.973)	0.047
Gender			
Female (ref.)			
Male	1.208	(0.222 – 6.570)	0.827
Married			
No (ref.)			
Yes	0.479	(0.055 – 4.171)	0.505
Children			
No (ref.)			
Yes	1.121	(0.316 – 3.980)	0.860
Years in practice			
1-2 (ref.)			
3-4	1.179	(0.364 – 3.814)	0.784
5	1.500	(0.350 – 6.431)	0.585
First job as arthroplasty surgeon			
No (ref.)			
Yes	0.675	(0.134 – 3.402)	0.634
Practice type			
Physician-owned (ref.)			
Hospital employee	0.444	(0.110 – 1.800)	0.256
University employee	0.593	(0.130 – 2.703)	0.499
Hybrid	0.111	(0.018 – 0.692)	0.019
Partner			
No (ref.)			
Yes	1.793	(0.524 – 6.129)	0.352
Compensation = RVU			
No (ref.)			
Yes	3.907	(0.821 – 18.590)	0.087
Compensation = Collections			
No (ref.)			
Yes	2.154	(0.687 – 6.755)	0.188
Compensation = Salary			
No (ref.)			
Yes	0.208	(0.062 – 0.704)	0.012
Receive ancillaries			
No (ref.)			
Yes	1.957	(0.505 – 7.578)	0.331
Paid call			
No (ref.)			
Yes	1.207	(0.424 – 3.438)	0.725
Call frequency			
1/week (ref.)			

Characteristic	Satisfied with Current Job		
	Odds Ratio	(95% CI)	p
1-2/week	1.071	(0.297 – 3.870)	0.916
>2/week	0.238	(0.042 – 1.360)	0.107
Work hours weekly			
<40 (ref.)			
40-60	3.909	(0.226 – 67.567)	0.348
60-80	3.600	(0.190 – 68.341)	0.394
>80	2.000	(0.051 – 78.250)	0.711
Perform research			
No (ref.)			
Yes	2.571	(0.858 – 7.705)	0.092
Teach residents/fellows			
No (ref.)			
Yes	1.065	(0.374 – 3.030)	0.907
Hobbies outside orthopedics			
No (ref.)			
Yes	7.500	(1.833 – 30.683)	0.005

search that appear to be associated with a greater sense of personal accomplishment. We believe a more thorough understanding of burnout has the potential to lead to improved job satisfaction and less practice turnover.

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Maslach Burnout Inventory (Abbreviated) – MBI-9

Maslach C, et al. *The Maslach Burnout Inventory*. 3rd ed. 1996

How often:	Never	A few times a year	Once a month or less	A few times a month	Once a week	A few times a week	Every day
	0	1	2	3	4	5	6
1) I deal very effectively with the problems of my patients.							
2) I feel I treat some patients as if they were impersonal objects.							
3) I feel emotionally drained from my work.							
4) I feel fatigued when I get up in the morning and have to face another day on the job.							
5) I've become more callous towards people since I took this job.							
6) I feel I'm positively influencing other people's lives through my work.							
7) Working with people all day is really a strain for me.							
8) I don't really care what happens to some patients.							
9) I feel exhilarated after working closely with my patients.							

Add items 1, 6, 9	Add items 2, 5, 8	Add items 3,4,7
TOTAL _____	TOTAL _____	TOTAL _____
Personal Accomplishment ≥15: low burnout 13-14: moderate burnout ≤12: high burnout	Depersonalization ≤3: low burnout 4-6: moderate burnout ≥7: high burnout	Emotional Exhaustion ≤6: low burnout 7-10: moderate burnout ≥11: high burnout

APPENDIX