Risk of Burnout in Perioperative Clinicians

A Survey Study and Literature Review

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ABSTRACT

Background: Burnout can lead to health and psychologic problems and is apparently increasing in physicians and nurses. Previous studies have not evaluated all healthcare workers within a single work unit. This study evaluates the risk of burnout in all medical personnel in one perioperative unit.

Methods: We developed an online survey that included demographics, a modified version of the Maslach Burnout Inventory–Human Services Survey, and the Social Support and Personal Coping Survey. Survey constructs (*e.g.*, depersonalization and health) and a global score were calculated. Larger construct and global values were associated with higher risk of burnout. These were separately regressed on role, age, and sex. The global score was then regressed on each of the survey constructs.

Results: Of the 145 responses, 46.2% were physicians (22.8% residents), 43.4% were nurses or nurse anesthetists, and 10.3% were other personnel. After adjusting for sex and age, residents scored higher than other physicians on the following (expected change [95% confidence interval]): global score (1.12 [0.43–1.82]), emotional exhaustion (1.54 [0.44–2.60]), and depersonalization (1.09 [0.23–1.95]). Compared with nonphysicians, residents were 1 U or more higher on these items ($P < 0.05$ in all cases). Residents had higher health (1.49 [0.48–2.50]) and workload (1.23 [0.07–2.40]) values compared with physicians. Better health, personal support, and work satisfaction scores were related to decreased global scores ($P < 0.05$).

Conclusions: Physicians (particularly residents) had the largest global burnout scores, implying increased risk of burnout. Improving overall health, increasing personal support, and improving work satisfaction may decrease burnout among perioperative team members.

What We Already Know about This Topic

- Although burnout is a significant concern among health care providers, a cross-sectional study of burnout among all members of a perioperative unit has not been performed

What This Article Tells Us That Is New

- Among 145 survey respondents using a modified version of the Maslach Burnout Inventory, global burnout scores were higher in physicians than nurse anesthetists and other personnel and highest among residents

BURNOUT is a term coined in the early 1970s by Herbert J. Freudenberger, Ph.D., a psychologist and psychoanalyst.[1,2] The term was given measurable attributes (*i.e.*, emotional exhaustion, depersonalization, and personal accomplishment) by Maslach *et al.*[3] in the 1990s. Burnout can lead to poor-quality work, job turnover, and personal and family difficulties. Perioperative clinicians may be at particular risk for burnout given increasing production pressure and staff shortages,[3] care of extremely ill patients, and work with extreme responsibility.[4]

For decades, the business community has realized that on-

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the-job factors can affect job performance and satisfaction.[5–9] Early studies of physicians did not directly assess burnout; instead, they ascertained career satisfaction or career longevity. For example, Hall *et al.*[10] surveyed emergency department physicians and found the "ten-year survival rate" was 84.9%, (*i.e.*, 15.1% attrition after 10 yr). In 1995, Fields *et al.*[11] studied pediatric critical care physicians using the Pines and Aronson burnout scale and found that 14% of respondents were burned out and another 36% were at risk of burnout. Since then, the Maslach Burnout Inventory–Human Services Survey (MBI–HSS) has become the definitive standard for evaluating the risk of job burnout in persons working in human services and health care.[3] The Pines and Aronson and the Maslach surveys are the most common burnout measures and are similar in scope (*e.g.*, tiredness and mood) and number (21 and 22, respectively) of their questions. Unlike the Pines and Aronson survey, in which subjects respond to short phrases, the MBI–HSS is written in complete sentences that are specifically geared for subjects who work in human service professions. More recent studies have used the MBI–HSS to evaluate burnout risk in, among others, surgeons,[12] otolaryngologists,[13] and academic reproductive medicine chairs.[14]

These later studies suggested that the risk of burnout and job dissatisfaction has increased in the modern healthcare workforce. Although burnout can occur regardless of work environment,[4] the risk may be increased by current healthcare work issues, such as financial pressures, reimbursement, and malpractice risk.[14–16] These issues, compounded with inherent personality risk factors,[3] can produce a cascade of events leading to significant worker morbidity. These personality traits may include an avoidant coping style and an external locus of control (*i.e.*, a feeling that luck or someone else [rather than one's self] is responsible for what happens to an individual). Burnout within a workplace is contagious (*i.e.*, it can spread to coworkers).[4,13]

Safe surgical care requires high performance by a team of well-trained surgeons, anesthesiologists, nurses, and other personnel; clinical performance can be further mediated by individual factors, including skill, preparation, stress, mood, state of health, and motivation.[17] Performance-shaping factors, including workload, role conflict, lack of community, and value conflicts can predispose to exhaustion, depersonalization, and "inefficacy."[3] Such findings are often signs of burnout and are not unique to anesthesia; however, they can occur in all physician specialties and in nurses and pharmacists. Burnout has been associated with substance abuse,[16,18,19] mental health issues,[20] early retirement,[21,22] physical illness,[23,24] and *presenteeism* (a syndrome in which workers are physically present but have low motivation and work effort).[25] Presenteeism can cyclically lead to poor job performance and further burnout. In addition to the risk of burnout spreading to other workers, some workers may refuse to work with a burned-out individual.[4]

Most previous studies of burnout in healthcare providers have examined individual specialties; none concurrently assessed burnout in multiple disciplines of the same healthcare team in the same work environment, and none have evaluated the operating room team. We designed the current study to quantify job burnout among perioperative providers in one operating room suite, to identify risk factors associated with job burnout, and to delineate factors that might improve job satisfaction and/or aid in coping with job stress.

Materials and Methods

A survey of 77 questions was developed to assess the magnitude of emotional, mental, and physical exhaustion among

Table 1. Modified MBI–HSS Questions

Construct	MBI–HSS Wording	
	Original	Modified
Depersonalization	I feel I treat some recipients as if they were impersonal objects.	I feel I treat some patients as if they were impersonal objects.
	I do not really care what happens to some recipients.	I do not really care what happens to some patients.
	I feel recipients blame me for some of their problems.	Patients blame me for some of their problems.
Emotional exhaustion	I feel fatigued when I get up in the morning and have to face another day on the job.	I still feel tired when I wake up on workday mornings.
Personal accomplishment	I can easily understand how my recipients feel about things.	I can easily understand how my patients feel about things.
	I deal effectively with the problems of my recipients.	I deal effectively with my patient's problems.
	I can easily create a relaxed atmosphere with my recipients.	I can easily create a relaxed atmosphere for my patients.
	I feel exhilarated after working closely with my recipients.	I feel exhilarated after working closely with my patients.

HSS = Human Services Survey; MBI = Maslach Burnout Inventory.

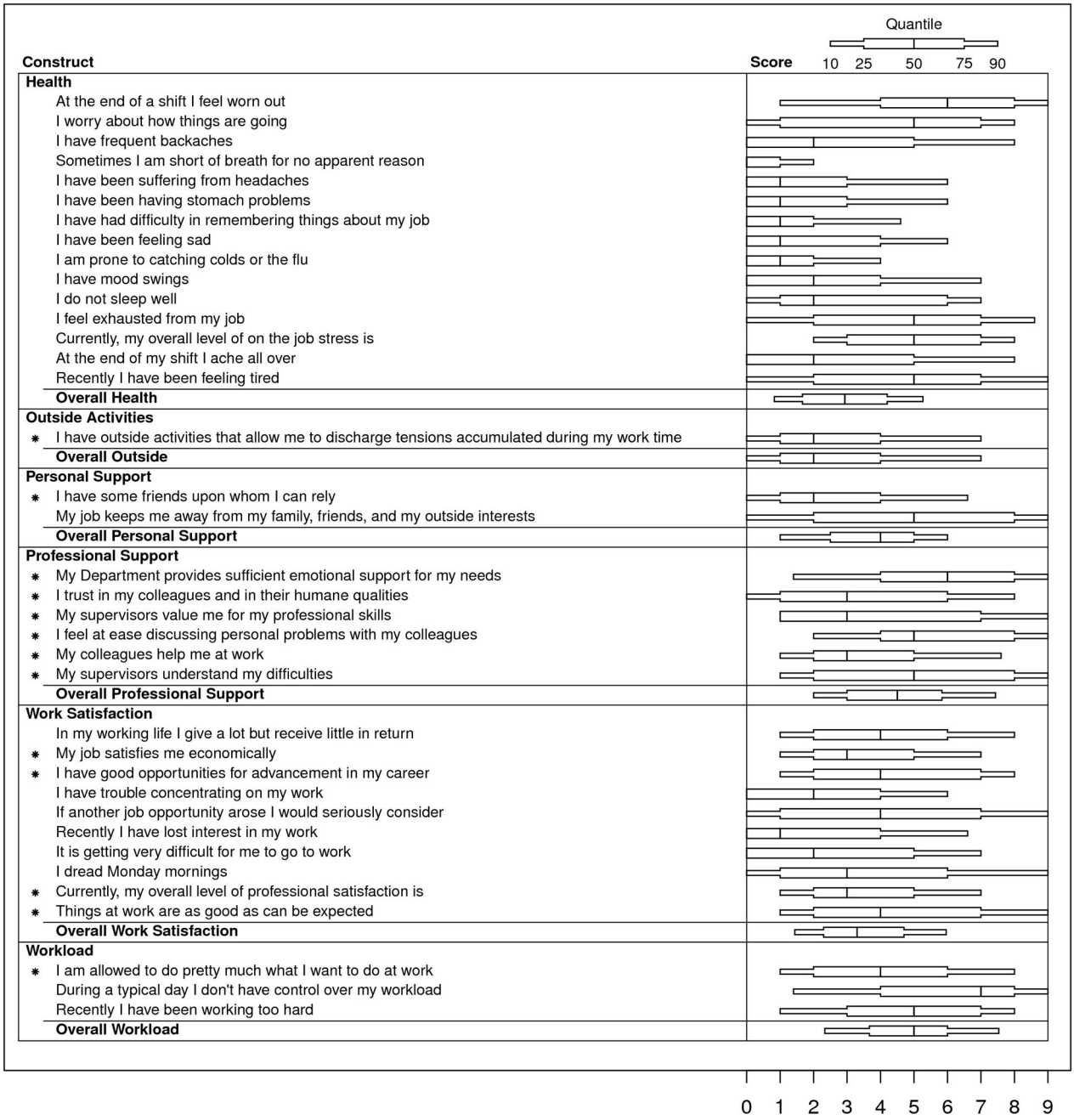

Fig. 1. Scores for all social support and personal coping questions. The distributions, as summarized by the 10th through 90th quantiles, of social support and personal coping items and overall constructs are shown. All survey questions are shown as used in the original survey, although those with an asterisk had their tone changed (*i.e.*, from positive to negative) for data analysis.

employees in a busy adult perioperative area. Twenty-two of the questions were the MBI–HSS, whereas the remainder were developed to describe the availability and impact of individuals' social support system and coping strategies.

The Institutional Review Board Behavioral Sciences Committee at Vanderbilt University, Nashville, Tennessee, approved the study. To minimize potential bias, potential participants were not informed of the specific purpose of the study. The act of completing and submitting the questionnaire implied consent. Given the intimate nature of some questions and the potential revelation of undesirable behaviors, it was important that participants not be identifiable. All data were kept completely anonymous to avoid any perceived retribution from participants' superiors. Each questionnaire was numerically coded (to permit follow-up of nonrespondents), but this code was unavailable to the test administrators or data analysts. Consequently, in addition to the general role within the perioperative care environment (*e.g.*, surgeon,

Table 2. Descriptive Summaries by Role

Variable	Role					Overall	*P* Value
	Resident*	Physician	CRNA	Nurse	Other†		
Participants, No. (%)	34 (23.4)	33 (22.8)	29 (20.0)	34 (23.4)	15 (10.3)	145	NA
Age, y	33.0 [6.0]	51.0 [9.0]	44.0 [9.0]	51.0 [7.0]	44.0 [15.5]	45.0 [16.0]	NA
Male sex, No. (%)	20 (58.8)	23 (69.7)	15 (51.7)	2 (5.9)	3 (20.0)	63 (43.4)	NA
MBI–HSS constructs							
Emotional exhaustion	4.5 [2.6]	3.45 [2.9]	2.45 [2.4]	3.3 [2.1]	3.0 [2.6]	3.4 [2.7]	0.001‡
Depersonalization	3.35 [3.0]	1.45 [1.6]	1.25 [1.8]	1.0 [2.0]	0.8 [1.2]	1.4 [2.0]	<0.001‡
Lack of personal accomplishment	3.75 [1.3]	2.25 [1.2]	3.15 [1.9]	2.1 [1.6]	2.8 [2.4]	2.8 [1.8]	<0.001‡
Global score	4.05 [1.3]	2.45 [1.8]	2.45 [1.4]	2.2 [1.3]	2.1 [1.0]	2.7 [1.8]	<0.001‡
Social support and personal coping constructs							
Health	3.75 [2.4]	2.75 [1.8]	2.55 [3.1]	2.8 [2.6]	2.7 [2.3]	2.9 [2.5]	0.005‡
Personal support	4.55 [1.9]	4.55 [3.0]	3.55 [2.0]	3.0 [3.4]	2.0 [2.8]	4.0 [2.5]	<0.001‡
Professional support	4.75 [2.3]	4.85 [3.5]	3.55 [3.2]	4.8 [2.2]	4.7 [3.0]	4.5 [2.8]	0.698
Workload	5.75 [2.2]	5.05 [2.0]	4.75 [2.0]	4.7 [2.9]	4.7 [2.3]	5.0 [2.3]	0.079
Work satisfaction	4.35 [2.7]	2.85 [2.8]	2.75 [1.2]	3.7 [1.7]	3.5 [1.4]	3.3 [2.4]	0.008‡
Outside activities	2.55 [4.0]	3.05 [3.0]	2.05 [3.0]	1.0 [1.8]	2.0 [2.5]	2.0 [3.0]	0.029‡

Data are given as median [interquartile difference] unless otherwise indicated.

* Physicians with five or fewer years of post–medical school experience were classified as residents for this study. † Clinical job categories in this group included clinical care partner, radiology technician, and one doctoral staff member. ‡ Statistically significant difference between roles by Kruskal–Wallis test. *P* values were not adjusted for multiple comparisons.

CRNA = certified registered nurse anesthetist; HSS = Human Services Survey; MBI = Maslach Burnout Inventory; NA = not applicable.

nurse, or anesthesia provider), we did not collect any data (*e.g.*, resident status) that could potentially be used to identify individual respondents. Participants accessed a Web site linked to a secure database (Vovici, Dulles, VA).

Study Population

Participants were employees with patient contact responsibilities in an adult perioperative suite (including preoperative, intraoperative, and postoperative areas). Eligible participants included nurses, certified registered nurse anesthetists, surgeons (resident and attending), anesthesiologists (resident and attending), scrub technicians, and other nondegreed clinical care providers. Medical students and student nurse anesthetists were excluded. In this study, *residents* were defined as physicians with five or fewer years of post–medical school experience.

We specifically targeted the unit's primary healthcare professional workforce, 250 potential participants, by e-mail and asked them to complete the Web-based survey. To maximize response rate, we sent three sequential e-mails to the participants. In addition, we placed recruitment posters in strategic locations (*i.e.*, break rooms, locker rooms, control rooms, and nurses' stations).

Survey Questions

Modified Maslach Constructs. The MBI–HSS evaluates the three aspects of burnout (*i.e.*, emotional exhaustion, depersonalization, and personal accomplishment). We altered the original MBI–HSS in three ways:

1. The possible responses for the original Maslach survey ranged from never (0) to every day (6) and asked the respondent to recall information from the past year. We focused on the past 2–4 weeks and ranked them on a scale of lowest (0) to highest (9) to provide a finer resolution of the responses.
2. We slightly altered the wording of eight items from the original MBI–HSS instrument to make it more applicable to perioperative care providers (table 1).
3. The MBI–HSS items (or their modified counterparts) were intertwined with other questions and were not in their original order.

To assess the effect of these modifications on the reliability of each construct, Cronbach's α statistics were calculated on the collected survey data. The α values for emotional exhaustion, depersonalization, and personal accomplishment were 0.88, 0.77, and 0.82, respectively, which indicates that even with the modifications the questions measured similar structures. Regardless, these modifications negated the applicability of the original instrument's scoring metrics. The average of the three constructs was used to define a "burnout global score." Because the tone of emotional exhaustion and depersonalization is negative, the personal accomplishment construct was transformed into a lack of personal accomplishment construct by subtracting nine from the personal accomplishment score because nine was the maximum item score in our version of the MBI–HSS.

Social Support and Personal Coping Constructs. The remainder of the survey was composed of questions intended to delineate individual's coping strategies and social support sys-

Table 3. Multiple Linear Regression Models for MBI–HSS and Social Support and Personal Coping Constructs

Outcomes	Resident (Intercept)	Physician	CRNA
MBI–HSS constructs			
Global score	3.94 (3.49, 4.39)	−1.12 (−1.82, −0.43)*	−1.26 (−1.88, −0.63)*
Emotional exhaustion	4.79 (4.07, 5.51)	−1.54 (−2.64, −0.44)*	−1.86 (−2.86, −0.87)*
Depersonalization	3.24 (2.68, 3.81)	−1.09 (−1.95, −0.23)*	−1.39 (−2.17, −0.62)*
Low personal accomplishment	3.79 (3.23, 4.34)	−0.74 (−1.59, 0.11)	−0.51 (−1.28, 0.25)
Social support and personal coping constructs			
Health	4.13 (3.47, 4.79)	−1.49 (−2.50, −0.48)*	−1.37 (−2.28, −0.47)*
Outside activities	3.19 (2.17, 4.20)	0.92 (−0.63, 2.47)	0.00 (−1.39, 1.40)
Personal support	4.45 (3.76, 5.13)	−0.40 (−1.45, 0.65)	−1.19 (−2.14, −0.25)*
Professional support	5.39 (4.56, 6.23)	0.36 (−0.92, 1.64)	−0.32 (−1.48, 0.83)
Work satisfaction	4.61 (3.94, 5.29)	−0.98 (−2.01, 0.05)	−1.29 (−2.22, −0.36)*
Workload	5.76 (5.00, 6.53)	−1.23 (−2.40, −0.07)*	−0.98 (−2.03, 0.07)

Data are given as parameter estimates (95% confidence intervals).

* Values that were statistically significant at the 0.05 level.

CRNA = certified registered nurse anesthetist; HSS = Human Services Survey; MBI = Maslach Burnout Inventory.

tem. These questions occurred in the following six groupings: health (n = 15), personal (n = 2), professional support (n = 6), workload (n = 3), work satisfaction (n = 10), and outside activities (n = 1). Each was defined as the average score of the construct-specific items after adjusting for tone. Most of the questions were originally phrased in a negative tone; thus, any item with a positive tone was adjusted to a negative tone for the analysis so that items could ultimately be grouped into a single score. For example, "My job satisfies me economically," with a score of 4, was replaced with "My job does not satisfy me economically," with a score of 5. A complete listing of survey questions with the original wording is in the figure.

Statistical Analysis

Descriptive summaries were calculated for age, sex, MBI–HSS constructs, and global scores. Counts and percentages were used for categorical variables, and medians and interquartile differences (75th–25th) were used for continuous variables. To inspect how burnout scores and the social support and personal coping constructs differed among the various roles, the Kruskal–Wallis test was applied.

We examined the association between role, sex, and age and the MBI–HSS and social support and personal coping scores using a series of linear regression models. Role and sex were coded as indicator variables, with female residents being defined as the reference group. Although any group could have been used as the reference group in the models, based on previous studies, younger physicians might be expected to have higher burnout scores; thus, it seemed logical to use them as the reference. Age was modeled as a linear term and was centered at 30 yr, roughly the median age of the resident sample. The resultant age estimate and its SE were scaled to reflect 10-yr increments. Modeling assumptions were evaluated by visual inspection of residual and QQ plots. All data analyses were performed using computer software (R Version 2.9.0; R Development Core Team, Vienna, Austria).[26]

Results

During the survey period (February–July 2007), 145 surveys were completed. If only the 250 surgeons, nurses, and anesthesia providers who work in this area regularly and were targeted for survey participation were the potential respondents, then the response rate was 58%. However, approximately 150 other personnel (mostly anesthesia providers) occasionally work in this operating room suite and could have seen the "participation encouragement" posters. If all of these "occasional" personnel saw the poster and declined to participate, the response rate was closer to 36%.

Of survey respondents, physicians (attending and resident) and nurses (registered nurses, licensed practical nurses, or certified registered nurse anesthetists) constituted 46% and 43% of the responses, respectively. Female respondents composed 57% of the sample. Most physicians were men (64% of 67), and most nurses were women (73% of 63). The age (median [interquartile difference]) across all roles was 45 [16] yr. These demographic summaries, stratified by role, are presented in table 2, along with summaries each MBI–HSS construct and the global score. Median scores for emotional exhaustion, depersonalization, and low personal accomplishment were as follows: 3.4, 2.7, 1.4, 2.0, and 2.8, 1.8, respectively. These scores and the global score differed significantly among the roles ($P < 0.001$). The median scores for social support and personal coping items were as follows: health (2.9, 2.5), personal support (4.0, 2.5), professional support (4.5, 2.8), workload (5.0, 2.3), work satisfaction (3.3, 2.4), and outside activities (2.0, 3.0). Significant differences by role were found for all items ($P < 0.05$), except professional support and workload.

Social support and personal coping summaries are presented in the figure, along with the item-specific responses for each category (*e.g.*, health and personal support). The highest median scores (all >5 of 9) were observed in the following subitems: feeling worn out at the end of a shift,

Table 3. Continued

Nurse	Other	Male Sex	Aged 10 yr
−1.24 (−1.95, −0.52)*	−1.26 (−2.01, −0.51)*	0.04 (−0.38, 0.46)	−0.21 (−0.48, 0.05)
−1.87 (−3.02, −0.73)*	−2.00 (−3.20, −0.81)*	−0.23 (−0.90, 0.44)	0.12 (−0.30, 0.55)
−1.18 (−2.08, −0.29)*	−1.95 (−2.89, −1.02)*	0.33 (−0.20, 0.85)	−0.41 (−0.74, −0.08)*
−0.65 (−1.53, 0.23)	0.18 (−0.74, 1.10)	0.01 (−0.50, 0.53)	−0.36 (−0.68, −0.03)*
−1.53 (−2.58, −0.49)*	−1.74 (−2.84, −0.65)*	−0.36 (−0.97, 0.25)	−0.11 (−0.28, 0.49)
−0.33 (−1.94, 1.28)	0.19 (−1.49, 1.86)	0.77 (−0.17, 1.71)	−0.57 (−1.16, 0.02)
−1.48 (−2.56, −0.39)*	−1.97 (−3.10, −0.83)*	0.85 (0.21, 1.48)*	−0.18 (−0.58, 0.22)
−0.13 (−1.46, 1.20)	0.10 (−1.29, 1.48)	−0.74 (−1.52, 0.04)	−0.39 (−0.88, 0.10)
−0.66 (−1.73, 0.42)	−0.74 (−1.86, 0.37)	−0.49 (−1.11, 0.14)	−0.11 (−0.51, 0.28)
−1.23 (−2.44, −0.02)*	−1.34 (−2.61, −0.08)*	−0.18 (−0.89, 0.53)	−0.11 (−0.34, 0.55)

insufficient departmental emotional support, and not having control over one's workload.

Table 3 presents parameter estimates and 95% confidence intervals for the following two linear regression models: (1) MBI–HSS constructs on role, age, and sex; and (2) social support and personal coping constructs on role, age, and sex. Based on the coding of role, age, and sex, the resident column (the intercept of each model) corresponds to female residents aged 30 yr. Other values in this table correspond to expected changes in MBI–HSS or social support and personal coping scores associated with (1) another role *versus* the resident role, (2) being male *versus* female, and (3) 10-yr age changes. Residents had consistently higher MBI–HSS scores than any other clinical role. They scored significantly higher than other physicians on global score, emotional exhaustion, and depersonalization constructs but not on low personal accomplishment. Compared with the nonphysician roles, resident scores were often greater than 1 U higher on the global score, emotional exhaustion, and depersonalization ($P < 0.05$ in all cases) but not low personal accomplishment. Although sex was not independently predictive of MBI–HSS construct scores, age had a clear impact on depersonalization and low personal accomplishment. The estimated change per 10-yr increase in age was −0.41 (−0.74 to −0.08) and −0.36 (−0.68 to −0.03) for depersonalization and low personal accomplishment, respectively. Age was not a strong predictor of either the global score or emotional exhaustion.

Residents and other physicians scored similarly on social support and personal coping items other than health and workload. Regression parameter estimates associated with being a physician (*versus* being a resident) were −1.49 (−2.50 to −0.48) for the health item and −1.23 (−2.40 to −0.07) for the workload item. Health and personal support scores for residents were at least 1 U higher than those for other nonphysician roles ($P < 0.05$), and results were nearly as strong for the workload item. Furthermore, residents scored 1.29 (0.36–2.22) U higher than nurse anesthetists on work satisfaction.

When the global score was regressed on the social support and personal coping items, the health, personal support, and work satisfaction items contributed to a higher global score ($P < 0.05$). Health had the strongest impact, with a 1-U increase in the health score corresponding to a 0.32 (0.21–0.43) U increase in global score. There were smaller, but still significant, effects of personal support and work satisfaction on the global score.

Discussion

In this study, we used a questionnaire consisting of a modified MBI–HSS and our own questions (social support and personal coping) to evaluate the risk of burnout among healthcare providers in a single surgical unit. Physicians (particularly residents) seem to be at greatest risk. Age was associated with the depersonalization and low personal accomplishment items but sex was not. After adjusting for role, age was not associated with any of the social support and personal coping items, but sex was related to personal support. Health, followed by work satisfaction and personal support, had the greatest effect on global score. This implies that maintaining good health, along with the availability of family and friends, contributes to more favorable personal coping strategies.

Maslach's definition of burnout is an increased level of emotional exhaustion and depersonalization, with low levels of personal accomplishment.[3] Because burnout "is an individual experience that is specific to the work context," six factors are believed to be "prime correlates" for the development of burnout: job, occupational, organizational, demographic, and personality characteristics and job attitudes. At-risk negative job characteristics may involve workload (overwork or boredom), conflict, diminished resources or social support, and lack of input or feedback. The "classical"

Table 4. Comparison of Studies of Burnout in Physicians

Study	Specialty Studied	Country of Study Population	Instrument(s) Used
Hall *et al.*,[10] 1992	Emergency medicine	United States	P&A
Lloyd *et al.*,[40] 1994	Emergency medicine	Canada	MBI, RDAS, EPJS, or T.O.
Fields *et al.*,[11] 1995	Pediatric critical care	United States	P&A or T.O.
Guntupalli and Fromm,[36] 1996	Intensive care	United States	MBI or T.O.
Ramirez *et al.*,[15] 1996	Gastroenterology	United Kingdom	MBI, T.O., or GHQ-12
	Surgery	United Kingdom	MBI, T.O., or GHQ-12
	Radiology	United Kingdom	MBI, T.O., or GHQ-12
	Oncology	United Kingdom	MBI, T.O., or GHQ-12
Campbell *et al.*,[12] 2001	Surgery (multispecialty)	United States	MBI
Hoff *et al.*,[33] 2001	Hospitalist	United States	P&A
Gabbe *et al.*,[14] 2002	Reproductive medicine (chairs)	United States	MBI,* APS, APPS, or SSS
Sargent *et al.*,[38] 2004	Orthopedics	United States	MBI, RDAS, or GHQ-12
Nyssen *et al.*,[31] 2003; and Nyssen and Hansez,[60] 2008	Anesthesia	Belgium	T.O., PSSM-A, WOCCQ, or SRPHS
Bertges Yost *et al.*,[34] 2005	Transplantation	United States	MBI, T.O., or SCI
Johns and Ossoff,[13] 2005; and Golub *et al.*,[50] 2007	Otolaryngology	United States	MBI,* APS, APPS, or SSS
Garelick *et al.*,[24] 2007	All specialties	United Kingdom	MBI, Core-OM, CORE-A, CORE-workplace, BSI, or GSI
Raggio and Malacarne,[37] 2007	Critical care	Italy	MBI, PMS, or DMI
Magnavita *et al.*,[45] 2008	Radiology	Italy	MBI, T.O., GHQ-12, KJCS, SERI, WJS, or GADS
Sharma *et al.*,[61] 2008	Colorectal	United Kingdom	MBI, T.O., GHQ-12, or TCQ
Embriaco *et al.*,[35] 2007	Critical care	Italy	MBI, T.O., SAPSII, or CESDS
Current study	Perioperative providers	United States	MBI–HSS

* Used a shortened MBI with a reliability test.

APS = Assessment of Professional Stressors; APPS = Assessment of Personal and Professional Satisfaction; BSI = Brief System Inventory; CESDS = Centers for Epidemiological Studies Depression Scale; CORE = Clinical Outcomes in Routine Evaluation; DMI = Defense Mechanism Inventory; EPJS = Emergency Physicians Job Satisfaction Instrument; GADS = Goldberg's Anxiety and Depression Scales; GHQ-12 = General Health Questionnaire-12; GSI = Global Severity Index; KJCQ = Karasek's Job Content Questionnaire; MBI = Maslach Burnout Index; NA = not applicable; NR = not reported; OM = Outcome Measure; P&A = Pines and Aronson; PMS = Profile of Mood States; PSSM-A = Psychological State of Stress Measures; RDAS = Revised Dyadic Adjustment Scale; SAPSII = Simplified Acute Physiology Scale; SCI = Surgeon Coping Inventory; SERI = Siegert's Effort–Reward Imbalance; SRPHS = Self-reported Physical Health Scale; SSS = Spousal Support Survey; TCQ = The Coping Questionnaire; T.O. = Their Own Questionnaire; WJS = Warr's Job Satisfaction; WOCCQ = Working Conditions and Control Questionnaire.

at-risk organizational profile is one in which there is a steep hierarchy and more is demanded of employees and less is given by the employer, such as that seen with downsizing or mergers. At-risk demographics include younger adults with more education and busy unmarried people (especially those who have never been married). At-risk personality characteristics are low hardiness (*i.e.*, without "involve[ment] in daily activities, a sense of control over events, and openness to change," poor self-esteem, and external locus of control [the "victim" mentality]). An at-risk job attitude is when people have unrealistically high expectations for their job. It is prudent to identify those who are risk for burnout because it can contribute to worsening job performance (*i.e.*, absenteeism, job turnover, decreased productivity, and negative effect on coworkers) and health issues (*i.e.*, substance abuse and mental and physical problems).[4,20,23,27–29]

Interpretation of the literature regarding burnout is challenging (table 4). Some articles[11,30–32] use the term burnout and assert its presence in their participants but are unclear about their measurement methods or criteria. Although many older studies used the Pines and Aronson instrument to assess burnout,[10,33] most current studies use the MBI–HSS as their primary measurement tool.[12–15,22,34–38] Our study used a variant of the MBI–HSS tailored to our periop-

Table 4. Continued

Attending				Resident				
Moderate to High Emotional Exhaustion, % (% High)	Moderate to High Depersonal-ization, % (% High)	Moderate to Low Personal Accomplish-ment, % (% Low)	Medium to High Burnout, % (% High)	Moderate to High Emotional Exhaustion, % (% High)	Moderate to High Depersonal-ization, % (% High)	Moderate to Low Personal Accomplish-ment, % (% Low)	Moderate to High Burnout, % (% High)	Chair: Moderate to High Burnout % (% High)
NA	NA	NA	(23)	NA	NA	NA	NA	NA
46 (29)	93 (61)	79 (16)	NA	NA	NA	NA	NA	NA
NA	NA	NA	50	NA	NA	NA	NA	NA
(29)	(20)	(59)	NA	NA	NA	NA	NA	NA
(31)	(28)	(38)	NR	NA	NA	NA	NA	NA
(27)	(19)	(38)	NR	NA	NA	NA	NA	NA
(33)	(21)	(49)	NR	NA	NA	NA	NA	NA
(35)	(27)	(37)	NR	NA	NA	NA	NA	NA
63 (32)	37 (13)	17 (4)	NA	NA	NA	NA	NA	NA
NA	NA	NA	37 (13)	NA	NA	NA	NA	NA
80 (56)	65 (36)	39 (21)	NA	NA	NA	NA	NA	92 (4)
Low	Low	High	Not high	High	High	Low	High	NA
NA	NA	NA	88 (22)	NA	NA	NA	NA	NA
61 (38)	49 (27)	40 (16)	NR	NA	NA	NA	NA	NA
35	20	68	Chair	35 (26)	20 (13)	68 (47)	86 (10)	84 (3)
(66)	(39)	(40)	18	NA	NA	NA	NA	NA
(36)	(56)	(28)	NR	NA	NA	NA	NA	NA
NA	NA	NA	24–38	NA	NA	NA	NA	NA
(31)	(17)	(27)	NA	NA	NA	NA	NA	NA
NR	NR	NR	46 (30)	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA

erative participant population. Although most of the studies in table 4 used Maslach or Pines and Aronson, some did not. Several articles used the General Health Questionnaire-12 as an additional instrument, but most either created their own questions or used a unique instrument. Future research on clinician burnout should strive for consistency in study design and choice of study instruments. We recommend the MBI–HSS.

In agreement with some studies, we were unable to detect differences in the MBI–HSS items between men and women,[22,33,37] but men were more likely to have a higher personal support score (table 3) after adjusting for age and role. Other researchers[10,13,15,30–32,36,38–40] have not commented on this correlation, but Fields *et al.*[11] and Guntupalli and Fromm[36] have reported increased burnout in female intensive care physicians. Gabbe *et al.*[14] identified increased emotional exhaustion and decreased personal accomplishment (both bad) and decreased depersonalization (good) in female reproductive medicine chairs but did not identify them as burned out. If female healthcare professionals have more burnout characteristics than male counterparts but also have less support, they are at greater risk and interventions may need to be targeted to prevent them from burning out.

Overall, our physicians appeared to be at higher risk for burnout than were nurses. This finding is consistent with two studies of nurses[41,42] and two studies that included nurses.[22,37] Other nurse-centered studies[43,44] have reported a high burnout rate, but their data must be viewed skeptically because of how they determined burnout (as discussed later). Some physician specialties appear to have a relatively low risk of burnout,[12,22] but others may have an enormous problem.[15,31,40,45] Surprisingly, specialties that might be considered high stress because of the nature of the work (surgery, transplantation, or orthopedics) did not report excessively high burnout scores,[12,14,34,38] whereas intensivists and anesthesiologists had a greater incidence.[31,35–37] It seems counterintuitive, but other specialties for which daily work might not at first seem highly stressful (*e.g.*, otolaryngology and radiology) have been at higher risk for burnout.[13,15,45]

Some researchers, based on studies of physicians[13–15,34,36] and nurses,[41] suggest that personal accomplishment is a buffering element. Even faced with overwhelming stress and job dissatisfaction, burnout risk decreases if individuals feel like their professional activities are for a good purpose. Aiken *et al.*[43] and Erickson and Grove[44] reported a burnout rate in nurses of 38–42%, but both studies equated burnout with high levels of emotional exhaustion. These studies failed to consider the potential protective effects of personal accomplishment in their analysis. Despite more than 43,000 subjects, their actual rate of burnout could be lower (if personal accomplishment were high) or higher (if personal accomplishment were low). Future studies will be needed to understand whether and how personal accomplishment really protects high-risk nurses and physicians (*i.e.*, high emotional exhaustion and depersonalization) from manifesting burnout.

Given the prevalence of burnout in health care, more investigators could be working on mitigation strategies. Scandinavian researchers[46,47] have successfully used peer support groups to treat burned-out providers (*i.e.*, physicians, nurses, therapists, and social workers), but only a few U.S. articles have proactively dealt with burnout. Elpern and Silver[48] reviewed burnout in the intensive care unit and provided guidelines for an organization to manage burnout. Dunn *et al.*[49] describes a proactive data-guided program (using validated instruments) that a private primary care group adopted to "enhance physician and organizational well-being."

Perhaps the most compelling aspect of our results is in our resident category (*i.e.*, the respondents who had the least experience and were the lowest in the organizational physician hierarchy). These physicians reported more negative characteristics than did any other clinicians. Although physicians in general appeared to be worse off relative to nurses in the areas of personal and professional support and outside activities (tables 2 and 3), residents were most affected in the areas of health, personal support, and workload. Residents scored more poorly in the global score, emotional exhaustion, and depersonalization but were notably worse off in personal accomplishment ($P < 0.05$, table 3). Our findings are similar to other studies with residents[38,50] and younger physicians, a pattern also seen in younger nurses.[41,43,44]

The general demographic of the burned-out employee matches that of medical trainees (young, single, well educated, and less in control of work life).[3] Dyrbye *et al.* reported that nearly half of medical students at major schools in the United States are burned out[51] and that negative personal life events affected their burnout rate.[52] Burnout remains a significant problem in residents[50,53–57] and may affect most of that group. Early intervention in these two groups alone might yield happier physicians who lead longer and more productive careers. Unfortunately, the literature on effective interventions is sparse. As with practicing physicians, few studies adequately address the issue of medical trainee burnout and its diagnosis, treatment, or prevention. McCray *et al.*,[58] reviewing literature from 1996 to 2007, found 190 articles and analyzed 129 articles. Of these studies, only 9 pertained specifically to therapy for residents or medical students and only 2 were randomized controlled trials. Sadly, none met the Strength of Recommendation Taxonomy[59] criteria for an "A" grade ("recommendation based on consistent and good-quality" evidence). There are no data on the effects of resident work hour restrictions on burnout on either the residents themselves or on the attending physicians or nurse practitioners who have had to pick up their work.

Another important consideration is what effect burnout has on the quality of patient care (*i.e.*, do affected individuals make more medical errors?). Unfortunately, the literature is confusing and inadequate for answering this question. West *et al.*[57] and Shanafelt *et al.*[55] report increased medical errors in burned-out residents, but Fahrenkopf *et al.*[53] did not. The problem with these studies is their reliance on self-reported errors. A change in the reported incidence of errors could be the result of a change in reporting (*e.g.*, burned-out or depressed physicians might be more or less likely to report errors), a change in the recognition of errors, or a change in the actual occurrence of errors. Thus, future research will be required to ascertain the nature of the relationship between clinician burnout and patient safety.

The term used by Maslach *et al.*[3] for the opposite of job burnout is job engagement and involves the proper alignment of the individual's own characteristics with his or her job characteristics. People can be taught new coping strategies, but workplace issues such as equity and fairness must also be addressed. Examples of positive healthcare workplace interventions in medicine might include flexible work hours, greater interdisciplinary clinical decision making,[48] and meetings to allow workers to express their concerns.[49] Although organizational changes are more expensive and more difficult to implement than are those for individuals, mean-

ingful change can only occur if both areas are adequately addressed.

This study has limitations. Although Shanafelt *et al.*[55] believe that burned-out or depressed physicians are more likely than their nonaffected counterparts to report suboptimal care, it is possible that both the most and the least severely affected individuals in our population did not complete our survey (*i.e.*, response bias). It is unknown if smaller or greater differences between roles, sexes, and age groups would be observed if willingness to complete the survey was based solely on a physician's burnout status. Additional studies will be needed to try to capture the widest possible array of individuals at risk.

A second limitation is our modifications to the MBI–HSS items. Based on Cronbach's α statistics (>0.75), these modifications had little impact on the internal reliability of each construct. Nevertheless, the actual score values cannot be directly compared with previously published Maslach benchmarks. Finally, in our well-intended attempt to maintain complete anonymity, we were unable to obtain important data relating to the educational status or specialty (*e.g.*, surgeon or anesthesiologist) of our physician respondents.

In conclusion, we found that, as opposed to the nurses and nurse anesthetists, physicians (particularly those who were younger) had higher levels of depersonalization and emotional exhaustion and are at a higher risk of burnout. Given the known risks associated with job burnout, these data suggest the need for greater attention to this phenomenon in the modern perioperative environment. Maslach *et al.*[3] suggest that a successful job-to-person match depends on workload, individual control, appropriate rewards, a sense of community, a sense of fairness, and common values. These items must all be in balance to achieve job engagement, the antithesis of burnout.[3] Perhaps individuals can be taught to cope with their job demands and, thus, reduce burnout. The impact of recent nationwide efforts to reengineer health care, incentivize out poor quality, and reduce costs must consider burnout risks in all medical and allied health personnel. Future studies need to capture more data in other surgical and nonsurgical units to determine whether our results are generalizable, to identify the highest-risk groups and contributory factors, and to evaluate prevention and treatment interventions.

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