pagepress
Qualitative Research in Medicine & Healthcare 2018; volume 2:101-112

Stress and burnout in anesthesia residency: a case study of peer support groups

Jessica Spence,[1] David Smith,[2] Anne Wong[1]

[1]Department of Anesthesia; [2]Department of Psychiatry and Behavioural Neurosciences, McMaster University, Hamilton, Ontario, Canada

ABSTRACT

Stress and burnout are alarmingly prevalent in anesthesiologists, with the highest risk occurring during anesthesia residency training. To better understand this phenomenon, we conducted a mixed methods case study of our anesthesia training program to explore the residents' accounts of stress and burnout and the potential value of peer support groups. Eight out of thirty eight residents participated in nine monthly peer support group (PSG) meetings followed by a focus group interview about stress and burnout in training and the value of PSG. We compared the participants' mean pre-and post-PSG Maslach Burnout Inventory® (MBI) and Perceived Stress Scale® (PSS) and analysed the focus group interview for recurring themes. We captured the perspectives of twenty seven out of thirty residents who did not participate in support groups (non-participants) through an online survey on stress and burnout. We found evidence of a high prevalence of stress and burnout from the MBI and PSS scores and survey responses. Analysis of the focus group interview showed that the specific stressors of anesthesia training included: an individually-based model of training that predisposes to isolation from peers, an over-reliance on the quality of the faculty-resident relationship and the critical, high stakes nature of the profession. Residents strongly endorsed the value of PSG in decreasing isolation, enhancing validation, and support through the sharing of experiences. Lack of dedicated time and integration into the training program were major barriers to PSG participation. These barriers need to be overcome in order to fully realize its role in mitigating stress and burnout.

Correspondence: Anne Wong, Department of Anesthesia, McMaster University, 2V3–1280 Main St. West, Hamilton, Ontario, Canada; L8S 4K1.
Tel.: +905.521.2100 ext 75212 - Fax: +905.523.1224.
E-mail: wongan@mcmaster.ca

Key words: Anesthesia residency training; Burnout; Stress; Physician health; Peer support.

Contributions: JS, AW: development of protocol, data analyzing; AW, DS: manuscript review; JS: data collection, manuscript writing; DS: facilitation of peer support groups.

Conflict of interest: the authors declare no potential conflict of interests.

Funding: this project was funded by a Special Projects Grant from the Canadian Physician Health Institute (CPHI).

Acknowledgements: the authors would like to thank Toni Tidy, who assisted with participant recruitment, data collection and logistical organization of support and focus groups.

Conference presentations: this study was presented at the Canadian Conference on Physician Health (CCPH) in Winnipeg, Manitoba, Canada on October 16, 2015. It was also presented at the International Conference on Residency Education (ICRE) Vancouver, British Columbia, Canada on October 23, 2015.

Received for publication: 14 March 2018.
Revision received: 3 August 2018.
Accepted for publication: 3 August 2018.

Qualitative Research in Medicine & Healthcare 2018; 2:101-112
doi:10.4081/qrmh.2018.7417

Introduction

Physician burnout has been characterized as reaching epidemic levels with an estimated prevalence ranging from 30% to over 54%.[1,2] *Burnout* is the consequence of prolonged and excessive stress, occurring when abilities are perceived to be unable to meet demands.[3] The ensuing *burnout* is characterized by a triad of emotional exhaustion, decreased sense of accomplishment and depersonalization.[3] Compared with the general population, physicians have twice the risk of burnout, and 1.4-2.3 times the relative risk of completed suicide in male and female physicians respectively.[2,4] Compared to other physicians, anesthesiologists have been shown to be particularly at elevated risk of burnout, substance abuse and suicide-related mortality.[5-11] A number of predisposing factors have been proposed to explain this increased risk, including the high intensity and critical nature of the work, the time-pressure demands, the medical culture of denying weakness, the easy access to drugs, personality characteristics and the relative isolation of the work environment.[12]

More disturbing is that the highest risk of burnout seems to occur during residency training.[10] In a US survey of anesthesiology residents, high burnout risk was found in 41% of respondents and depression in 22%.[10] Compared with practicing anesthesiologists, anesthesia trainees have twice the incidence of substance abuse and three times the incidence of suicide.[13] This has significant implications not only for the personal and professional

wellbeing of our next generation of anesthesiologists but also for patient care and safety.[10] However, it remains unclear which elements of training predispose anesthesia residents to be at relatively higher risk compared to their counterparts in other disciplines.

Peer support has been increasingly recognized as integral to wellbeing for trainees and staff physicians.[5,9,14-19] Peer support group participation decreases isolation, validates experiences, facilitates reflectiveness and a stronger sense of professional identity as well as improves resilience.[19,20] These benefits translate to decreased burnout and perceived stress, increased empathy and job satisfaction, and improved patient care.[21-23] While peer support groups have been studied in other specialties, the use of peer support in the anesthesia resident population has not been explored.[16,17] In contrast to residents in other specialties such as internal medicine, surgery, and obstetrics, Canadian anesthesia residents typically manage patients alone under the supervision of a staff anesthesiologist, rather than in a peer-based team. Within this training model, residents have limited opportunities and access to peer support.

The purpose of our study is twofold. We explore anesthesia residents' accounts of stress and burnout to better understand their contributing factors. We also examine the value of peer support group participation (PSG) in mitigating stress and burnout. In doing so, we hope to improve the training experience for our residents and provide further insights to inform other anesthesia residency programs with similar concerns.

Materials and Methods

Ethics approval was obtained from the Hamilton Integrated Research Ethics Board at McMaster University prior to the start of the study.

We use a case study research methodology, a research approach with origins in anthropology, sociology, and psychology.[24] A case study is defined as an *in-depth description and analysis of a bounded system,* the boundaries of which *fence in* what is to be studied.[24] Case studies are particularistic,[24] contextually-based, and draw from *any mix of quantitative and qualitative evidence*[25] *and as many variables as possible.*[24] This methodology allows us to explore the phenomenon of resident stress and burnout within the boundaries of our anesthesia training program.[24,25] In particular, we want to understand anesthesia residents' accounts of stress and burnout and their contributing factors. Secondly, we want to examine the value of peer support groups in mitigating residents' stress and burnout.

We used a mixed-methods approach in our case study in order to develop a more holistic understanding from the integration and triangulation of both quantitative and qualitative sources of information.[24-26] We take a social constructionism perspective that posits that individuals make sense or *co-construct* their understanding of reality through dialogic and social interactions with others and their environments.[27] Thus, knowledge is a relational process that is embodied and mediated through language and context.[27] As researchers, we acknowledge how our own interpretation of the research findings is influenced by our own past experiences and interactions during the research process. Our research team consists of an anesthesia resident (JS), faculty anesthesiologist (AW) and social worker (DS). We took these different perspectives into consideration during our team meetings and analysis and interpretation of the findings.

The study consists of two main components. All residents enrolled in the university anesthesia residency program were eligible for recruitment to participate in a total of nine facilitated monthly peer support group (PSG) meetings. To assess the potential value of PSG in mitigating stress and burnout, we measured participants' scores using the Maslach Burnout Inventory® (MBI) and Perceived Stress Scale® (PSS) (MBI, example available at https://www.mindgarden.com/314-mbi-human-services-survey#horizontalTab2 accessed August 20, 2018. PSS available at http://www.mindgarden.com/documents/PerceivedStressScale.pdf accessed August 20, 2018) prior to the first PSG meeting and after the ninth PSG meeting. We compared the pre-post mean values, using the PSG participants as their own control. We also explored their accounts of stress and burnout and the value of PSG by analyzing the facilitator PSG meeting notes and a focus group interview held at the end of the nine meetings.

In order to capture the perspectives of the remaining residents who did not choose to participate in PSG (non-participants), we administered an online survey to understand their perceptions of stress and burnout and barriers to participation in PSG.

We analyzed and integrated the data from these two components of the study in order to address the research questions. The prevalence and accounts of stress and burnout during residency training and the value of PSG are the primary study outcomes and the contributing factors to stress and burnout in anesthesia residency are secondary outcomes. We describe the study details in the following sections.

Study context

There are 17 university-based anesthesia residency training programs in Canada. All have a similar organizational structure and follow the same curricular and training requirements set out by the Royal College of Physicians and Surgeons of Canada (the national certification organization that oversees specialist residency training). Anesthesia residency training comprises of a total of five years of training after the completion of medical school.

At the time of the study, the Department of Anesthesia had a total of 88 clinical faculty anesthesiologists who

work at four hospital sites. All clinical faculty are responsible for supervising and teaching the residents.

During our study period, the anesthesia residency program consisted of a total of 38 residents in postgraduate years (PGYs) 1-5. The residency academic year typically runs between July 1st to June 30th of the following calendar year. The residents rotate through all four main hospitals during their clinical training. PGY 1 is a basic clinical training year consisting of two months of anesthesia in addition to core rotations in medicine, pediatrics, obstetrics and surgery. PGY 2 consists of core rotations in general anesthesia training. The PGY 3 year consists of medical subspecialty and intensive care unit rotations. PGY 4 and 5 focus on both general and subspecialty anesthesia training.

During the clinical anesthesia rotations, residents are assigned on a daily basis to work one-on-one with a faculty anesthesiologist in the operating room. Under this residency training model, residents typically work with a different faculty member each day. Residents are also assigned to take 24-hour on-call shifts individually rather than as part of an on-call team, and work directly under the supervision of the on-call faculty anesthesiologist.

Study activities

Peer support group meetings

In order to understand the potential value of PSG on resident stress and burnout, we recruited anesthesia residents to participate in monthly peer support group meetings during the academic year. Of the 38 PGY1-5 anesthesia residents in the residency program, 35 were eligible to be included in this part of the study (three residents were on maternity leave during this recruitment period). We sent an *invitation to participate* email with an attached information/consent form to all of the residents followed in a few weeks by a reminder email. We also held two separate information sessions about the study just prior to their academic teaching sessions. Our research assistant coordinated all direct communication and recruitment procedures, including obtaining consent, to ensure confidentiality and voluntary participation.

Eight residents were recruited to participate in the monthly PSG meetings for a total of nine sessions between September and June of the following year**.** These sessions were held at the main university campus classroom after working hours to allow residents adequate time to travel from their respective hospital locations.

The purpose of these meetings was to allow a regular venue for residents to discuss any issues that concerned them. All PSG meetings were held in confidence with no faculty anesthesiologist involvement. A faculty social worker with no affiliation to the anesthesia department helped facilitate the meetings but the residents primarily led the discussions. Participants were encouraged to submit topics to the facilitator prior to each session. These submitted topics provided the stimulus for group discussions in addition to any other issues that were raised during the session. To assure confidentiality and promote open conversations of potentially sensitive topics, we did not record the meetings. Instead, the facilitator made reflective summary notes of the discussion after each meeting.

After the final session, we held a one-hour focus group interview to further explore participants' experiences of stress and burnout during residency, as well as contributing factors in the training program and their accounts of the value of the PSG meetings (see the online Appendix). The focus group interview was recorded and transcribed with permission for qualitative analysis.

We administered the MBI and PSS to the eight participants prior to the first and after the completion of the last PSG meeting in order to measure the participants' baseline and post-PSG risk of burnout and level of perceived stress. The MBI is a gold standard indicator used to evaluate burnout.[3,8,28-33] This 22-item instrument assesses three dimensions of burnout: Emotional exhaustion, Depersonalization and low Personal Accomplishment.[3] The 9-item Emotional Exhaustion subscale measures one's emotional reserves, and assesses feelings of being emotionally overextended and exhausted by one's work. The 5-item Depersonalization subscale assesses for an unfeeling and impersonal response towards one's patients. The 8-item Personal Accomplishment subscale evaluates feelings of self-efficacy in relation to one's work with patients. High scores on the Emotional Exhaustion (≥ 27) and Depersonalization subscales (≥ 10) and low scores of the Personal Accomplishment subscale (≤ 33) are associated with a high risk of burnout.

PSS is a 10-item scale that examines individual perceptions of the stressfulness of life events, with high scores (>15) corresponding to high levels of perceived stress.[34] It has been widely used to quantify perceptions of stress in medical education settings.[34-36]

Non-participant survey

As the majority of our anesthesia residents did not participate in the PSG meetings, we developed a survey for these residents (non-participant survey) in order to understand their perceptions of stress and burnout as well as the barriers to PSG participation**.** We generated the survey questions by using an iterative process that included review of pertinent literature and consultation with faculty and residents.[3,7,17,32,33,37] We pre-tested the survey on anesthesia residents and faculty to ensure clarity and comprehensiveness. We then converted the survey into an online format using the SurveyMonkey® platform[37] and disseminated it to the 30 non-participant residents (the three previously on-leave residents included) by email link.

Analysis

The sources of data included the PSG participants' pre- and post- PSG MBI and PSS scores, the facilitator's

notes of the PSG meetings, the post-PSG focus group interview and the non-participant survey.

We used descriptive statistics to analyze the demographic details and non-participant survey results. We compared pre- and post- MBI and PSS scores using Student's paired t-test. The two primary co-investigators (JS and AW) separately conducted the analysis of the focus group transcript using the qualitative analytic approach outlined by Merriam.[24] We subjected the transcript to close reading and primary coding of the data segments that pertained to the phenomena of stress in residency and the role of peer support. We aggregated similar or related codes into broad categories until we could comprehensively account for all of the coded data. We then analyzed the categories for recurring patterns to aggregate similar categories into themes and subthemes. We conducted team meetings to compare the separate analyses and resolved discrepancies by way of discussion in order to arrive at a final consensus of the final themes and subthemes from the focus group interview. We used the facilitator's session notes to supplement our interpretation and analysis.

We analyzed each component of the case study separately before integrating the quantitative and qualitative elements to arrive at the interpretation of our study. To ensure study rigor, we maintained an audit trail of research procedures and analysis, conducted member checking (participant feedback on summarized results), and peer review of the completed analysis and results.

Results

Monthly peer support group meetings

Pre and post-Maslach Burnout Inventory® and Perceived Stress Scale® results

Eight residents out of a total of 38 residents participated in the monthly PSG meetings. Participants were at the PGY 2, 3 and 4 levels of training. The majority were female, aged 25-35 years and all reported being either married, common-law or in a relationship (Table 1).

Pre-MBI test shows a group mean for two out of the three MBI subscales (Emotional Exhaustion and Depersonalization) that are consistent with *high burnout* (Table 2). Interestingly, *Professional Accomplishment* subscale scores are consistent with lower risk of burnout at baseline. The mean PSS score is higher than normative data for those from a similar educational background, consistent with high perceived stress (Table 2). The post-MBI scores at the conclusion of the peer support group meetings are essentially unchanged. The post-PSS score shows a small increase from 17.4 to 20.9 (P<.05).

Table 1. Demographics of peer support group participants (n=8).

Demographic	n (%)
Postgraduate year (PGY) level	
PGY1	0
PGY2	3 (37.5%)
PGY3	2 (25.0%)
PGY4	3 (37.5%)
PGY5	0
Gender	
Male	1 (12.5%)
Female	7 (87.5%)
Age (years)	
<25	0
25-30	5 (62.5%)
30-35	2 (25.0%)
>35	1 (12.5%)
Relationship status	
Single	0
Unmarried but in a relationship	4 (50.0%)
Married or common-law	4 (50.0%)

Table 2. Maslach Burnout Inventory® (MBI) subscale and Perceived Stress Scale® (PSS) scores before and after support group participation with normative comparisons.

Scale	Mean (SD) baseline	Mean (SD) post-participation	P value
MBI – Depersonalization subscale			
Resident scores	13.8 (5.3)	11.6 (4.5)	0.2068
Normative comparison*	≥10	-	-
MBI – Emotional Exhaustion subscale			
Resident scores	34.0 (8.2)	30.6 (7.2)	0.1926
Normative comparison*	≥27	-	-
MBI – Professional Accomplishment subscale			
Resident scores	43.3 (8.2)	44.5 (5.8)	0.3278
Normative comparison*	≤33	-	-
PSS			
Resident scores	17.4 (5.2)	20.9 (2.2)	0.05
Normative comparison+	15.8 (7.5)	-	-

*Derived from a group of 1104 physicians and nurses. Scores in the lower, middle and upper thirds of validation cohort were classified as low, average and high risk of burnout respectively. Shown here are 'high' risk score cut-offs.3; +Derived from 2000 men and women in 2009. Shown here are mean (SD) scores.[34,37]

Discussion topics in the peer support group meetings (Facilitator's notes)

Attendance varied from between two to four participants throughout the nine PSG sessions due to scheduling issues (on call, vacations *etc.*). Recurrent topics of discussion included: feelings of isolation, challenges in forming relationships amongst peers, training in a high risk specialty and dealing with medical error. Residents were particularly concerned about their professional competence and whether they were performing adequately for their level of training. This was a recurring source of anxiety and stress as expressed by one of the residents:

> *Sometimes I worry that I won't ever know/be capable of functioning at the level of a staff [faculty anesthesiologist]*

These insecurities around professional competence were exacerbated by poor patient outcomes or harsh feedback from faculty. Residents described *compartmentalizing* or distancing themselves from these feelings of inadequacy as a stress-coping mechanism.

Focus group interview

Six out of the eight PSG participants attended the focus group interview. The analysis of the focus group interview reveals three major themes: Unique sources of stress during anesthesia residency, Importance of peer support, and Integrating peer support into residency training. The principle themes and subthemes with corresponding exemplar quotes are summarized in Table 3.

Theme I: Unique sources of stress during anesthesia residency

All participants believed that there are unique aspects of the Canadian anesthesia residency training that make it particularly stressful. Four sub-themes characterize the major sources of stress: the faculty-resident relationship, isolation, high stakes profession, and level of training.

The nature of the faculty-resident relationship is identified as a source of stress in anesthesia training. The current Canadian model of anesthesia training involves the assignment of residents to work one-on-one with a different faculty in the operating room on a daily basis. These time-limited but intense working relationships are recognized as being pivotal in either promoting or diminishing resident wellbeing. As a participant states:

> *How you feel after a night on call is completely dependent on whom you're working with overnight… [Faculty] can teach you so much…or they can generate significant stress and you go home feeling burned out and demoralized.*

Table 3. Themes and subthemes identified during focus group discussion.

Themes	Sub-themes	Exemplar quotes
Unique sources of stress during anesthesia residency	Faculty-resident relationship	Training in anesthesia…especially a call shift…is like getting on a plane with somebody, sitting next to them for 8-10 hours and having to work through life-threatening problems with them
	Isolation	As an anesthesia resident you're in isolation. Sometimes I don't see the other people at my site because our break times are different, our lunchtimes are different… And it's kind of sad… you know it's fun joking around the ortho residents or the gen surg residents but it's not the same. They just don't know what I'm going through
	High stakes	Nights are stressful when you're in anesthesia. Sometimes you're the most experienced person in the hospital… People think that it's okay because if something happens I'll just call the code team and anesthesia will come and take care of the patient
	Differences according to level of training	(Second year residents) are the ones that feel the most isolated. They don't all know each other and they have a completely different set of stressors. They bounce around from hospital to hospital and have to get to know all the staff. Nothing and no one is familiar to them
The importance of peer support	Validating experiences Decreasing isolation	You don't see or work with your peers, so it's good to get perspective… You realize that hey, I'm not crazy and it's not just me. (See quote in text)
	Peer learning	More senior people (in the peer support group) can give you an idea of what to do in a situation then next time when that happens … you feel more comfortable… having seniors there gives perspective to the younger years
Integrating peer support into anesthesia residency training	Timeliness and timing	It's a balance between finding protected time that's not infringing on people's personal time. But somehow keeping it separate from academic time. Because (peer support) isn't really an academic activity. It's a personal activity
	Ideal composition and logistics	As residents from the same specialty, you bond over similar situations… we're all part of this marathon, progressing to the exam, the end of the road

In this quote, the participant describes how the individually-based faculty-resident working model predisposes residents to feel primarily reliant on faculty for feedback, support, and validation. However, there is an inherent power imbalance between resident and faculty and an absence of the moderating influence of other peers that would otherwise be present in a team-based model. This combination leaves anesthesia residents particularly dependent on the quality of the faculty-resident relationship, especially with respect to their professional and personal self-worth.

While on call, there is a similar dyadic model of faculty and resident making up the on call team. In describing how he experiences the stress associated with training in anesthesia especially while being on call, one participant states:

> *Training in anesthesia…especially a call shift…is like getting on a plane with somebody, sitting next to them for 8-10 hours and having to work through life-threatening problems with them…*

He later elaborates:

> *I think it's just extremely difficult in our specialty because we work on-on-one with a variety of staff [faculty]…And sometimes you work with a staff [faculty] that you've never worked with before and it's kind of like in anesthesia where you get to know your patient in 5 seconds and they'd have to trust you.*

Under the current training model, the resident may or may not have worked with the faculty before, especially early in their training. This quote alludes to the intensity of having to work closely with a potentially unfamiliar faculty member under the already highly stressful demands of emergency and critical cases. How the faculty manages this working relationship is seen to be especially important in terms of the amount of the stress that the resident experiences.

Furthermore, participants believe that the current Canadian model of anesthesia residency training predisposes to feelings of isolation from peers, contributing to increased stress and burnout. There are few opportunities to meet and work alongside their anesthesia peers in the day to day work. One participant comments:

> *As an anesthesia resident, you 're in isolation… sometimes I don't see the other [anesthesia residents] at my site because our breaktimes are different, our lunchtimes are different. I don't see them until the end of the day. And it's kind of sad…you know it's fun joking around with the orthopedic residents or the general surgery residents but it's not the same.*

While anesthesia residents do have the opportunity to work with trainees of other disciplines in the operating room, they do not have this opportunity with their anesthesia peers. This quote has a degree of poignancy that reflects a need for greater connection with other anesthesia residents as part of the daily work.

With respect to the consequences of the individually-based rather than team-based model of training, this same participant further expresses a sense of performance anxiety:

> *I don't get to see how peers at my level are working in the OR. So that's a little bit stressful....Am I at the bottom of the pack? Where am I? I have no idea.*

This quote is consistent with the insecurities around attaining professional competence previously seen in the facilitator notes. In the absence of working in a peer-based team, residents feel that they lack a gauge of their own performance and thus are dependent on faculty for validation and feedback on their progress. Further, in addition to clinical teaching, the faculty supervisor is also responsible for evaluating the resident performance. Therefore, the resident feels under constant scrutiny, which adds to the aforementioned sense of performance anxiety.

The high-stakes nature of anesthesia practice was an additional source of stress, especially while on call.

> *Nights are stressful when you're in anesthesia. Sometimes you're the most experienced person in the hospital…People think that…if something happens, I'll just call the code team and anesthesia will come and take care of the patient.*

The anesthesia resident is called upon to manage critically ill emergency cases on their own without the benefit of a team response, in contrast with other specialties on call at the same time (*e.g.* medicine, surgery, obstetrics). Because of the life-threatening nature of what they are expected to manage (such as emergent intubation on a trauma victim or massive hemorrhage in an obstetrical patient), residents often feel that they are ultimately responsible for life-saving procedures (or *at the end of the line*, as one participant expressed). This quote conveys the participant's heavy sense of responsibility and pressure to perform while being on call as an anesthesia resident.

Finally, the participants acknowledge that there are differences in stressors according to level of training. In particular, the participants believe that PGY2 residents are particularly prone to stress and burnout due to the transition they have to make from basic clinical training to full time clinical anesthesia training. Additionally, PGY2 are not familiar with the anesthesia faculty or the operating rooms in each of the hospital rotations. On the other hand, while senior residents have become more familiar with the training contexts and faculty, they have greater clinical and administrative responsibilities. They also have the additional stress of preparing for their specialty certification examinations in order to obtain their license to practice.

Theme II: The importance of peer support

The participants recognize the importance of peer support – both formal and informal – as central in mitigating burnout and stress in residency. Three subthemes relating to the value of PSG are identified as: decreasing isolation, validating experiences, and peer learning.

The issue of feeling isolated during anesthesia training is common amongst anesthesia residents' accounts as the typical day is spent working exclusively with the assigned faculty supervisor. The participants describe how the PSG meetings help mitigate this by creating a safe environment to interact. As one participant states:

> *I think there's a lot of value to meeting with other residents in multiple years…sharing experiences…You feel like it's real and it's safe.*

Because the academic teaching sessions are separated by year of training, residents in different stages of training do not have many opportunities to interact. The PSG meetings allowed opportunities for relationships and social supports to be formed and strengthened.

Importantly, the PSG meetings allow participants to engage in narrative storytelling about their experiences, concerns and anxieties. As one participant says:

> *Sometimes I feel like I'm the only person who feels a certain way and then you realize you're not. So it [the PSG] helps in that way for sure.*

Another participant adds:

> *You don't see or work with your peers, so it's good to get perspective [from peer support groups]… You realize that hey, I'm not crazy and it's not just me.*

These quotes show how residents derive a great deal of reassurance when they are able to share and validate each other's experiences and emotions. The therapeutic value of PSG is also reflected in the following:

> *I found the sessions to be useful. Because they would just go in whatever direction they needed to as issues come up. If nothing else,* you just feel comfortable knowing you can just share experiences with your colleagues and…just talk about it and somehow you feel better.

The act of discussing experiences with other anesthesia residents had an intrinsic value in allowing one to process and then *let go* of stressful experiences. Participants believe that this helps keep them from ruminating about past mistakes or poor outcomes in order to effectively function in their work.

With respect to the differences in the level of training, participants acknowledge the value of debriefing and learning from more senior residents.

> *More senior people (in the peer support group) can give you an idea of what to do in a situation then next time when that happens…you feel more comfortable…having seniors there gives perspective to the younger years.*

Senior residents derive a great deal of satisfaction from providing further perspectives and advice as well as learning from their peers at the different levels. In this way, PSG allow residents to learn from each other's experiences in ways that they could not get from the training program or their faculty alone. The residents highly value the peer learning and mentorship that resulted from these discussions.

Theme III: The need to integrate peer support into residency

All of the participants agree that it was important to integrate PSG into the residency program scheduling in order to fully realize its benefits. They identify lack of time and timeliness as major barriers for effective PSG participation. In order to enable maximal attendance, participants feel that it was important to create a protected time during the workday for the PSG meetings to take place. Sessions need to be offered frequently enough so that current issues could be discussed and addressed within a relatively short timeframe. Hence ideal PSG composition and logistics would consist of twice monthly meetings and be composed of anesthesia residents from all training years and allow for the anonymous submission of discussion topics. One participant brings up the issue of balancing competing interests in the logistics of scheduling into the residency training program:

> *It's a balance between finding protected time that's not infringing on people's personal time. But somehow keeping it separate from academic time. Because (peer support) isn't really an academic activity. It's a personal activity*.

This quote reflects how the participants distinguish PSG as separate from the academic teaching but relevant to improving the ability to cope with the training and clinical demands. Yet, at the same time, it should not supplant the time used for other means of stress relief, such as spending personal time with family and friends.

Participants believe that PSG meetings would be most effective if they consisted only of anesthesia residents rather than residents from other specialties because of the unique features and stressors associated with anesthesia training. A participant uses the metaphor of a marathon to describe anesthesia residency training:

> *As residents from the same specialty, you bond over your similar situations…we're all part of this marathon, progressing to the exam, the end of the road.*

In using the phrase, *we're all part of this marathon*, this participant emphasizes the importance of residents supporting each other as a collective toward the ultimate goal of completing the training and becoming certified anesthesiologists.

Non-participant survey

Twenty seven out of thirty eligible (90%) non-participant residents completed the survey (Table 4). There was relatively equal representation of male and females from all postgraduate years, with most aged 25-35 years and slightly more than half were married, common-law or in a relationship.

Table 5 summarizes the survey responses. The majority of the respondents (96.3%) agreed that anesthesia residency training was a stressful experience and believed that they experienced burnout as a result. Only 7.4% of respondents identified peer support as their preferred method of achieving wellness but, despite this, over 77% believed that participation in peer support groups would help to mitigate feelings of stress and burnout. Nearly all respondents cited scheduling issues as the primary obstacle to peer support group participation. When asked what would enable them to participate in a monthly peer support group, most (88.9%) believed that peer group meetings should be scheduled immediately before, after, or during dedicated academic time.

Discussion

Anesthesiologists are recognized to be at elevated risk of stress and burnout compared to other specialties.[5-8] Compared to internists, anesthesiologists have an increased risk of suicide and drug-related death.[11] Anesthesiologists also have an increased risk of drug abuse.[12,13] Given that burnout appears to peak during training, anesthesia residents are at an even higher risk compared with practicing anesthesiologists.[10,13] Why anesthesia trainees are more prone to stress and burnout is not well understood, but some evidence suggests that there are certain aspects of anesthesia residency training that are particularly demanding. A Swedish qualitative study of nine anesthesia trainees revealed difficulties associated with a sense of high demands, uncertainty about their roles, lack of support, and loneliness.[5] Likewise, although there is widespread recognition that peer support is important in mitigating burnout in other specialties, this has not been studied in anesthesia residency training.[5,9,14-19] To better understand these issues in our residents, we undertook this study to explore, first, what are the anesthesia residents' experiences of stress and burnout and their contributing factors and second, what is the value of peer support groups in mitigating residents' stress and burnout.

With respect to the first research question, we find evidence of high burnout risk and stress in our anesthesia residents. The PSG participants had high mean scores on the PSS and two out of three of the MBI subscales indicative of high burnout risk. Interestingly, their mean Professional Accomplishment subscale score was indicative of low burnout. This finding is similar to a study on academic program directors, possibly suggesting that, in spite of significant stressors, our residents were able maintain a sense of self-efficacy and competence through their training.[38,39] Similarly, the majority of the surveyed non-participant residents perceived a high level of stress and burnout related to anesthesia training. These findings are consistent with pre-existing literature.[4-10]

Our study is able to further elucidate the contributors of stress unique to the Canadian model of anesthesia residency training that has not been previously identified in the literature. The analysis of the themes and subthemes drawn from the PSG discussions and focus group interview reveals that the nature of the faculty-resident relationship, sense of isolation, high stakes profession, and level of training are contributing factors.

A team-based model of training (consisting of clinical clerks, junior and senior residents) that is supervised by a faculty member on an ongoing basis is commonly used in specialties such as surgery and medicine. The team-based model of training allows trainees to work together, learn from, and support each other during the working day and while on call. In contrast, the Canadian anesthesia training model is individually-based and primarily involves one-on-one supervision of residents on a daily basis with a different faculty.

Our participants perceived the individually-based anesthesia resident training model as contributing to a sense of loneliness and isolation from peers. This makes it hard to gauge one's own performance and to obtain peer

Table 4. Demographics of Non-participants (n=27).

Demographic	n (%)
Postgraduate year (PGY) level	
PGY1	7 (26.0%)
PGY2	6 (22.2%)
PGY3	5 (18.5%)
PGY4	5 (18.5%)
PGY5	4 (14.8%)
Gender	
Male	13 (48.1%)
Female	14 (51.9%)
Age (years)	
<25	0
25-30	10 (37.0%)
30-35	15 (55.6%)
>35	2 (7.4%)
Relationship status	
Single	11 (40.7%)
Unmarried but in a relationship	14 (52.0%)
Married or common-law	2 (7.3%)

validation and support. In particular, this training model results in an excessive reliance on faculty for support and validation. At the same time, working with different faculty members on a daily basis may make it difficult for continuity of the training experience and for residents and faculty to foster close working relationships. Therefore, our trainees identified the day-to-day quality of the faculty-resident relationship as being crucial to their well-being. Poor faculty-resident relations are a major contributor to stress.

The critical nature of anesthesia practice, risk of medical error, and the high stakes role that anesthesia residents play in emergency situations – especially while on call – are additional sources of stress. The level of training also affects the degree of stress that residents experience. Junior residents may be particularly vulnerable due to their

Table 5. Perceptions of stress and burnout in anesthesia residency among non-participants in peer support groups.

Statement/Question	n (%)
Anesthesia residency is a stressful experience	
Strongly agree	15 (55.6%)
Agree	11 (40.7%)
Neutral	1 (3.7%)
Disagree	0
Strongly disagree	0
I experience burnout as a result of my anesthesia residency training	
Strongly agree	11 (40.7%)
Agree	14 (51.9%)
Neutral	1 (3.7%)
Disagree	1 (3.7%)
Strongly disagree	0
I believe that participation in a peer support group would be helpful to mitigate current feelings of stress and burnout	
Strongly agree	11 (40.7%)
Agree	10 (37.0%)
Neutral	6 (22.3%)
Disagree	0
Strongly disagree	0
I believe that participation in anesthesia resident peer support groups will help me cope with future stressors	
Strongly agree	2 (7.4%)
Agree	19 (70.4%)
Neutral	6 (22.2%)
Disagree	0
Strongly disagree	0
What is your preferred method of achieving wellness?	
Individual counselling	1 (3.7%)
Spending time with family and friends	17 (63.0%)
Exercise	7 (26.0%)
Meditation	0
Peer support	2 (7.4%)
I don't feel that I am in need of wellness activities	0
Other	0
What is the biggest obstacle that you perceive to participating in a monthly peer support group?	
Fatigue	1 (3.7%)
Scheduling around personal/family commitments	6 (22.2%)
Scheduling around residency training responsibilities	18 (66.7%)
I don't feel that I would benefit from participating in a peer support group	2 (7.4%)
Other	0
What, if anything, would be required for you to participate in a monthly peer support group?	
Scheduling of the group immediately before or after dedicated academic time	1 (3.7%)
Scheduling of the group during dedicated academic time	23 (85.2%)
Less frequent meetings	0
Scheduling on the weekend	0
Scheduling later in the evening	1 (3.7%)
I am not interested in participating in peer support groups	2 (7.4%)
If McMaster University was to offer regular peer support groups, do you think it would be more valuable that they be offered to specific specialty groups or to residents as a whole?	
Individual specialty groups	26 (96.3%)
Residents as a whole	1 (3.7%)

relative inexperience, lack of familiarity with the faculty, training, and professional demands.

With respect to our second research question, the value of PSG in mitigating stress and burnout based on the MBI and PSS measurements is inconclusive. In our PSG participants, the pre-and post MBI scores were essentially unchanged. The post-PSS scores actually showed a small increase but the clinical significance of these findings is indeterminant given the small number of participants. It is possible that the number of PSG sessions and participants were inadequate to demonstrate a beneficial effect even if it exists or that PSG surfaced rather than ameliorated tensions in the discussions.

The benefits of engaging in PSG were clearly stated by the participants during the focus group interview. The PSG meetings create the opportunity for residents to meet that was otherwise not available during the work day. The therapeutic nature of telling one's story is an important aspect of PSG. Through peer validation of shared experiences, participants felt a decreased sense of isolation as well as emotional release associated with talking about stressful events. In particular, junior residents benefitted from the perspective and support provided by their more experienced colleagues.

Our study findings show an apparent disconnect between the residents' perception of the benefits of PSG and their actual practice. Despite over 75% of surveyed residents endorsing PSG for mitigating stress and burnout, less than 10% of surveyed residents used this method. Most indicated a preference for spending time with family and friends. Likewise, we were able to recruit only eight residents for the monthly PSG meetings. The survey and focus group interview findings suggest this disconnect can be attributed to a lack of allocated time as the major barrier to PSG participation. Therefore, timing and proper infrastructure for conducting PSG are essential for its success. In particular, the importance of creating a defined space for peer support within residency training was emphasized. This space should be scheduled during working hours to avoid generating more stress by infringing upon personal time with family and friends.

Our study has several limitations. The small number of PSG participants and uneven attendance within the nine meetings was insufficiently powered to draw any clear conclusions from the comparisons of the pre/post MBI and PSS scores. While our interview and survey questions on the value of PSG were open ended, we did not specifically explore the potential negative aspects of PSG. In addition, self-selection bias could have affected our findings. The PSG participants were predominantly female and did not include PGY 5 representation which made it difficult to generalize these findings to the remainder of our resident population. However, on the positive side, the 90% response rate of the non-participant survey suggests the findings are representative of this group of residents.

Despite these limitations, the findings from both the participant and non-participant groups consistently triangulated on several key points with important implications for anesthesia residency training programs. First, we clearly identify stress and burnout as serious concerns for residents that are related to unique aspects of anesthesia residency training. Loneliness and isolation as an anesthesia resident was a recurrent issue in our study and identified elsewhere in the literature.[5] This can be linked to an individually-based anesthesia training model that provides few opportunities for peer interaction and support. Further, the stress of training in a high stakes profession is exacerbated by being on call alone as opposed to being part of an on-call team.

To address this, our residency training program could consider modifications in the Canadian training model that would allow a more team-based approach, such as staggered or team-based call schedules and increasing opportunities for residents to engage in peer-peer learning in clinical settings or in complex cases. An international comparative study of anesthesia training programs showed considerable heterogeneity across seven countries.[40] All but two countries (UK and Denmark) required direct faculty supervision of the trainees at all stages of training.[40] A comparative study of Canadian and Thai anesthesia residency training revealed a team-based approach in the latter.[41] Given our study findings, it would be interesting to compare anesthesia resident stress and burnout rates in those countries with an individual versus team-based training model.

Second, because the current one-to-one training model may also result in over-reliance on the faculty-resident relationship for validation, our findings also highlight the importance of cultivating positive faculty-resident relationships to improve stress and burnout in trainees. Faculty development and mentorship programs may enhance faculty awareness of the critical role they play in resident wellness and support.

Finally, although the MBI and PSS data were inconclusive, the potential benefits of PSG for mitigating stress and burnout were clearly expressed by our residents in the focus group interview and survey data. However, the feasibility of PSG is hampered by lack of allotted time and infrastructure within an already busy clinical and academic training schedule. In order to properly realize and assess its value in mitigating stress and burnout, our findings suggest that our anesthesia residency program should provide adequate dedicated time and infrastructure to improve PSG integration and maximize resident participation. Given our preliminary findings, we believe that the role of PSG in mitigating stress and burnout in anesthesia residency merits further investigation with larger cohort studies with comparative control groups. While our case study cannot generalize to others, Canadian anesthesia residency programs are all based on a similar training model, and thus, our findings may inform their strategies for resident wellness.

Since the completion of our case study, several strategies to support resident wellness have been implemented at our university. An Office of Resident Affairs has been established at the university level that provides access to mentorship, career and supportive counselling, and wellness activities for residents across all disciplines. Our anesthesia residency training program has recently created a position for a Resident Wellness Coordinator who will be reviewing recommendations for supporting resident wellness. In addition, residents' academic half-days have been changed to full days to allow further peer interaction and wellness-related programming in the latter part of the day.

Conclusions

Our findings confirm the high incidence of stress and burnout amongst anesthesia residents. consistent with previous literature. This alarmingly high prevalence has major implications for the health of residents, the profession and ultimately for patient care. While there are inevitable stressors that are inherently associated with a high stakes profession, we also identify potentially modifiable factors in anesthesia training such as the individually-based anesthesia training model, the over-reliance on the quality of the faculty-resident relationship and the sense of isolation during residency. We recommend increasing team-based training strategies, faculty development and creating space for PSG. At the heart of our findings is the need for greater connection and support, particularly from peers. Our findings reflect the centrality of social interaction, language, and narrative story-telling in the construction of reality that is embodied in the social constructionist framework. PSG offers additional opportunities for residents to make sense of their development as anesthesiologists, obtain validation and support in order to mitigate stress and burnout. Although our residents valued PSG, its full benefits were not realized in this study due the lack of allotted time. To maximize the potential effectiveness of PSG, dedicated space and time must be created to ensure its integration into the residency training program. Even though this is a case study, given the existent literature, we believe our findings are not unique to our context and can inform other anesthesia training programs. Anesthesia residency programs should also explore other wellness strategies in addition to PSG to ensure adequate support for their residents during their training.

References

1. Dyrbye LN, Harper W, Moutier C, et al. A multi-institutional study exploring the impact of positive mental health on medical students' professionalism in an era of high burnout. Acad Med 2012;87:1024-31.
2. Shanafelt TD, Hasan O, Dyrbye LN, et al. Changes in burnout and worklife balance in physicians between 2011-2014. Mayo Clin Proc 2015;9:1600-13.
3. Maslach C, Jackson S, Leiter M. Maslach Burnout Inventory Manual. 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
4. Schernhammer ES, Colditz GA. Suicide rates among physicians: a quantitative and gender assessment (meta-analysis). Am J Psychiatry 2004;161:2295-302.
5. Larsson J, Sanner M. Doing a good job and getting something good out of it: on stress and well-being in anaesthesia. Br J Anaesth 2010;105:34-7.
6. Larsson J, Rosenqvist U, Holmstrom I. Enjoying work or burdened by it? How anaesthetists experience and handle difficulties at work: a qualitative study. Br J Anaesth 2007;99:493-9.
7. Larsson J, Rosenqvist U, Holmstrom I. Being a young and inexperienced trainee anesthetist: a phenomenological study on tough working conditions. Acta Anaesthesiol Scand 2006;50:653-8.
8. Hyman SA, Michaels DR, Berry JM, et al. Risk of burnout in perioperative clinicians: a survey study and literature review. Anesthesiology 2011;114:194-204.
9. Nyssen AS, Hansez I, Baele P, et al. Occupational stress and burnout in anaesthesia. Br J Anaesth 2003;90:333-7.
10. De Oliveira GS, Chang R, Fitzgerald PC, et al. The prevalence of burnout and depression and their association with adherence to safety and practice standards: A survey of United States anesthesiology trainees. Anesth Analg 2013;117:182-93.
11. Alexander BH, Checkoway H, Nagahama SI, Domino KB. Cause-specific mortality risks of anesthesiologists. Anesthesiology 2000;93:922-30.
12. Kuhn CM, Flanagan EM. Self-care as a professional imperative: physician burnout, depression, and suicide. Can Anesth 2017;64:158-68.
13. Fry RA, Fry LE, Castanelli DJ. A retrospective survey of substance abuse in anaesthetistis in Australia and New Zealand from 2004-2013. Anaesth Intensive Care 2015;43:111-7.
14. Wallace JE, Lemaire JB, Ghali WA. Physician wellness: a missing quality indicator. Lancet 2009;374:1714-21.
15. Engel KG, Rosenthal M, Sutcliffe KM. Residents' responses to medical error: coping, learning, and change. Acad Med 2006;81:86-93.
16. Hu YY, Fix ML, Hevelone ND, et al. Physicians' needs in coping with emotional stressors: the case for peer support. Arch Surg 2012;147:212-7.
17. Satterfield JM, Becerra C. Developmental challenges, stressors and coping strategies in medical residents: a qualitative analysis of support groups. Med Educ 2010;44:908-16.
18. van Wyk BE, Pillay-van Wyk V. Preventive staff-support interventions for health workers. Cochrane Database Syst Rev 2010:CD003541.
19. Kjeldmand D, Holmstrom I, Rosenqvist U. Balint training makes GPs thrive better in their job. Patient Educ Couns 2004;55:230-5.
20. Holden M, Buck E, Clark M, et al. Professional identity formation in medical education: the convergence of multiple domains. HEC Forum 2012;24:245-55.
21. Rosenzweig S, Reibel DK, Greeson JM, et al. Mindfulness-based stress reduction lowers psychological distress in medical students. Teach Learn Med 2003;15:88-92.
22. Warnecke E, Quinn S, Ogden K, et al. A randomised controlled trial of the effects of mindfulness practice on medical student stress levels. Med Educ 2011;45:381-8.

23. Charon R. At the membranes of care: stories in narrative medicine. Acad Med 2012;87:342-7.
24. Merriam SB. Qualitative research : a guide to design and implementation. San Francisco: Jossey-Bass; 2009.
25. Yin RK. Case study research : design and methods. 3rd ed. Thousand Oaks, CA: Sage Publications; 2003.
26. Creswell JW, Plano-Clark V. Designing and conducting mixed methods research. 2nd ed. Thousand Oaks: Sage Publications; 2007.
27. Andrews T. What is social constructionism? Grounded Theory Review: An Int J 2012;11. Available from: http://groundedtheoryreview.com/2012/06/01/what-is-social-constructionism/
28. Rafferty JP, Lemkau JP, Purdy RR, Rudisill JR. Validity of the Maslach Burnout Inventory for family practice physicians. J Clin Psychol 1986;42:488-92.
29. Rosen IM, Gimotty PA, Shea JA, Bellini LM. Evolution of sleep quantity, sleep deprivation, mood disturbances, empathy, and burnout among interns. Acad Med 2006;81:82-5.
30. Thomas NK. Resident burnout. JAMA 2004;292:2880-9.
31. West CP, Dyrbye LN, Sloan JA, Shanafelt TD. Single item measures of emotional exhaustion and depersonalization are useful for assessing burnout in medical professionals. J Gen Intern Med 2009;24:1318-21.
32. West CP, Dyrbye LN, Satele DV, et al. Concurrent validity of single-item measures of emotional exhaustion and depersonalization in burnout assessment. J Gen Intern Med 2012;27:1445-52.
33. West CP, Shanafelt TD, Kolars JC. Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents. JAMA 2011;306:952-60.
34. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav 1983;24:385-96.
35. Duffrin C, Larsen L. The effect of primary care fellowship training on career satisfaction, happiness and perceived stress. Postgrad Med J 2014;90:377-82.
36. Shah M, Hasan S, Malik S, Sreeramareddy CT. Perceived stress, sources and severity of stress among medical undergraduates in a Pakistani medical school. BMC Med Educ 2010;10:2.
37. Cohen S, Janicki-Deverts D. Who's stressed? Distributions of psychological stress in the United States in probability samples from 1983, 2006 and 2009. J Appl Soc Psychol 2012;42:1320-34.
38. SurveyMonkey®. Available from: https://www.surveymonkey.com/
39. De Oliveira GS, Almeida MD, Ahmad S, et al. Anesthesiology residency program director burnout. J Clin Anesth 2011;23:176-82.
40. Yamamoto S, Tanaka P, Madsen MV, Macario A. Comparing anesthesiology residency training structure and requirements in seven different countries on three continents. Cureus 2017; 9:e1060.
41. Wong AK. Culture in medical education: Comparing a Thai and a Canadian residency programme. Med Educ 2011;45:1209-19.