



Original Research Article

Comparative study on stress and burnout among senior residents in anaesthesia versus medicine working in critical care units at a tertiary care hospital

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Abstract

Background: Senior residency is one of the most challenging stages for healthcare providers due to long working hours, increased patient load, and lack of personal space. Critical care support by anaesthesia and medicine residents are some of the disciplines most susceptible to burnout and stress. Hence, this study compared burnout and stress among anaesthesia and medicine senior residents (SRs) in critical care units.

Material and Methods: This study was conducted from July to October 2024 among 50 Anaesthesia and 50 Medicine SRs of a tertiary care centre in Chennai through an online semi-structured questionnaire adopted from the Perceived Stress Scale (PSS-10), and Burnout Clinical Subtypes Questionnaire (BCSQ-12). Data was analysed using SPSS version 21.

Results: A total of 100 SRs (50 in Anaesthesia and 50 in Medicine) responded to the study. Most participants (68%) worked 6–12 hours per day, and more than half (54%) had 5–10 night shifts monthly. Despite provisions for post-duty off and weekly off, Medicine SRs exhibited significantly higher burnout scores (15.9 ± 4.2) than anaesthesia SRs (14.2 ± 3.8), with a statistically significant difference ($p = 0.036$). Stress levels were also notably higher among Medicine SRs (16.9 ± 3.4) compared to anaesthesia SRs (15.3 ± 2.8), with a p -value of 0.012.

Conclusion: Medicine SRs experience higher stress and burnout levels than Anaesthesia SRs, emphasising the urgent need for interventions. Healthcare policymakers must prioritize reforms to optimize working hours and provide accessible mental health support. Institutional measures, such as implementing mandatory counselling sessions, structured feedback systems, and adequate leave policies, are critical to mitigating burnout. These reforms can enhance the well-being of medical residents, ensuring sustained clinical service delivery without compromising patient care.

Keywords: Burnout, Stress, Senior residents, Anaesthesia, Medicine.

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1. Introduction

Healthcare providers (HCPs) are medical professionals who include physicians, nurses, pharmacists, laboratory technicians, and other skilled and non-skilled workers.¹ HCPs are expected to provide quality care to the beneficiaries and are under pressure.² This high pressure is due to the developing medical knowledge and epidemiology of disease patterns over the years. The burden on the HCP varies with the discipline opted by them and the hierarchy of the HCP in the discipline where they are posted.³ This workplace burden in addition to long duty hours contributes to reduced recreation time and has a negative impact on sleeping hours, study time, dining time, etc. and has increased morbidity and

mortality among HCPs.^{4,5} According to the study by Abuzeyad et al., 50% of residents experience high personal burnout.⁶

In addition to the long working hours, the fear of establishing a career following post-graduation courses, the expectations from the family and faculties and the lack of vacation time hamper their performance.⁷ Lack of adequate infrastructure and high patient load increase the day-to-day stress.⁸ To improve the performance of SRs during critical conditions following their graduation, a certain level of stress is needed.⁹ However, the current working conditions predispose the SR to continuous pressure and stress.^{10,11} This, in turn, leads to low personal satisfaction, exhaustion, work

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fatigue, depersonalization, etc, which contributes to burnout syndrome.¹² In the study by R. Shalaby et al. in 2023, burnout prevalence among residents was 58.2%. The Professional Fulfilment Index reported 56.7% for work exhaustion and interpersonal disengagement and 83.5% for lack of professional fulfilment.¹³ Burnout syndrome is a chain of reactions affecting interpersonal relationships between colleagues and family members, and the quality of care provided to the patients.¹⁴

Among all the medical disciplines, clinical department SRs are exposed to high levels of burnout and stress.¹⁵ Among them, medicine and anaesthesia SRs are two of the most stressful disciplines as they involve critical care support given to the patients. Medicine SRs deal with increased patient load in addition to critical care while Anaesthesia SRs deal with critical care units, casualty and operation theatres. According to several studies the prevalence among medicine and anaesthesia SRs range from 2.7% to 67%.^{16,17} The primary objective of these SRs is to stabilize the patients with critical care support and daily activities in life-threatening scenarios. This has led to an increased prevalence of morbidity and mortality among these SRs including suicides.^{18,19} Several studies have reported the prevalence of stress and burnout among anaesthetists and also compared it with surgeons.²⁰ Similarly, studies on stress and burnout among medicine SRs and comparisons with surgical SRs are common.²¹ Due to the paucity of literature on the subject, not much is known about the comparison of stress and burnout between practitioners of Medicine and Anaesthesia. With this knowledge, this study was planned to analyse the levels of stress and burnout in anaesthesia and medicine SRs working at the ICU and also to evaluate the problems faced and perceived by the department SRs.

2. Material and Methods

This analytical cross-sectional observational study was conducted from July 2024 to October 2024 after obtaining approval from the Ethics Committee of the local institution (SRMIEC-ST0724-1563). The sample size was calculated by using the formula for two proportions.

$$N = \frac{(Z_{\alpha/2} + Z_{\beta})^2 (p_1 q_2 + p_2 q_1)}{(p_1 - p_2)^2}$$

The prevalence of stress among anaesthetic SRs was assumed to be 62% and the prevalence of stress among surgical SRs was used as a surrogate prevalence for Medicine SRs at 86% based on the study by Gandhi K et al. as no literature was available to compare the stress between Anaesthesia SRs and Medicine SRs.¹⁴ Further Medicine SRs tend to work in similar situations to Surgery SRs in terms of duty hours, patient load and multidisciplinary approach according to the study by B. Crewther et al.²¹ By substituting the above prevalence with power alpha and beta at 95% and 80% and 10% non-response rates, the estimated sample size

is 50 in Group A and Group B. The overall sample size of the study was 100.

The selection of the participants strictly adhered to the inclusion and exclusion criteria. All the anaesthesia and medicine SRs who were willing to participate in the study were included while SRs who didn't see night shifts and those who completed the residency were excluded. From the list of SRs obtained, 50 from the medicine department and 50 from the Anaesthesia department were selected randomly by a random number generator and a unique number was allotted to them to mask their identity. They were assured that their identity would not be revealed, and they could withdraw from the study whenever they wanted. All the selected participants were informed of the study procedure and the importance of this study to the wellness of the community. All the participants willing to participate provided informed written consent.

All the selected participants were administered a modified standard semi-structured questionnaire through email. The questionnaire consisted of the basic profile of the participants, perceived stress scale-10 and burnout clinical subtype questionnaire-12 (**Annexure 1**). The PSS-10 has a strong internal consistency, with Cronbach's alpha values often exceeding 0.70–0.90 and good reliability.^{16,23} BCSQ-12's reliability is supported by high internal consistency (Cronbach's alpha > 0.70 across subtypes) and test-retest stability.^{2,24} The questionnaire was pretested through a pilot study among peers for its validity and reliability.

The PSS-10 consists of 10 items assessing the perceived stress level among the selected participants based on the scoring from the questionnaire. The scoring is reversed for items 4,5,7 and 8 in the questionnaire compared to 1,2,3,6,9 and 10. Participants are considered high level stressed with scores of more than 20 and 13 as average.²³ The BCSQ-12 is a 12-item questionnaire with 3 dimensions scored on a Likert scale with 5 options scoring from 1 to 5, strongly disagree to strongly agree. The overload dimension comprises items 1,4,7 and 10. The lack of development dimension comprises items 2,5,8, and 11, The neglect dimension comprises items 3,6,9 and 12.²⁴

The data was retrieved as Microsoft Excel and after data validation, the data was analysed using SPSS version 21. The continuous data with normal distribution was presented as mean and standard deviation. Categorical data was presented as frequency and proportion. The test of significance was an independent sample t-test for continuous variables and a Chi-square test or Fisher's exact test for categorical variables. Statistical significance was set at a 95% confidence interval with a p-value of <0.05.

Annexure 1: Questionnaire

S. No.	Questions
1	Participant ID
2	Age
3	Sex
4	Department
5	Years of residency
6	Marital status
7	Working hours per day
8	How many night shifts are you posted per month?
9	Are you given post duty off?
10	Are you provided a week - off?
11	Are you provided with a sick leave if needed?
BCSQ-12	
12	I think the dedication I invest in my work is more than what I should for my health
13	I neglect my personal life when I pursue important achievements in my work
14	I risk my health when I pursue good results in my work
15	I overlook my own needs to fulfil work demands
16	I would like to be doing another job that is more challenging for my abilities
17	I feel that my work is an obstacle to the development of my abilities
18	I would like to be doing another job where I can better develop my talents
19	My work does not offer me opportunities to develop my abilities
20	When things at work do not turn out as well as they should, I stop trying
21	I give up in response to difficulties in my work
22	I give up in the face of any difficulties in my work tasks
23	When the effort I invest in work is not enough, I give in
PSS-10	
24	In the last month, how often you have been upset because of something that happened unexpectedly?
25	In the last month, how often you have felt that you were unable to control the important things in your life?
26	In the last month, how often you have felt nervous and stressed?
27	In the last month, how often you have felt confident about your ability to handle your personal problems?
28	In the last month, how often you have felt things were going your way?
29	In the last month, how often you have found that you could not cope with all the things that you had to do?
30	In the last month, how often you have been able to control irritations in your life?
31	In the last month, how often you have felt that you were on top of things?
32	In the last month, how often you have been angered because of things that were outside of your control?
33	In the last month, how often you have felt difficulties were piling up so high that you could not overcome them?

3. Results

This study includes consecutive samples of 100 senior residents. Each 50 from the anaesthesia and medicine department. The mean age of the participants was 29 ± 3 years. The demographic characteristics of residents in the anaesthesia and medicine departments are depicted in **Table 1**. No statistically significant differences in age, sex, years of residency, marital status or working hours per day, since the P value >0.05 . The number of night shifts posted per month, post-duty off and weekly off also shows no significant differences as indicated by P values greater than 0.05

respectively. Additionally, the provision of sick leave did not show a significant difference between the groups.

The analysis of the BCSQ-12 scores reveals a significant difference in mean scores between the anaesthesia and medicine departments. Anaesthesia residents reported a mean score of 14.2 (SD = 3.8) compared to 15.9 (SD = 4.2) for Medicine residents. The P-value of 0.036 indicates a significant difference, suggesting that residents in Medicine experience higher levels of burnout compared to their Anaesthesia counterparts (**Figure 1**).

The analysis of the burnout clinical subtype questionnaire-12 (BCSQ-12) shows minor differences in burnout dimensions between anaesthesia and medicine residents, as detailed in **Table 2**. Medicine residents reported slightly higher mean scores for overload (16.5 ± 2.9 vs. 15.9 ± 3.2), lack of development (16.7 ± 2.3 vs. 15.8 ± 2.9), and neglect (15.1 ± 2.7 vs. 14.6 ± 2.9), with all P-values >0.05 , indicating no statistically significant difference. These findings suggest Medicine residents perceive greater workload, fewer growth opportunities, and undervaluation compared to their Anaesthesia counterparts.

The perceived stress scale (PSS-10) scores indicate a significant difference in stress levels between residents in the anaesthesia and medicine departments. The mean score for the Anaesthesia group was 15.3 with a standard deviation of 2.8, while the medicine group had a mean score of 16.9 and a standard deviation of 3.4. The P value of less than 0.012 indicates that this difference is statistically significant, suggesting that residents in the Medicine department experience a considerably higher level of perceived stress compared to those in the anaesthesia department (**Figure 2**).

Table 1: Comparison of demographic characteristics between anaesthesia and medicine residents

Demographic characteristics		Department				Total		p-value
		Anaesthesia		Medicine				
		N=50	%	N=50	%	N=100	%	
Age	<25	10	20	11	22	21	21	0.583
	25-30	14	28	18	36	32	32	
	30-35	26	52	21	42	47	47	
Sex	Male	30	60	33	66	63	63	0.534
	Female	20	40	17	34	37	37	
Years of residency	1	17	34	14	28	31	31	0.243
	2	19	38	14	28	33	33	
	3	14	28	22	44	36	36	
Marital status	Married	17	34	14	28	31	31	0.513
	Unmarried	33	66	36	72	69	69	
Working hours per day	6-12 hours	30	60	38	76	68	68	0.229
	12-18 hours	13	20	8	16	21	21	
	>18 hours	7	14	4	8	11	11	
How many night shifts are you posted per month?	<5	11	22	9	18	20	20	0.133
	5-10	30	60	24	48	54	54	
	10-15	9	18	13	26	22	22	
	>15	0	0	4	8	4	4	
Are you given post-duty off?	Yes	50	100	50	100	100	100	-
Are you provided a week - off?	Yes	50	100	50	100	100	100	-
Are you provided sick leave if needed?	Yes	50	100	50	100	100	100	-

#Chi-square test was used for categorical comparisons between Anaesthesia and Medicine groups in Table 1

*Statistically significant p-value < 0.05 seen in the Medicine group in Table 1

Table 2: Comparison of BCSQ-12 domain scores between anaesthesia and medicine residents

BCSQ-12	Anaesthesia	Medicine	T value	p-value
Overload	15.9 \pm 3.2	16.5 \pm 2.9	-0.982	0.328
Lack of development	15.8 \pm 2.9	16.7 \pm 2.3	-1.719	0.088
Neglect	14.6 \pm 2.9	15.1 \pm 2.7	-0.892	0.374

#Independent t-test was used

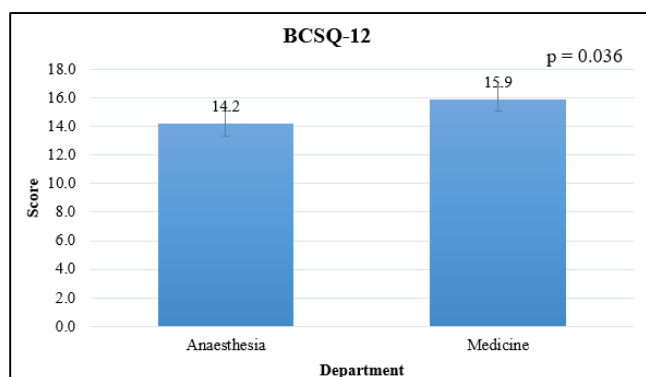


Figure 1: Comparison of BCSQ-12 between anaesthesia and medicine residents

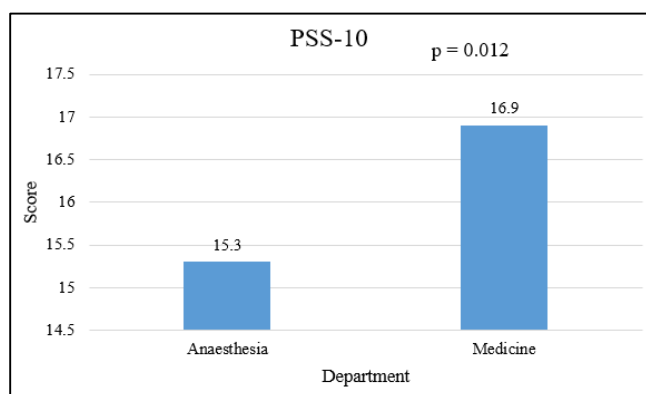


Figure 2: Comparison of PSS-10 between anaesthesia and medicine residents

4. Discussion

This study illustrates the variations in the levels of stress and burnout among the Anaesthesia SRs and Medicine SRs. The findings from our study highlighted high levels of stress and burnout among Medicine SRs compared to their counterpart Anaesthesia SRs. The findings also indicated that despite increased working hours and days, Medicine SRs were allotted a higher number of night shifts. To compensate for the working hours, both Medicine SRs and Anaesthesia SRs are permitted to avail themselves of weekly offs and post-duty offs. Regardless of these provisions, the increased working hours and days result in sleep and personal space deprivation, leading to stress among SRs as observed by Kumar S et al.¹²

Factors such as insecurity of job progression, competition among peers, target-based performance appraisal, and lack of motivation and recognition are common among all SRs, which could lead to high burnout levels.²⁴ In our study, the burnout components among Medicine and Anaesthesia SRs showed no statistically significant differences, as these factors are identical across all SRs.

Medicine SRs, however, were more stressed compared to Anaesthesia SRs. Exclusive training demands, excessive workload, and lack of institutional support were major contributors. Measures such as reducing workloads by

capping the number of patients consulted and procedures performed and enhancing institutional support through improved human resources (HR), limiting duty hours to 48 hours per week, granting permissible leaves without conditionality, and providing recognition and career progression opportunities could mitigate stress and burnout.^{25,26} The COVID-19 pandemic has exacerbated pre-existing issues such as work-life balance challenges and staffing shortages, especially in high-stakes fields like Anaesthesia, as highlighted by Sorensen BD et al.²⁷

SRs in Medicine and Anaesthesiology are particularly vulnerable to burnout, characterized by diminished personal accomplishment, depersonalization, and emotional exhaustion. Excessive working hours, heavy workload, and lack of support networks are primary causes, as noted by Mohamed B et al. and Tahir A et al.^{28,29} A nationwide survey in the US reported that 24% of Anaesthesiology trainees are at high risk of burnout, while 51% of Medical and Surgical residents experience burnout. Burnout is more common among males and older individuals, as identified by Low ZX et al.³⁰

Long working hours, demanding duties, and insufficient support networks contribute significantly to burnout among anaesthesia and medicine residents. Factors such as inadequate sleep, dissatisfaction with training, and dual roles as employees and learners exacerbate burnout, according to Soonthornkes N et al.³¹ Interestingly, older residents reported higher burnout scores than their junior counterparts, as noted by Manzi et al.³² Research in Thai residents revealed that 35.5% experienced burnout, with significant risk factors being long working hours and less than seven hours of sleep per night, as highlighted by Soonthornkes N et al.³¹

Studies consistently find that internal medicine and other generalist fields report higher burnout rates compared to procedural or anaesthesia-related specialties, as noted by Hussenoeder FS et al.³³ High patient loads, frequent decision-making under pressure, and emotional labour contribute to this higher burnout, as seen in Saini NK et al.³ Systematic reviews on residency burnout highlight that specialties requiring critical decision-making, like internal medicine, report higher burnout scores.⁸ Anaesthesia, while challenging, involves episodic care with reduced patient interaction, potentially buffering against burnout, as observed by Ratnakaran B et al.^{Error! Reference source not found.} The nature of patient care in Anaesthesia, primarily during anesthetized stages, minimizes the doctor-patient relationship's emotional labour, focusing more on safe surgery.²⁹

Workload and patient interaction were examined by Kakiashvili et al., who identified that constant patient interaction and critical decision-making in Medicine increase stress and burnout. Hochberg et al. emphasized that residency in demanding fields like Medicine is associated with heightened stress and risks of burnout, depression, and suicide.^{2,5} Anaesthesia SRs face unique stressors, as noted by

Larsson et al., where the episodic nature of patient interaction may contribute to lower burnout levels than in Medicine residents. Studies such as Sanfilippo et al. and Abut et al. highlight that while Anaesthesia residents do experience burnout, fewer longitudinal patient relationships and reduced burdens of patient satisfaction and follow-ups mitigate its severity to some extent.^{11,16} Evidence indicates that healthcare professionals have a heightened risk of suicide, with anaesthetists being particularly vulnerable.²⁴

This study has several limitations, including a small sample size, reliance on subjective self-reported questionnaires, and the exclusion of other surgical and non-clinical specialties. Cultural factors, such as hierarchy and training practices, as well as variations in working hours and residency duration, may limit the generalizability of the findings. Future longitudinal studies are needed to provide more robust and comprehensive evidence.

5. Conclusion

Medical residents in medicine experience higher stress and burnout levels compared to their anaesthesia counterparts, with senior residents being particularly vulnerable. Long workdays, limited vacation days, and demanding schedules are major contributors to these issues, negatively impacting residents' health, job satisfaction, and clinical performance. Policymakers must prioritize reforms by optimizing working hours, ensuring access to mental health support, and implementing mandatory 15-day annual counselling and rehabilitation programs. Institutions should also enforce structured feedback systems and ensure all residents can fully utilise their permitted leave and post-duty offs. Such comprehensive steps can enhance residents' well-being and sustain clinical care quality.

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7. Conflict of Interest

None.

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