DOI: 10.21088/ijaa.2349.8471.12425.3

Indian Journal of Anesthesia and Analgesia
Volume 12 Number 4 October - December 2025

ORIGINAL ARTICLE

"Burn-Out" An Occupational Phenomenon Amongst Indian Anaesthesiology Residents

K.R. Namratha[1], Kumar N. Suresh[2]

HOW TO CITE THIS ARTICLE:

K.R. Namratha, Kumar N. Suresh. "Burn-Out" An Occupational Phenomenon Amongst Indian Anaesthesiology Residents. Ind J Anesth Analg. 2025; 12(4): 285-294.

ABSTRACT

Context: Residency training, particularly in anaesthesiology, is known for its high demands and stress, potentially leading to burnout. This study aimed to assess the levels of perceived stress and burnout among anaesthesiology residents in India.

Aims: This study aimed to assess the levels of perceived stress and burnout among anaesthesiology residents in tertiary care hospitals in India.

Settings and Design:

- *Study Design:* cross-sectional, observational study
- *Study Participants:* Indian Anaesthesiology residents working in tertiary care hospitals
- *Sampling Method:* convenience sampling

Methods and Material: A total of 109 anaesthesiology residents participated in this study. The Perceived Stress Scale (PSS-10) was used to assess perceived stress, while burnout was measured using the Maslach Burnout Inventory (MBI), focusing on emotional exhaustion, depersonalization, and personal accomplishment. Data were analysed to examine the relationship between stress and burnout with demographic variables such as age, gender, marital status, and year of residency.

Statistical analysis used: The sample size was determined using the formula proposed by Hulley *et al.* (2013), with parameters such as $Z_\alpha = 1.96$ (Standard normal value at $\alpha = 0.05$) and $Z_\beta = 0.8416$ (Standard normal value for $\beta = 20\%$). The sample sizes for different correlation values were calculated, and 103 participants were determined to be the minimum required number for the study. A final of 109 participants were considered in this study. (Hulley SB, 2013)

AUTHOR'S AFFILIATION:

[1] Junior Resident, Anaesthesiology, Sri Devaraj Urs Medical College, Kolar, Karnataka, India.

[2] Professor and HOD, Department of Anaesthesiology, Sri Devaraj Urs Medical College, Kolar, Karnataka, India.

CORRESPONDING AUTHOR:

Suresh Kumar N., Professor and HOD, Department of Anaesthesiology, Sri Devaraj URS Medical College, Kolar, Karnataka, India.

E-mail: drskumar6@gmail.com

➢ **Received:** 03-06-2025 ➢ **Accepted:** 10-07-2025

The collected data will be coded and entered into an Excel database for analysis. Qualitative variables will be expressed as frequencies and percentages, while quantitative variables will be reported as means and standard deviations. Spearman's rank correlation will be used to assess the relationship between perceived stress and occupational burnout, with a significance level set at $p<0.05$.

Results: The majority of participants (58.7%) reported moderate stress, with 40.4% experiencing high stress. Nearly 89% of residents were categorized as having high burnout. A significant positive correlation was found between perceived stress and emotional exhaustion ($r = 0.627$, $p < 0.001$) and a moderate correlation with depersonalization ($r = 0.345$, $p < 0.001$). Married residents reported higher levels of stress and emotional exhaustion than unmarried residents ($p = 0.002$ and $p = 0.005$, respectively). No significant differences were observed between genders or across years of residency in terms of stress or burnout.

Conclusions: The findings indicate that anaesthesiology residents in India experience high levels of perceived stress and burnout, with married residents being more susceptible. This highlights the need for targeted interventions, such as mental health support and wellness programs, to address stress and burnout during residency training.

KEYWORDS

• Anaesthesiology • Burnout • Maslach burnout inventory • Perceived stress scalea • Residency • Stress.

Key Messages: The high levels of stress and burnout observed in this study highlight the need for interventions aimed at mitigating these issues among medical residents. Institutions should consider implementing wellness programs, promoting work-life balance, and providing mental health support to address the psychological toll of residency training. There is an urgent need for universities and hospitals to provide structured programs that support mental health and work-life balance throughout residency training, not just as a one-time initiative but as an ongoing institutional priority. Future research should explore the effectiveness of such interventions and further investigate the role of demographic factors, including marital status and gender, in influencing stress and burnout levels.

INTRODUCTION

Burnout is a complex psychological syndrome primarily characterized by three core dimensions: emotional exhaustion, depersonalization, and a diminished sense of personal accomplishment. (De Hert S., 2020) These symptoms arise as a result of prolonged exposure to occupational stress, particularly when workplace demands consistently exceed the individual's coping resources. (Edú-Valsania S, 2022) Burnout is not merely a personal issue it is a systemic problem with wide-reaching implications for healthcare systems, medical professionals, and patients alike. (Ungur 2024)

The International Classification of Diseases (ICD-11), issued by the World Health Organization (WHO), formally recognizes burnout as an occupational phenomenon. It defines burnout as "a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed". (WHO, 2019) It highlights that burnout is distinct from other mental health conditions, such as anxiety or depression, although it may co-occur with them. (Morse G, 2012).

Among the numerous healthcare professionals affected by burnout, anaesthesiologists represent one of the most vulnerable groups. Anaesthesiology is a specialty that demands a high level of sustained vigilance, rapid decision-making under pressure, and the ability to manage both anticipated and unanticipated critical events. (Gupta L, 2024) The role also involves limited direct recognition and relatively less patient interaction, which can exacerbate feelings of emotional detachment. (Verma, 2015) According to Berger-Estilita *et al*. (2024), anaesthesiologists are particularly susceptible

to burnout due to the intense cognitive and emotional demands of their daily work.

Several studies have documented the profound consequences of burnout on the individual and institutional levels. On a personal level, affected clinicians often report persistent fatigue, irritability, sleep disturbances, reduced concentration, and a sense of professional inefficacy. More serious psychological sequelae include anxiety, depression, and even substance abuse. In extreme cases, burnout can lead to suicidal ideation. (Koutsimani P, 2019) Professionally, these symptoms translate into reduced job satisfaction, increased absenteeism, compromised interpersonal relationships, and a higher likelihood of medical errors. (De Hert S., 2020) From an institutional perspective, burnout among healthcare workers contributes to decreased productivity, and higher turnover rates. (De Hert S., 2020)

Romito *et al*. (2020) point out that anaesthesiologists operate in high-stakes environments such as operating rooms, intensive care units, and emergency departments. The need for round-the-clock availability, long work hours, overnight shifts, and rapid turnaround between cases places enormous physical and psychological strain on practitioners. (Ayoğlu H, 2021)

In the Indian context, these stressors are further intensified by systemic and cultural challenges. Healthcare systems in India are frequently burdened with high patient volumes, limited infrastructure, and uneven resource distribution. (Anesi GL, 2021) Anaesthesiologists, particularly those in public sector institutions, often face erratic work schedules, inadequate support staff, and limited access to mental health or wellness resources. (Kaur A 2023) According to Verma *et al*. (2015), anaesthesiologists in India experience significantly higher workloads and longer duty hours than their counterparts in many developed nations, without proportional institutional support or recognition.

Anaesthesiology residency is a formative phase in a physician's career, shaped by intense academic and clinical demands, as well as the emotional complexities of the specialty. According to Dhoon *et al*. (2023), residents often navigate this period within a success-driven culture that stigmatizes failure, leading to increased psychological stress. The high-pressure environment, hierarchical supervision, limited autonomy, and constant exposure to critical clinical situations can exacerbate this stress. Without structured support systems, anaesthesiology residents may become particularly vulnerable to burnout and emotional exhaustion. (Dhoon, 2023)

Burnout among residents not only jeopardizes their personal and professional development but also poses a risk to patient safety. According to Cohen (1983), unaddressed occupational stress can lead to a cascade of negative health outcomes for medical professionals, which in turn compromise the quality and safety of patient care. High levels of burnout are associated with increased rates of diagnostic and procedural errors, poor patient communication, and overall decline in care standards. (Cohen 1983)

The long-term effects of burnout during residency may influence a physician's career trajectory, specialty choice, and retention in the workforce. Physicians who experience burnout early in their careers are more likely to leave clinical practice or suffer from chronic mental health issues. Hence, addressing burnout at the residency level is both a preventive and a strategic priority for healthcare systems aiming to retain skilled professionals and uphold high standards of care. (Ishak WW, 2009)

Despite its significance, burnout among Anesthesiology residents in India remains under-researched. Existing studies largely focus on Western settings or general healthcare professionals, overlooking the specialty-specific and culturally unique stressors in India. Given these contextual differences, it is essential to assess occupational burnout and perceived stress among Indian anaesthesiology residents to inform relevant interventions.

MATERIALS AND METHODS

After obtaining clearance from the institutional ethics committee, this cross-sectional study was conducted among anaesthesiology residents from various tertiary care hospitals across India. The study aimed to assess levels of burnout and perceived stress using a structured questionnaire. The questionnaire was developed using Google Forms and distributed via email, following informed consent from the participants. A total of 109 trainee Indian anaesthesiologists were included in the study, with data collection carried out over a period

of 45 days. Participants were selected through convenience sampling. The inclusion criteria will consist of anaesthesiology residents working in tertiary care hospitals across India. Exclusion criteria include those who do not consent to participate, resident doctors from other medical specialties, and anaesthesiology residents who are not based in India.

Data was collected using a three-part questionnaire, administered via Google Form after obtaining informed consent. The first section captured demographic information, such as age, gender, marital status, and year of residency. The second section assessed perceived stress using the Perceived Stress Scale (PSS-10), a 10-item questionnaire with scores ranging from 0 to 40, where higher scores indicate higher perceived stress. Stress levels are categorized as low (0-13), moderate (14-26), or high (27-40). (Cohen, 1983) The third section used the Maslach Burnout Inventory (MBI) to evaluate burnout across three subscales: emotional exhaustion (7 items), depersonalization(7 items), and personal accomplishment (8 items). Normative scores are used to categorize the severity of burnout across these dimensions. (Maslach C, 1996) (*Figure 1*)

Figure 1: Normative scores to calculate level of burnout with the Maslach-Burnout Inventory

Levels of burnout	Emotional exhaustion	Depersonalization	Personal accomplishment
Low burnout	<17	<5	>40
Moderate burnout	18–29	6–11	34–39
High burnout	>30	>12	<33

Appendixes (if necessary)

Abbreviations: Perceived Stress Scale (PSS-10), Maslach Burnout Inventory (MBI)

The sample size was determined using the formula proposed by Hulley *et al*. (2013), with parameters such as $Z_\alpha = 1.96$ (Standard normal value at $\alpha = 0.05$) and $Z_\beta = 0.8416$ (Standard normal value for $\beta = 20\%$). The sample sizes for different correlation values were calculated, and 103 participants were determined to be the minimum required number for the study. A final of 109 participants were considered in this study. (Hulley SB, 2013)

The collected data will be coded and entered into an Excel database for analysis. Qualitative variables will be expressed as frequencies and percentages, while quantitative variables will be reported as means and standard deviations. Spearman's rank correlation will be used to assess the relationship between perceived stress and occupational burnout, with a significance level set at $p<0.05$.

RESULTS

A total of 109 participants were in the study. Most participants (85.3%) were between 21 and 30 years of age, while 14.7% were aged between 31 and 40 years. Gender distribution was nearly equal, with 49.5% males and 50.5% females. A majority of participants were unmarried (62.4%), while 37.6% were married. Regarding residency year, 39.4% were in their first year, 26.6% in their second year, and 33.9% in their third year of training. (*Table 1*) According to the Perceived Stress Scale (PSS-10), 58.7% of residents reported moderate stress, and 40.4% experienced high stress. Only 0.9% reported low stress (*Table 2*). Regarding burnout, nearly half (44%) reported high emotional exhaustion, and 81.7% experienced high depersonalization. Over half (52.3%) had low personal accomplishment, and 89% of residents were categorized as having high burnout (*Table 3*).

Table 1: Demographic Characteristics of Study Participants (N = 109)

Variable	Category	n (%)
Age (years)	21-30 years	93 (85.3%)
	31-40 years	16 (14.7%)
Gender	Male	54 (49.5%)
	Female	55 (50.5%)
Marital Status	Married	41 (37.6%)
	Unmarried	68 (62.4%)
Year of Residency	1st Year	43 (39.4%)
	2nd Year	29 (26.6%)
	3rd Year	37 (33.9%)

Table 2: Distribution of Perceived Stress Levels (PSS-10) among Residents

Stress Level	Score Range	n (%)
Low Perceived Stress	0 – 13	1 (0.9%)
Moderate Perceived Stress	14 – 26	64 (58.7%)
High Perceived Stress	27 – 40	44 (40.4%)

Table 3: Burnout Classification Based on Maslach Burnout Inventory (MBI) Subscales (N = 109)

Subscale	Burnout Level	Score Range	n (%)
Emotional Exhaustion	Low	≤ 17	29 (26.6%)
	Moderate	18 – 29	32 (29.4%)
	High	≥ 30	48 (44%)
Depersonalization	Low	≤ 5	9 (8.3%)
	Moderate	6 – 11	11 (10.1%)
	High	≥ 12	89 (81.7%)
Personal Accomplishment	High (Positive)	≥ 40	26 (23.9%)
	Moderate	34 – 39	26 (23.9%)
	Low (Negative)	≤ 33	57 (52.3%)
Burnout	Low burnout	EE= <17, DP =<5, PA =>40	4 (3.7%)
	Moderate burnout	EE= 18-29, DP= 6-11, PA=34-39	8 (7.3%)
	High burnout	EE= >30, DP= >12, PA=<33	97 (89%)

Pearson correlation analysis revealed significant positive correlations between perceived stress and emotional exhaustion (r = 0.627, p < 0.001), as well as depersonalization (r = 0.345, p < 0.001). Additionally, perceived stress had a negative correlation with personal accomplishment (r = –0.400, p < 0.001), and a weak positive correlation with overall burnout (r = 0.216, p = 0.024) (*Table 4*).

Table 4: Correlation Between Perceived Stress and Burnout Subscale Scores

Variable	Perceived Stress	
	r-value	p-value
Emotional Exhaustion	0.627	< 0.001
Depersonalization	0.345	< 0.001
Personal Accomplishment	-0.400	< 0.001
Burnout	0.216	0.024

While gender differences in stress and burnout levels were not statistically significant (*Table 5*), marital status was significantly associated with higher perceived stress (p = 0.002) and emotional exhaustion (p = 0.005), with married residents reporting higher levels (*Table 6*). No significant differences were found by residency year (*Table 7*). Furthermore, married participants reported significantly higher stress and burnout scores, as well as higher levels of emotional exhaustion (Mean = 2.46 ± 0.71 vs. 2.00 ± 0.85, p = 0.004) and depersonalization (Mean = 2.88 ± 0.33 vs. 2.65 ± 0.71, p = 0.023) compared to unmarried participants (*Table 8*). Female residents scored significantly higher in personal accomplishment (Mean = 2.45 ± 0.77) compared to males (Mean = 2.11 ± 0.86, p = 0.030) (*Table 8*). These findings highlight the significant impact of marital status on stress and burnout levels among anaesthesiology residents.

Table 5: Association Between Gender and Stress Levels

Variable	Category	Male (n%)	Female (n%)	χ^2 Value	p-value
PSS	Low Perceived Stress	0 (0%)	1 (1.8%)		
	Moderate Perceived Stress	27 (50%)	37 (67.3%)	4.826	0.090
	High Perceived Stress	27 (50%)	17 (30.9%)		
Emotional Exhaustion (EE)	Low EE	14 (25.9%)	15 (27.3%)		
	Moderate EE	17 (31.5%)	15 (27.3%)	0.234	0.890
	High EE	23 (42.6%)	25 (45.5%)		
Depersonalization (DP)	Low DP	4 (7.4%)	5 (9.1%)		
	Moderate DP	7 (13%)	4 (7.3%)	1.021	0.600
	High DP	43 (79.6%)	46 (83.6%)		
Personal Accomplishment (PA)	Low PA	17 (31.5%)	9 (16.4%)		
	Moderate PA	14 (25.9%)	12 (21.8%)	4.729	0.094
	High PA	23 (42.6%)	34 (61.8%)		

table cont....

Variable	Category	Male (n%)	Female (n%)	χ^2 Value	p-value
Burnout	Low burnout	2 (3.7%)	2 (3.6%)		
	Moderate burnout	5 (9.3%)	3 (5.5%)	0.584	0.747
	High burnout	47 (87%)	50 (90.9%)		

Table 6: Association Between Marital Status and Stress Levels

Variable	Category	Married n (%)	Unmarried n (%)	χ^2 Value	p-value
Perceived Stress (PSS)	Low Perceived Stress	0 (0%)	1 (1.5%)		
	Moderate Perceived Stress	17 (41.5%)	47 (69.1%)	12.858	**0.002**
	High Perceived Stress	24 (58.5%)	20 (29.4%)		
Emotional Exhaustion (EE)	Low EE	5 (12.2%)	24 (35.3%)		
	Moderate EE	12 (29.3%)	20 (29.4%)	8.625	**0.005**
	High EE	24 (58.5%)	24 (35.3%)		
Depersonalization (DP)	Low DP	0 (0%)	9 (13.2%)		
	Moderate DP	5 (12.2%)	6 (8.8%)	5.890	0.052
	High DP	36 (87.8%)	53 (77.9%)		
Personal Accomplishment (PA)	Low PA	10 (24.4%)	16 (23.5%)		
	Moderate PA	12 (29.3%)	14 (20.6%)	1.274	0.528
	High PA	19 (46.3%)	38 (55.9%)		
Burnout	Low burnout	0	4 (5.9%)		
	Moderate burnout	2(4.9%)	6 (8.8%)	3.232	0.199
	High burnout	39 (95.1%)	58 (85.3%)		

Table 7: Association Between Year of Residency and Stress Levels

Variable	Category	1st Year n(%)	2nd Year n(%)	3rd Year n(%)	χ^2 Value	p-value
Perceived Stress (PSS)	Low Perceived Stress	1 (2.3%)	0 (0%)	0 (0%)		
	Moderate Perceived Stress	26 (60.5%)	16 (55.2%)	22 (59.5%)	2.099	0.605
	High Perceived Stress	16 (37.2%)	13 (44.8%)	15 (40.5%)		
Emotional Exhaustion (EE)	Low EE	14 (32.6%)	6 (20.7%)	9 (24.3%)		
	Moderate EE	13 (30.2%)	9 (31.0%)	10 (27.0%)	2.529	0.277
	High EE	16 (37.2%)	14 (48.3%)	18 (48.6%)		
Depersonalization (DP)	Low DP	5 (11.6%)	2 (6.9%)	2 (5.4%)		
	Moderate DP	4 (9.3%)	3 (10.3%)	4 (10.8%)	1.735	0.416
	High DP	34 (79.1%)	24 (82.8%)	31 (83.8%)		
Personal Accomplishment (PA)	Low PA	13 (30.2%)	3 (10.3%)	10 (27.0%)		
	Moderate PA	10 (23.3%)	10 (34.5%)	6 (16.2%)	1.631	0.443
	High PA	20 (46.5%)	16 (55.2%)	21 (56.8%)		
Burnout	Low burnout	3 (7%)	0	1 (2.7%)		
	Moderate burnout	4 (9.3%)	1 (3.4%)	3 (8.1%)	3.614	0.461
	High burnout	36 (83.7%)	28 (96.6%)	33 (89.2%)		

Table 8: Comparison of Perceived Stress and Burnout Scores Across Demographic Variables

Variable	Category	PSS-10 (Mean ± SD)	EE (Mean ± SD)	DP (Mean ± SD)	PA (Mean ± SD)	Burnout (Mean ± SD)
Gender	Male	2.50 ± 0.50	2.17 ± 0.82	2.72 ± 0.59	2.11 ± 0.86	2.83 ± 0.46
	Female	2.29 ± 0.49	2.18 ± 0.84	2.74 ± 0.61	2.45 ± 0.77	2.87 ± 0.43
	p-value	**0.032**	0.924	0.842	**0.030**	0.648
Marital Status	Married	2.59 ± 0.50	2.46 ± 0.71	2.88 ± 0.33	2.22 ± 0.82	2.95 ± 0.22
	Unmarried	2.28 ± 0.48	2.00 ± 0.85	2.65 ± 0.71	2.32 ± 0.84	2.79 ± 0.53
	p-value	**0.002**	**0.004**	**0.023**	0.528	**0.034**
Year of Residency	1st Year	2.35 ± 0.53	2.05 ± 0.84	2.67 ± 0.68	2.16 ± 0.87	2.77 ± 0.57
	2nd Year	2.45 ± 0.51	2.28 ± 0.80	2.76 ± 0.58	2.45 ± 0.69	2.97 ± 0.19
	3rd Year	2.41 ± 0.50	2.24 ± 0.83	2.78 ± 0.53	2.30 ± 0.88	2.86 ± 0.42
	p-value	0.714	0.426	0.701	0.359	0.181

DISCUSSION

This study aimed to assess the levels of perceived stress and burnout among anaesthesiology residents in tertiary care hospitals in India. Our findings reveal that a significant proportion of anaesthesiology residents in India experienced high levels of perceived stress and burnout, with emotional exhaustion, high depersonalization, and low personal accomplishment, particularly among married residents who reported significantly higher stress and burnout scores.

In this study, 89% of residents were classified as experiencing high burnout, characterized by elevated emotional exhaustion, high depersonalization, and low personal accomplishment. A systematic review by Chong MYF *et al*. (2022) reported that the prevalence of burnout among anaesthesiology residents ranged from 2.7% to 67.0%, with a median prevalence of 24.7%. (Chong MYF, 2022) In the present study, 44% of anaesthesiology residents reported high emotional exhaustion, 81.7% experienced high levels of depersonalization, and 52.3% demonstrated a low sense of personal accomplishment. In a similar study conducted in India, John AS (2021) reported comparable findings, with 39.5% of anaesthesiology residents experiencing emotional exhaustion, 65% reporting depersonalization, and 50.6% demonstrating low personal accomplishment. (John AS, 2021) These findings suggest that burnout among anaesthesia residents in India is a significant issue, likely influenced by both structural and cultural factors within the healthcare system. These findings could be attributed to contextual factors specific to anaesthesiology residency training in India. These include longer working hours, insufficient rest, high patient loads, limited support systems, and under-resourced hospital settings that can intensify workplace stress. Additionally, lack of structured mental health support, limited access to wellness programs, and sociocultural stigma surrounding mental health discussions may exacerbate burnout symptoms but go unaddressed. The timing of the study may also be relevant if conducted post-COVID-19 pandemic, residual psychological strain from the crisis could have further elevated burnout levels among residents (Gupta L, 2024).

In terms of demographic factors, the study found a significant association between marital status and perceived stress. Married residents reported higher levels of stress and emotional exhaustion compared to unmarried residents. This finding aligns with previous research by Rotenstein *et al*. (2016), which suggests that marital and family responsibilities contribute to higher stress levels among healthcare professionals, including residents. (Rotenstein, 2016) However, no significant differences were observed between gender and stress or burnout levels in this study, which contrasts with studies such as those by Leiter and Maslach (2005), where gender differences in burnout and stress were noted, particularly in terms of how male and female healthcare professionals cope with work-related stressors. (Leiter and Maslach, 2005)

In this study, high perceived stress was reported by 44.8% of second-year residents, 40.5% of third-year residents, and 37.2% of first-year residents. Median Perceived Stress Scale (PSS) scores followed a similar trend, with scores of 16.5, 20, and 19 for first-, second-, and third-year residents, respectively. These findings suggest that stress remains consistently high throughout anaesthesiology training, without a significant increase or decrease with seniority. This observation aligns with the findings of Gandhi *et al*. (2018), who also reported sustained levels of stress across residency years. In their study, first-year anaesthesia residents had a median PSS score of 16.5, second-year residents scored 20, and final-year residents scored 19. (Gandhi, 2018) These results highlight the continuous psychological pressure imposed by anaesthesia training, likely driven by high clinical responsibilities, long working hours, and the critical nature of decision-making involved in the specialty. While these findings indicate a lack of variation in stress levels by year of training, it is important to consider the evolving nature of residents' coping mechanisms and support systems that could mitigate stress over time. Although variations in burnout levels were observed across different years of residency, with second-year residents exhibiting the highest proportion of high burnout (96.6%) compared to first-year (83.7%) and third-year residents (89.2%), burnout remained consistently high across all stages of anaesthesiology training. These findings contrast with earlier studies that reported a progressive increase in burnout with advancing years of residency. For instance, a study by John AS (2021) found a significantly higher prevalence of burnout among senior residents across all subscales, highlighting the cumulative stress experienced over time. (John AS, 2021) In contrast, the persistently elevated burnout levels observed in this study may reflect the uniformly high demands and stressors inherent in anaesthesiology training, affecting residents irrespective of their year in the program. It is crucial to note that burnout levels, even in the earlier years of residency, suggest a need for addressing workload and mental health support early in the training process.

Anesthesiology residents often struggle with the fear of failure, shaped by a culture that equates mistakes with personal inadequacy. This mindset can hinder learning and resilience. Training programs must foster an environment where failure is normalized as a valuable learning tool. By promoting reflective practice, structured feedback, and psychological safety, residents can develop the resilience and adaptability essential for navigating the complexities of clinical care and professional growth. (Dhoon, 2023)

Future longitudinal studies could help elucidate the long-term effects of stress and burnout on residents' career satisfaction and overall well-being. Despite these limitations, the study has several strengths. The inclusion of a relatively diverse sample of residents from different years of training and hospitals across India adds to the generalizability of the findings. Additionally, the use of well-established tools such as the Perceived Stress Scale (PSS-10) and the Maslach Burnout Inventory (MBI) provides a robust framework for assessing stress and burnout levels.

The high levels of stress and burnout observed in this study highlight the need for interventions aimed at mitigating these issues among medical residents. Institutions should consider implementing wellness programs, promoting work-life balance, and providing mental health support to address the psychological toll of residency training. There is an urgent need for universities and hospitals to provide structured programs that support mental health and work-life balance throughout residency training, not just as a one-time initiative but as an ongoing institutional priority. Future research should explore the effectiveness of such interventions and further investigate the role of demographic factors, including marital status and gender, in influencing stress and burnout levels.

CONCLUSION

This study underscores the alarming prevalence of stress and burnout among anaesthesiology residents in India. The significant association between marital status and higher levels of stress and emotional exhaustion calls for targeted interventions to support residents, particularly those with familial responsibilities. As burnout and stress continue to threaten the well-being of healthcare professionals, it is crucial that residency programs adopt strategies to support mental health and foster a sustainable work environment for their trainees.

ACKNOWLEDGEMENT

Limitations of study

This study has a few limitations. Firstly, the use of convenience sampling may not fully represent the broader population of anaesthesiology residents across India. Secondly, the self-reporting nature of the questionnaires, while widely used, may introduce bias due to social desirability or personal perceptions of stress and burnout. Thirdly, this study is a cross-sectional design, which limits the ability to establish causality between stress and burnout.

REFERENCES

1. De Hert S. Burnout in Healthcare Workers: Prevalence, Impact and Preventative Strategies. Local Reg Anesth. 2020 Oct 28; 13: 171-183.
2. Edú-Valsania S., Laguía A., Moriano JA. Burnout: A Review of Theory and Measurement. Int J Environ Res Public Health. 2022 Feb 4; 19(3): 1780.
3. Ungur AP, Bârsan M, Socaciu AI, *et al*. A Narrative Review of Burnout Syndrome in Medical Personnel. Diagnostics (Basel). 2024 Sep 6; 14(17): 1971.
4. World Health Organization (WHO). Burn-out an "occupational phenomenon": International Classification of Diseases. Geneva: WHO; 2019. Available from: https://www.who.int/news/item/28-05-2019-burn-out-an-occupational-phenomenon-international-classification-of-diseases
5. Morse G., Salyers M.P., Rollins A.L., *et al*. Burnout in mental health services: a review of the problem and its remediation. Adm Policy Ment Health. 2012 Sep; 39(5): 341-52. Gupta L. *The silent threat: Fatigue, burnout, and patient safety in anaesthesia*. 2024.
6. Verma R., Mohan B., Attri J.P., *et al*. Anesthesiologist: The silent force behind the scene. Anesth Essays Res. 2015 Sep-Dec; 9(3): 293-7.
7. Berger-Estilita J., Salvisberg D., Köselerli E, *et al*. Impact of Burnout on Anaesthesiologists. Turk J Anaesthesiol Reanim. 2024 May 3; 52(2): 54-59.
8. Koutsimani P., Montgomery A, Georganta K. The Relationship Between Burnout, Depression, and Anxiety: A Systematic Review and Meta-Analysis. Front Psychol. 2019 Mar 13; 10: 284.
9. Romito B.T., Okoro E.N., Ringqvist J.R.B., *et al*. Burnout and Wellness: The Anesthesiologist's Perspective. Am J Lifestyle Med. 2020 Mar 15; 15(2): 118-125.
10. Ayoğlu H, Ayoğlu FN. Occupational Risks for Anaesthesiologists and Precautions. Turk J Anaesthesiol Reanim. 2021 Apr; 49(2): 93-99.
11. Anesi G.L., Kerlin M.P. The impact of resource limitations on care delivery and outcomes: routine variation, the coronavirus disease 2019 pandemic, and persistent shortage. Curr Opin Crit Care. 2021 Oct 1; 27(5): 513-519.
12. Kaur A., Kallakuri S., Mukherjee A., *et al*. Mental health related stigma, service provision and utilization in Northern India: situational analysis. Int J Ment Health Syst. 2023 Apr 27; 17(1): 10.
13. Dhoon T., McCartney K., Yeung B. Anesthesiology Residency: Understanding the Role of Failure. J Educ Perioper Med. 2023 Dec 27; 25(4): E716.
14. Cohen S., Kamarck T., Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983 Dec; 24(4): 385-96. PMID: 6668417.
15. Ishak W.W., Lederer S., Mandili C., *et al*. Burnout during residency training: a literature review. J Grad Med Educ. 2009 Dec; 1(2): 236-42.
16. Maslach C., Jackson S.E., Leiter M.P. Maslach Burnout Inventory manual. 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
17. Hulley S.B., Cummings S.R., Browner W.S., *et al*. Designing Clinical Research: An Epidemiologic Approach. 4th ed. Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins; 2013.
18. Chong M.Y.F., Lin SHX, Lim W.Y., *et al*. Burnout in anaesthesiology residents: A systematic review of its prevalence and stressors. Eur J Anaesthesiol. 2022 Apr 1; 39(4): 368-377.
19. John A.S.; Kumar T.S. Burnout among anaesthesiologists in India: A questionnaire-based study. Asian J Pharm Clin Res. 2021; 14(7): 93–97.
20. Rotenstein L.S., Torre M., Ramos M.A., *et al*. Prevalence of Burnout Among Physicians: A Systematic Review. JAMA. 2018 Sep 18; 320(11): 1131-1150.
21. Leiter M.P., Maslach C. Burnout and gender: The role of gender in the experience of burnout. *Int J Stress Manag*. 2005; 12(2): 70-89.

22. Gandhi K., Sahni N., Padhy S.K., *et al*. Comparison of stress and burnout among anesthesia and surgical residents in a tertiary care teaching hospital in North India. J Postgrad Med. 2018 Jul-Sep; 64(3): 145-149.