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Stress, Anxiety, and Work-Related Distress Among Medical Residents: A Comparative Analysis of Anesthesiology and Internal Medicine Residents

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ABSTRACT

Objective: The field of anesthesiology and reanimation is particularly suited for investigating the relationship between work-related stress and anxiety due to the high demands it places on managing these psychological states. For residents newly exposed to the rigorous working conditions of anesthesiology, the clinical environment can be psychologically challenging. This study was designed based on the hypothesis that anesthesia and reanimation residents, due to their higher exposure to emergency situations and more intense workloads, may exhibit higher levels of stress, anxiety, and distress compared to internal medicine residents.

Materials and Methods: Between April 21 and July 6, 2025, a total of 50 medical residents were enrolled in this study from the Departments of Anesthesiology and Reanimation and Internal Medicine at a tertiary education and research hospital. Each participant completed the Visual Analog Scale (VAS), State-Trait Anxiety Inventory (STAI-I and STAI-II), Perceived Stress Scale (PSS-10), and Penn State Worry Questionnaire (PSWQ) during a 24-hour shift. Residents with known cardiovascular or psychiatric disorders were excluded from the study.

Results: Regarding psychological assessments, no significant differences were found between the groups for PSS-10 scores. Similarly, PSWQ scores did not differ significantly. VAS scores for anxiety measured before and after shifts showed no significant difference between groups. There was no statistically significant correlation between years of residency and scores on the PSS-10, PSWQ, STAI-I, STAI-II, pre-shift VAS, and post-shift VAS scales. The observed correlation coefficients were weak and negative in direction. The strongest negative correlation was found between years of residency and the PSS-10 score, though this was not statistically significant. These findings suggest that as residency seniority increases, there is no notable change in levels of stress, worry, or anxiety.

Conclusion: This study highlights that both anesthesiology and internal medicine residents experience high levels of anxiety, stress, and pathological worry associated with 24-hour shift work, regardless of differences in specialty or seniority.

Keywords: Anxiety, Resident, Stress

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INTRODUCTION

The field of anesthesiology and reanimation is particularly suited for investigating the relationship between work-related stress and anxiety due to the high demands it places on managing these psychological states.[1] For residents who are newly exposed to the rigorous working conditions of anesthesiology, the clinical environment can be psychologically challenging.[1] Among anesthesia residents, stress and anxiety are commonly observed, largely due to responsibilities such as ensuring patient safety and managing unexpected emergencies.[2] Although internal medicine residents also work under demanding conditions, they are comparatively less frequently exposed to acute, life-threatening situations.

While the medical specialty in which a healthcare professional works does not significantly influence the intensity of stress symptoms, it has been shown to play a specific role in the severity of anxiety symptoms.[3] Stress is defined as a physiological response triggered by the perception of a threat. This response is often accompanied by emotional reactions in which anxiety emerges as a dominant and persistent feeling.[4] Anxiety is generally categorized into two types: state anxiety, which refers to a temporary and acute response to perceived threats, and trait anxiety, which reflects a stable tendency to experience anxiety and is closely associated with personality traits.[5]

The increase in anxiety levels among physicians is considered to be multifactorial. Elevated anxiety not only affects the psychological and physical well-being of physicians but can also impair job performance, increase the risk of medical errors, and reduce patient satisfaction.[6]

This study was designed based on the hypothesis that anesthesia and reanimation residents, due to their higher exposure to emergency situations and more intense workloads, may exhibit higher levels of stress, anxiety, and distress compared to internal medicine residents. The primary aim of this study is to assess the impact of work-related factors on stress, anxiety, and distress levels among anesthesiology and internal medicine residents during 24-hour shifts. The secondary aim is to provide recommendations for mitigating the risks of stress, anxiety, and psychological distress associated with prolonged work hours.

MATERIALS AND METHODS

Study Design and Participants

Between April 21 and July 6, 2025, a total of 50 medical residents were enrolled in this study from the Departments of Anesthesiology and Reanimation and Internal Medicine at a tertiary education and research hospital. This study was initiated following the approval of the Ethics Committee of the local hospital, dated April 18, 2025, and numbered 94, and adhered to the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants. The sample included 25 residents from each department, with representation from each year of residency training, ranging from the first to fifth year.

Each participant completed the designated psychological assessments at the beginning and end of a 24-hour shift. Residents with known cardiovascular or psychiatric disorders were excluded from the study.

Data Collection and Assessment Tools

All residents who participated in the study worked 24-hour shifts at a frequency of once every three days or less throughout the study period. The participants completed validated self-report questionnaires assessing anxiety, stress, and pathological worry.

The following standardized assessment tools were used:

1. **Anxiety Assessment:**

- **Visual Analog Scale (VAS):** Administered at the beginning and end of each 24-hour shift to evaluate subjective anxiety levels. A VAS score of ≥5 was considered indicative of significant anxiety.
- **State-Trait Anxiety Inventory (STAI-I and STAI-II):** Administered only at the beginning of the 24-hour shift. STAI-I measured state anxiety (cut-off ≥40), while STAI-II assessed trait anxiety (cut-off ≥44).[7]

2. **Stress Assessment:**

- **Perceived Stress Scale (PSS-10):** Applied prior to the shift to evaluate perceived stress levels during the past month. A score of ≥14 was used as the threshold for significant stress.[8]

3. **Pathological Worry Assessment:**

- **Penn State Worry Questionnaire (PSWQ):** Administered prior to the 24-hour shift to assess levels of pathological worry. A score of ≥40 was considered indicative of clinically significant worry.[9]

Statistical Analysis

Descriptive statistics were presented as mean, standard deviation, median, minimum, maximum, frequency, and percentage values. The distribution of continuous variables was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests. For the analysis of independent quantitative variables: if normally distributed, the Independent Samples t-test was used; if not normally distributed, the Mann–Whitney U test was applied. Categorical (qualitative) variables

were analyzed using the Chi-square test. To assess correlations between variables, the Spearman correlation analysis was performed. All statistical analyses were conducted using IBM SPSS Statistics for Windows, Version 27.0 (IBM Corp., Armonk, NY, USA).

Sample Size and Power Analysis

In this observational pre-test/post-test (before–after) study involving 50 participants with paired measurements and a 1:1 group ratio, the statistical power was calculated to be 92% (1–β=0.92), assuming a significance level (α=0.05) and an effect size (Cohen's d=0.75).

RESULTS

Participant Characteristics

Among the 50 residents included in the study, 27 (54%) were female and 23 (46%) were male. None of the participants reported any comorbid medical conditions. Twelve residents (24%) were in their first year of training, 8 (16%) in the second year, 13 (26%) in the third year, 8 (16%) in the fourth year, and 9 (18%) in the fifth year of residency (Table 1).

Regarding psychological assessments, the PSS-10 scores ranged from 9 to 33, with a median of 20 and a mean±SD of 20.4±5.7; 88% of participants scored ≥14, indicating high perceived stress levels. The PSWQ scores varied between 23 and 72, with a median of 45.5 and mean±SD of 46.6±11.6; 70% scored above the pathological worry cutoff (≥40). STAI-I scores ranged from 20 to 80 (median: 42.5; mean±SD: 43.4±12.5), with 56% scoring ≥40. STAI-II scores ranged from 20 to 68 (median: 43.5; mean±SD: 43.1±10.2), with 68% scoring ≥44. VAS scores for anxiety before shifts ranged from 0 to 8 (median: 3.0; mean±SD: 3.4±2.0), with 26.0% scoring ≥5. Post-shift VAS scores ranged from 0 to 7 (median: 4.0; mean±SD: 4.2±2.0), with 50% scoring ≥5 (Table 1).

Comparison Between Internal Medicine and Anesthesiology Groups

There was no statistically significant difference between the Internal Medicine and Anesthesiology groups in terms of gender distribution (female: 52.0% vs. 56.0%, p=0.777). However, seniority differed significantly between groups (p=0.021), with a higher proportion of senior residents in the Anesthesiology group compared to Internal Medicine (Table 2).

Regarding psychological assessments, no significant differences were found between the groups for PSS-10 scores (Internal Medicine: 21.0±5.8 vs. Anesthesiology: 19.9±5.7; p=0.494), with 88.0% of participants in both groups scoring above the cutoff (≥14). Similarly, PSWQ scores did not differ significantly (47.4±11.7 vs. 45.7±11.7; p=0.614), with pathological worry (≥40) observed in 72.0% and 68.0% of participants in the Internal Medicine and Anesthesiology groups, respectively (Table 2).

Table 1. Demographic Characteristics and Psychological Scale Scores of the Participants

Variable	Category/ Min-Max	N/Median	%/ Mean±SD
Gender			
Female	27	54	
Male	23	46	
Department			
Anesthesiology	25	50	
Internal Medicine	25	50	
Seniority (Year of Residency)			
1st year	12	24	
2nd year	8	16	
3rd year	13	26	
4th year	8	16	
5th year	9	18	
PSS-10 Score			
<14	6	12	
≥14	44	88	
PSS-10 Score (Numeric)	9.0 – 33.0	20.0	20.4±5.7
PSWQ Score			
<40	15	30	
≥40	35	70	
PSWQ Score (Numeric)	23.0 – 72.0	45.5	46.6±11.6
STAI-I Score			
<40	22	44	
≥40	28	56	
STAI-I Score (Numeric)	20.0 – 80.0	42.5	43.4±12.5
STAI-II Score			
<44	16	32	
≥44	34	68	
STAI-II Score (Numeric)	20.0 – 68.0	43.5	43.1±10.2
VAS Score Pre-Shift			
<5	37	74	
≥5	13	26	
VAS Score Pre-Shift (Numeric)	0.0 – 8.0	3.0	3.4±2.0
VAS Score Post-Shift			
<5	25	50	
≥5	25	50	
VAS Score Post-Shift (Numeric)	0.0 – 7.0	4.0	4.2±2.0

PSS-10: Perceived Stress Scale; PSWQ: Penn State Worry Questionnaire; STAI-I and STAI-II: State-Trait Anxiety Inventory; VAS:Visual Analog Scale.

STAI-I and STAI-II scores were comparable between the two groups (STAI-I: 42.8±13.6 vs. 44.0±11.6, p=0.747; STAI-II: 44.1±9.5 vs. 42.1±11.0, p=0.502). The proportion of partici-

Table 2. Comparison of Internal Medicine and Anesthesiology Residents According to Sociodemographic and Scale Scores

Variable	Internal Medicine (n=25) Mean±SD (Median)/ n (%)	Anesthesiology (n=25) Mean±SD (Median)/ n (%)	p
Gender			
Female	13 (52.0)	14 (56.0)	0.777*
Male	12 (48.0)	11 (44.0)	
Seniority			
1st year	8 (32.0)	4 (16.0)	0.021*
2nd year	6 (24.0)	2 (8.0)	
3rd year	5 (20.0)	8 (32.0)	
4th year	2 (8.0)	6 (24.0)	
5th year	4 (16.0)	5 (20.0)	
PSS-10 Score			
Score	21.0±5.8 (20)	19.9±5.7 (20)	0.494**
<14	3 (12.0)	3 (12.0)	1.000*
≥14	22 (88.0)	22 (88.0)	
PSWQ Score			
Score	47.4±11.7 (49)	45.7±11.7 (44)	0.614**
<40	7 (28.0)	8 (32.0)	0.758*
≥40	18 (72.0)	17 (68.0)	
STAI-I Score			
Score	42.8±13.6 (43)	44.0±11.6 (42)	0.747**
<40	10 (40.0)	12 (48.0)	0.569*
≥40	15 (60.0)	13 (52.0)	
STAI-II Score			
Score	44.1±9.5 (45)	42.1±11.0 (43)	0.502**
<40	8 (32.0)	8 (32.0)	1.000*
≥44	17 (68.0)	17 (68.0)	
VAS Score (Pre-Shift)			
Score	3.3±2.2 (3)	3.5±1.8 (3)	0.632***
<5	18 (72.0)	19 (76.0)	0.747*
≥5	7 (28.0)	6 (24.0)	
VAS Score (Post-Shift)			
Score	3.8±2.0 (3)	4.6±2.0 (6)	0.119***
<5	14 (56.0)	11 (44.0)	0.396*
≥5	11 (44.0)	14 (56.0)	

*Chi Square Test; **Mann Whitney U Test; ***T Test; PSS-10: Perceived Stress Scale; PSWQ: Penn State Worry Questionnaire; STAI-I and STAI-II: State-Trait Anxiety Inventory; VAS: Visual Analog Scale.

pants scoring above cutoff points for STAI-I (≥40) and STAI-II (≥44) was also similar (Table 2).

VAS scores for anxiety measured before and after shifts showed no significant difference between groups (pre-shift: 3.3±2.2 vs. 3.5±1.8, p=0.632; post-shift: 3.8±2.0 vs. 4.6±2.0, p=0.119). The percentage of participants scoring above the cutoff (VAS≥5) was comparable pre-shift (28.0% vs. 24.0%) and post-shift (44.0% vs. 56.0%) between Internal Medicine and Anesthesiology groups (Table 2).

Correlation Analysis Findings

According to the results of the Spearman correlation analysis, there was no statistically significant correlation between years of residency and scores on the PSS-10, PSWQ, STAI-I, STAI-II, pre-shift VAS, and post-shift VAS scales (p>0.05 for all). The observed correlation coefficients were weak and negative in direction. The strongest negative correlation was found between years of residency and the PSS-10 score (r=–0.176), though this was not statistically significant (p=0.222). These findings suggest that as residency seniority increases, there is no notable change in levels of stress, worry, or anxiety (Table 3).

DISCUSSION

This study aimed to compare the impact of 24-hour shift-related work conditions on anxiety, stress, and pathological worry among anesthesiology and reanimation residents and internal medicine residents during their specialty training. Existing literature supports the notion that clinical specialty and years of experience significantly influence healthcare workers' psychological well-being.[10] However, our findings reveal no statistically significant differences between the two groups in anxiety levels measured by the VAS at both the beginning and end of the shifts, nor in STAI-I and STAI-II scores measured at shift onset.

Despite the lack of statistical significance, descriptive analyses indicated that a substantial proportion of anesthesiology residents experienced elevated anxiety, with 76.0% scoring above the VAS cut-off (≥5) before shifts and 56.0% after shifts, compared to 72.0% and 44.0% in internal medicine residents, respectively. Similarly, trait anxiety (STAI-II) was elevated in 68.0% of residents from both groups. These trends suggest that the demanding nature of anesthesiology, characterized by greater exposure to acute emergencies and responsibility for patient safety, may contribute to higher baseline anxiety, although this did not reach statistical significance.

Regarding stress, Perceived Stress Scale (PSS-10) scores showed no significant difference between groups, yet 88.0% of residents in both specialties scored above the cut-off (≥14), reflecting high perceived stress levels over the preceding month. This finding aligns with prior studies indicating that medical residents, regardless of specialty, endure considerable chronic stress that may affect their mental health and performance.[11]

Table 3. Correlation Between Resident Seniority and Psychometric Scale Scores

Variable	PSS-10	PSWQ	STAI-I	STAI-II	VAS (Pre-Shift)	VAS (Post-Shift)
Spearman's ρ (r)	–0.176	–0.104	–0.092	–0.094	–0.081	0.025
p-value	0.222	0.474	0.524	0.514	0.578	0.865

PSS-10: Perceived Stress Scale; PSWQ: Penn State Worry Questionnaire; STAI-I and STAI-II: State-Trait Anxiety Inventory; VAS: Visual Analog Scale.

Similarly, the Penn State Worry Questionnaire (PSWQ) results revealed comparable rates of pathological worry (≥40) among anesthesiology (68.0%) and internal medicine (72.0%) residents. Such pervasive worry may be influenced by factors beyond shift work, including the hierarchical structure of medical training, institutional culture, and the inherent uncertainties of clinical practice—factors previously identified as modulators of resident anxiety.[12]

Furthermore, our findings regarding the high prevalence of stress and anxiety among residents are consistent with recent research conducted in similar settings. For instance, a study conducted in a tertiary training hospital in Türkiye demonstrated elevated depression levels and identified workload and shift patterns as significant factors affecting residents' mental health.[13] This parallel underscores the widespread nature of psychological distress among resident physicians and highlights the urgent need for institutional interventions aimed at mental health support across specialties.

Similar to other studies in the literature,[14] our findings underscore the necessity of optimizing working conditions and providing psychological support within healthcare institutions to alleviate the anxiety, stress, and worry experienced by healthcare professionals. Addressing these factors is crucial for improving the well-being and performance of resident physicians.

Contrary to several reports associating longer or more frequent shifts with increased anxiety and stress symptoms,[15,16] our study did not find significant correlations between seniority and any of the psychological measures (PSS-10, PSWQ, STAI-I, STAI-II, or VAS scores). This may indicate that stress and anxiety are pervasive throughout residency, irrespective of experience level, highlighting the chronic nature of psychological strain in these professions.

The absence of statistically significant intergroup differences and correlations may also reflect the relatively small sample size or unmeasured confounding variables such as individual coping strategies, social support, and institutional wellness resources. Future multicenter, longitudinal studies with larger samples are warranted to further elucidate these complex relationships and to identify effective interventions tailored to specialty-specific stressors.

Limitations

Several limitations should be acknowledged regarding this study. First, the study was conducted at a single tertiary training hospital, which may limit the generalizability of the findings to other institutions with different working conditions, resident populations, or organizational cultures. Second, the relatively small sample size may have reduced the statistical power to detect subtle differences or correlations between variables. Third, the cross-sectional design captures residents' psychological states at specific points in time but does not allow for assessment of causal relationships or fluctuations over longer periods. Fourth, the reliance on self-reported questionnaires may introduce response bias, including social desirability or underreporting of psychological distress due to stigma. Finally, unmeasured confounding factors such as individual coping mechanisms, support systems, workload intensity, and personal life stressors were not controlled for, which could have influenced the results.

Future studies incorporating larger, multicenter cohorts with longitudinal follow-up and mixed-method approaches are recommended to overcome these limitations and provide more comprehensive insights into the mental health of resident physicians.

CONCLUSION

This study highlights that both anesthesiology and internal medicine residents experience high levels of anxiety, stress, and pathological worry associated with 24-hour shift work, regardless of differences in specialty or seniority. Although no statistically significant differences were found between the groups, the overall elevated psychological distress underscores the need for targeted mental health support and interventions within residency programs. Future research with larger, multicenter cohorts is essential to better understand specialty-specific stressors and to develop effective strategies to enhance the well-being and performance of residents.

DECLARATIONS

Ethics Committee Approval: The study was approved by Health Sciences University Istanbul Training and Research Hospital Clinical Research Ethics Committee (No: 94, Date: 18/04/2025).

Informed Consent: Written informed consent was obtained from all participants.

Conflict of Interest: The authors declare that there is no conflict of interest.

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REFERENCES

1. De Cassai A, Negro S, Geraldini F, Boscolo A, Sella N, Munari M, et al. Inattentional blindness in anesthesiology: A gorilla is worth one thousand words. PLoS One 2021;16:e0257508.
2. Pasin L, Sella N, Correale C, Boscolo A, Mormando G, Zordan M, et al. Pandemic COVID-19: the residents' resilience. Acta Biomed 2020;91:e2020120.
3. Daviu N, Bruchas MR, Moghaddam B, Sandi C, Beyeler A. Neurobiological links between stress and anxiety. Neurobiol Stress 2019;11:100191.
4. Al-Amer R, Malak MZ, Aburumman G, Darwish M, Nassar MS, Randal S, et al. Prevalence and correlates of psychological reactions among jordanian nurses during the coronavirus disease 2019 pandemic. 2020. Available at: https://www.researchsquare.com/article/rs-35820/v1. Accessed Aug 12, 2023.
5. Dehelean L, Papava I, Musat MI, Bondrescu M, Bratosin F, Bucatos BO, et al. Coping strategies and stress related disorders in patients with COVID-19. Brain Sci 2021;11:1287.
6. Yip YC, Yip KH, Tsui WK. The transformational experience of junior nurses resulting from providing care to COVID-19 patients: from facing hurdles to achieving psychological growth. Int J Environ Res Public Health 2021;18:7383.
7. Pedrabissi L, Santinello M. Verification of the validity of the STAI, Form Y, by Spielberger. Giunti Organizzazioni Speciali 1989;191-192:11–4.
8. Messineo L, Tosto C. Evaluation of the psychometric properties of the Italian version of the 10-item perceived stress scale in a sample of teachers. Front Psychol 2024;14:1330789.
9. Morani S, Pricci D, Sanavio E. Penn State Worry Questionnaire e Worry Domains Questionnaire. Presentazione delle versioni italiane ed analisi della fedeltà. Psicoterapia Cognitiva e Comportamentale 1999;5:195–209. [Article in Italian]
10. Sun P, Wang M, Song T, Wu Y, Luo J, Chen L, et al. The psychological impact of covid-19 pandemic on health care workers: a systematic review and meta-analysis. Front Psychol 2021;12:626547.
11. Vizheh M, Qorbani M, Arzaghi SM, Muhidin S, Javanmard Z, Esmaeili M. The mental health of healthcare workers in the COVID-19 pandemic: A systematic review. J Diabetes Metab Disord 2020;19:1967–78.
12. Speroff T, Nwosu S, Greevy R, Weinger MB, Talbot TR, Wall RJ, et al. Organisational culture: variation across hospitals and connection to patient safety climate. Qual Saf Health Care 2010;19:592–6.
13. Gücüyener MB, Topaçoğlu H, Dikme Ö, Gücüyener BG. Determination of depression levels and affecting factors of the residents in a training hospital. Istanbul Med J 2024;25:127–31.
14. Laza R, Lustrea A, Lazureanu VE, Marinescu AR, Nicolescu N, Herlo A, et al. Untangling the professional web: Understanding the impact of work-related factors on the mental health of healthcare professionals during the late stages of Covid-19 pandemic. J Multidiscip Healthc 2023;16:2391–404.
15. Afonso P, Fonseca M, Pires JF. Impact of working hours on sleep and mental health. Occup Med (Lond) 2017;67:377–82.
16. Lollis BD, Kumar M, Kaplan J, Schmelzer C, Harthcock K, Silva M. The on-call burden of physicians: discussion, recommendations and risk mitigation strategies. Clin Case Rep J 2020;1:1–5.