

Burnout, anxiety, and depressive symptoms in Turkish neurology residency: A cross-sectional analysis

İlker Arslan¹, Doruk Arslan², Cansu Ayvacioğlu Çağan¹, Bekir Burak Kılboz³,
Tuğçe Saltoğlu⁴, Mehmet Akif Topçuoğlu¹

¹Department of Neurology, Hacettepe University Faculty of Medicine, Ankara, Türkiye

²Department of Neurology, Ankara Sincan State Hospital, Ankara, Türkiye

³Department of Neurology, İstanbul Prof. Dr. Cemil Taşcıoğlu City Hospital, İstanbul, Türkiye

⁴Department of Neurology, Kastamonu Training and Research Hospital, Kastamonu, Türkiye

ABSTRACT

Objectives: This study aimed to assess the mental health status of neurology residents in Türkiye and identify contributing factors, with the goal of enhancing the quality of neurology training.

Patients and methods: A web-based, multiple-choice survey was designed by a study-group of the Turkish Society of Neurology. Neurology residents throughout Türkiye were invited to participate via email between October 2023 and May 2024. The questionnaire gathered data on demographics, institutional characteristics, educational activities, and working conditions. Mental health and job satisfaction were evaluated using the Minnesota Job Satisfaction Questionnaire, Maslach Burnout Inventory, Beck Anxiety Inventory, and Beck Depression Inventory.

Results: A total of 226 neurology residents (135 females, 91 males; median age: 28 years; range, 25 to 47 years) who completed the online survey were included in the analysis. Participants reported a median of 55 working hours per week, with approximately 10% of this time dedicated to educational activities. Symptoms of depression were present in 64.6% of respondents, while anxiety affected 72.1%. Burnout symptoms were identified in 97.3% of participants, and 46.5% met criteria for burnout. Weekly working hours and time allocated for research and education were positively associated with job satisfaction, yet inversely correlated with burnout, depression, and anxiety. Exploratory factor analysis revealed six principal components influencing burnout and job satisfaction: weekly working hours, time allocated for education, confidence in personal competency, adequacy of clinical equipment, time spent on research, and sociodemographic characteristics (Kaiser-Meyer-Olkin: 0.64; cumulative explained variance: 69.02%).

Conclusion: This study demonstrated a high prevalence of burnout, depressive symptoms, and anxiety among neurology residents in Türkiye. Targeted interventions such as the reduction of daily clinical workload and the expansion of protected time for academic activities may be warranted to mitigate these adverse psychological outcomes and promote professional well-being.

Keywords: Anxiety, burnout, depression, neurology residency, workload.

Healthcare professions are inherently challenging due to the intensive and continuous training process, heavy practical workload, and the high emotional and intellectual demands they entail. This rigorous process impacts clinicians both physically and mentally. Current studies

indicate varying levels of burnout, depression, anxiety, and job satisfaction among clinicians.^[1-6] Physicians experiencing burnout, depression, or anxiety are at a higher risk of committing medical errors, demonstrating noncompliance, increased absenteeism, treating patients impersonally,

Correspondence: İlker Arslan, MD. Hacettepe Üniversitesi Tıp Fakültesi, Nöroloji Anabilim Dalı, 06230 Sıhhiye, Ankara, Türkiye.

E-mail: ilkerarslan94@gmail.com

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struggling with poor social relationships, facing work-life conflicts, and having an elevated risk of suicide.^[7-12]

Neurology trainees are integral to the functioning of both healthcare and the educational system.^[13] Their physical and mental health can be influenced by a range of personal factors and job-related factors.^[14,15] Distress among residents were associated with occupational exposure to body fluids, motor vehicle accidents, medical errors, and a diminished quality of life.^[16-19] Studies reported higher burnout rates among neurology residents compared to neurologists and physicians in other specialties.^[5,14,20,21] The factors contributing to burnout and professional dissatisfaction can be divided into personal, work-related, organizational, and national levels, each involving elements such as workload, efficiency, professional autonomy, work-life balance, and a sense of purpose in the workplace.^[11] Excessive workload, poor work-life balance,^[22] and an increased burden of nonclinical tasks, such as paperwork,^[23] have been identified as significant risk factors. Recognizing these factors is essential to meet the growing demand for neurological care and to foster healthier work environments.^[24]

This study aimed to evaluate the levels of burnout, depression, anxiety, and job satisfaction among neurology residents in Türkiye, as well as to identify work-related stressors. We hope that the findings of this study will inform the development of targeted policies to enhance the standards of neurology training.

PATIENTS AND METHODS

This study was conducted online by Residents and Young Neurologist Section (AGUH) of Turkish Society of Neurology. Neurology residents currently enrolled in active residency training programs in Türkiye were invited to participate in the online survey between October 2023 and May 2024. The survey link was distributed via online forms by representatives and departmental academic coordinators. Written informed consent was obtained from all participants. The study protocol was approved by the Hacettepe University Health Sciences Research Ethics Committee (Date: 21.11.2023, Project No: SBA 23/330). The study was conducted in accordance with the Declaration of Helsinki.

The questionnaire was designed based on a review of relevant literature and consisted of three

main sections, totaling 120 items. At the beginning of the survey, each participant provided informed consent and confirmed that they had completed the survey only once.

The first section focused on personal and professional characteristics. The second section explored working conditions, including questions about weekly working hours, daily tasks, the number and structure of on-call shifts, levels of satisfaction, and perceived competence. The third section included the following validated instruments: Maslach Burnout Inventory (22 items) to assess burnout,^[25] Beck Depression Inventory (21 items) to evaluate depression,^[26] and Beck Anxiety Inventory (21 items) to assess anxiety.^[27] Job satisfaction was assessed using the short form of the Minnesota Satisfaction Questionnaire (MSQ), which measures intrinsic, extrinsic, and general aspects of job satisfaction through Likert-type items. Higher scores indicate greater job satisfaction.^[28]

The Maslach Burnout Inventory was used to measure burnout in three dimensions: emotional exhaustion, cynicism (depersonalization), and personal accomplishment.^[25] The following thresholds were used for classification: emotional exhaustion, cynicism, and personal accomplishment. Individuals were classified as follows: “engaged” if personal accomplishment was ≥ 37 , exhaustion < 27 , and cynicism < 14 ; “ineffective” if personal accomplishment was < 37 , exhaustion < 27 , and cynicism < 14 ; “overextended” if exhaustion was ≥ 27 and cynicism < 14 ; “disengaged” if cynicism was ≥ 14 and exhaustion < 27 ; “burnout” if both exhaustion was ≥ 27 and cynicism ≥ 14 .

Based on the total scores obtained from the Beck Depression Inventory, participants were categorized as follows:^[29] 0-9 points = minimal depressive symptoms; 10-16 points = mild depressive symptoms; 17-29 points = moderate depressive symptoms; 30-63 points = severe depressive symptoms. According to the Beck Anxiety Inventory scores, participants were grouped into four categories:^[29] 0-7 points = minimal anxiety symptoms; 8-15 points = mild anxiety symptoms; 16-25 points = moderate anxiety symptoms; 26-63 points = severe anxiety symptoms.

Cronbach's alpha values were calculated as 0.801 for the Maslach Burnout Inventory, 0.823 for the Beck Depression Inventory, 0.956 for the Beck Anxiety Inventory, and 0.918 for the Minnesota Satisfaction Questionnaire, indicating good to excellent internal consistency across all scales.

Statistical analysis

Statistical analysis was performed using IBM SPSS version 27.0 software (IBM Corp., Armonk, NY, USA). Normality of data distribution was evaluated with the Shapiro-Wilk test. Quantitative variables were expressed as mean \pm standard deviation (SD) or median (min-max) according to distribution. For comparison between two groups, Student's t-test was used if parametric assumptions were met; otherwise, the Mann-Whitney U test was applied. For comparisons among more than two groups, one-way analysis of variance or the Kruskal-Wallis test were used depending on distribution, and post hoc pairwise comparisons were performed with Bonferroni correction. Variables related to burnout, depression, and anxiety that reached a p -value < 0.20 in univariable analyses were included in the logistic regression models. Correlations between two variables were assessed using Spearman's correlation coefficient; as these analyses were exploratory, p -values were not adjusted for multiple comparisons. A factor analysis was performed to explore underlying dimensions related to burnout and job satisfaction. Prior to factor extraction, the suitability of the data was assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. Principal component analysis was used for factor extraction. The number of factors was determined by considering eigenvalues > 1 together with inspection of the scree plot, which indicated a noticeable inflection after the sixth component. Varimax rotation was applied to facilitate a clearer and more interpretable structure, given that the underlying dimensions were conceptually considered to be relatively independent. A p -value < 0.05 was considered statistically significant with a 95% confidence interval.

RESULTS

Out of approximately 1,700 neurology residents, 226 (135 females, 91 males; median age: 28 years; range, 25 to 47 years) voluntarily participated in the survey conducted between October 2023 and May 2024. The demographic characteristics and working conditions of the participants are presented in Table 1. Regarding institutional affiliation, 47.8% ($n = 108$) were training at research and training hospitals or city hospitals, 50.4% ($n = 114$) at university hospitals, and 1.8% ($n = 4$) at private university hospitals. The median weekly working hours were reported as 55 (30-80) h. Participants stated that approximately

85% of this time was dedicated to clinical duties, 10% to education, and only 1% to research. The median number of on-call shifts per month was 5 (0-10), while the median number of on-call shifts on weekends per month was 2 (0-5).

Among responders, 72.1% reported having received orientation training, whereas only 37.2% expressed clarity regarding the expectations related to knowledge acquisition, procedural competence, and responsibilities during their residency. When asked about their perceived competence in managing clinical areas independently, 68.2% stated they could manage emergency cases, 64.6% felt capable of managing inpatient wards, and 38.9% reported being able to manage the neurological intensive care unit. A majority of participants (58.4%) considered the clinical equipment insufficient, while 9.3% found the patient variety inadequate, and 29.6% expressed dissatisfaction with facilities of neurophysiology units. Notably, 89.4% of residents reported a desire to change certain aspects of their clinical environment, as shown in Table 2.

Symptoms of anxiety were identified in 72.1% of the participants, with 28.8% exhibiting severe anxiety, which represented the largest subgroup. Depression was detected in 69% of the participants at varying severity levels. Based on the Maslach Burnout Inventory, 97.3% of residents demonstrated impairment in at least one dimension of burnout. According to the established criteria, 46.5% were classified as burnout, 21% as overextended, 21% as ineffective, 8.4% as disengaged, and only 2.7% as engaged, as shown in Table 3. These distributions are visually represented in Figure 1. Additionally, as shown in Figure 2, the majority of residents classified as "burnout" exhibited moderate to severe levels of both anxiety and depression. In contrast, residents categorized as "ineffective" predominantly demonstrated mild symptoms or no significant signs of anxiety and depression. Participants in the "overextended" group showed a more balanced distribution across mild, moderate, and severe symptoms, while the "disengaged" group mostly exhibited mild or no symptoms. Residents classified as "engaged" demonstrated the lowest levels of anxiety and depression severity.

Residents classified as having burnout, depression, or anxiety had significantly lower job satisfaction scores. Statistical comparisons of job satisfaction using the Mann-Whitney U test revealed

TABLE 1
Demographic characteristics and working conditions of participants (n = 226)

	n	%	Median	Min-Max
Age (year)			28	25-47
Sex				
Female	135	59.7		
Male	91	40.3		
Nationality				
Turkish	220	97.3		
Foreign	6	2.7		
Marital status				
Married	172	76.1		
Single	54	23.9		
Training institution				
Research and Training Hospital/City Hospital	108	47.8		
University Hospital	114	50.4		
Private University Hospital	4	1.8		
Years as a resident			2	1-5
Number of children			0	0-3
Monthly education hours			8	0-60
Weekly working hours			55	30-80
Daily working hours			9	6.5-11
Distribution of daily working hours				
Clinical duties			85	10-100
Education			10	0-80
Research			1	0-40
Monthly on-call shifts per month			5	0-10
Monthly on-call shifts on weekends per month			2	0-5
Post-shift leave				
None	12	5.3		
Half day	32	14.2		
Full day	182	80.5		

significant differences for burnout ($r = 0.38$, $p < 0.001$), depression ($r = 0.37$, $p < 0.001$), and anxiety ($r = 0.17$, $p = 0.01$). Furthermore, participants identified as burned out had significantly higher anxiety scores ($r = 0.33$, $p < 0.001$), higher depression scores ($r = 0.41$, $p < 0.001$), and longer weekly working hours ($r = 0.2$, $p = 0.003$). In contrast, they reported significantly less time allocated to education ($r = 0.23$, $p = 0.002$) and research ($r = 0.17$, $p = 0.011$). In the multivariable analysis, weekly working hours emerged as an independent risk factor for burnout (odds ratio [OR] = 1.026, $p = 0.025$, 95% confidence interval [CI]: 1.003-1.050), while no other variables retained statistical significance in the model.

Participants with any level of anxiety symptoms reported significantly longer working hours per week ($r = 0.16$, $p = 0.016$), shorter duration of training in their residency program ($r = 0.17$,

$p = 0.01$), and higher depression scores ($r = 0.44$, $p < 0.001$). Among those with severe anxiety, the number of weekends on-call shifts per month was significantly higher (Bonferroni-adjusted $p = 0.036$). Multivariable logistic regression among residents with any level of anxiety showed that years in residency (OR = 0.745, $p = 0.033$, 95% CI: 0.568-0.977) and weekly working hours (OR = 1.027, $p = 0.044$, 95% CI: 1.001-1.054) were independently associated with anxiety, whereas no other variables demonstrated significant associations in the model. Anxiety scores were significantly lower among residents working at university hospitals ($p = 0.03$), and these residents also reported spending a higher proportion of their time on research activities ($p = 0.019$).

Correlation analyses revealed weak but statistically significant negative associations between the proportion of time allocated to

TABLE 2

Satisfaction levels and perceived competence among neurology residents (n = 226)

	n	%
Received orientation training		
Yes	163	72.1
No	63	27.9
Clarity regarding training responsibilities		
Strongly disagree	14	6.2
Disagree	31	13.7
Neutral	97	42.9
Agree	70	31
Strongly agree	14	6.2
Confidence in managing emergencies alone		
Strongly disagree	5	2.2
Disagree	29	12.8
Neutral	38	16.8
Agree	103	45.6
Strongly agree	51	22.6
Confidence in managing inpatient ward alone		
Strongly disagree	7	3.1
Disagree	31	13.7
Neutral	42	18.6
Agree	100	44.2
Strongly agree	46	20.4
Satisfaction with clinical equipment		
Strongly disagree	20	8.8
Disagree	112	49.6
Neutral	32	14.2
Agree	50	22.1
Strongly agree	12	5.3
Satisfaction with patient variety		
Strongly disagree	6	2.7
Disagree	15	6.6
Neutral	75	33.2
Agree	88	38.9
Strongly agree	42	18.6
Satisfaction with EEG/EMG/PSG facilities		
Strongly disagree	20	8.8
Disagree	47	20.8
Neutral	46	20.4
Agree	78	34.5
Strongly agree	35	15.5
Presence of neurological ICU		
Yes	199	88.1
No	27	11.9
Confidence in managing ICU alone		
Strongly disagree	25	12.3
Disagree	42	20.7
Neutral	57	28.1
Agree	54	26.6
Strongly agree	25	12.3
Presence of stroke center		
Yes	167	73.9
No	59	26.1
Desire to make changes in current institution		
Yes	202	89.4
No	24	10.6

EEG, electroencephalography; EMG, electromyography; PSG, polysomnography; ICU, intensive care unit.

TABLE 3

Anxiety, depression, and burnout status among neurology residents

	n	%
Anxiety severity		
Minimal	63	27.9
Mild	62	27.4
Moderate	36	15.9
Severe	65	28.8
Depression severity		
Minimal	70	31
Mild	64	28.3
Moderate	64	28.3
Severe	28	12.4
Burnout spectrum		
Engaged	6	2.7
Ineffective	48	21.2
Overextended	48	21.2
Disengaged	19	8.4
Burnout	105	46.5

education and research and burnout scores ($r = -0.199$ and -0.256 ; $p = 0.003$ and < 0.001 , respectively), as well as depression scores ($r = -0.154$ and -0.182 ; $p = 0.02$ and 0.006). In contrast, these same variables were positively correlated with job satisfaction scores ($r = 0.22$ and 0.24 ; $p < 0.01$ and < 0.001 , respectively). A negative correlation was also found between weekly working hours and job satisfaction ($r = -0.218$, $p = 0.001$), while weak positive correlations were observed between weekly working hours and burnout ($r = 0.22$, $p = 0.001$), anxiety ($r = 0.18$, $p = 0.006$), and depression ($r = 0.138$, $p = 0.038$). The number of on-call shifts on weekends per month was positively correlated with burnout ($r = 0.165$, $p = 0.013$), anxiety ($r = 0.19$, $p = 0.003$), and depression ($r = 0.154$, $p = 0.02$). A weak negative correlation was also observed between the length of residency and anxiety scores ($r = -0.154$, $p = 0.02$).

In the factor analysis, the KMO measure of sampling adequacy was found to be 0.64, indicating a borderline yet acceptable level for exploratory factor analysis. Six factors related to burnout and job satisfaction were identified, accounting for 69.02% of the total variance, suggesting that the model provided a satisfactory explanation of the relationships among the observed variables. The extracted factors were interpreted as representing total working hours, time allocated to education, perceived personal competence, adequacy of clinical equipment,

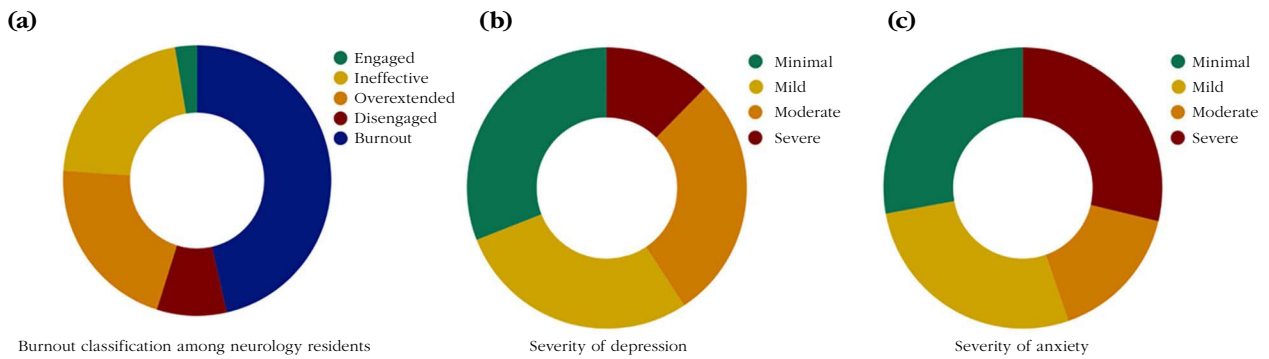


Figure 1. Classification of Burnout and Severity of Psychiatric Symptoms Among Neurology Residents: Donut charts illustrate the distribution of burnout classifications (a) and the severity of depression (b) and anxiety (c) symptoms among neurology residents.

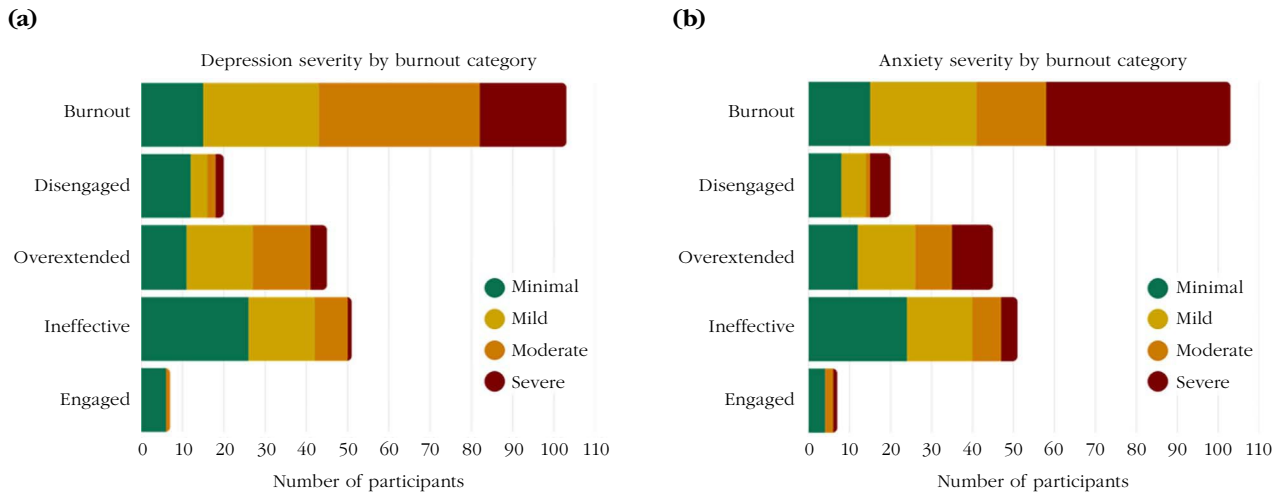


Figure 2. Distribution of Anxiety and Depression Severity Across Burnout Categories: Horizontal stacked bar charts depict the severity levels of depression (a) and anxiety (b) among neurology residents classified into different burnout profiles (burnout, disengaged, overextended, ineffective, engaged).

time spent on research, and sociodemographic characteristics.

DISCUSSION

In recent years, healthcare professionals have increasingly faced higher rates of burnout and declining professional satisfaction, which negatively impacts medical education and public health.^[30] Neurology residents and specialists report higher rates of depression and burnout compared to physicians in other specialties.^[5,14,20,21] The declining demand for neurology among medical students parallels this trend; in the August 2024 Medical Specialty Examination (TUS) in Türkiye, neurology ranked 29th among 41 specialties.

The findings of our study demonstrated that neurology residents in Türkiye experienced high rates of depression (69%) and anxiety symptoms (72.1%), along with low levels of job satisfaction. According to the Maslach Burnout Inventory, 97.3% of participants exhibited impairment in at least one dimension of burnout; however, fewer than half (46.5%) met the criteria for full burnout, while only 2.7% were classified as “engaged.” A total of 46.5% of participants met the criteria for full burnout. Although depression and burnout scores showed parallel trends, it is important to note that these phenomena are not synonymous; they interact in complex ways, and both increase under dysfunctional working conditions.^[31-34] The co-occurrence of depression and burnout in a physician is particularly

concerning, as it may significantly elevate the risk of suicide.^[32,35,36]

Similar studies conducted in the USA and Europe also reported high burnout rates among neurology residents (73.5% and 52.5%, respectively).^[3,11] However, the rates identified in our study were even higher, suggesting that neurology residents in Türkiye may be facing additional context-specific risks beyond the inherent challenges of medical training and neurology practice. It also implies that strategies aiming to enhance professional satisfaction and healthier work environments could yield significant benefits in this setting.

Our findings indicate that longer weekly working hours and a greater number of weekend shifts per month are associated with higher burnout, anxiety, and depression rates, and with lower job satisfaction. This relationship is consistent with previous studies.^[3,11,21] In the USA, after the Accreditation Council for Graduate Medical Education implemented restrictions on resident work hours, burnout rates among internal medicine residents decreased from 76 to 66%, while job satisfaction increased from 66 to 80%.^[37] Although work hour restrictions significantly improved these outcomes, the persistence of high burnout rates suggests that workload alone is not the sole determinant. Nevertheless, considering that neurology residents in Türkiye work approximately five hours more per week and have more weekend shifts compared to their European and American counterparts, interventions targeting workload reduction are likely to be beneficial.^[3,11] On the other hand, compared to a study conducted among Turkish neurology residents in 2014,^[38] the current data showed a decrease in the number of weekend shifts; however, there has been no significant change in weekly working hours. Adjusting weekend duties through optimized scheduling and more efficient use of workforce resources could further reduce weekly working hours.^[36] Moreover, allocating more time to education and research activities during residency was associated with lower burnout and depression scores and higher job satisfaction scores. Similarly, residents working at university hospitals, who spent more time on research activities, reported lower anxiety scores. The protective role of academic engagement against burnout was supported by other studies.^[3,5]

Although several associations were statistically significant, some effect sizes were small, suggesting a modest magnitude of impact. While such effects may not independently drive major clinical or

educational changes, they may still be meaningful within the multifactorial and cumulative nature of burnout, depression, and anxiety. Therefore, these findings should be cautiously interpreted but not disregarded in terms of practical relevance.

A meta-analysis investigating interventions to reduce burnout suggested that combined strategies at the individual, structural, and organizational levels are needed for substantial impact.^[39] Given the multifaceted nature of burnout, personalized interventions tailored to different burnout profiles are recommended.^[3] For example, workload adjustments for overextended clinicians, promotion of collegiality and kindness among disengaged individuals, and mentorship emphasizing meaningful academic engagement for ineffective residents. For those fully burned out, a combination of these strategies would be necessary.^[3,31,39-42] At the structural and organizational levels, residency programs should be restructured to enhance personal resilience and stress management skills.^[5] Increasing participation and autonomy, providing meaningful clinical experiences early in training, reducing administrative burden, and fostering opportunities for professional growth can all contribute to mitigating burnout.^[5,43,44] Alternating periods of lower and higher intensity rotations during the early years of training and encouraging residents to focus on neurology's intellectual and procedural aspects, rather than nonclinical tasks, are also recommended.^[5]

This study had several limitations. Its cross-sectional design precludes causal inferences. Although efforts were made to reach a broad participant base, participation was voluntary, which may have introduced selection bias and limited the representativeness of the sample. The use of self-report measures introduces the possibility of reporting bias, particularly as participants experiencing difficulties in their daily clinical practice may have been more inclined to respond negatively. Residual confounding also cannot be excluded. In addition, the absence of clinical performance indicators and institutional-level data restricts contextual interpretation. Finally, the factor analyses were exploratory, and the borderline KMO value indicates that these results should be interpreted with caution.

In conclusion, anxiety, depression, and burnout symptoms were common among neurology residents in Türkiye, and residents with these symptoms tended to allocate less daily time

to education and research, had longer weekly working hours, took more night and weekend on-call shifts, and reported lower levels of job satisfaction. Developing strategies and policies informed by the factors associated with anxiety, depression, and burnout may contribute to fostering a healthier and more productive working environment, which may benefit the field of neurology and the broader medical community in Türkiye, potentially improving public health. Residency program directors could utilize periodic surveys to monitor the well-being of their residents over time, identifying areas that require intervention tailored to specific burnout profiles. Furthermore, longitudinal studies analyzing the impact of systemic changes on resident outcomes would contribute to a better understanding of this phenomenon and the development of more effective solutions.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

- Codron P, Roux T, Le Guennec L, Zuber M. Are the French neurology residents satisfied with their training? *Rev Neurol (Paris)* 2015;171:787-91. doi: 10.1016/j.neurol.2015.07.004.
- Coon EA, West CP, Jones LK. Can we improve burnout in neurology by targeting residency program resiliency? *Neurol Educ* 2023;2:e200085. doi: 10.1212/NE9.0000000000200085.
- Di Liberto G, Baldizzi G, Carvalho V, Cuffaro L, Sauerbier A, Klingelhofer L, et al. Education research: Impact of burnout on neurology residents and research fellows in Europe. *Neurol Educ* 2022;1:e200035. doi: 10.1212/NE9.0000000000200035.
- Juul D, Gutmann L, Adams HP Jr, O'Shea SA, Faulkner LR. Training in neurology: Feedback from graduates about the psychiatry component of residency training. *Neurology* 2021;96:233-6. doi: 10.1212/WNL.000000000010857.
- Levin KH, Shanafelt TD, Keran CM, Busis NA, Foster LA, Molano JRV, et al. Burnout, career satisfaction, and well-being among US neurology residents and fellows in 2016. *Neurology* 2017;89:492-501. doi: 10.1212/WNL.0000000000004135.
- Rotenstein LS, Torre M, Ramos MA, Rosales RC, Guille C, Sen S, et al. Prevalence of burnout among physicians: A systematic review. *JAMA* 2018;320:1131-50. doi: 10.1001/jama.2018.12777.
- Duarte D, El-Hagrassy MM, Couto TCE, Gurgel W, Fregni F, Correa H. Male and female physician suicidality: A systematic review and meta-analysis. *JAMA Psychiatry* 2020;77:587-97. doi: 10.1001/jamapsychiatry.2020.0011.
- Gold KJ, Sen A, Schwenk TL. Details on suicide among US physicians: Data from the National Violent Death Reporting System. *Gen Hosp Psychiatry* 2013;35:45-9. doi: 10.1016/j.genhosppsych.2012.08.005.
- Center C, Davis M, Detre T, Ford DE, Hansbrough W, Hendin H, et al. Confronting depression and suicide in physicians: A consensus statement. *JAMA* 2003;289:3161-6. doi: 10.1001/jama.289.23.3161.
- Dyrbye LN, Sotile W, Boone S, West CP, Tan L, Satele D, et al. A survey of U.S. physicians and their partners regarding the impact of work-home conflict. *J Gen Intern Med* 2014;29:155-61. doi: 10.1007/s11606-013-2581-3.
- Busis NA, Shanafelt TD, Keran CM, Levin KH, Schwarz HB, Molano JR, et al. Burnout, career satisfaction, and well-being among US neurologists in 2016. *Neurology* 2017;88:797-808. doi: 10.1212/WNL.0000000000003640.
- Shanafelt TD, Mungo M, Schmitgen J, Storz KA, Reeves D, Hayes SN, et al. Longitudinal study evaluating the association between physician burnout and changes in professional work effort. *Mayo Clin Proc* 2016;91:422-31. doi: 10.1016/j.mayocp.2016.02.001.
- Di Liberto G, Carvalho V. Shaping neurology subspecialty training in Europe. *Eur J Neurol* 2021;28:3541-2. doi: 10.1111/ene.15020.
- Shanafelt TD, Boone S, Tan L, Dyrbye LN, Sotile W, Satele D, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med* 2012;172:1377-85. doi: 10.1001/archinternmed.2012.3199.

15. Bernat JL, Busis NA. Patients are harmed by physician burnout. *Neurol Clin Pract* 2018;8:279-80. doi: 10.1212/CPJ.0000000000000483.
16. West CP, Tan AD, Shanafelt TD. Association of resident fatigue and distress with occupational blood and body fluid exposures and motor vehicle incidents. *Mayo Clin Procs* 2012;87:1138-44. doi: 10.1016/j.mayocp.2012.07.021.
17. West CP, Shanafelt TD, Kolars JC. Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents. *JAMA* 2011;306:952-60. doi: 10.1001/jama.2011.1247.
18. West CP, Tan AD, Habermann TM, Sloan JA, Shanafelt TD. Association of resident fatigue and distress with perceived medical errors. *JAMA* 2009;302:1294-300. doi: 10.1001/jama.2009.1389.
19. West CP, Huschka MM, Novotny PJ, Sloan JA, Kolars JC, Habermann TM, et al. Association of perceived medical errors with resident distress and empathy: A prospective longitudinal study. *JAMA* 2006;296:1071-8. doi: 10.1001/jama.296.9.1071.
20. Hasan TF, Turnbull MT, Vatz KA, Robinson MT, Mauricio EA, Freeman WD. Burnout and attrition: Expanding the gender gap in neurology? *Neurology* 2019;93:1002-8. doi: 10.1212/WNL.00000000000008583.
21. Shanafelt TD, Gradishar WJ, Kosty M, Satele D, Chew H, Horn L, et al. Burnout and career satisfaction among US oncologists. *J Clin Oncol* 2014;32:678-86. doi: 10.1200/JCO.2013.51.8480.
22. Shanafelt TD, Hasan O, Dyrbye LN, Sinsky C, Satele D, Sloan J, et al. Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. *Mayo Clin Proc* 2015;90:1600-13. doi: 10.1016/j.mayocp.2015.08.023.
23. Shanafelt TD, Dyrbye LN, Sinsky C, Hasan O, Satele D, Sloan J, et al. Relationship between clerical burden and characteristics of the electronic environment with physician burnout and professional satisfaction. *Mayo Clin Proc* 2016;91:836-48. doi: 10.1016/j.mayocp.2016.05.007.
24. Deuschl G, Beghi E, Fazekas F, Varga T, Christoforidi KA, Sipido E, et al. The burden of neurological diseases in Europe: An analysis for the Global Burden of Disease Study 2017. *Lancet Public Health* 2020;5:e551-67. doi: 10.1016/S2468-2667(20)30190-0.
25. Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory Manual*. 4th ed. Menlo Park (CA): Mind Garden; 2016.
26. Upton J. Beck Depression Inventory (BDI). In: Gellman MD, Turner JR, editors. *Encyclopedia of Behavioral Medicine*. New York (NY): Springer; 2013. p. 178-9.
27. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. *J Consult Clin Psychol* 1988;56:893-7. doi: 10.1037//0022-006x.56.6.893.
28. Weiss DJ, Dawis RV, England GW. *Manual for the Minnesota Satisfaction Questionnaire*. Minnesota Studies in Vocational Rehabilitation. Minneapolis (MN): University of Minnesota; 1967. p. 120.
29. Maust D, Cristancho M, Gray L, Rushing S, Tjoa C, Thase ME. Psychiatric rating scales. *Handb Clin Neurol* 2012;106:227-37. doi: 10.1016/B978-0-444-52002-9.00013-9.
30. Bernat JL. How can neurologists avoid burnout? *Neurology* 2017;88:726-7. doi: 10.1212/WNL.0000000000003648.
31. Maslach C, Leiter MP. Understanding the burnout experience: Recent research and its implications for psychiatry. *World Psychiatry* 2016;15:103-11. doi: 10.1002/wps.20311.
32. Verweij H, van der Heijden FMMA, van Hooff MLM, Prins JT, Lagro-Janssen ALM, van Ravesteijn H, Speckens AEM. The contribution of work characteristics, home characteristics and gender to burnout in medical residents. *Adv Health Sci Educ Theory Pract* 2017;22:803-18. doi: 10.1007/s10459-016-9710-9.
33. Stainman RS, Lewis A, Nelson A, Zabar S, Kurzweil AM. Training in neurology: Identifying and addressing struggling colleagues in the era of physician burnout. *Neurology* 2020;95:796-9. doi: 10.1212/WNL.0000000000010601.
34. Hu YY, Ellis RJ, Hewitt DB, Yang AD, Cheung EO, Moskowitz JT, et al. Discrimination, abuse, harassment, and burnout in surgical residency training. *N Engl J Med* 2019;381:1741-52. doi: 10.1056/NEJMsa1903759.
35. Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med* 2002;136:358-67. doi: 10.7326/0003-4819-136-5-200203050-00008.
36. Wurm W, Vogel K, Holl A, Ebner C, Bayer D, Mörkl S, et al. Depression-burnout overlap in physicians. *PLoS One* 2016;11:e0149913. doi: 10.1371/journal.pone.0149913.
37. Goitein L, Shanafelt TD, Wipf JE, Slatore CG, Back AL. The effects of work-hour limitations on resident well-being, patient care, and education in an internal medicine residency program. *Arch Intern Med* 2005;165:2601-6. doi: 10.1001/archinte.165.22.2601.
38. Batur Çağlayan HZ, Ege F, Baştan B, Yalçın Çakmaklı G, Yıldırım Çapraz İ, Arsava EM, et al. The status of the neurology education from resident's perspective: A national survey in Turkey. *Turk J Neurol* 2014;20:72-5. doi: 10.4274/tnd.26576.
39. West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent and reduce physician burnout: A systematic review and meta-analysis. *Lancet* 2016;388:2272-81. doi: 10.1016/S0140-6736(16)31279-X.
40. Torkelson E, Holm K, Bäckström M, Schad E. Factors contributing to the perpetration of workplace incivility: The importance of organizational aspects and experiencing incivility from others. *Work Stress* 2016;30:115-31. doi: 10.1080/02678373.2016.1175524.
41. Copeland P. Stop describing academic teaching as a "load". *Nature* 2022. doi: 10.1038/d41586-022-00145-z.
42. Dewey J, Encandela J, Moeller J. Thriving in neurology residency: An appreciative inquiry Approach. *Neurology* 2022;98:e1397-e405. doi: 10.1212/WNL.00000000000200031.

43. Zis P, Anagnostopoulos F, Artemiadis AK. Residency training: Work engagement during neurology training. *Neurology* 2016;87:e45-8. doi: 10.1212/WNL.0000000000002911.
44. Zis P, Artemiadis AK, Lykouri M, Xirou S, Roussopoulou A, Papageorgiou E, et al. Residency training: Determinants of burnout of neurology trainees in Attica, Greece. *Neurology* 2015;85:e81-4. doi: 10.1212/WNL.0000000000001924.