Original Article/*Özgün Araştırma*

doi: 10.54875/jarss.2026.03780

Burnout Levels Among Intensive Care Specialists and Residents in Türkiye: A Cross-Sectional Study

Türkiye'de Yoğun Bakım Uzmanları ve Asistanlarında Tükenmişlik Düzeyleri: Kesitsel Bir Çalışma

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ABSTRACT

Objective: This study aimed to determine the prevalence of burnout syndrome among physicians undergoing intensive care specialty training in Türkiye, identify contributing factors, and explore potential solutions.

Method: After obtaining ethical approval, an online questionnaire was made available to physicians undergoing intensive care specialty training. The survey included sections on demographic characteristics, lifestyle habits, working conditions, and job satisfaction. Burnout levels and associated factors were assessed using the Maslach Burnout Inventory.

Results: A total of 69 physicians in intensive care specialty training participated in the study, including 22 residents. Primary specialties were distributed as follows: anesthesiology and reanimation (68.1%), internal medicine (11.6%), pulmonology (8.7%), and emergency medicine (11.6%). During their primary specialty training, 47.8% of participants reported experiencing burnout. Although 73.9% of the participants stated that they had voluntarily chosen intensive care specialty training, high levels of emotional exhaustion (58.0%) and depersonalization (59.4%) were observed in more than half of the participants, while 58.0% demonstrated low personal accomplishment. Overall, 42.0% of participants were classified as having a high level of burnout. When the Maslach Burnout Inventory subscales were considered, approximately 58-59% of the sample was found to be at high risk in at least one subscale, indicating a substantial risk of burnout. Regardless of primary specialty, physicians receiving intensive care specialty training who worked more than 80 hours per week had significantly higher levels of emotional exhaustion (p = 0.023).

Conclusion: Burnout syndrome is common among physicians in intensive care specialty training and constitutes a significant problem. Regulation of working hours is necessary to reduce and prevent burnout. Preventing burnout among physicians specializing in intensive care is essential to improve patient care standards in intensive care units.

Keywords: Intensive care specialty training, burnout syndrome, physicians, Türkiye

ÖZ

Amaç: Bu çalışma Türkiye'de yoğun bakım yan dal eğitimi alan hekimler arasındaki tükenmişlik sendromu oranını, etkileyen faktörleri ve çözüm seçeneklerinin tespiti için tasarlandı.

Yöntem: Alınan etik onay ardından anket yoğun bakım eğitimi alan hekimlere online olarak ulaşıma açıldı ve cevaplamaları sağlandı. Anket demografik bilgiler, yaşam tarzı, çalışma koşulları ve memnuniyet durumlarını içeren bölümlerden oluşmuştur. Anket cevapları üzerinden Maslach tükenmişlik ölçeği ile tükenmişlik düzeyleri ve ilişkili faktörler analiz edildi.

Bulgular: Çalışmaya yoğun bakım yan dal eğitimi alan 69 hekim (22'si asistan) katıldı. Anadal uzmanlıkları %68,1 anesteziyoloji ve reanimasyon, %11,6 iç hastalıkları, %8,7 göğüs hastalıkları ve %11,6 acil tıp alanı olarak dağılım gösterdi. Anadal uzmanlığı sırasında tükenmişlik yaşadığını belirtenlerin oranı %47,8'dir. %73,9'u yan dal eğitimini isteyerek tercih ettiğini belirtse de yan dal eğitimi ile katılımcıların yarısından fazlasında yüksek duygusal tükenme %58 ve yüksek duyarsızlaşma %59,4 saptanırken, kişisel başarı algısının düşük olduğu bireylerin oranı %58 olarak bulunmuştur. Katılımcıların % 42'si yüksek tükenmişlik düzeyinde sınıflandırılırken, Maslach Tükenmişlik Ölçeği alt boyutları dikkate alındığında örneklemin yaklaşık %58-59'unun en az bir alt boyutta yüksek risk taşıdığı ve tükenmişlik açısından risk altında olduğu görülmüştür. Anadal ayrımı olmaksızın yan dal eğitimi alan hekimler arasında haftalık 80 saat üzerinde çalışanların duygusal tükenme oranı anlamlı oranda yüksek sonuçlandı (p=0,023).

Sonuç: Tükenmişlik sendromu yoğun bakım eğitimi alan hekimler arasında yaygındır ve önemli bir sorundur. Tükenmişlik sendromunu azaltmak ve önlemek için çalışma saatlerinin düzenlenmesi gerekmektedir. Yoğun bakım alanında özelleşen hekimlerin tükenmişliklerinin önlenmesi yoğun bakımlarda hasta bakım standartlarının iyileştirilmesi için gereklidir.

Anahtar sözcükler: Yoğun bakım uzmanlık eğitimi, tükenmişlik sendromu, hekimler, Türkiye

Received/Geliş tarihi : 04.01.2026
Accepted/Kabul tarihi : 13.04.2026
Publication date : 30.04.2026

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Cite as: Birtane D, Ozdemir F, Cukurova Z, Hergunsel GO. Burnout levels among intensive care specialists and residents in Türkiye: A cross-sectional study. JARSS 2026;34(2):156-167.

INTRODUCTION

Burnout syndrome, as defined by Freudenberger, is a serious problem involving energy depletion, negative attitudes toward professional activities, and reduced work performance, affecting social life and emotional state (1). Therefore, occupational burnout arises as a result of inadequate management of work-related stress, does not only affect work life.

Within hospitals, intensive care units (ICU) are settings with the highest patient severity, mortality rates, and workload intensity. In Türkiye, physicians who are eligible based on compulsory service requirements and exam success criteria following different primary specialties can complete their training in ICU and then specialize in this field by undergoing another exam and fulfilling compulsory service requirements. Given the numerous and lengthy prerequisites for ICU specialty training and the conditions of the training period, it is expected that burnout is common in this profession. Moreover, burnout syndrome is widely reported among ICU professionals worldwide (2-4). Professional uncertainty during and after ICU specialty training, reduction in professional entitlements, lack of standardized work-hour scheduling, financial and psychosocial burdens, the critical condition of patients, and high mortality rates are among the most common contributors to burnout among physicians in ICU specialty training. Despite decades of research on physician burnout, contemporary data specifically focusing on ICU trainees in Türkiye remain limited. The ICU workforce in Türkiye is heterogeneous, and the number of formally trained ICU specialists is still insufficient. Standardization in training pathways and long-term professional sustainability has not yet been fully achieved. Before encouraging new physicians to pursue this demanding specialty, it is essential to evaluate the current well-being and professional outlook of those who voluntarily choose ICU training.

This study aims to identify the levels of burnout experienced by physicians who have chosen to pursue specialty training in ICU in Türkiye during and after their training, and to reduce the causes and find solutions. It is intended that the data collected through survey methods will guide the development of strategies to improve physicians' quality of professional life, increase demand for ICU specialty training, and improve patient care standards.

MATERIALS and METHODS

Study Setting

This study was designed as a cross- sectional observational survey study. Following ethics approval, the questionnaire was made available to participants. The survey included both recall-based questions addressing past experiences and items assessing current conditions. Access to the survey was provided to physicians via online access through the association links of the specialties that can choose intensive care specialty training. The survey consisted of two sections: The first section collected information about sociodemographic, professional, and personal life (questions answered voluntarily), while the second section included 22 questions from the Maslach Burnout Inventory (MBI) - General Form (Turkish version), which had to be answered. The aim was to collect data on the parameters to be evaluated through the survey results and to analyze the relationship between these parameters and the level of burnout determined by the MBI.

Ethical Consideration

This study was approved by the University of Health Sciences Bakirkoy Dr. Sadi Konuk Hospital, Clinical Research Local Ethics Committee (Approval No: 2025-14-01; Date: 06.08.2025). Informed consent was obtained electronically from all participants prior to survey completion.

Participants

Physicians aged ≥28, who are healthy and volunteer, continuing or have completed residency training in ICU, were included. Participants who were not receiving ICU specialty training and those who declined to participate in the survey were excluded.

Statistical Analysis

Descriptive statistics were used in the analysis. Categorical variables were reported as frequency and percentage, while continuous variables were reported as mean ± standard deviation or median (interquartile range). All analyses were performed using R software (version 4.1.1, Posit Software, USA). In the analysis of the collected data, frequency, percentage, mean, standard deviation, median (min-max), and a normality test (Shapiro-Wilk) were used, along with the Kruskal-Wallis and Mann-Whitney U tests for the analysis of data that did not show a normal distribution. The Spearman correlation test, one of the non-parametric methods, was used to examine the relationships between variables. The significance level was set at $p < 0.05$.

Maslach Burnout Inventory Scoring

As emphasized by Maslach and colleagues, the MBI is not a diagnostic tool, and cut-off values vary depending on the scale form used, the Likert response structure, and the professional group being studied (5-7). In the original Maslach literature, the most widely accepted threshold values for the subscales of burnout in studies using a 7-point Likert scale are defined as ≥27 for emotional exhaustion (EE), ≥13 for deper-

sonalization (DP), and ≤31 for personal accomplishment (PA). The reference threshold values for EE, DP, and PA are based on the fundamental study by Maslach and colleagues on burnout measurement (8). However, in large-scale studies conducted among physicians, it has been reported that a lower threshold value (≥10) is used for DP in order to detect clinically meaningful DP more sensitively (9,10).

In this study, since a high-risk population consisting of intensive care physicians was examined, a threshold of ≥10 was used for the DP subscale. The Turkish version of the MBI, adapted by Ergin, has been widely used in studies involving healthcare professionals in Türkiye (11). For example, Cronbach's alpha coefficients were reported as 0.920 for EE, 0.819 for DP, and 0.803 for PA in a study of Turkish physicians. These findings support the reliability of the Turkish MBI across different clinical settings (12). Because the Turkish MBI uses a 5-point Likert scale, cut-off values originally defined on the 7-point scale were proportionally adapted using a linear transformation. In this regard, burnout syndrome is defined as the simultaneous presence of high scores in the EE and DP subdimensions and low scores in the PA subdimension. For each subscale, cut-off values were proportionally adjusted by preserving their ratio to the maximum theoretical score when converting from the 7-point to the 5-point Likert scale. The Turkish version of the MBI uses a 5-point Likert response format ranging from 0 (never) to 4 (always).

Emotional Exhaustion

The maximum score for the 7-point Likert scale is 54, and a threshold value of ≥27 has been adopted. Since the maximum score for the 5-point Likert scale is 36, (27/54) × 36 = 18 is the adapted threshold value, and ≥18 is defined as high EE.

Depersonalization

The ≥ 10 threshold used in physician-based studies was taken as the basis. The maximum score for the 7-point Likert scale is 30, while the maximum score for the 5-point Likert scale is 20. The adapted threshold value is (10/30) × 20 = 6.7, and ≥ 7 is considered high DP.

Personal Accomplishment

The original 7-point Likert scale threshold of ≤ 31 defines low personal achievement (high burnout). The maximum score on the 7-point Likert scale is 48, while the maximum score on the 5-point Likert scale is 32. The adapted threshold value (31/48) x 32 =20.7 was calculated and ≤ 21 was defined as low PA.

In line with these definitions, burnout syndrome is defined as the coexistence of high scores in the EE and DP subdimensions and a low score in the PA subdimension. Furthermore, consistent with the literature, burnout risk is defined as high risk in at least one of the subdimensions.

The adaptation of cutoff values from the original 7-point Likert scale to the 5-point Turkish version was performed by preserving the proportional position of thresholds within the theoretical score range. However, burnout cutoff values are not absolute diagnostic thresholds and may vary depending on population characteristics and response distributions, as emphasized in previous methodological study (8). Therefore, the adapted thresholds in this study should be interpreted as approximate indicators rather than definitive classification criteria.

RESULTS

Study Population

The survey was conducted online, and participants were recruited via professional networks and institutional communication channels. The survey included 69 physicians; 47 intensive care specialists and 22 residents. The highest academic status was associate professor of ICU. The 65.2% were female. The predominant age group among participants was 35-40 years (49.3%). In terms of specialty distribution, 68.1% of participants work in anesthesiology and reanimation, 11.6% in internal medicine, 8.7% in pulmonary medicine, 11.6% in emergency medicine. Among the participants, 91.3% were married, and 76.8% had children. Among paticipants, 9 were working in state university hospitals, 36 in Ministry of Health training and research hospitals, 3 in private or foundation university hospitals, 11 in university-affiliated training and research hospitals, and 10 in state provincial or district hospitals. Nearly half of the participants were based in the Marmara region (49.3%) (Table I).

Although the exact number of intensive care physicians in Türkiye is not definitively established, it is substantially larger than the study sample; therefore, the findings should be interpreted with caution regarding their generalizability and representativeness.

Distribution of Work Characteristics

Completion of compulsory service was reported by 68.1% of participants. Due to compulsory service, 81.2% of participants had relocated to another province. Only 2.5% of participants served as on-duty intensive care physicians, whereas more than half worked alone during duty hours. A large proportion of participants worked more than 60 hours per week. Participants commonly reported monthly shift work, and nearly half worked more than six shifts. The absence of post-shift time off was reported by 13.1% of participants. Employment at the same hospital for 1-5 years was reported by 60.9% of participants. Compulsory service had been completed ≥2 times by 73.9% of the participants. A history of resignation was reported by 37.7% of participants once, while

Table I. Sociodemographic Characteristics of the Participants

Variable	Category	n	%
Gender	Female	45	65.2
	Male	24	34.8
Marital Status	Single	6	8.7
	Married	63	91.3
Number of Children	0	16	23.2
	1	28	40.6
	2	20	29.0
	3	5	7.2
Academic Status	Residents	22	31.9
	Specialists	47	68.1
Type of hospital	Public university hospital	9	13.0
	Ministry of Health training and research hospital	36	52.2
	Private / foundation university	3	4.3
	University-affiliated training and research hospital	11	15.9
	Public state hospital (provincial/district)	10	14.5
Years in residency	Non-resident physician	48	69.6
	1st year	12	17.4
	2nd year	7	10.1
	3rd year	2	2.9
Primary specialty	Anesthesiology and reanimation	47	68.1
	Internal medicine	8	11.6
	Pulmonology	6	8.7
	Emergency medicine	8	11.6
Number of ICU beds at the training institution	5-9	2	2.9
	10-19	16	23.2
	20-29	27	39.1
	≥30	24	34.8
Age	28-34	8	11.6
	35-40	34	49.3
	41-45	18	26.1
	46-50	4	5.8
	51-60	5	7.2

ICU: Intensive care unit.

1.4% reported resigning twice and another 1.4% three times. Nearly three-quarters of participants worked in ICUs with at least 20 beds (Table II).

Burnout Levels According to Professional Status

A subgroup analysis was conducted to compare burnout levels between ICU residents and specialists. No statistically significant differences were observed between the groups in EE ($p = 0.4$), DP ($p = 0.3$), PA ($p = 0.09$), or total MBI scores ($p = 0.6$) (Table III).

Satisfaction Levels

Overall satisfaction with residency or workplace conditions was reported by fewer than 40% of participants, while over 60% expressed a desire to change hospitals. Compulsory service and specialist shortages were frequently perceived as negatively impacting working life. Access to social, economic, and psychological support, as well as time for personal interests, was limited. Although ICU training was initially chosen voluntarily by a substantial proportion of participants, more

Table II. Study Characteristics of Participants

		n	%
Completion of compulsory service requirement	Yes	47	68.1
	No	3	4.3
	Partially	19	27.5
Change of province for compulsory service	Yes	56	81.2
	No	13	18.8
Use of post-call leave	Always	39	63.9
	Sometimes	14	23.0
	Never	8	13.1
Single-physician on-call duty	Yes	35	57.4
	No	26	42.6
On-call responsibility as the ICU attending physician	Yes	50	72.5
	No	19	27.5
Negative impact of compulsory service on working life	Not currently in compulsory service	33	50.0
	Yes	26	39.4
	No	7	10.6
Average hours worked per week	40-59	31	44.9
	60-79	28	40.6
	≥80	10	14.5
Number of on-call shifts per month	0	16	23.2
	<6	23	33.3
	>6	30	43.5
Years since graduation from medical school	5-10	7	10.1
	10-15	30	43.5
	15-20	22	31.9
	≥20	10	14.5
Years of employment at the same hospital	<1	13	18.8
	1-5	42	60.9
	5-10	12	17.4
	≥10	2	2.9
Number of times served compulsory service	0	4	5.8
	1	14	20.3
	2	26	37.7
	3	25	36.2
Number of resignations	0	41	59.4
	1	26	37.7
	2	1	1.4
	3	1	1.4

ICU: Intensive Care Unit

than half reported that they would not choose it again. Consideration of changing profession or working abroad was common. Perceived support during working hours was low, with the majority reporting no or limited support (Table IV).

Burnout Syndrome and High- Risk Individuals

Nearly half of participants reported burnout during their primary specialty, while after secondary specialization, 42% met criteria for high burnout and 58% were at risk, (Table V). Emotional exhaustion scores differed significantly by weekly working hours, with lower scores in the 40-59 and 60-79 hours groups compared with those working ≥80 hours (p=0.023), (Table VI). No association was observed between EE or PA and the number of compulsory service requirements; however, DP differed significantly, being lower among those who completed compulsory service once (p=0.004), (Table VII). Overall burnout scores did not differ by compulsory service completion or primary specialty.

DISCUSSION

In this study, more than half of the participants were found to have high EE (58%) and high DP (59.4%), while the proportion of individuals with low PA was found to be 58%. Although the overall burnout rate was determined to be 42%, the high rates observed in each of the three subscales of the MBI suggest that burnout, while not yet at an advanced stage, constitutes a widespread and progressive stress profile. The high prevalence of EE may reflect the nature of the ICU environment, which involves high workload, time pressure, and constant emotional demands. Similarly, high levels of DP suggest a tendency toward emotional detachment as a coping mechanism developed by healthcare workers in response to chronic stress; this situation is known to have negative effects on the patient-healthcare worker relationship and quality of care. On the other hand, low perceived personal success indicates the presence of negative percep-

Table III. Comparison of Maslach Burnout Inventory Scores Between ICU Residents and Specialists

		n	Mean ± SD	Min-Max (Median)	p
Emotional Exhaustion	ICU residents	22	19.27 ± 9.46	0-34 (22)	0.4
	ICU specialists	47	18.11 ± 7.04	3-33 (18)	
Depersonalization	ICU residents	22	6.05 ± 3.85	0-12 (7)	0.3
	ICU specialists	47	7.17 ± 4.22	0-17 (8)	
Personal Accomplishment	ICU residents	22	18.23 ± 3.8	11-24 (18.5)	0.09
	ICU specialists	47	20.6 ± 4.7	13-32 (20)	
Total MBI Score	ICU residents	22	43.55 ± 13.06	16-68 (43)	0.6
	ICU specialists	47	45.87 ± 10.78	26-78 (44)	

ICU: Intensive Care Unit; **MBI:** Maslach Burnout Inventory. Continuous variables are presented as mean ± standard deviation or median (min-max), as appropriate. Comparisons between groups were performed using the Mann-Whitney U test. A p-value < 0.05 was considered statistically significant.

Table IV. Characteristics of Satisfaction

		n	%
Experience of burnout during primary specialty training	Yes	33	47.8
	No	24	34.8
	Partially	12	17.4
Feeling supported during working hours	None	26	37.7
	Low	22	31.9
	Adequately	16	23.2
	Well supported	5	7.2
Overall satisfaction with the residency program	Very satisfied	7	10.1
	Satisfied	26	37.7
	Neutral	20	29.0
	Dissatisfied	13	18.8
	Very dissatisfied	3	4.3

Table IV. Continue

Satisfaction with the hospital of employment	Not at all satisfied	18	26.1
	Slightly satisfied	21	30.4
	Satisfied	24	34.8
	Very satisfied	6	8.7
Intention to transfer to another hospital	Yes	42	60.9
	No	27	39.1
Probability of resigning within the next two years	Very unlikely	9	13.0
	Unlikely	18	26.1
	Neutral	16	23.2
	Likely	20	29.0
	Very likely	6	8.7
Ability to engage in social activities and financial adequacy	Not at all sufficient	13	18.8
	Slightly sufficient	26	37.7
	Moderately sufficient	25	36.2
	More than sufficient	5	7.2
Difficulty in continuing the profession due to the hospital's physical conditions	Yes	43	62.3
	No	26	37.7
Availability of mental health support services at the institution	Yes	6	8.7
	No	32	46.4
	Unsure	31	44.9
Rate of receiving professional psychological support in the past year	Yes	16	23.2
	No	53	76.8
Ability to spend time on personal interests	Always	4	5.8
	Sometimes	46	66.7
	Never	19	27.5
Family /social support	Yes	30	43.5
	No	8	11.6
	Partially	31	44.9
Intention to reselect intensive care specialty training	Yes	33	47.8
	No	36	52.2
Intensive care specialty training chosen voluntarily	Yes	51	73.9
	No	2	2.9
	Partially	16	23.2
Thoughts about changing profession	Never	13	18.8
	Rarely	29	42.0
	Often	23	33.3
	Always	4	5.8
Consideration of practicing the profession abroad	Never	14	20.3
	Rarely	16	23.2
	Often	29	42.0
	Always	10	14.5

Table V. Analysis of Burnout Based on the Maslach Burnout Inventory

Emotional exhaustion n (%)	Depersonalization n (%)	Personal Accomplishment n (%)	Total Burnout n (%)
Low 29 (42)	Low 28 (40.6)	High 29 (42)	Risk of Burnout 40 (58)
High 40 (58)	High 41 (59.4)	Low 40 (58)	High Burnout 29 (42)

Table VI. Comparison of Measurements Based on Weekly Average Working Hours

		n	Mean ± SD	Min-Max (Median)	p
Emotional Exhaustion	40-59	31	17 ± 8.14	2-33 (18)	***0.023****
	60-79	28	18.07 ± 7.63	0-34 (18)	
	≥80	10	24.2 ± 4.92	17-30 (25)	
Depersonalization	40-59	31	6.52 ± 3.72	0-13 (7)	0.8
	60-79	28	7.14 ± 4.53	0-17 (7.5)	
	≥80	10	6.8 ± 4.39	0-15 (6.5)	
Personal Accomplishment	40-59	31	19.13 ± 5.15	12-32 (18)	0.1
	60-79	28	20.86 ± 3.96	13-30 (21)	
	≥80	10	19.2 ± 3.88	11-24 (19.5)	
Maslach Burnout Inventory Total Score	40-59	31	42.65 ± 11.35	16-66 (43)	0.1
	60-79	28	46.07 ± 12.14	21-78 (42.5)	
	≥80	10	50.2 ± 8.75	40-66 (47.5)	

Continuous variables are presented as mean ± standard deviation or median (min-max), as appropriate. Comparisons among groups were performed using the Kruskal-Wallis test. A p-value < 0.05 was considered statistically significant. *p < 0.05, **p < 0.01

Table VII. Comparison of Measurements Based on the Number of Compulsory Services Performed

		n	Mean ± SD	Min-Max (Median)	p
Emotional Exhaustion	Never	4	24.75 ± 6.99	18-33 (24)	0.3
	1 Time	14	19.57 ± 5.1	13-29 (20)	
	2 Time	26	17.23 ± 9.02	0-34 (17)	
	3 Time	25	18.16 ± 7.76	3-29 (20)	
Depersonalization	Never	4	12.5 ± 3.11	10-17 (11.5)	***0.004****
	1 Time	14	7.5 ± 2.98	3-12 (8)	
	2 Time	26	4.96 ± 3.83	0-12 (5.5)	
	3 Time	25	7.44 ± 4.09	0-15 (8)	
Personal Accomplishment	Never	4	20.5 ± 5.8	14-28 (20)	0.2
	1 Time	14	17.64 ± 3.52	11-23 (17.5)	
	2 Time	26	19.85 ± 4.24	13-27 (20)	
	3 Time	25	20.96 ± 4.96	13-32 (20)	
Maslach Burnout Inventory Total Score	Never	4	57.75 ± 15.06	42-78 (55.5)	0.1
	1 Time	14	44.71 ± 4.51	36-53 (44)	
	2 Time	26	42.04 ± 12.66	16-68 (43)	
	3 Time	25	46.56 ± 11.39	26-66 (47)	

Continuous variables are presented as mean ± standard deviation or median (min-max), as appropriate. Comparisons among groups were performed using the Kruskal-Wallis test. A p-value < 0.05 was considered statistically significant. *p < 0.05, **p < 0.01

tions regarding professional competence and the meaning of work among a significant portion of participants. This finding suggests that burnout may not be limited to EE alone but may also involve reduced professional satisfaction and motivation**.** When these findings are considered together, they suggest that burnout syndrome represents a clinically significant concern among ICU physicians and that individual and institutional measures taken at an early stage may play a critical role in reducing the progression of burnout and its potential negative consequences.

Burnout is associated with job dissatisfaction among physicians, decreased academic productivity, increased clinical errors, and a decline in the quality of patient care. This condition is not limited to energy loss or emotional breakdown; unfortunately, a US survey showing that 54% of physicians exhibit burnout has demonstrated a link between burnout and fatigue and major errors (13). The meta-analysis demonstrated that decreasing levels of physician burnout were associated with improved quality of care (14). Therefore, reducing or preventing burnout among physicians working in ICU may lead to improvements in the quality of care delivered in these settings.

For intensivists, time is more than just time. When working hours increase, it is not only the hours that increase, but also night and weekend periods, uninterrupted working periods, decisions made, anxieties, fatigue, and potential mistakes. Time pressure on ICU physicians continues to increase, as role expectations expand and they are expected to make the most critical decisions accurately at all times (15). Persistent anxiety, fear of making mistakes, the necessity and difficulty of making the right decisions are associated with high levels of burnout (16). The changing rhythm of life and the disrupted work-life balance, along with the cumulative effect of all these factors, may contribute to burnout. The intensity of hours spent in ICU, the high volume of phone calls, and the fact that most hours coincide with night shifts or weekend shifts can also increase burnout. Higher burnout rates have been reported among night-shift workers in southern Ethiopia (17). It has also been shown that an increase in the number of night shifts worked and the number of consecutive days worked increases exhaustion, while reducing consecutive days prevents and reduces exhaustion (18,19). How time is spent is at least as important as the amount of time itself. Unlike many other hospital departments, ICUs are the most dynamic and variable settings, caring for the most critically ill patients and representing the areas with the highest mortality rates within hospitals. This environment may impose additional stress and significant physical and mental demands on ICU staff. It has been shown that a substantial proportion of time spent in ICUs is devoted to critical and high-intensity tasks, leaving very limited time for personal needs (20). Managing time may represent an important strategy for reducing burnout risk, but this requires optimizing the distribution of tasks among healthcare providers in ICU (21). However, in Türkiye and in many parts of the world, standardization regarding the job descriptions and responsibilities of physicians specialized in ICU has not been adequately established during training and after completion of training, which constitutes one of the contributing factors to burnout. Appropriate selection and allocation of staff during night shifts have been shown to result in modest increases in total sleep duration among ICU physicians, accompanied by reductions in physical exhaustion and improvements in overall well-being (22).

In Brazil, more than half of adult, pediatric, and neonatal ICU physicians work 49-72 hours per week, with reported rates of EE, DP, and low PA of 50.6%, 26.1%, and 15.0%, respectively (23). Notably, the Brazilian cohort reported lower rates of DP and low PA compared to our findings, and the weekly working hours in that study were generally shorter than those observed in our sample. This contrast suggests that working hours may represent an important contributing factor associated with burnout dimensions and suggests that cumulative workload intensity may partially explain the higher burnout dimensions observed in our study. Burnout is not limited to the workplace or working conditions; the balance between private life and work also has a direct impact. Indeed, a study conducted in China demonstrated that a higher number of children and greater income satisfaction among ICU physicians were protective factors against burnout. The primary factor contributing to burnout was difficulty in making treatment-related decisions (24). This supports the notion that burnout is strongly associated not only with individual vulnerability but also with decision-making burden and institutional pressures, and that it manifests similarly across different healthcare systems. A survey of 1148 intensivists reported increased intentions to leave the profession in the post-pandemic period, with approximately two-thirds expressing a preference for reduced working hours. Importantly, international post-pandemic data emphasize that institutional interventions—such as staffing reinforcement and structured workload redistribution—are more effective than solely individual-focused resilience programs. The limited availability of mental health support in our cohort (8.7%) further highlights the need for systemic rather than purely psychological solutions**.** Working hours emerged as a key factor associated with job satisfaction, stress, and intention to leave (25). Our findings are consistent with this observation, particularly in the context of extended working hours and the high proportion of physicians reporting resignation intention. Analyses of workplace support interventions aimed at reducing burnout during the pandemic concluded that individual stress-reduction programs alone were insufficient. Instead,

measures such as increasing staffing levels to reduce individual workload, improving financial compensation, and establishing effective teams were found to be more effective in reducing burnout (26).

Professional satisfaction has been reported as a protective factor associated with lower burnout levels; however, due to the nature of ICU practice, it tends to be lower among ICU physicians. During the pandemic, working fewer than 15 full-time weeks in 2020 and performing home-based on-call duties under resident supervision were factors associated with professional satisfaction (27).

Demonstrating a direct association between workload and burnout remains difficult. In our study, burnout among ICU physicians was not directly related to the number of patients in their units. Likewise, a study evaluating patient load and burnout reported that despite one quarter of physicians experiencing burnout during the day, burnout was not significantly associated with patient numbers (≤14 vs. >14) (28).

Another important finding is that more than one-third of physicians consider resigning within the next two years, and EE scores are significantly higher in this group. This may suggest that physicians experiencing higher EE may perceive greater difficulty coping with stress or find solutions and support. The discrepancy between voluntary selection of ICU specialization (73.9%) and subsequent regret (52.2%) may reflect an erosion of professional fulfillment over time. This finding indicates that initial intrinsic motivation may be progressively undermined by sustained exposure to systemic stressors. It is clear how burnout, which is considered an individual issue, will have a systemic impact unless the factors are addressed by the healthcare system. While the burnout rate among ICU physicians working in France is 24%, 35% are considering changing jobs and abandoning their training (29). Despite higher levels of burnout, physicians in our country have similar rates of considering leaving their jobs.

Intensive care physicians face with more problems throughout the hospital, forced to make the right decision over longer periods of time, and are successful in managing chaos, but when the problem is not limited to patients, the solution is not the same. In a prospective study designed to understand how stress is managed in ICUs, it was observed that a proportion of physicians required professional support; however, the majority were reluctant to disclose this to their colleagues. Another notable finding was that many physicians reported insufficient training to provide support to others in coping with stress (30). In Türkiye there is no formal training or support systems available on this subject prior to or during ICU specialty training. Another study examining intensivists' coping strategies found that stress can be most effectively reduced by increasing learning and implementing changes aimed at preventing errors (31). In an international study, physicians' responses to challenging situations in ICU were evaluated, and it was observed that ICU physicians are sensitive and responsive to their patients. However, it was found that insufficient resources and limited opportunities to improve patients' conditions are the main factors causing stress on physicians (32).

Unfortunately, high burnout is also associated with the onset of depressive symptoms (33). Additionally, there are organic effects; a direct relationship has been observed between occupational stress and oxidative stress in individuals with low job commitment (34).

While ICU physicians in our country face similar problems, issues vary depending on local circumstances and conditions. We analyzed the participants' views on solving the problems in order to find collective solutions to individual problems. In the section of the survey on solutions to prevent burnout, the most frequently suggested solutions by participating physicians were reducing the number of shifts and improving salaries. This result is understandable and not surprising. However, unexpectedly, some physicians expressed that during and after their ICU specialty training, they felt pressured, alienated, and unaccepted by specialist physicians who worked in ICU but were not specialists in the field. This situation may contribute to reduced motivation and higher burnout levels. The solution to this could be possible by clarifying the boundaries of ICU specialty training and the duties and academic status of ICU physicians, and by ensuring the standardization and optimization of their working areas and conditions nationwide. Indeed, in the current system, the lack of clarity in the job description of physicians specializing or not specializing in ICU leads to incompatibility among physicians and a tense working environment, which can only be eliminated by clarifying their job descriptions and statuses.

In a previous burnout analysis conducted in Türkiye, which also included ICU specialists, the every-other-day work system was similarly identified as a key risk factor in both EE and DP (35). In an assessment conducted with 64 intensive care physicians, they showed low levels of DP (5.08± 3.18) and moderate levels of EE (15.56±6.26) and PA (22.44±3.69) (36). Over the past decade, burnout among ICU physicians has not decreased; on the contrary, an increase in burnout levels has been observed. Unfortunately, these findings indicate that over the past decade there have been no positive developments aimed at reducing burnout or addressing the underlying problems among physicians specializing in this field. This temporal continuity underscores that burnout in ICU physicians is not an episodic phenomenon but a sustained occupational pattern requiring long-term policy-level strategies. Although 73.9% of participants reported that they had

chosen to specialize in ICU willingly, 52.2% stated that they would not choose this specialty again. This discrepancy suggests that experiences during ICU training and subsequent professional practice have overshadowed their initial motivation, rendering the profession increasingly unsustainable. These findings suggest that burnout may threaten not only individual well-being but also the long-term sustainability of the healthcare workforce. Accordingly, our study serves as an important warning signal underscoring the urgent need to develop targeted strategies for ICU specialization. Notably, this problem does not appear amenable to resolution through individual psychological interventions alone. Klick et al. highlighted that organizational factors—including staffing adequacy, leadership support, and role clarity—play a central role in physician well-being and burnout trajectories (37). Our findings are consistent with this framework, particularly given the high proportion of physicians reporting excessive working hours, limited mental health support, and dissatisfaction with institutional conditions. These results reinforce the argument that effective burnout mitigation requires structural and policy-level interventions rather than exclusively individual-focused coping strategies. Considering that 42% of physicians undergoing ICU training exhibited high levels of burnout and that 58-59% were at risk of burnout, the bell tolls for intensivists.

The cross-sectional design of the study limits causal inference. One of the main limitations of this study is the relatively small sample size. A limited number of participants may reduce the statistical power to detect significant differences and increase the risk of type II error. Furthermore, the small sample size may limit the generalizability of the findings to the broader population of intensive care physicians. Therefore, the results of this study should be interpreted with caution. Future studies with larger, multicenter cohorts are needed to validate and extend these findings. And prospective, multicenter studies are needed to reduce and potentially prevent burnout. In addition, nearly half of the participants were from the Marmara region, which may introduce potential geographic bias. Therefore, the findings may not fully reflect regional variations in working conditions and burnout patterns across Türkiye.

The inability to reach all intensivists, residents and non-response to the survey by a proportion of eligible participants may limit the generalizability of our findings to the entire population of physicians in Türkiye.

CONCLUSION

This study is one of the few investigations to assess burnout levels among physicians undergoing ICU specialization training in Türkiye using the MBI. Nearly half of the participants demonstrated the classical 'high burnout profile,' highlighting burnout as a significant occupational threat within the ICU training environment. Almost two-thirds of the participants were identified as being at risk for burnout. Overall, burnout was highly prevalent during ICU training, particularly among individuals with longer working hours. Future policy efforts should consider implementing evidence-based structural interventions, including maximum weekly working-hour limits, mandatory post-shift rest periods, and the establishment of accessible institutional mental health support systems. Such measures may contribute to improving physician well-being and sustaining the quality of ICU practice.

Conflict of Interest: The authors declare no conflicts of interest.

Funding: No funding was received for conducting this study.

AUTHOR CONTRIBUTIONS

Conception or design of the work: DB, ZC, GOH

Data collection: DB, FO, ZC

Data analysis and interpretation: DB, FO, ZC

Drafting the article: DB, GOH

Critical revision of the article: DB, FO, ZÇ, GOH

Other (study supervision, fundings, materials, etc): DB, FO, ZÇ, GOH

The author (DB, FO, ZC, GOH) reviewed the results and approved the final version of the manuscript.

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