

Original Article
Medicine General & Health
Policy



Surgeons' Burnout During the Medical Crisis in Korea

Jihyeon Choi ,^{1,2} Jungook Kim ,³ Jeong-Eun Lee ,¹ Yoo Shin Choi ,⁴
Suk-Won Suh ,⁴ and Seung Eun Lee ⁴

¹Co-Research Cooperative, Seoul, Korea

²Women's Institute, Chatham University, Pittsburgh, PA, USA

³School of Business & Enterprise, Chatham University, Pittsburgh, PA, USA

⁴Department of Surgery, Chung-Ang University College of Medicine, Seoul, Korea

OPEN ACCESS

Received: Apr 15, 2025

Accepted: Aug 14, 2025

Published online: Nov 21, 2025

Address for Correspondence:

Seung Eun Lee, MD, PhD, FACS

Department of Surgery, Chung-Ang University
College of Medicine, 102 Heukseok-ro,
Dongjak-gu, Seoul 06973, Korea.
Email: selee508@cau.ac.kr

© 2026 The Korean Academy of Medical
Sciences.

This is an Open Access article distributed
under the terms of the Creative Commons
Attribution Non-Commercial License (<https://creativecommons.org/licenses/by-nc/4.0/>)
which permits unrestricted non-commercial
use, distribution, and reproduction in any
medium, provided the original work is properly
cited.

ORCID iDs

Jihyeon Choi

<https://orcid.org/0000-0002-4756-8416>

Jungook Kim

<https://orcid.org/0000-0001-6901-9680>

Jeong-Eun Lee

<https://orcid.org/0000-0001-6104-3168>

Yoo Shin Choi

<https://orcid.org/0000-0003-3172-0329>

Suk-Won Suh

<https://orcid.org/0000-0001-6111-9601>

Seung Eun Lee

<https://orcid.org/0000-0003-1830-9666>

ABSTRACT

Background: In February 2024, more than 80% of medical residents resigned, and more than 70% of medical students took a leave of absence to protest the South Korean government's new health care policies. This study examines the existing level of burnout based on a reliable measure and compares burnout levels before and after the onset of the current medical crisis through a comprehensive survey of surgeons in Korea.

Methods: We conducted a survey targeting all members of the Korean Surgical Society, and 457 responses were analyzed. Burnout was measured using the full version of the Maslach Burnout Inventory-Human Service Survey for Medical Personnel (MBI-HSS-MP). We compared the burnout levels of Korean surgeons in 2024 with the result of a survey of surgeons conducted in 2019, both of which used 2 short-form single-item measures from the MBI-HSS-MP. Moreover, we conducted a group comparison analysis and performed multiple linear and binary logistic regressions to explore the factors influencing burnout.

Results: The overall burnout rate among Korean surgeons is considerably high at 70.5% on the full MBI-HSS-MP. Weekly working hours are significant predictors of burnout. Compared to 2019, before the coronavirus disease 2019 pandemic, burnout levels measured with a 2 single-item measures of burnout increased from 34.9% to 50.8% in 2024 during the medical crisis in South Korea. The prevalence of full MBI-HSS-MP-defined burnout by rank was as follows; academic tenure, 70.2%; academic other, 79.2%; hospital-employed, 60.7%; and private practice, 72.1%. An increase in burnout measured with a 2 single-item measures is particularly noticeable among surgeons in the academic field.

Conclusion: This study confirms a high level of burnout among Korean surgeons, underscoring the need for efforts to improve workplace conditions and the healthcare system to alleviate this issue.

Keywords: Burnout; Surgeon; Medical Crisis; Pandemic

Funding

This study was supported by the Research Program of the Korean Surgical Society 2023.

Disclosure

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Lee SE. Data curation: Choi J, Kim J, Lee SE, Choi YS, Suh SW. Formal analysis: Choi J, Lee JE, Kim J, Choi YS. Funding acquisition: Choi J, Lee JE, Lee SE. Investigation: Lee JE, Choi YS, Suh SW. Methodology: Choi J, Lee JE, Kim J. Software: Lee JE, Choi J, Choi YS, Suh SW. Supervision: Lee SE. Validation: Kim J, Lee JE, Choi YS, Suh SW. Visualization: Lee JE, Choi J, Kim J. Writing - original draft: Choi J, Lee SE. Writing - review & editing: Choi J, Lee SE.

INTRODUCTION

The level of physician burnout is reportedly extremely high, attracting active research recently. A 2017 survey of physicians in American academic faculties revealed that 45.6% experienced burnout, with high levels of exhaustion at 57.7%, high levels of cynicism at 51.1%, and low levels of professional efficacy at 19.8%.¹ Data from Finland in 2019 revealed that 37% of physicians exhibited burnout, reporting at least one high level of emotional exhaustion (EE) and/or depersonalization (DP).² Among American surgeons, burnout rates were 31.7% for EE, 26% for DP, and 12.8% for low personal accomplishment, with 39.6% reporting experiencing at least one of either the EE or DP dimensions.³

However, physician burnout research in South Korea is nascent, with no assessments of burnout levels by medical specialty. A study of South Korean medical school faculty revealed that EE, DP, and low personal accomplishment were reported at 34.2%, 66.3%, and 92.4%, respectively, with 30.5% of the faculty experiencing all 3 dimensions of burnout.⁴ This study was conducted during the COVID-19 pandemic with no baseline on physician burnout in South Korea against which to compare the findings. Furthermore, while physician burnout has generally been reported to be higher than that of general workers,⁵ a study in South Korea revealed that physicians had levels of burnout lower than those of general workers,⁶ highlighting the need for systematic research and assessment of physician burnout in Korea.

Changes in the workplace environment or crisis situations accelerate worker burnout, as evidenced by the recent coronavirus disease 2019 (COVID-19) pandemic. Physician burnout was anticipated to rise during the pandemic.⁷ A study on United States (US) physicians' burnout during COVID-19 revealed that mean scores for EE and DP were higher in 2021 than in 2020, 2017, 2014, and 2011. Of the physicians studied, 62.8% exhibited at least 1 sign of burnout in 2021, showing an increase compared to the previous years.⁸ One of the risk factors for health workers identified during the pandemic was work overload, which led to insufficient rest, prolonged exposure to infected patients, and working under pressure.⁹ The current situation in the South Korean medical system indicates that it is as much a crisis for physician burnout as it was during the COVID-19 era.

On February 6, 2024, South Korea's Minister of Health and Welfare announced a plan to increase the medical school enrollment quota by 67%, raising the number from 3,058 to 5,058 students annually over the following 5 years, beginning in 2025. In response to this significant increase, 10,034 (80.5%) out of 12,464 medical residents submitted their resignations.¹⁰ Additionally, 13,698 (72.8%) out of 18,793 medical students applied for a leave of absence. While the crisis was precipitated by a sudden increase in medical school enrollment, the intense opposition from medical residents and students highlights deep-seated structural contradictions in the Korean healthcare system.^{10,11} Before this crisis, the government's enforcement of ultra-low fees, as well as the criminalization of medical accidents and the soaring compensation costs for them, led to a rapid exodus of young doctors from high-risk, essential medical fields—such as surgery, pediatrics, and emergency medicine—and regions with low patient populations. In the ongoing healthcare crisis in South Korea, the overwhelming majority of surgical residents submitting resignation letters has placed an immense burden on attending surgeons, who now shoulder additional patient loads without the necessary support.^{12,13} This sudden disruption has magnified preexisting issues of high workload, lack of work-life balance, and insufficient institutional support,

leading to a surge in burnout rates among South Korean surgeons. To better understand the impact of this crisis, this study examines the existing level of burnout based on a reliable measure and compares burnout levels before and after the onset of the current medical crisis through a comprehensive survey of surgeons in South Korea.

METHODS

Participants and survey design

The study population included all registered members of the Korean Surgical Society. All those with valid information were invited to participate via email. The invitation included an information letter containing the general terms of the study, a request for consent, and the link that they could access individually. The participation was voluntary and anonymous. The survey was conducted from May 27 to June 12, 2024, via the web-based survey tool SurveyMonkey® (<https://ko.surveymonkey.com>), and two reminder emails were sent out. The invitation was sent to 4,591 surgeons, of whom 626 responded (response rate = 13.6%). After excluding cases with missing information or incomplete responses, 457 cases were analyzed.

This study examined surgeons' current burnout levels in Korea by comparing their state before—particularly pre-COVID-19—with their present state. To do this, we used data¹⁴ from a survey conducted between November 11, 2019, and January 11, 2020, targeting the same population. These data are referred to as the 2019 survey, and the total number of responses analyzed in the 2019 survey was 400.

Survey measures

In the 2024 survey, burnout was measured using the 22-item Maslach Burnout Inventory-Human Service Survey for medical personnel (MBI-HSS-MP), which comprises 3 dimensions of burnout: EE, DP, and personal accomplishment. Below are a few sample items of the MBI-HSS-MP. "I feel emotionally drained from my work," "I have accomplished many worthwhile things in this job," and "I don't really care what happens to some patients." The phrases describing the frequency are never, a few times a year or less, once a month or less, a few times a month, once a week, a few times a week, and every day. The items were rated on a 7-point scale ranging from 0 to 6, and the scores for each dimension were summed to obtain the total score. Higher scores indicate more severe EE and DP and reduced personal accomplishment.¹⁵ In this study, surgeons' burnout was assessed only on 2 dimensions—EE and DP—based on the precedents in several studies by Shanafelt and colleagues.⁸ The total scores for EE and DP were divided into 3 groups—low, intermediate, and high—based on the cut off points. A high score in either of the 2 dimensions is defined as burnout in that respective dimension (for example, high-EE or high-DP). Overall burnout refers to a high score on EE, DP, or both.⁸

Because the full MBI-HSS-MP was used only in the 2024 survey, the comparison of surgeons' burnout between the 2019 and 2024 surveys utilized 2 single-item measures.¹⁶ This scale was used in the 2019 survey¹⁴ and included for comparison in the 2024 survey despite using the full MBI. To enhance the survey convenience, the 2 single-item measures were developed in a shortened form, measuring each dimension of EE and DP with 1 item each. A strong correlation was observed between these single items that represent EE, DP, and the EE and DP dimensions of the full MBI.¹⁷ The 2-item measures were rated on a 7-point scale ranging from 0 (never) to 6 (daily). The response of the single-item measure was categorized into

“not high” (less than once weekly) and “high” (weekly or more often).¹⁸ High EE and/or DP scores was classified as overall burnout to mirror the previous method.

Demographic and job-related variables identified as factors associated with physicians' burnout in prior research were included in the survey. They include sex, age, marital relationship, having children, years of practice, surgical subspecialty, practice setting, rank, weekly work hours, weekly emergency operation cases, and weekly on-duty days.

Statistical analysis

The primary analysis included descriptive statistics and analyses of between-group differences through the χ^2 test, *t*-test, and one-way analysis of variance. We conducted multiple linear and binary logistic regressions to identify factors independently associated with burnout. For the former, the EE and DP dimensions were treated as continuous dependent variables; for the latter, overall burnout status (Y/N) was treated as the dependent variable. All analyses were performed using SPSS Statistics (IBM Corp., Armonk, NY, USA).

Ethics statement

This study was approved by the Institutional Review Board (IRB) of Chung-Ang University Hospital (approval No. 2311-018-579). All participants provided informed consent prior to participation, and their responses were analyzed after excluding identifiable information from the raw survey response data. The 2019 survey was under a separate IRB approval which included the use of the data for the future use.¹⁴

RESULTS

Table 1 presents the demographic and work-related characteristics of the participants, stratified by rank. The sample comprised 75.9% male and 24.1% female participants, with an average age of 46.9 years (standard deviation [SD], 9.5). Among them, 29.0% were on the academic tenure track, 28.8% were in other academic positions (academic other), 27.1% were hospital-employed, and 15.1% were in private practice. Their average weekly work hours were 62.7 hours (SD, 19.2), with 1.2 weekly emergency surgery cases (SD, 1.4) and 1.3 weekly on-duty days (SD, 1.3). Demographic and work-related characteristics varied by rank. Private practice exhibited the largest gender gap, with 91.2% male participants, while the academic other rank showed the smallest gender gap, with 55.4% male and 44.6% female participants. Private practice also boasted the longest average years of practice (29.9 years), followed by the hospital-employed (22.5 years), academic tenure (21.8 years), and academic other (12.5 years) ranks. Private-practice and hospital-employed surgeons comprised a higher proportion of general surgical specialists. Academic settings demanded the longest weekly work hours, with the academic other and academic tenure ranks averaging 73.9 and 71.8 hours, respectively. Private practitioners had fewer emergency operations and on-duty days compared to the other ranks.

Burnout levels among South Korean surgeons in 2024, measured with the full MBI were notably high, with 55.6% and 58.6% in the high-EE and high-DP, respectively (**Table 2**). Overall burnout, defined as high-EE or high-DP, affected 70.5% of surgeons (**Fig. 1**). Compared to a US study, which reported 62.8% overall burnout among US physicians in 2021 during the COVID-19 pandemic, burnout among South Korean surgeons is exceptionally high. Further analysis of burnout levels revealed differences across various factors, such

Table 1. Descriptive statistics

Variables	Total (N = 457)	Rank ^a (n = 451)				P value
		Academic tenure	Academic other	Hospital-employed	Private practice	
Sex						
Men	346 (75.9)	112 (85.5)	72 (55.4)	95 (78.5)	62 (91.2)	< 0.001
Women	110 (24.1)	19 (14.5)	58 (44.6)	26 (21.5)	6 (8.8)	
Age, yr	46.9 ± 9.5	47.8 ± 6.8	39.8 ± 6.3	48.9 ± 9.7	55.7 ± 8.6	< 0.001
30–39	111 (24.3)	11 (8.4)	75 (57.7)	21 (17.2)	0 (0.0)	< 0.001
40–49	193 (42.2)	76 (58.0)	45 (34.6)	48 (39.3)	23 (33.8)	
50–59	100 (21.9)	32 (24.4)	9 (6.9)	33 (27.0)	26 (38.2)	
60+	53 (11.6)	12 (9.2)	1 (0.8)	20 (16.4)	19 (27.9)	
Marital relationship						
Married	384 (84.0)	117 (89.3)	89 (68.5)	107 (87.7)	66 (97.1)	< 0.001
Single/divorced/other	73 (16.0)	14 (10.7)	41 (31.5)	15 (12.3)	2 (2.9)	
Has children						
Yes	362 (79.2)	113 (86.3)	79 (60.8)	102 (83.6)	65 (95.6)	< 0.001
No	95 (20.8)	18 (13.7)	51 (39.2)	20 (16.4)	3 (4.4)	
Has pre-school aged children						
Yes	90 (19.7)	20 (15.3)	43 (33.1)	24 (19.7)	2 (2.9)	< 0.001
No	367 (80.3)	111 (84.7)	87 (66.9)	98 (80.3)	66 (97.1)	
Years of practice	20.4 ± 10.2	21.8 ± 7.4	12.5 ± 6.6	22.5 ± 10.4	29.9 ± 8.7	< 0.001
< 10	71 (15.5)	1 (0.8)	56 (43.1)	10 (8.2)	0 (0.0)	< 0.001
10–14	73 (16.0)	15 (11.5)	34 (26.2)	24 (19.7)	0 (0.0)	
15–19	87 (19.0)	45 (34.4)	20 (15.4)	16 (13.1)	5 (7.4)	
20–24	82 (17.9)	29 (22.1)	13 (10.0)	23 (18.9)	17 (25.0)	
25–29	59 (12.9)	20 (15.3)	5 (3.8)	20 (16.4)	14 (20.6)	
30	85 (18.6)	21 (16.0)	2 (1.5)	29 (23.8)	32 (47.1)	
Surgical subspecialty ^b						
Upper GI	46 (10.1)	20 (15.3)	15 (11.5)	9 (7.4)	2 (2.9)	< 0.001
Colorectal	99 (21.7)	24 (18.3)	17 (13.1)	35 (28.7)	22 (32.4)	
Hepatobiliary-pancreas	77 (16.8)	34 (26.0)	28 (21.5)	13 (10.7)	1 (1.5)	
Breast-thyroid-endocrine	85 (18.6)	22 (15.3)	27 (20.8)	28 (23.0)	10 (14.7)	
Pediatric	14 (3.1)	5 (3.8)	6 (4.6)	1 (0.8)	1 (1.5)	
Vascular	33 (7.2)	15 (11.5)	11 (8.5)	5 (4.1)	2 (2.9)	
Acute care	27 (5.9)	8 (6.1)	11 (8.5)	3 (2.5)	5 (7.4)	
General surgery	76 (16.6)	5 (3.8)	15 (11.5)	28 (23.0)	25 (36.8)	
Practice setting						
University hospital	215 (47.0)	108 (82.4)	104 (80.0)	1 (0.8)	0 (0.0)	< 0.001
General hospital (> 100 beds)	126 (27.6)	23 (17.6)	26 (20.0)	73 (59.8)	1 (1.5)	
Hospital (> 30 beds)	36 (7.9)	0 (0.0)	0 (0.0)	30 (24.6)	6 (8.8)	
Private clinic	76 (16.6)	0 (0.0)	0 (0.0)	16 (13.1)	60 (88.2)	
Other	4 (0.9)	0 (0.0)	0 (0.0)	2 (1.6)	1 (1.5)	
Weekly work hours	62.7 ± 19.2	71.8 ± 16.1	73.9 ± 17.6	50.9 ± 13.5	45.6 ± 8.6	< 0.001
< 50	131 (29.4)	6 (4.7)	8 (6.3)	62 (51.7)	53 (79.1)	< 0.001
≥ 50 to < 80	203 (45.5)	75 (58.6)	63 (50.0)	51 (42.5)	13 (19.4)	
≥ 80	112 (25.1)	47 (36.7)	55 (43.7)	7 (5.8)	1 (1.5)	
Weekly emergency operation cases	1.2 ± 1.4	1.4 ± 1.3	1.2 ± 1.1	1.2 ± 1.5	0.4 ± 1.0	< 0.001
0	159 (35.5)	24 (18.5)	36 (28.1)	44 (37.6)	54 (80.6)	< 0.001
≥ 1	144 (32.1)	59 (45.4)	42 (32.8)	34 (29.1)	8 (11.9)	
> 1 to ≤ 2	86 (19.2)	26 (20.0)	36 (28.1)	21 (17.9)	2 (3.0)	
> 2	59 (13.2)	21 (16.2)	14 (10.9)	18 (15.4)	3 (4.5)	
Weekly on-duty	1.3 ± 1.3	1.3 ± 0.8	1.5 ± 1.0	1.3 ± 1.5	0.6 ± 1.6	< 0.001
0	117 (26.0)	13 (10.0)	7 (5.5)	42 (35.3)	53 (79.1)	< 0.001
> 0 to ≤ 1	166 (36.9)	72 (55.4)	58 (45.3)	30 (25.2)	6 (9.0)	
> 1 to ≤ 2	108 (24.0)	33 (25.4)	45 (35.2)	25 (21.0)	3 (4.5)	
> 2	59 (13.1)	12 (9.2)	18 (14.1)	22 (18.5)	5 (7.5)	

Values are presented as mean ± standard deviation or number of patients (%).

GI = gastrointestinal.

^aOther in rank response is excluded; academic other = fellow and academic non-tenured.

^bGeneral surgery = no subspecialty.

Table 2. Burnout among surgeons in Korea and the United States

Variables	Korean surgeons 2024 (n = 457)	American physicians ^a	
		2021 (n = 2,440)	2017 (n = 5,445)
Emotional exhaustion			
Mean ± SD	28.3 ± 12.3	29.1 ± 14.8	23.2 ± 13.2
Low score	113 (24.7)	567 (27.1)	1,991 (41.0)
Intermediate score	90 (19.7)	313 (15.0)	989 (20.3)
High score	254 (55.6)	1,210 (57.9)	1,881 (38.7)
Depersonalization			
Mean ± SD	11.5 ± 6.8	9.8 ± 7.9	6.8 ± 6.5
Low score	107 (23.4)	819 (39.2)	2,644 (54.2)
Intermediate score	82 (17.9)	339 (16.2)	907 (18.6)
High score	268 (58.6)	932 (44.6)	1,331 (27.3)
Overall burnout ^b	322 (70.5)	1,313 (62.8)	2,147 (43.9)

Values are presented as mean ± SD or number of patients (%).

SD = standard deviation.

^aA table from Shanafelt et al.⁸ has been excerpted and reorganized.

^bOverall burnout was defined as a binary variable in which a high score on the emotional exhaustion and depersonalization subscales of the Maslach Burnout Inventory-Human Service Survey for Medical Personnel is classified as Yes (falls under overall burnout) and No (falls under no burnout) otherwise.

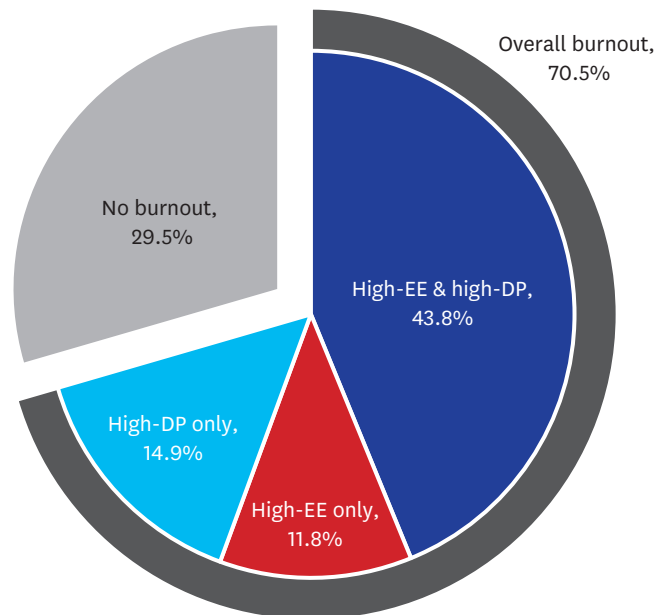


Fig. 1. Percentage of surgeons who have experienced burnout. Overall burnout was defined as a binary variable in which high scores on the EE and DP subscales of the Maslach Burnout Inventory-Human Service Survey for Medical Personnel indicate burnout. It included the EE-only high score group, DP-only high score group, and EE and DP high score group.

EE = emotional exhaustion, DP = depersonalization.

as sex, age, marital status, having children, position, years of practice, type of hospital, weekly work hours, and on-call days. DP was influenced by age, marital status, having children, position, years of practice, and weekly work hours (Table 3). Younger surgeons and those with fewer years of practice were more likely to experience higher overall burnout. The highest burnout rate was found in the academic other rank, followed by private practice and academic tenure. The lowest burnout rate was observed in the hospital-employed rank. Surgeons working in university and general hospitals with more than 100 beds showed higher burnout rates, with longer work hours and more on-call days correlating with higher burnout.

Table 3. Univariate analyses of variables associated with burnout

Variables	Emotional exhaustion	P value	Depersonalization	P value	Overall burnout ^a		P value
					No	Yes	
Sex		< 0.001		0.057			0.129
Men	27.1 ± 12.3		11.2 ± 6.8		108 (31.2)	238 (68.8)	
Women	32.2 ± 11.8		12.6 ± 6.9		26 (23.6)	84 (76.4)	
Age, yr		0.018		0.017			0.005
30–39	30.6 ± 11.9		12.8 ± 6.8		22 (19.8)	89 (80.2)	
40–49	28.6 ± 12.1		11.8 ± 6.8		54 (28.0)	139 (72.0)	
50–59	27.1 ± 12.2		10.5 ± 6.6		35 (35.0)	65 (65.0)	
60+	24.5 ± 13.5		9.7 ± 6.9		24 (45.3)	29 (54.7)	
Marital relationship		< 0.001		0.008			0.066
Married	27.3 ± 12.2		11.1 ± 6.7		120 (31.3)	264 (68.8)	
Single/divorced/other	33.2 ± 11.9		13.4 ± 7.0		15 (20.5)	58 (79.5)	
Has children		0.001		0.005			0.201
No	31.9 ± 12.4		13.2 ± 7.0		23 (24.2)	72 (75.8)	
Yes	27.3 ± 12.2		11.0 ± 6.7		112 (30.9)	250 (69.1)	
Rank		0.001		0.025			0.015
Academic tenure	28.9 ± 11.7		11.1 ± 6.9		39 (29.8)	92 (70.2)	
Academic other	31.0 ± 10.9		12.5 ± 6.3		27 (20.8)	103 (79.2)	
Hospital-employed	24.8 ± 13.3		10.1 ± 6.7		48 (39.3)	74 (60.7)	
Private practice	28.0 ± 12.2		12.3 ± 7.0		19 (27.9)	49 (72.1)	
Years of practice		0.012		0.009			0.037
< 10	32.1 ± 11.0		13.4 ± 6.6		14 (19.7)	57 (80.3)	
10–14	26.3 ± 12.8		10.5 ± 6.7		23 (31.5)	50 (68.5)	
15–19	29.2 ± 12.1		11.9 ± 6.8		21 (24.1)	66 (75.9)	
20–24	28.7 ± 11.7		12.6 ± 7.0		21 (25.6)	61 (74.4)	
25–29	28.6 ± 12.3		10.5 ± 6.7		21 (35.6)	38 (64.4)	
30+	25.3 ± 13.0		10.0 ± 6.6		35 (41.2)	50 (58.8)	
Surgical subspecialty ^b		0.797		0.601			0.920
Upper GI	29.7 ± 11.9		12.9 ± 6.1		11 (23.9)	35 (76.1)	
Colorectal	28.2 ± 13.7		11.0 ± 7.4		31 (31.3)	68 (68.7)	
Hepatobiliary-pancreas	29.1 ± 11.5		11.8 ± 6.4		21 (27.3)	56 (72.7)	
Breast-thyroid-endocrine	28.7 ± 12.1		11.8 ± 6.8		27 (31.8)	58 (68.2)	
Acute care	27.6 ± 11.7		10.8 ± 7.0		21 (28.4)	53 (71.6)	
General surgery	26.8 ± 12.7		11.3 ± 6.8		24 (31.6)	52 (68.4)	
Practice setting ^c		0.025		0.709			0.117
University hospital	29.7 ± 11.7		11.5 ± 6.7		59 (27.4)	156 (72.6)	
General hospital (> 100 beds)	28.0 ± 11.9		11.9 ± 6.7		33 (26.2)	93 (73.8)	
Other	25.9 ± 13.6		11.1 ± 7.3		43 (76.1)	73 (62.9)	
Weekly work hours		< 0.001		0.002			< 0.001
< 50	23.5 ± 12.9		10.0 ± 6.8		57 (43.5)	74 (56.5)	
≥ 50 to < 80	28.5 ± 11.5		11.7 ± 6.6		59 (29.1)	144 (70.9)	
≥ 80	33.7 ± 11.0		13.2 ± 7.0		15 (13.4)	97 (86.6)	
Weekly emergency operation cases		0.137		0.948			0.315
0	27.2 ± 13.1		11.4 ± 7.3		54 (34.0)	105 (66.0)	
> 0 to ≤ 1	27.7 ± 11.9		11.5 ± 6.4		43 (29.9)	101 (70.1)	
> 1 to ≤ 2	29.9 ± 12.3		11.5 ± 6.9		21 (24.4)	65 (75.6)	
> 2	30.7 ± 10.4		12.0 ± 6.8		14 (23.7)	45 (76.3)	
Weekly on-duty days		0.006		0.290			0.017
0 days	25.0 ± 13.4		10.8 ± 7.3		47 (40.2)	70 (59.8)	
> 0 to ≤ 1	29.0 ± 11.8		11.7 ± 6.4		47 (28.3)	119 (71.7)	
> 1 to ≤ 2	29.8 ± 11.6		12.4 ± 6.3		24 (22.2)	84 (77.8)	
> 2	30.6 ± 12.0		10.8 ± 7.9		14 (23.7)	45 (76.3)	

Values are presented as mean ± standard deviation or number of respondents (%).

GI = gastrointestinal.

^aPercentages are the total respondents reporting burnout in each variable category (i.e., percentage of row totals).

^bOther = acute care surgery, etc.; General surgery = no subspecialty.

^cOther = hospital (> 30 beds), private clinic, etc.

Table 4. Regression analyses of EE, DP, and overall burnout

Variables	Multiple linear regression for EE		Multiple linear regression for DP		Binary logistic regression for overall burnout	
	β	P value	β	P value	OR	P value
Sex	0.19	0.001	0.06	0.344	1.64	0.158
Rank						
Academic tenure	-0.08	0.512	-0.13	0.305	0.57	0.401
Academic other	-0.09	0.476	-0.08	0.554	0.65	0.544
Hospital-employed	-0.17	0.038	-0.18	0.033	0.40	0.033
Weekly work hours	0.39	< 0.001	0.26	< 0.001	1.05	< 0.001
Weekly on-duty days	0.06	0.252	-0.06	0.241	1.07	0.508
Model F(R ²)/ χ^2 (-2 Log likelihood)	5.065 (0.163)		2.446 (0.086)		58.483 (466.211)	

Both multiple linear and binary logistic models included the following variables as risk factors: marital relationship, having children, years of practice, surgical subspecialty, and practice setting. They were not significant and have hence been omitted from the table.

EE = emotional exhaustion, DP = depersonalization, β = standardized coefficients, OR = odds ratio.

The regression analysis in **Table 4** reveals that weekly work hours were the most significant predictor of burnout among South Korean surgeons, significantly impacting EE and DP, with longer work hours associated with higher levels of both. The logistic regression analysis confirmed that longer weekly work hours increased the likelihood of experiencing overall burnout (odds ratio, 1.05, $P < 0.001$). In the multiple regression analysis predicting EE, longer weekly working hours were significantly associated with higher EE ($\beta = 0.39$, $P < 0.001$). Similarly, in the analysis predicting DP, longer working hours were also significantly associated with higher DP ($\beta = 0.26$, $P < 0.001$). In the logistic regression analysis predicting overall burnout, none of the other variables were statistically significant except for rank. Specifically, only the “hospital-employed” group showed a significant association (odds ratio, 0.40, $P = 0.033$), indicating that individuals in private practice (used as the reference group) were more likely to experience overall burnout compared to those employed in hospitals.

In the following step, we compared burnout levels between 2019 and 2024 based on two single-item assessments. A comparison between survey data from 2019 (pre-COVID-19) and 2024 revealed a significant increase in burnout among South Korean surgeons. While 34.9% reported burnout in 2019, this rate had increased to 50.8% by 2024 (**Fig. 2**, **Table 5**).

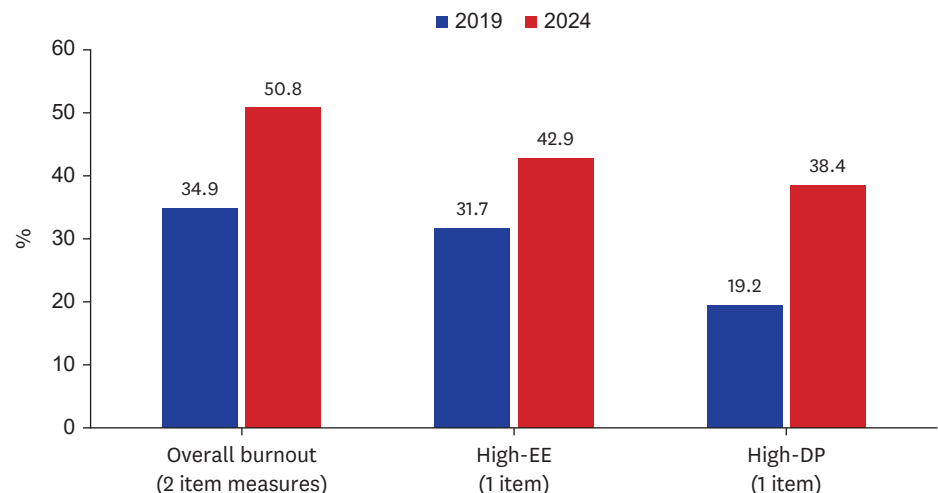


Fig. 2. Changes in burnout from 2019 to 2024 (2 single-item measures). Two single-item measures adapted from the full Maslach Burnout Inventory^{8,16} (**Table 2**) were used to compare burnout between physicians and United States workers using these 2 single-item measures. EE = emotional exhaustion, DP = depersonalization.

Table 5. Comparison of burnout in 2019 and 2024 (2 single-item measures)

Variables	2019 Burnout		P value	2024 Burnout		P value
	No	Yes		No	Yes	
Sex			0.029			0.001
Men	149 (69.0)	67 (31.0)		213 (53.3)	187 (46.8)	
Women	54 (56.3)	42 (43.8)		44 (35.8)	79 (64.2)	
Age, yr			0.001			0.003
30–39	54 (52.4)	49 (47.6)		47 (37.6)	78 (62.4)	
40–49	98 (67.1)	48 (32.9)		112 (49.8)	113 (50.2)	
50–59	31 (75.6)	10 (24.4)		57 (51.8)	53 (48.2)	
60+	20 (90.9)	2 (9.1)		42 (65.6)	22 (34.4)	
Marital relationship			0.001			0.036
Married	181 (69.1)	81 (30.9)		225 (51.3)	214 (48.7)	
Single/divorced/other	22 (44.0)	28 (56.0)		33 (38.8)	52 (61.2)	
Has children			0.025			0.002
No	6 (42.9)	8 (57.1)		39 (36.1)	69 (63.9)	
Yes	166 (71.2)	67 (28.8)		219 (52.6)	197 (47.4)	
Rank ^a			0.001			0.002
Academic tenure	61 (69.3)	27 (30.7)		62 (43.7)	80 (56.3)	
Academic other	62 (52.1)	57 (47.9)		63 (41.2)	90 (58.8)	
Hospital-employed	50 (80.6)	12 (19.4)		83 (61.0)	53 (39.0)	
Private practice	23 (71.9)	9 (28.1)		49 (56.3)	38 (43.7)	
Years of practice			0.003			0.038
< 10	24 (53.3)	21 (46.7)		30 (37.0)	51 (63.0)	
10–14	32 (51.6)	30 (48.4)		40 (46.0)	47 (54.0)	
15–19	52 (62.7)	31 (37.3)		49 (50.0)	49 (50.0)	
20–24	41 (74.5)	14 (25.5)		47 (51.1)	45 (48.9)	
25–29	17 (73.9)	6 (26.1)		32 (46.4)	37 (53.6)	
30+	37 (84.1)	7 (15.9)		60 (61.9)	37 (38.1)	
Surgical subspecialty ^b			0.935			0.463
Upper GI	18 (64.3)	10 (35.7)		23 (45.1)	28 (54.9)	
Colorectal	49 (70.0)	21 (30.0)		61 (54.5)	51 (45.5)	
Hepatobiliary-pancreas	46 (61.3)	29 (38.7)		40 (48.8)	42 (51.2)	
Breast-thyroid-endocrine	44 (63.8)	25 (36.2)		47 (46.5)	54 (53.5)	
Other	20 (66.7)	10 (33.3)		37 (42.5)	50 (57.5)	
General surgery	26 (65.0)	14 (35.0)		50 (54.9)	41 (45.1)	
Practice setting ^c			0.115			0.009
University hospital	102 (60.0)	68 (40.0)		101 (42.3)	138 (57.7)	
General hospital (> 100 beds)	51 (69.9)	22 (30.1)		73 (52.1)	67 (47.9)	
Other	50 (72.5)	19 (27.5)		84 (57.9)	61 (42.1)	
Weekly work hours			< 0.001			< 0.001
< 50	51 (81.0)	12 (19.0)		104 (64.2)	58 (35.8)	
≥ 50 to < 80	108 (69.2)	48 (30.8)		113 (50.0)	113 (50.0)	
≥ 80	43 (47.3)	48 (52.7)		36 (29.3)	87 (70.7)	

Values are presented as number of respondents (%). Percentages are the total number of respondents reporting burnout in each variable category (i.e., percentage of row totals).

GI = gastrointestinal.

^aAcademic other = fellow and academic non-tenured.

^bOther = acute care and others, General surgery = no subspecialty.

^cOther = hospital (> 30 beds), private clinic, etc.

Burnout was associated with sex, age, marital status, having children, rank, years of practice, surgical subspecialty, and weekly work hours in both years. However, significant differences by practice setting only emerged in 2024, with burnout rates increasing across all subgroups. Surgeons in academic roles and those with more years of practice demonstrated a more pronounced increase in burnout from 2019 to 2024. Surgeons in academic tenure positions experienced a 25.6 percentage points increase in burnout, from 30.7% in 2019 to 56.3% in 2024, while those in other ranks showed increases of 10.9 percentage points (academic other), 19.6 percentage points (hospital-employed), and 15.6 percentage points (private practice). Surgeons in university hospitals experienced a 17.7 percentage points increase in burnout,

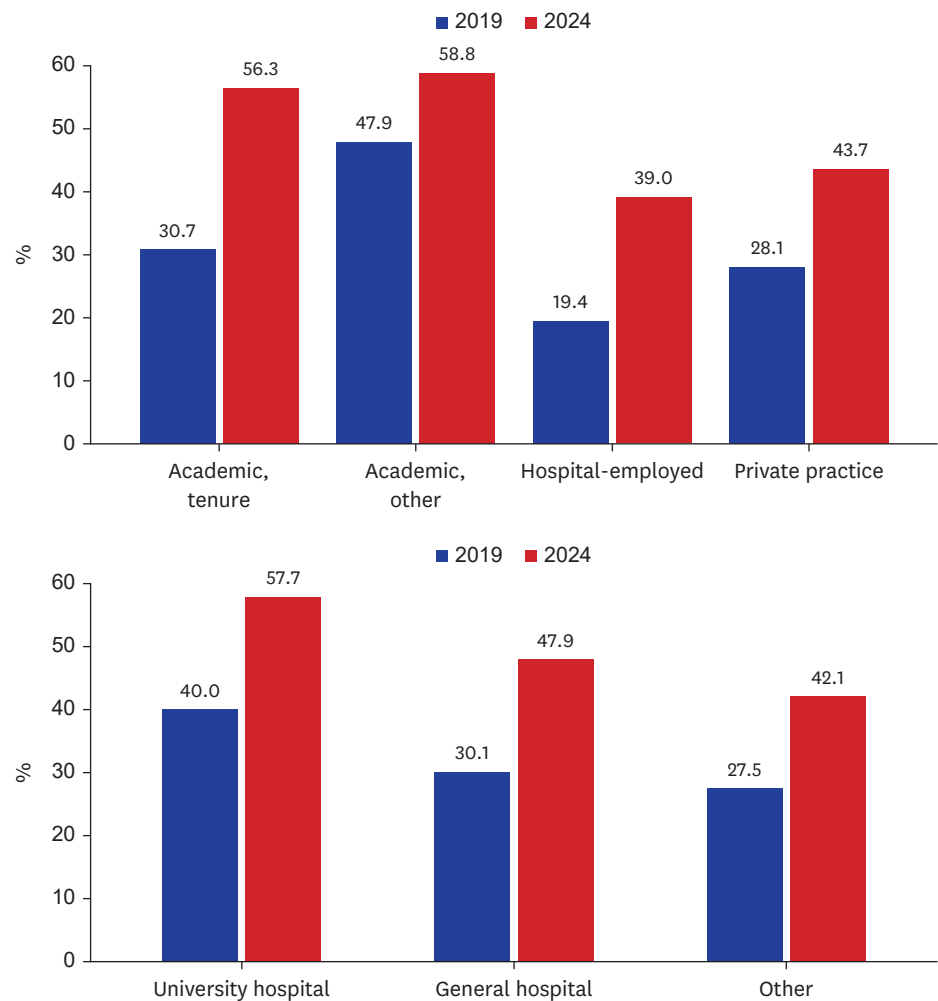


Fig. 3. Changes in burnout between 2019 and 2024 by rank and practice setting. Comparing the overall burnout percentage from the results of 2 single-item measures.

from 40.0% in 2019 to 57.7% in 2024, with general hospitals and other settings showing increases of 17.8 percentage points and 14.6 percentage points, respectively (**Fig. 3**). These findings highlight that academic faculty and surgeons in university hospitals experienced high burnout levels in 2019 and 2024, with a notably larger increase in burnout in 2024.

DISCUSSION

In 2024, South Korea experienced an unprecedented medical crisis, with 80.5% of medical residents resigning. This resulted in excessive workloads being shouldered by the remaining physicians.^{11,13,19} Specifically, Korean surgeons are facing high levels of burnout, with 55.6% as high-EE, 58.6% as high-DP, and 43.8% in both. The overall burnout rate among surgeons is 70.5%, indicating that 7 out of 10 surgeons are affected. This demonstrates the severity of the situation and highlights the need to address burnout not as a personal but as a systemic problem within the healthcare system. Burnout negatively impacts physicians' physical and mental health, quality of patient care, and healthcare institutions, with broader adverse consequences for the healthcare system.^{1,5,17,20,21}

South Korea is well-known for its demanding working conditions, especially in high-risk specialties, such as surgery, anesthesiology, and emergency medicine—fields that require long hours and carry high responsibilities, often under less favorable conditions compared to other specialties. This has led to declining interest among medical students to pursue these specialties, as evidenced by the fact that the surgical residency application rate in the first half of 2024 fell short of the required quota.²² Although government reforms to increase medical school enrollment aimed to fill positions in deferred specialties,^{13,23} they failed to address the root causes of physician exodus and damaged morale. The 2024 medical crisis emerged in response to a sudden surge in medical school enrollment but was exacerbated by intense opposition from residents and medical students, highlighting deep-rooted systemic issues within the healthcare system.

Before the crisis, issues such as ultra-low fees, criminalization of medical accidents, and rising compensation costs contributed to the rapid departure of young doctors from high-risk fields and areas with low patient populations. The field of surgery was particularly impacted, as the surgical residency application rate was already insufficient. This ongoing shortage of residents and the high work intensity in surgery are closely linked, with the current medical crisis only intensifying burnout among Korean surgeons.

A comparison of burnout levels among Korean surgeons between 2019 (pre-pandemic) and 2024 reveals a significant increase. In 2024, the DE high-score group and the overall burnout rate were higher than those for US physicians during the 2021 COVID-19 period—burnout among Korean surgeons had escalated. The pandemic had already increased physician burnout due to factors such as work overload, lack of personal protective equipment, and poor infection control, which caused emotional and physical stress. The current medical crisis in South Korea mirrors these conditions, with resource shortages and high work intensity contributing to the elevated risk of burnout among surgeons. The crisis, beginning in February 2024, likely extended the period of high burnout levels among Korean physicians, much like the pandemic did for US healthcare workers.^{7,9}

This study also explored the various factors influencing burnout among Korean surgeons, including sex, age, rank, years of practice, weekly work hours, and on-duty days. Research has revealed that work-related factors are significant contributors to physician burnout.^{17,21,24} In this study, work characteristics, particularly weekly work hours, were strongly correlated with burnout, with surgeons working longer hours, particularly in academic settings, experiencing higher levels of burnout. Academic faculty members worked longer hours than hospital-employed surgeons did and were, thus, more likely to experience burnout. The absence of medical residents increased the workload of academic surgeons, exacerbating their burnout.

Weekly work hours emerged as the most significant factor influencing burnout, aligning with findings from previous studies. During the current medical crisis, the resignation of residents intensified physicians' workloads, making work hours a critical factor in burnout.^{2,4,25} Notably, weekly work hours are interconnected with other work-related characteristics, such as rank and practice setting, which may amplify the impact of work hours on burnout.

Whereas the collective results for surgeons' burnout change between 2019 and 2024 are striking, the results for certain subgroups are even more alarming. Among different ranks,

surgeons with academic tenure experienced a 25.6 percentage points increase in burnout (from 30.7% to 56.3%), while hospital-employed surgeons experienced a 19.6 percentage points increase (from 19.4% to 39.0%). Surgeons in academic settings faced higher overall burnout, likely because of their reliance on medical residents, whose absence created excessive workloads. This study also revealed that certain groups, including women, those with children, and surgeons in academic settings, were more vulnerable to burnout during the crisis. The changes in burnout levels between 2019 and 2024 varied across subgroups, increasing by 15.8 percentage points (from 31.0% to 46.8%) among male surgeons and 20.4 percentage points (from 43.8% to 64.2%) among female surgeons. Women had higher burnout levels and saw a larger increase in burnout during the medical crisis. Future studies are warranted to examine the underlying causes of burnout in female surgeons and to identify effective countermeasures. Thus, burnout is not evenly distributed, and systemic issues may disproportionately affect specific subgroups of surgeons. Therefore, the effects of the 2024 medical crisis have seemingly exacerbated preexisting disparities and vulnerabilities within the healthcare system.

This study has some limitations. First, because the full MBI was not used in 2019, burnout measured with the full MBI in 2024 could not be directly compared to the 2019 data. Instead, burnout levels in 2019 and 2024 were compared using two single-item measures. These items were developed as a short form of the full MBI, and previous studies have shown a strong correlation between burnout assessed using these single items and the full MBI.¹⁷ As noted in the methods section a strong correlation was observed between these single items that represent EE, DP, and the EE and DP dimensions of the full MBI. However, since they are not identical instruments, differences in burnout rates are expected. In this study, the overall burnout measured by the full MBI in 2024 was 70.5%, whereas burnout measured using the two single-item measures was 50.8%. Although the single-item measures were used again in 2024 to allow comparison with the 2019 data, this introduces limitations in interpreting and comparing the findings. Additionally, the response rate was relatively low at 13.6%. The study population included all registered members of the Korean Surgical Society, and data were collected through an online survey distributed via email. Due to the nature of the survey method and recruitment strategy, there is a possibility that academic faculty and younger surgeons—who tend to be more active in society activities—were overrepresented. These groups are also known to experience higher levels of burnout, particularly among non-tenured, younger, and female academic faculty, and may have contributed to elevated burnout rates in our sample. Therefore, caution is warranted in generalizing the findings to all surgeons in Korea.

Despite these limitations, this study provides valuable insights into the burnout crisis among Korean surgeons, confirming that burnout is at critical levels. It also highlights the urgent need for systemic changes to address the root causes of burnout, particularly work-related factors and the overall healthcare environment. To reduce burnout, efforts must be directed toward devising individual coping strategies, improving working conditions, addressing systemic issues, such as work hours, shortage of residents, and over-reliance on specific specialties. In particular, strengthening psychological support system at both institutional and academic society level is essential. Structural mental health program including counseling services, peer support groups, and stress management workshops should be established. From a policy perspective, national health care authorities must play an active role in addressing the structural contributors to burnout. The government should prioritize healthcare workforce sustainability in its national agenda, starting with realistic

reforms in medical education, proper compensation for high-intensity specialties, limiting excessive working hours not only for residents but also for medical staffs, and improved legal protections for physicians. Ultimately, a comprehensive and multilayered approach such as institutional reform, professional solidarity and government policy changes must work in tandem to protect the well-being of healthcare professionals and ensure sustainable, high quality patient care.

REFERENCES

1. Del Carmen MG, Herman J, Rao S, Hidrue MK, Ting D, Lehrhoff SR, et al. Trends and factors associated with physician burnout at a multispecialty academic faculty practice organization. *JAMA Netw Open* 2019;2(3):e190554. [PUBMED](#) | [CROSSREF](#)
2. Gluschkoff K, Hakanen JJ, Elovainio M, Vänskä J, Heponiemi T. The relative importance of work-related psychosocial factors in physician burnout. *Occup Med (Lond)* 2022;72(1):28-33. [PUBMED](#) | [CROSSREF](#)
3. Shanafelt TD, Balch CM, Bechamps GJ, Russell T, Dyrbye L, Satele D, et al. Burnout and career satisfaction among American surgeons. *Ann Surg* 2009;250(3):463-71. [PUBMED](#) | [CROSSREF](#)
4. Seo JH, Bae HO, Kim BJ, Huh S, Ahn YJ, Jung SS, et al. Burnout of faculty members of medical schools in Korea. *J Korean Med Sci* 2022;37(9):e74. [PUBMED](#) | [CROSSREF](#)
5. Grow HM, McPhillips HA, Batra M. Understanding physician burnout. *Curr Probl Pediatr Adolesc Health Care* 2019;49(11):100656. [PUBMED](#) | [CROSSREF](#)
6. Cho SJ, Shin YC, Jeon SW, Kim H, Shin Y, Kim DY, et al. *Physician Mental Health Management Model: Based on the Mental Health Status of Doctors in Korea*. Seoul, Korea: Research Institute for Healthcare Policy Korean Medical Association; 2022.
7. Alkhamees AA, Aljohani MS, Kalani S, Ali AM, Almatham F, Alwabili A, et al. Physician's burnout during the COVID-19 pandemic: a systematic review and meta-analysis. *Int J Environ Res Public Health* 2023;20(5):4598. [PUBMED](#) | [CROSSREF](#)
8. Shanafelt TD, West CP, Dyrbye LN, Trockel M, Tutty M, Wang H, et al. Changes in burnout and satisfaction with work-life integration in physicians during the first 2 years of the COVID-19 pandemic. *Mayo Clin Proc* 2022;97(12):2248-58. [PUBMED](#) | [CROSSREF](#)
9. Mhango M, Dzobo M, Chitungo I, Dzinamarira T. COVID-19 risk factors among health workers: a rapid review. *Saf Health Work* 2020;11(3):262-5. [PUBMED](#) | [CROSSREF](#)
10. Park HW. The 2024 medical crisis: challenges for medical education. *Korean Med Educ Rev* 2024;26(2):118-21. [CROSSREF](#)
11. Yoon JH, Kwon IH, Park HW. The South Korean health-care system in crisis. *Lancet* 2024;403(10444):2589. [PUBMED](#) | [CROSSREF](#)
12. Moon J, Lee JY. Why I decide to leave South Korea healthcare system. *Lancet Reg Health West Pac* 2024;52:101232. [PUBMED](#) | [CROSSREF](#)
13. Park J, Shin CH, Lee JY. Why did all the residents resign? Key takeaways from the junior physicians' mass walkout in South Korea. *J Grad Med Educ* 2024;16(4):402-6. [PUBMED](#) | [CROSSREF](#)
14. Choi J, Lee JE, Choi B, Kim J, Lee SE. Experiences and perceptions of gender discrimination and equality among Korean surgeons: results of a survey of the Korean Surgical Society. *J Korean Med Sci* 2021;36(48):e323. [PUBMED](#) | [CROSSREF](#)
15. Maslach C, Jackson S, Leiter M. *Maslach Burnout Inventory Manual*. 4th ed. Menlo Park, CA, USA: Mind Garden, Inc.; 2017.
16. West CP, Dyrbye LN, Sloan JA, Shanafelt TD. Single item measures of emotional exhaustion and depersonalization are useful for assessing burnout in medical professionals. *J Gen Intern Med* 2009;24(12):1318-21. [PUBMED](#) | [CROSSREF](#)
17. West CP, Dyrbye LN, Shanafelt TD. Physician burnout: contributors, consequences and solutions. *J Intern Med* 2018;283(6):516-29. [PUBMED](#) | [CROSSREF](#)
18. West CP, Dyrbye LN, Satele DV, Sloan JA, Shanafelt TD. Concurrent validity of single-item measures of emotional exhaustion and depersonalization in burnout assessment. *J Gen Intern Med* 2012;27(11):1445-52. [PUBMED](#) | [CROSSREF](#)
19. Hong WG. Medical school professors collectively appeal for 'burnout': "4 weeks is the limit". <https://www.doctorsnews.co.kr/news/articleView.html?idxno=154204>. Updated 2024. Accessed February 3, 2025.

20. Shanafelt TD, Balch CM, Bechamps G, Russell T, Dyrbye L, Satele D, et al. Burnout and medical errors among American surgeons. *Ann Surg* 2010;251(6):995-1000. [PUBMED](#) | [CROSSREF](#)
21. Patel RS, Bachu R, Adikey A, Malik M, Shah M. Factors related to physician burnout and its consequences: a review. *Behav Sci (Basel)* 2018;8(11):98. [PUBMED](#) | [CROSSREF](#)
22. Ministry of Health and Welfare (KR). Announcement of the results of the first-year resident recruitment for the first half of 2024. https://www.mohw.go.kr/board.es?mid=a10503000000&bid=0027&act=view&list_no=1479528&tag=&nPage=1. Updated 2023. Accessed February 3, 2025.
23. Yoshida K. Why doctors are against South Korea's expansion of medical school admissions. <https://thedi diplomat.com/2024/06/why-doctors-are-against-south-koreas-expansion-of-medical-school-admissions/>. Updated 2024. Accessed February 3, 2025.
24. Senturk JC, Melnitchouk N. Surgeon burnout: defining, identifying, and addressing the new reality. *Clin Colon Rectal Surg* 2019;32(6):407-14. [PUBMED](#) | [CROSSREF](#)
25. Marques-Pinto A, Moreira S, Costa-Lopes R, Zózimo N, Vala J. Predictors of burnout among physicians: evidence from a national study in Portugal. *Front Psychol* 2021;12:699974. [PUBMED](#) | [CROSSREF](#)