

Exploring residents' well-being factors on the Multilevel Model of Healthcare Professional (HCP): Insight from the nationwide cross-sectional survey

Seung-Joo Na

Gachon University College of Medicine

Janghee Park

jhpark22@kangwon.ac.kr

Kangwon National University College of Medicine

Hyoseon Choi

Kyung Hee University College of Medicine

Sanghee Yeo

Kyungpook National University School of Medicine

Hyojin Kwon

Kangwon National University College of Medicine

Research Article

Keywords: Resident physicians, Well-being, Clinical learning environment, Medical education, Organisational factors, Specialty choice, South Korea

Posted Date: October 12th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10733670/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Background

Resident well-being is shaped by factors extending beyond individual distress, including interpersonal relationships, training structures, organisational conditions, and the wider health-care system. Empirical applications of integrated multilevel frameworks to resident well-being remain limited. We applied the Multilevel Model of Healthcare Professional Well-Being to describe resident well-being in South Korea before the 2024 workforce crisis and to examine differences by postgraduate year (PGY) and specialty track.

Methods

We conducted a cross-sectional secondary analysis of the 2020 Korean Physician Survey, a nationwide online survey administered by the Korean Medical Association. The analytic sample included 650 residents in PGY1–4. Two medical-education faculty mapped survey items to five levels of well-being (individual, interpersonal, training-program, organisational, and system), and five faculty experts evaluated the appropriateness of level classification and item relevance. We compared retained item-level indicators across PGY groups using one-way analysis of variance or Welch's analysis of variance, with post-hoc comparisons where appropriate. Essential and non-essential specialty tracks were compared using independent-samples t-tests or Welch's t-tests.

Results

The final framework comprised 48 indicators across the five levels. Differences by PGY were most evident in organisational conditions and selected individual-level indicators. Compared with senior residents, junior residents reported longer working hours, fewer days off, lower satisfaction with working hours, shorter sleep duration, lower self-rated health, and higher perceived stress. Burnout and emotional labour did not differ significantly across PGY groups. Residents in essential specialties reported less favourable organisational conditions than those in non-essential specialties, including longer weekday, weekend, and public-holiday working hours; fewer annual days off; and lower satisfaction with working hours, typical workload, and the availability of medical resources. They also devoted a greater proportion of their workload to clinical practice (81.4% vs 68.9%) and reported lower leisure-time and life satisfaction, shorter sleep duration, higher perceived stress, and lower satisfaction with the overall health-care system. Burnout did not differ significantly by specialty track.

Conclusions

Resident well-being was heterogeneous across postgraduate years and specialty tracks, particularly with respect to organisational conditions. The absence of differences in burnout did not indicate uniform well-being across resident groups. A multilevel assessment that incorporates individual experiences alongside training-program, organisational, specialty-specific, and system-level conditions may provide a more complete basis for understanding and improving resident well-being. Longitudinal studies using resident-specific validated

measures are needed to assess changes over time and clarify the relationships between training conditions and well-being.

Background

Residents are both learners undergoing specialty training and physicians who assume substantive responsibility for patient care. Within a training environment in which the demands of education and clinical care intersect, role conflict and stress may arise [1]. Resident well-being is therefore not merely an individual concern; it is an issue of educational quality that is closely linked to the clinical learning environment, including opportunities for learning, autonomy, feedback, psychological safety, and organizational support. Furthermore, resident burnout and mental health difficulties have been reported to be associated with medical errors and patient-safety outcomes. Resident well-being should thus be regarded as an important issue that requires simultaneous consideration of both the educational environment and patient safety [2, 3]. However well-being is increasingly recognised not merely as the absence of burnout but as a multidimensional construct shaped by interacting personal, relational, organisational, and systemic factors.

Traditionally, research on residents' well-being has focused primarily on individual distress and the regulation of working hours. Duty-hour restrictions have been implemented in many countries as system-level interventions intended to mitigate fatigue and improve quality of life. Although such reforms have yielded improvements in selected indicators, their overall impact has been mixed, with persistent concerns regarding physical health, professional relationships, educational experiences, and perceptions of healthcare systems [4–6]. These findings suggest that resident well-being cannot be fully understood through single-domain or single-level approaches.

In response, contemporary scholarship has advocated a shift toward more holistic and systems-oriented perspectives on clinician well-being [7–8]. The Multilevel Model of Healthcare Professional (HCP) Well-Being conceptualises well-being across five interconnected levels: individual, interpersonal, training program, organisational, and system [9]. This framework emphasises that well-being emerges from the interaction between personal resources, social relationships, educational structures, institutional policies, and broader regulatory environments. Despite its conceptual relevance, empirical applications of an integrated multilevel framework to resident well-being remain limited. These findings suggest that residency programmes may consider protecting educational time, particularly in specialty tracks with a high service-workload share.

To understand the factors associated with resident well-being, a multilevel approach is needed that considers not only individual-level characteristics but also higher-level features of the training environment, including medical specialty, training institution, and region. Previous studies of residents have primarily described differences in well-being according to postgraduate year or specialty; however, relatively few studies have simultaneously examined factors at multiple levels and their respective explanatory contributions while accounting for the hierarchical structure in which individual residents are nested within particular specialties and training institutions. In South Korea, concerns have been raised regarding declining applications to, and the shrinking training workforce in, essential medical specialties such as internal medicine, surgery, obstetrics and gynecology, and pediatrics [10]. Changes in workforce composition across specialties and heterogeneity in training environments suggest that resident well-being cannot be adequately explained by individual characteristics alone and should be examined in relation to organizational- and specialty-level contexts.

The Korean Medical Association initiated a nationwide survey (Korean Physician Survey, KPS) of physicians in 2016 and conducted its second survey in 2020, with plans for subsequent surveys at regular intervals [11]. However, amid the healthcare disruption and mass resignation of residents following the 2024 controversy surrounding the expansion of medical school admissions in Korea, a follow-up survey could not be conducted. Accordingly, the 2020 nationwide survey provides an important pre-crisis baseline for assessing residents' well-being and its associated factors.

This study applied the Multilevel Model of Healthcare Professional Well-Being to data from the 2020 Korean Physician Survey (KPS). Its objectives were: (1) to identify and content-validate KPS indicators that represent the five levels of the model; (2) to describe residents' pre-crisis well-being across these levels; and (3) to examine whether indicators differed by postgraduate year and by essential versus non-essential specialty track.

Methods

Study design and data source

This was a cross-sectional secondary analysis of the 2020 KPS, conducted by the Korean Medical Association from 19 November 2020 to 10 January 2021. The survey sampled from the Korean Medical Association membership database using stratified quota sampling by sex, age, and professional role and was administered as a computer-assisted web survey. Of 56,434 people who accessed the survey link, 6,507 completed the survey (response rate, 11.5%) [11].

The analytic sample comprised 650 residents in postgraduate years 1–4; interns were excluded. More than 95% of respondents worked in tertiary hospitals or general hospitals with at least 100 beds, over 70% worked in private hospitals, and approximately 70% practised in the Seoul Capital Area. The original KPS sampling frame, response profile, and the resident sample characteristics should be reported in full in Table 1.

Table 1
Characteristics of Residents

		n	%
Resident training year	Year 1	91	14.0
	Year 2	168	25.8
	Year 3	221	34.0
	Year 4	170	26.2
Specialty-track	Essential (internal medicine, general surgery, obstetrics, gynecology, pediatrics, cardiothoracic surgery, emergency medicine, neurosurgery, and neurology)	242	37.2
	Non-essential (Others)	408	62.8
Current workplace	Tertiary hospital (advanced general hospital)	437	67.2
	General hospital (≥ 100 beds)	192	29.5
	Hospital (≥ 30 beds)	11	1.7
	Medical school (incl. graduate-entry medical program, school of public health)	8	1.2
	Other (e.g., military/military hospital, government agency)	2	0.4
	Missing	0	0.0
Hospital ownership	Public (national/municipal)	158	24.3
	Private	492	75.7
Work region	Seoul Capital Area	457	70.3
	Non-Seoul Capital Area	193	29.7
Total		650	100.0

Conceptual framework and item selection

We used the Multilevel Model of Healthcare Professional Well-Being, which specifies five interconnected domains: individual, interpersonal, training program, organisational, and system [9]. Two medical-education

faculty independently reviewed KPS variables and identified items relevant to resident well-being. Each item was assigned to one of the five levels. Disagreements were resolved by discussion and consensus.

Content-validity assessment

Five faculty members evaluated each candidate item for: (1) appropriateness of its level classification; and (2) relevance to resident well-being. Ratings used a 4-point scale. The item-level content validity index (I-CVI) was calculated as the proportion of experts rating relevance as 3 or 4, following Lynn's approach [12]. Items with inconsistent classification or I-CVI below 1.00 were re-examined, reclassified, or excluded. Only items with unanimous agreement on acceptable relevance and classification were retained for analysis. The complete item-level mapping, ratings, and retention decisions should be supplied as Appendix 1.

Variables and outcomes

Retained items were organised by the five-level framework. Individual-level indicators included satisfaction, health, sleep, work-related stress, emotional labour, burnout, professional development, and professional calling. Interpersonal-level indicators covered relationships with colleagues, patients, and staff, and professional autonomy. Training-program indicators described the distribution and recent change in clinical, administrative, educational, and research activities. Organisational indicators included working hours, days off, workload satisfaction, and related working conditions. System-level indicators included satisfaction with the national health-care system and government regulation or policy.[11]

Essential versus non-essential specialty classification

Residents were additionally classified by specialty track as training in an essential medical specialty or a non-essential specialty. Essential specialties were defined as internal medicine, general surgery, obstetrics and gynecology, pediatric, cardiothoracic surgery, emergency medicine, neurosurgery, and neurology, following the specialty list designated under South Korea's Malpractice Insurance Premium Support Program for Essential-Medicine Physicians, administered by the Ministry of Health and Welfare, which extends government-subsidized malpractice insurance coverage to residents in these eight specialties [13]. This designation targets specialties associated with high litigation risk and disproportionate exposure to malpractice claims relative to reimbursement, and is widely used in current Korean health-workforce policy discourse to denote specialties facing recruitment shortages. All other specialties were classified as non-essential. Although this classification reflects a policy designation introduced after the survey period, it was applied retrospectively to the 2020 survey data as a consistent operational definition of essential specialties, since no equivalent official designation existed at the time of the original survey. This classification was applied post hoc to compare training conditions across specialty tracks, independent of postgraduate year, and yielded 242 residents (37.2%) classified as training in an essential specialty and 408 (62.8%) in a non-essential specialty.

Statistical analysis

We calculated descriptive statistics for all retained indicators. Differences across PGY1–PGY4 were assessed using one-way analysis of variance. Welch's analysis of variance was used when Levene's test suggested

heterogeneity of variance. Post-hoc comparisons were conducted for variables with statistically significant omnibus tests. Differences between essential and non-essential specialty tracks were assessed using independent-samples t-tests, with Welch's t-test used when Levene's test indicated unequal variances; Cohen's d was calculated as a measure of effect size for statistically significant comparisons. Two-sided p values < 0.05 were considered statistically significant. Analyses were conducted in jamovi version 2.6.26, using R and the car package as applicable [14–16].

Ethics approval

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The protocol utilizing secondary data was reviewed and was approved by the Institutional Review Board of the CHA University medical school (IRB No. 1044308-202411-HR-217-01). Access to the KPS data was granted by the Korean Medical Association after reviewing a formal research proposal. All secondary data were fully anonymized by de-identifying personal information prior to analysis, and the IRB waived the requirement for informed consent according to relevant law and institutional policies.

Results

Level classification and Content validity

The expert panel reviewed candidate KPS items and retained indicators at all five levels. [Appendix 1] Initial agreement on level classification ranged from 0.20 to 1.00. Items with disagreement were reconsidered; for example, items initially allocated to the individual level but judged to concern relationship satisfaction were reassigned to the interpersonal level. Item-level CVIs ranged from 0.40 to 1.00, and mean relevance scores ranged from 2.20 to 4.00. Patient-centred-care items had comparatively lower CVIs, whereas leisure-time satisfaction, workload, and health-system satisfaction items had high content validity.

The final indicator set was concentrated at the individual and organisational levels. (Table 2). At the level summary, the individual domain comprised 21 items (mean classification concordance 0.867; CVI 0.914), interpersonal domain four items (0.700; 0.950), training-program domain six items (0.800; 0.967), organisational domain 14 items (0.729; 0.743), and system domain three items (1.000; 1.000). Because concordance and CVI are properties of the expert validation exercise rather than measures of residents' well-being, they should be presented separately from respondent outcomes

Table 2
Multilevel Well-Being Classification and Content Validity of Variables in the National Physician Survey by
Faculties

Level	N of Item	Level Mean	CVI	Mean	SD
		Level Concordance			
Individual	21	0.867	0.914	3.667	0.264
Interpersonal	4	0.700	0.950	3.900	0.200
Training Program	6	0.800	0.967	3.700	0.398
Organization	14	0.729	0.743	3.839	0.254
System	3	1.000	1.000	4.000	0.000
Level Concordance: Mean expert agreement rate on the level assignment of each item, CVI: Content Validity Index, Mean: Mean CVI score by level, SD: Standard deviation of CVI scores by level					

Differences by postgraduate year (PGY) & Specialty

Table 3 presents item-level comparisons of KPS scores by postgraduate year (PGY) and specialty track. All item-level estimates, degrees of freedom, omnibus tests, and post-hoc comparisons are presented in the table. The following text focuses on items that showed statistically significant differences at $P < .01$; for items that did not meet this threshold, descriptive values are reported in the table without further discussion.

Table 3
– 1. Comparison of Well-being Variables by Resident Year & Specialty-track: Individual level

			PGY				Specialty-track		sum
			1	2	3	4	essential	Non-essential	
Individual	Satisfaction with providing one's own medical services	N	74	150	199	147	235	335	570
		Mean	2.97	2.89	2.97	3.06	2.95	2.99	2.97
		SD	0.88	0.86	0.91	0.79	0.85	0.87	0.86
	(5 point Likert)	F/t value	1.019				-0.534		
	Professional development: I regularly read medical journals.	N	91	68	221	170	242	408	650
		Mean	4.10	4.11	4.13	4.08	3.90	4.23	4.11
		SD	1.09	1.10	1.14	1.06	1.10	1.08	1.10
	(6 point Likert)	F/t value	0.067				-3.686***		
		Cohen's D					-0.299		
	Professional development: I regularly participate in academic conferences or seminars.	N	91	168	221	170	242	408	650
		Mean	3.86	3.73	4.00	4.02	3.78	4.00	3.92
		SD	1.40	1.32	1.21	1.23	1.28	1.27	1.28
	(6 point Likert)	F/t value	1.948				-2.161*		
		Cohen's D					-0.175		
	Sense of professional calling: Being dedicated to the medical profession is a highly rewarding endeavor.	N	91	168	221	170	242	408	650
		Mean	3.95	4.16	4.24	4.28	4.10	4.24	4.19
		SD	1.35	1.18	1.11	1.16	1.12	1.22	1.18
	(6 point Likert)	F/t value	1.804				-1.475		
	Sense of professional calling: Physicians should maintain high ethical standards	N	91	168	221	170	242	408	650
		Mean	3.99	4.12	3.94	4.31	4.12	4.07	4.09
		SD	1.20	1.14	1.21	1.09	1.13	1.19	1.17
	(6 point Likert)	F/t value	3.434*				0.514		

*** p<.001

		post hoc	3 < 4						
	Patient-centered attitudes and behaviors: I consider patient-centered care to be my highest priority.	N	91	168	221	170	242	408	650
		Mean	3.49	3.75	3.90	3.96	3.74	3.87	3.82
		SD	1.14	1.15	1.16	0.98	1.18	1.08	1.12
	(6 point Likert)	F/t value	4.110**						
		post hoc	1 < 3,4						
	Patient-centered attitudes and behaviors: I view patients as partners in care.	N	91	168	221	170	242	408	650
		Mean	4.64	4.62	4.73	4.76	4.54	4.79	4.70
		SD	1.06	1.01	0.96	0.83	0.99	0.92	0.96
	(6 point Likert)	F/t value	0.834						
		Cohen's D	-0.266						
	I treat patients with respect as individuals.	N	74	150	199	147	235	335	570
		Mean	4.86	4.96	5.02	4.99	4.89	5.04	4.98
	(6 point Likert)	SD	1.04	0.79	0.75	0.75	0.78	0.81	0.80
		F/t value	0.718						
		Cohen's D	-0.187						
	Satisfaction with leisure time	N	74	150	199	147	235	335	570
		Mean	2.14	2.50	2.60	2.71	2.26	2.74	2.54
	(6 point Likert)	SD	1.26	1.47	1.40	1.37	1.32	1.42	1.40
		F/t value	3.033*						
		Cohen's D	-0.345						
		post hoc	1 < 4						
	Satisfaction with income	N	74	150	199	147	235	335	570
		Mean	2.46	2.66	2.92	3.07	2.90	2.78	2.83
	(6 point Likert)	SD	1.30	1.35	1.33	1.49	1.41	1.37	1.38
*** p<.001									

		F/t value	4.322**				1.044		
		post hoc	1 < 4						
	Satisfaction with life	N	91	168	221	170	242	408	650
	(6 point Likert)	Mean	3.42	3.26	3.50	3.76	3.27	3.63	3.50
		SD	1.23	1.33	1.16	1.21	1.26	1.21	1.24
		F/t value	4.607**				-3.581***		
		Cohen's D	-0.291						
		post hoc	2 < 4						
	Frequency of physical activity	N	27	82	107	94	100	210	310
	(day)	Mean	2.67	2.82	3.22	3.18	3.12	3.02	3.05
		SD	1.11	1.11	1.52	1.36	1.47	1.29	1.35
		F/t value	2.848*				0.586		
	Average daily sleep duration (hour)	N	91	168	221	170	242	408	650
		Mean	5.59	5.82	6.01	6.19	5.75	6.07	5.95
		SD	1.53	1.29	1.20	1.20	1.32	1.26	1.29
		F/t value	4.628**				-2.993**		
		Cohen's D	-0.243						
		post hoc	1,2 < 4						
	Self-rated health status	N	91	168	221	170	242	408	650
	(5 point Likert)	Mean	2.67	2.87	3.04	3.11	2.89	3.00	2.96
		SD	0.87	0.82	0.73	0.76	0.77	0.81	0.79
		F/t value	6.987***				-1.814		
		post hoc	1,2 < 4 1 < 3						
	Perceived stress level	N	91	168	221	170	242	408	650
*** p<.001									

	(5 point Likert)	Mean	3.93	3.79	3.69	3.62	3.90	3.63	3.73
		SD	0.74	0.89	0.82	0.87	0.79	0.87	0.85
		F/t value	3.570*4.083***						
		Cohen's D	0.327						
		post hoc	4 < 1						
	Emotional labor	N	91	168	221	170	242	408	650
	(6 point Likert)	Mean	4.16	4.20	4.11	4.16	4.11	4.18	4.15
		SD	0.86	0.79	0.67	0.68	0.69	0.76	0.73
		F/t value	0.537-1.200						
	Burnout	N	91	168	221	170	242	408	650
	(6 point Likert)	Mean	3.87	3.89	3.72	3.70	3.85	3.74	3.78
		SD	0.80	0.89	0.79	0.81	0.82	0.83	0.83
		F/t value	2.4101.756						
*** p<.001									

Table 3
– 2. Comparison of Well-being Variables by Resident Year & Specialty-track : Interpersonal, Organization, System level

Inter-personal	Relationship with patients (6 point Likert)	N	74	150	199	147	235	335	570	
		Mean	3.78	4.04	4.07	3.93	4.00	3.98	3.99	
		SD	1.39	1.23	1.16	1.22	1.28	1.19	1.23	
		F/t value	1.008				0.131			
	Relationship with colleagues (6 point Likert)	N	74	150	199	147	235	335	570	
		Mean	4.15	4.01	4.29	4.15	4.18	4.15	4.16	
		SD	1.08	1.22	0.98	1.20	1.13	1.12	1.12	
		F/t value	1.789				0.278			
	Relationship with employees (6 point Likert)	N	74	150	199	147	235	335	570	
		Mean	3.95	3.97	4.03	4.01	3.95	4.03	4.00	
		SD	1.26	1.20	1.14	1.24	1.25	1.16	1.20	
		F/t value	0.123				-0.795			
	Professionalism: Autonomy (6 point Likert)	N	91	168	221	170	242	408	650	
		Mean	3.91	3.97	3.90	3.91	3.94	3.92	3.92	
		SD	0.65	0.53	0.56	0.52	0.50	0.59	0.56	
		F/t value	0.545				0.511			
Training program	Providing learning opportunities (6 point Likert)	N	74	150	199	147	235	335	570	
		Mean	3.28	3.37	3.60	3.50	3.32	3.58	3.47	
		SD	1.43	1.45	1.31	1.37	1.38	1.37	1.38	
		F/t value	1.366				-2.220*			
		Cohen's D					-0.189			
	Workload: Clinical practice(ratio)	N	74	150	199	147	235	335	570	
		Mean	76.24	72.83	75.68	72.14	81.43	68.94	74.09	
		SD	23.76	23.06	22.17	20.79	19.23	22.85	22.28	
*** p<.001										

		F/t value	1.104					7.060***	
		Cohen's D						0.592	
	Workload: Administration (ratio)	N	74	150	199	147	235	335	570
		Mean	11.55	10.82	9.86	10.12	8.34	11.85	10.40
		SD	14.76	14.13	13.21	11.19	12.50	13.45	13.17
		F/t value	0.373					-3.160**	
		Cohen's D						-0.269	
	Workload: Education(ratio)	N	74	150	199	147	235	335	570
		Mean	5.22	7.83	6.73	9.14	5.56	8.76	7.44
		SD	10.35	13.50	9.79	11.97	9.37	12.70	11.54
		F/t value	2.306					-3.460***	
		Cohen's D						-0.287	
	Workload: Research(ratio)	N	74	150	199	147	235	335	570
		Mean	4.49	6.15	6.03	7.10	3.73	7.82	6.14
		SD	12.89	8.99	9.59	10.58	10.28	9.79	10.19
		F/t value	1.096					-4.770***	
		Cohen's D						-0.408	
	Workload: Others(ratio)	N	74	150	199	147	235	335	570
		Mean	2.50	2.37	1.71	1.50	0.94	2.63	1.93
		SD	8.57	10.69	10.07	8.14	5.75	11.49	9.58
		F/t value	0.326					-2.310*	
		Cohen's D						-0.186	
Organization	Working hours: Weekdays	N	91	168	221	170	242	408	650
		Mean	61.44	58.48	56.06	50.28	58.85	54.19	55.93
	(hour)	SD	13.55	13.61	12.57	10.50	12.69	12.92	13.03
*** p<.001									

		F/t value	22.349***				4.474***		
		Cohen's D					0.363		
		post hoc	4 < 1,2,3 / 3 < 1						
	Working hours: Weekends	N	91	168	221	170	242	408	650
	(hour)	Mean	17.57	16.75	10.92	6.22	15.69	10.02	12.13
		SD	11.35	11.35	10.39	7.83	10.68	10.79	11.09
		F/t value	45.379***				6.498***		
		Cohen's D					0.527		
		post hoc	4 < 1,2,3 / 3 < 1,2						
	Working hours: Public holidays	N	91	168	221	170	242	408	650
	(hour)	Mean	8.18	6.39	4.57	3.08	7.65	3.68	5.16
		SD	8.76	7.77	6.52	5.47	7.46	6.56	7.16
		F/t value	12.387***				6.851***		
		Cohen's D					0.565		
		post hoc	4 < 1,2 / 3 < 1						
	Annual number of days off: Weekdays	N	91	168	221	170	242	408	650
	(day)	Mean	11.37	12.41	12.21	12.86	12.21	12.38	12.32
		SD	6.29	6.11	6.97	6.75	8.10	5.54	6.61
		F/t value	1.030				-0.283		
	Annual number of days off: Weekends	N	91	168	221	170	242	408	650
	(day)	Mean	40.77	40.17	48.71	50.49	36.93	51.15	45.86
		SD	29.63	30.40	31.79	35.86	28.56	33.58	32.52
		F/t value	4.322**				-5.741***		
		Cohen's D					-0.456		
*** p<.001									

		post hoc	2 < 3,4						
	Annual number of days off: Public holidays	N	91	168	221	170	242	408	650
		Mean	6.87	7.20	9.00	9.33	6.07	9.66	8.32
	(day)	SD	5.70	5.72	5.95	6.56	5.44	6.08	6.10
		F/t value	6.371***				-7.78***		
		Cohen's D	-0.622						
		post hoc	1,2 < 3,4						
	Annual number of days off: Total	N	91	168	221	170	242	408	650
		Mean	59.01	59.78	69.93	72.68	55.21	73.19	66.50
	(day)	SD	35.84	36.96	37.71	42.88	34.63	40.00	39.04
		F/t value	4.894**				-6.034***		
		Cohen's D	-0.481						
		post hoc	1,2 < 4						
	Satisfaction with working hours	N	74	150	199	147	235	335	570
		Mean	2.49	2.68	3.04	3.18	2.57	3.15	2.91
	(hour)	SD	1.30	1.46	1.46	1.44	1.42	1.43	1.45
		F/t value	5.765***				-4.836***		
		Cohen's D	-0.412						
		post hoc	1 < 3,4 / 2 < 4						
	Satisfaction with typical workload	N	74	150	199	147	235	335	570
		Mean	2.45	2.69	2.90	2.98	2.51	3.02	2.81
	(6 point Likert)	SD	1.37	1.40	1.51	1.39	1.38	1.45	1.44
		F/t value	2.871*				-4.238***		
		Cohen's D	-0.361						
*** p<.001									

		post hoc	1 < 4						
	Satisfaction with the availability of medical resources (6 point Likert)	N	74	150	199	147	235	335	570
		Mean	3.08	2.97	3.20	3.03	2.93	3.18	3.08
		SD	1.50	1.38	1.38	1.39	1.41	1.38	1.40
		F/t value	0.853				-2.145*		
		Cohen's D					-0.183		
System	Satisfaction with the health care system as a whole (5 point Likert)	N	91	168	221	170	242	408	650
		Mean	2.93	2.92	2.94	2.86	2.76	3.00	2.91
		SD	1.13	1.13	1.14	1.12	1.08	1.15	1.13
		F/t value	0.177				-2.734**		
		Cohen's D					-0.222		
	Regulations from the government, etc (6 point Likert)	N	74	150	199	147	235	335	570
		Mean	1.84	1.89	1.84	1.84	1.80	1.89	1.85
		SD	0.99	1.13	1.09	1.15	1.05	1.14	1.10
		F/t value	0.066				-0.955		
*** p<.001									

Differences by postgraduate year (PGY)

Using a reporting threshold of $P < .01$, organizational conditions generally became more favorable with advancing postgraduate year (PGY). Working hours declined from PGY1 to PGY4 on weekdays (61.44 vs. 50.28 hours), weekends (17.57 vs. 6.22 hours), and public holidays (8.18 vs. 3.08 hours; all $P < .001$). Senior residents also reported more annual days off: compared with PGY1–2 residents, PGY4 residents had more public-holiday days off (9.33 vs. 6.87–7.20 days) and total days off (72.68 vs. 59.01–59.78 days), while PGY3–4 residents had more weekend days off than PGY2 residents (48.71–50.49 vs. 40.17 days; all $P < .01$). Satisfaction with working hours increased across PGY, with PGY3–4 residents reporting higher scores than PGY1 residents and PGY4 residents reporting higher scores than PGY2 residents (all $P < .001$).

Several individual-level indicators also differed by PGY. PGY3 and PGY4 residents were more likely than PGY1 residents to identify patient-centered care as their highest priority (3.90 and 3.96 vs. 3.49, respectively; $P < .01$). PGY4 residents reported greater satisfaction with income than PGY1 residents (3.07 vs. 2.46; $P < .01$) and greater life satisfaction than PGY2 residents (3.76 vs. 3.26; $P < .01$). Daily sleep duration increased from 5.59 hours among PGY1 residents and 5.82 hours among PGY2 residents to 6.19 hours among PGY4 residents ($P < .01$).

.01). Self-rated health was higher among PGY4 than PGY1–2 residents and higher among PGY3 than PGY1 residents (all $P < .001$).

Burnout, emotional labor, satisfaction with providing medical services, professional-development activities, professional calling, relationships with patients, colleagues, and employees, professional autonomy, perceived availability of learning opportunities, workload allocation, satisfaction with medical resources, satisfaction with the overall healthcare system, and perceptions of government regulations did not meet the $P < .01$ reporting threshold across PGY groups.

Differences by essential versus non-essential specialty track

Resident's training in essential specialties reported systematically less favourable organisational conditions than those in non-essential specialties. Essential-specialty residents worked longer hours on weekdays (58.85 vs 54.19), over the combined weekend (15.69 vs 10.02), and on public holidays (7.65 vs 3.68), and had fewer annual days off on weekends (36.93 vs 51.15), public holidays (6.07 vs 9.66), and in total (55.21 vs 73.19). They also reported lower satisfaction with working hours (2.57 vs 3.15), typical workload (2.51 vs 3.02), and the availability of medical resources (2.93 vs 3.18). Essential-specialty residents devoted a substantially higher share of time to clinical practice (81.4% vs 68.9%), whereas non-essential-specialty residents devoted more time to administration (8.3% vs 11.9%), teaching (5.6% vs 8.8%), research (3.7% vs 7.8%), and other duties (0.9% vs 2.6%).

These organisational disparities extended further into the individual and interpersonal domains. Essential-specialty residents reported lower satisfaction with leisure time (2.26 vs 2.74) and life overall (3.27 vs 3.63), shorter sleep duration (5.75 vs 6.07 hours), and higher work-related stress (3.90 vs 3.63). They also reported less frequent engagement in professional development, including reading medical journals (3.90 vs 4.23), attending academic conferences (3.78 vs 4.00, $t = -2.16$, $p = 0.031$, $d = -0.18$), and perceiving that their training programme provided adequate learning opportunities (3.32 vs 3.58, $t = -2.22$, $p = 0.027$, $d = -0.19$). Essential-specialty residents were also less likely to view patients as partners in care (4.54 vs 4.79) and less likely to report treating patients with respect (4.89 vs 5.04, $t = -2.20$, $p = 0.028$, $d = -0.19$).

Essential-specialty residents also reported lower satisfaction with the health-care system overall (2.76 vs 3.00). In contrast, essential- and non-essential-specialty residents did not differ significantly in burnout (3.85 vs 3.74, $p = 0.080$), emotional labour, interpersonal relationships with colleagues or employees, professional autonomy, individual satisfaction with providing medical services, sense of professional calling, patient-centred care as a stated priority, income satisfaction, physical activity frequency, self-rated health, weekday days off, or satisfaction with government regulation (all $p > 0.05$).

Discussion

Conceptual Framework for Resident Well-Being

Well-being research often utilises conceptual frameworks to organise and interpret findings. Previous studies have employed multilevel models, ecological systems frameworks, and domain-based approaches such as the Stanford Well-Being Model [9, 17]. Multilevel and ecological models view well-being as arising from interactions

between individuals and their environments at multiple levels, whereas domain-centred models focus on specific outcomes or determinants of well-being [17].

In this study, we adopted a multilevel perspective, positing that residents' well-being is influenced by the interplay of individual characteristics, training structures, organisational contexts, and the broader regulatory environment. Within the structured residency system, several individual and organisational indicators, including life satisfaction, perceived workload, and working hours, varied by postgraduate year. These findings are consistent with prior work showing that physician and resident well-being is shaped by organisational conditions alongside individual and job-related factors. Gabay examined the association of organisational trust in senior management with burnout among hospital physicians, whereas Talen et al. described organisational-wellness monitoring in a residency programme [18, 19]. Together, these studies support the value of examining resident well-being beyond individual-level measures.

The value of this multilevel approach is illustrated directly by our findings: burnout and emotional labour showed no significant differences by postgraduate year or specialty track, whereas organisational conditions, such as working hours and days off, and system-level satisfaction varied markedly. Thus, an assessment relying solely on burnout might have suggested little variation in resident well-being, while overlooking substantial and policy-relevant differences at the organisational and system levels.

Multilevel pattern in Korean Resident

Analysis of the KPS data indicated that individual and organisational well-being generally improved with increasing years of training, whereas no significant differences were observed at the interpersonal or system levels. The clearest differences by postgraduate year were observed in organisational conditions and selected individual-level indicators. The clearest differences by postgraduate year were observed in individual and organisational conditions: compared with senior residents, junior residents reported longer working hours, fewer days off, lower satisfaction with their workload, shorter sleep duration, lower self-rated health, and higher perceived stress.

System-level satisfaction was relatively low across all PGY groups. It was shared across PGY groups rather than restricted to junior residents, suggesting that residents' concerns extended beyond workload alone. South Korean reforms to resident training conditions have improved some elements of the learning environment, while work-hour burdens have persisted, especially for junior trainees [20–22]. International duty-hour reforms have likewise produced mixed effects on education and well-being [23]. Our results support an approach that links protection of junior residents' working conditions with organisational change and broader health-system reform, rather than relying on individual resilience interventions alone.

Specialty-track inequities in training conditions

Residents in essential specialties experienced less favourable working and training conditions across multiple well-being domains. This pattern supports concerns that essential specialties in South Korea have become structurally less attractive and may have contributed to specialty-choice avoidance and the workforce disruption surrounding the 2024 crisis [22–25].

This pre-crisis pattern is consistent with concerns about heterogeneity in training conditions across specialty tracks; it cannot, however, establish a causal link to subsequent specialty preferences or the 2024 workforce

crisis. The cross-sectional design does not allow these explanations to be distinguished.

These findings suggest that specialty-related inequities extend beyond workload to professional development, system satisfaction, and patient-centred care. Such disparities may warrant further study professional identity formation, career satisfaction, and care quality even in the absence of higher burnout. Structural reforms to workload and training conditions are therefore needed alongside individual-level well-being interventions. Because medical students' specialty preferences may be influenced by their observations of residents' working conditions [26, 27], these inequities may also discourage future recruitment into essential specialties [28], although longitudinal research is needed to confirm this relationship.

Implications for residency training and professional development

The professional-development gap has direct implications for residency training. Essential-specialty residents reported less engagement with medical journals, conferences, and learning opportunities, consistent with evidence that heavy service demands reduce time for education and reflection [29]. Because structured learning time is essential to competency-based progression [30], programmes should protect academic time through dedicated education blocks, flexible teaching formats, or non-clinical rotations. Modestly lower scores on selected patient-centred attitude items may also suggest strain on professional identity formation, which requires reflection and mentorship [31]. Efforts to strengthen professionalism and patient-centred care should therefore address excessive workload alongside curricular interventions.

The study's strengths include the use of a large nationwide online survey of physicians and a predefined multilevel framework, for which the classification and content relevance of KPS items were evaluated by experts. This framework distinguishes individual indicators from the organisational and system contexts in which residents train. Several limitations should be considered. The cross-sectional design precludes causal inference and cannot link the observed pre-crisis patterns to the 2024 workforce crisis. The 11.5% response rate and quota-based online sampling may have introduced selection bias. Because the KPS was not developed specifically to assess resident well-being, the number and content of available indicators varied across framework levels, with relatively limited coverage of the training-program domain. Item-level comparisons were exploratory and involved multiple tests. In addition, the post hoc essential/non-essential specialty classification may oversimplify specialty-specific working conditions, and the absence of a PGY-by-specialty-track interaction analysis leaves uncertainty about whether specialty-track disparities differ across stages of training.

Conclusions

This study applied a multilevel framework to describe resident well-being in South Korea before the 2024 workforce crisis. Although burnout and emotional labour did not differ significantly by postgraduate year or specialty track, meaningful differences were observed in working hours, days off, workload satisfaction, sleep duration, self-rated health, and satisfaction with the healthcare system. Junior residents generally reported less favourable organisational conditions than senior residents, while residents in essential specialties experienced heavier clinical workloads, fewer days off, and lower satisfaction with several aspects of their training and work environment than those in non-essential specialties.

Abbreviations

CVI
Content Validity Index
I-CVI
Item-level Content Validity Index
KMA
Korean Medical Association
KPS
Korean Physician Survey
PGY
Postgraduate year

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The protocol utilizing secondary data was reviewed and was approved by the Institutional Review Board of the CHA University medical school (IRB No. 1044308-202411-HR-217-01). Access to the KPS data was granted by the Korean Medical Association after reviewing a formal research proposal. All secondary data were fully anonymized by de-identifying personal information prior to analysis, and the IRB waived the requirement for informed consent according to relevant law and institutional policies.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Funding

No specific funding was received.

Author Contribution

H.C. and J.P. equally contributed to the supervision, conceptualization, design, methodology, statistics, formal analysis, figure preparation, writing—original draft, and writing—review and editing. S.N. contributed to the visualization, figure preparation, writing the manuscript, statistics, and data interpretation. H.K. contributed to writing the manuscript, statistics, and data interpretation. Y. S. contributed to the literature review, formal analysis, statistics, and the original draft. All authors reviewed and approved the final manuscript.

Acknowledgement

The authors would like to thank the Korean Medical Association for providing the data used in this study.

Data Availability

The data that support the findings of this study are available from the Korean Medical Association (KMA) but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the Korean Medical Association (KMA) (<https://rihp.re.kr/doctor/introduce.php>).

References

1. Forssmann-Falck R. Role Conflict: an Important Dimension of the Psychiatric Residency. *Int J Soc Psychiatry*. 1986;32(1):58–62. 10.1177/002076408603200107.
2. Hodkinson A, Zhou A, Johnson J, Geraghty K, Riley R, Zhou A, et al. Associations of physician burnout with career engagement and quality of patient care: systematic review and meta-analysis. *BMJ*. 2022;378. 10.1136/bmj-2022-070442.
3. Rotenstein L, Wang H, West CP, Dyrbye LN, Trockel M, Sinsky C, Shanafelt T. Teamwork climate, safety climate, and physician burnout: a national, cross-sectional study. *Jt Comm J Qual Patient Saf*. 2024;50(6):458–62. 10.1016/j.jcjq.2024.03.007.
4. Bolster L, Rourke L. The Effect of Restricting Residents' Duty Hours on Patient Safety, Resident Well-Being, and Resident Education: An Updated Systematic Review. *J Grad Med Educ*. 2015;7(3):349–63. 10.4300/JGME-D-14-00612.1.
5. Ahmed N, Devitt KS, Keshet I, Spicer J, Imrie K, Feldman L, Cools-Lartigue J, Kayssi A, Lipsman N, Elmi M, Kulkarni AV, Parshuram C, Mainprize T, Warren RJ, Fata P, Gorman MS, Feinberg S, Rutka J. A systematic review of the effects of resident duty hour restrictions in surgery: impact on resident wellness, training, and patient outcomes. *Ann Surg*. 2014;259(6):1041–53. 10.1097/SLA.0000000000000595.
6. Nagasaki K, Kobayashi H. The effects of resident work hours on well-being, performance, and education: A review from a Japanese perspective. *J Gen Fam Med*. 2023;24(6):323–31. 10.1002/jgf2.649.
7. Eckleberry-Hunt J, Van Dyke A, Lick D, Tucciarone J. Changing the conversation from burnout to wellness: physician well-being in residency training programs. *J Grad Med Educ*. 2009;1(2):225–30. 10.4300/JGME-D-09-00026.1.
8. National Academies of Sciences. Engineering, and Medicine. Taking action against clinician burnout: a systems approach to professional well-being. Washington (DC): National Academies; 2019. 10.17226/25521.
9. Penwell-Waines L, Ward W, Kirkpatrick H, Smith P, Abouljoud M. Perspectives on healthcare provider well-being: looking back, moving forward. *J Clin Psychol Med Settings*. 2018;25(3):295–304. 10.1007/s10880-018-9541-3.
10. Kim S, Kim DH, Lee YM. Impact of the medico-political conflict in South Korea on specialty choice and professional identity among medical students: a cross-sectional study. *J Korean Med Assoc*.

2025;68(12):881.

11. Lee J, Park J, Kim G. 2020 Korean Physician Survey. Seoul: Institute for Healthcare Policy, Korean Medical Association; 2021. pp. 1–370.
12. Lynn MR. Determination and quantification of content validity. *Nurs Res*. 1986;35(6):382–6. 10.1097/00006199-198611000-00017.
13. Ministry of Health and Welfare (Republic of Korea). Government support for malpractice insurance premiums for physicians in essential medical fields [press release, in Korean]. Sejong: Ministry of Health and Welfare; 2025 Oct 27 [cited 2026 Aug 28]. Available from: https://www.mohw.go.kr/board.es?mid=a10503010100&bid=0027&act=view&list_no=1487700&tag=&nPage=2. Archived at: https://web.archive.org/web/20260828025857/https://www.mohw.go.kr/board.es?mid=a10503010100&bid=0027&act=view&list_no=1487700&tag=&nPage=2.
14. The jamovi project. jamovi [computer software]. Version 2.6. 2024. Available from: <https://www.jamovi.org/>
15. R Core Team. R: A language and environment for statistical computing [computer software]. Version 4.4. Vienna: R Foundation for Statistical Computing. 2024. Available from: <https://cran.r-project.org/>
16. Fox J, Weisberg S, car. Companion to Applied Regression [R package]. 2023. Available from: <https://cran.r-project.org/package=car>
17. Choi H, Park J, Yeo S, Na S, Kwon H. Physicians' and residents' well-being in ecological system: a scoping review of positive deviance strategies. *Healthc (Basel)*. 2025;13(15):1856. 10.3390/healthcare13151856.
18. Gabay G. Professional burnout among expert physicians, patient-focused care, and trust in top management: Moving forward. *Scand J Psychol*. 2024.
19. Talen MR, Edberg D, Pence A, Kettel Khan L. Monitoring the organizational wellness of a physician residency program: a quality improvement process. *Int J Psychiatry Med*. 2019;54:316–26. 10.1177/0091217419862480.
20. Heppe D, Baduashvili A, Limes JE, Suddarth K, Mann A, Gottenborg E, Sacro Y, Davis L, Chacko K, Connors G. Resident Burnout, Wellness, Professional Development, and Engagement Before and After New Training Schedule Implementation. *JAMA Netw Open*. 2024;7(2):e240037. 10.1001/jamanetworkopen.2024.0037.
21. Zis P, Anagnostopoulos F, Sykioti P. Burnout in medical residents: a study based on the job demands-resources model. *ScientificWorldJournal*. 2014;2014:673279. 10.1155/2014/673279.
22. Sohn S, Seo Y, Jeong Y, Lee S, Lee J, Lee KJ. Changes in the working conditions and learning environment of medical residents after the enactment of the Medical Resident Act in Korea in 2015: a national 4-year longitudinal study. *J Educ Eval Health Prof*. 2021;18. <https://doi.org/10.3352/jeehp.2021.18.7>.
23. Nagasaki K, Nishizaki Y, Shinozaki T, Shimizu T, Yamamoto Y, Shikino K, et al. Association between mental health and duty hours of postgraduate residents in Japan: a nationwide cross-sectional study. *Sci Rep*. 2022;12(1). <https://doi.org/10.1038/s41598-022-14952-x>.
24. Stansfield RB, Kenaga H, Markova T. Building a culture of well-being in primary care resident training programs. *Ochsner J*. 2021;21(1):68–75. <https://doi.org/10.31486/toj.19.0111>.
25. Choi S. Public servants or privileged elites? Analyzing physician strikes in the Republic of Korea. *Soc Sci Med*. 2026;395:119092. 10.1016/j.socscimed.2026.119092.
26. Schoon B, Kötter T. Intracurricular Factors Influencing Medical Students' Specialty Choice: A Systematic Review. *Adv Med Educ Pract*. 2024;15:1127–40. <https://doi.org/10.2147/AMEP.S491008>.

27. Saito T, Yamaoka Y, Shirai M, et al. The global surgical workforce crisis: narrative review of the role of surgical educator development and technological innovations. *Surg Today*. 2026;56:1707–22. <https://doi.org/10.1007/s00595-026-03320-1>.
28. Kim S, Kim DH, Lee YM. Impact of the medico-political conflict in South Korea on specialty choice and professional identity among medical students: a cross-sectional study. *J Korean Med Assoc*. 2025;68(12):881. <https://doi.org/10.5124/jkma.25.0145>.
29. Melvin L, Kim VS, et al. Working to learn or learning to work: resident perceptions of service and education in internal medicine. *Acad Med*. 2025;101(1):71–8. <https://doi.org/10.1093/acamed/wvaf011>.
30. ten Cate O, Scheele F. Competency-based postgraduate training: can we bridge the gap between theory and clinical practice? *Acad Med*. 2007;82(6):542–7. <https://doi.org/10.1097/ACM.0b013e31805559c7>.
31. Cruess RL, Cruess SR, Boudreau JD, Snell L, Steinert Y. Reframing medical education to support professional identity formation. *Acad Med*. 2014;89(11):1446–51. <https://doi.org/10.1097/ACM.0000000000000427>.

Figures



Figure 1

Well-being Item Classification and Analysis Process