

High rate of burnout among residents under standardized residency training in a tertiary teaching hospital of middle China

Results from a cross-sectional survey

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Abstract

Burnout has been commonly observed in health care workers. Though research has been conducted involving burnout among doctors in China, few studies have focused on residents during standardized residency training (SRT). The professional status of the residents during SRT remains largely unclear. The present study was conducted in order to clarify the prevalence and potential risk factors of burnout in residents during SRT.

An electronic questionnaire comprised 2 parts. The first part was designed to collect some basic characteristic information. Maslach Burnout Inventory-Human Services Survey was included in the second part.

As many as 71.05% residents had at least 1 scale of burnout. Emotional exhaustion (EE) was found in 55.6% residents, depersonalization (DP) in 29.7% and reduced personal accomplishment (RPA) in 41.6%. Being older than 27, senior SRT year, working time more than 60 hours per week and poor sleeping quality was independently associated with at least on scale of burnout. Being unable to receive timely supervisor support significantly increased the probability of DP and EE. Not having friends at work or feeling cared for by the hospital were independently related to all 3 symptoms of burnout as well as overall burnout.

Burnout rate is high in residents under SRT from middle part of China. Organizational, professional, and social support was demonstrated critical by the potential roles in protecting against burnout. Residents with burnout were prone to considering turnover. Strategies for managing burnout related factors among residents should be focused in future studies.

Abbreviations: DP = depersonalization, EE = Emotional exhaustion, RPA = personal accomplishment, SRT = standardized residency training.

Keywords: burnout, residents, standardized residency training

1. Introduction

Burnout has been commonly observed in health care workers since it was first studied in 1970s.^[1] Three main characteristics, a state of emotional exhaustion, depersonalization, and a reduced sense of accomplishment, were deemed as the main symptoms of burnout. The consequence of burnout included physicians

intentions to reduce their working hours and even leave their jobs.^[2,3] Serious burnout was also independently associated with medical mistakes.

Various studies have suggested that burnout among doctors is a global phenomenon. The prevalence of burnout varies geographically and among work specialties.^[1,4] Regarding

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This study was approved by the Ethics Committee of Henan Provincial People's Hospital. The requirement for informed consent was waived because completing the questionnaire was voluntary.

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China, where there is a conspicuous doctor shortage, it is common for doctors to experience long working hours and a tremendous workload. Though research has been conducted involving burnout among doctors in China, few studies have focused on residents during standardized residency training (SRT).^[4] The modernization of residency education is specialized and critical for residents. The aim of residency training is to cultivate medical graduates with practical skills and the ability to work independently; the long work hours and high pressure during such training might be related to burnout.^[5] Burnout among residents under SRT should not be ignored. In this early stage of doctors careers, burnout might overwhelm residents and push them to discontinue training, perhaps even to switch to another job.

In 2014, a new policy of SRT programs launched in China. The professional status of the residents during SRT remains largely unclear. The present study was conducted in order to clarify the prevalence and potential risk factors of burnout in residents during SRT.

2. Methods

2.1. Ethics statements

Participants were assured before responding to the questionnaire that their answers were confidential and that no privacy-containing data could be obtained. Completing or refusing the questionnaire was totally voluntary. Therefore, the requirement for informed consent was waived, and the study was approved by the Ethics Committee of Henan Provincial People's Hospital.

2.2. Questionnaire and participants

A cross-sectional survey was conducted during the month of June 2019. All participants were residents in SRT from a tertiary teaching hospital of Henan province. They were at the end of their first, second, or third year of SRT. Electronic anonymous questionnaires were sent through WeChat (Tencent, China). The questionnaires were created using www.wenjuan.com, a freely obtained website.

The questionnaires comprised 2 parts. The first part was designed to collect some basic characteristic information including age, sex, marital status, year of SRT, specialty, working hours per week, and night shifts per month. The Chinese version of the Maslach Burnout Inventory-Human Services Survey (MBI-HSS)^[6] was included in the second part. A seven-point Likert-type scale was used, ranging from never to every day.

2.3. The definition

Emotional exhaustion (EE) was defined as receiving a total score of more than 27. A score higher than 12 was considered to reflect depersonalization (DP). Reduced personal accomplishment (RPA) was indicated by a score lower than 32. Total burnout was indicated when participants had all 3 aspects of burnout (emotional exhaustion >27, depersonalization >12, and personal accomplishment <32).

2.4. Statistical analysis

Qualitative data were presented as percentage/composition ratios, and the Pearson Chi-Squared test or Fisher exact probabilities were used to compare the differences. Two-tailed

P values <.05 were considered significant. SPSS 19.0 software (IBM Corporation, Armonk, NY, USA) was used to perform statistical analyses. Multivariate logistic regression was used to determine the factors related to all 3 aspects of burnout as well as overall burnout.

3. Results

3.1. Characteristics

The questionnaires were sent to 768 residents and 563 completed the survey; the response rate was 73.3%. Women comprised 60.7% of the 563 respondents. More than half of the residents (61.8%) were older than 27, and 42.8% of respondents were not in a relationship. Regarding training level, 36.8% of the participants were at the end of their first year of SRT, 28.1% in their second year, and the remaining 35.2% in their third year. Regarding working time, 35.9% of them work more than 60 hours per week. Almost two-thirds had fewer than 5 night shifts a month. The average sleeping time was more than 7 hours in 51.5% of the residents. Regarding sleeping quality, 62.7% of residents reported their sleep quality as moderate and 16.3% as poor.

The EE incidence was 55.6%, the DP incidence was 29.7%, and that of RPA was 41.6%. Ninety three participants (16.5%) were scored as having all 3 aspects of burnout. As many as 71.05% residents were shoring at least 1 symptom of burnout. The details of participants characteristics are shown in Table 1.

3.2. Comparison between those with and without burnout

Men were more like to experience DP than women (Table 2). Those older than 27 might be more prone to developing total burnout. Residents with long working year were also prone to experiencing DP and RPA. Long working hours and dissatisfaction with salary increased the probability of DP, EE, and total burnout. Sleep quality, but not sleep time, played an important role in the development of all 3 symptoms of burnout as well as total burnout.

Social support, timely supervisor support, having friends at work, and feeling cared for by the hospital might be important factors for decreasing the incidence of burnout on all 3 scales of burnout as well as total burnout. Residents with burnout were more likely to switch to another job. The results of the above comparisons are listed in Table 2.

3.3. Multivariate logistic regression analysis of factors related to burnout

In order to investigate the potential related factors of burnout, a multivariate logistic regression was performed. Only the factors that showed statistical differences from Table 2 were entered into the multivariate analyses. The results of the multivariate logistic regression are shown in Table 3. Being older than 27 was independently related to total burnout. Compared to residents in their first year of training, those in their second and third years were more likely to develop DP and RPA. With regard to work time, those who worked more than 60 hours per week faced an increased probability of EE. Residents who could not sleep well were likely to suffer from all symptoms of burnout as well as total burnout. Being unable to receive timely supervisor support significantly increased the probability of DP and EE. Not having

Table 1
The characteristics of participants.

		N (563)	Percentage
Gender	Male	221	39.3%
	Female	342	60.7%
Age (y)	<27	215	38.2%
	≥27	348	61.8%
Marital status	Single	241	42.8%
	In a relationship without child	256	45.5%
	In a relationship with child	66	11.7%
SRT	1st year	207	36.8%
	2nd year	158	28.1%
	3rd year	198	35.2%
Specialty	Anesthesia	82	14.6%
	Pediatrics	29	5.2%
	Gynecology and obstetrics	43	7.6%
	Internal medicine	221	39.3%
	Surgical	134	23.8%
Working time (h/week)	Others	54	9.6%
	<50	211	37.5%
	50–60	150	26.6%
	≥60	202	35.9%
Night shift (per month)	<5	372	66.1%
	5–7	172	30.6%
	≥8	19	3.4%
Salary satisfaction	Yes	209	37.1%
	No	354	62.9%
Sleeping time (h)	<7	273	48.5%
	≥7	290	51.5%
Sleeping quality	Good	118	21.0%
	Moderate	353	62.7%
	Poor	92	16.3%
Supervisor support in time	Every time	167	29.7%
	Most time	363	64.5%
	Sometimes	33	5.9%
Having friends in work	Yes	494	87.7%
	No	69	12.3%
Feeling cared from the hospital	Yes	341	60.6%
	No	222	39.4%
Burnout	EE	313	55.6%
	DP	167	29.7%
	RPA	234	41.6%
	Total burnout	93	16.5%
Turnover intention	Yes	213	37.8%
	No	350	62.2%

DP = depersonalization, EE = emotional exhaustion, RPA = reduced personal accomplishment.

friends at work or feeling cared for by the hospital were independently related to all 3 symptoms of burnout as well as overall burnout.

4. Discussion

Burnout in health care workers at all levels is quite common,^[7] and it has even been found in medical students and residents.^[8] The present study demonstrated that burnout in residents under SRT is high. As much as 71.05% of residents had at least 1 symptom of burnout. With regard to the symptoms of burnout, EE was found in 55.6% residents, DP in 29.7%, and RPA in 41.6%. The potential factors associated with the 3 symptoms might be multifactorial. Supervisor support, friends at work and feeling cared for by the hospital were demonstrated as important for protecting against burnout in the present study.

Residents with burnout are more likely to consider switching to another job, so it is important to understand what factors affect burnout.

SRT is critical for residents who intend to become qualified doctors. SRT is always conducted in tertiary teaching hospitals, where the doctor shortage is conspicuous and being a doctor is challenging, especially in China. Patients flood into tertiary hospitals, into the teaching hospitals in particular, because the health referral system is not strict in China. This puts pressure on the already low doctor-to-patient ratio in these hospitals. Low doctor-to-patient and nurse-to-doctor ratios compromise the clinical work efficiency and can even intensify doctor-patient tensions, escalating violence in hospitals. The challenging clinical work environment and high work pressures can lead to burnout. In the present study, residents in SRT in tertiary teaching hospitals showed high burnout rates. As much as 71.05% of

Table 2
The comparisons between residents with and without burnout.

		DP			EE			RPA			Total burnout		
		No	Yes	P	No	Yes	P	No	Yes	P	No	Yes	P
Gender	Male	141 (63.8%)	80 (36.2%)	.006	87 (39.4%)	134 (60.6%)	.053	129 (58.4%)	92 (41.6%)	.98	177 (80.1%)	44 (19.9%)	.082
	Female	255 (74.6%)	87 (25.4%)		163 (47.7%)	179 (52.3%)		200 (58.5%)	142 (41.5%)		293 (85.7%)	49 (14.3%)	
Age (y)	<27	160 (74.4%)	55 (25.6%)	.096	100 (46.5%)	115 (53.5%)	.429	129 (60.0%)	86 (40.0%)	.554	188 (87.4%)	27 (12.6%)	.047
	≥27	236 (67.8%)	112 (32.2%)		150 (43.1%)	198 (56.9%)		200 (57.5%)	148 (42.5%)		282 (81.0%)	66 (19.0%)	
Marital status	Single	169 (70.1%)	72 (29.9%)	.753	110 (45.6%)	131 (54.4%)	.715	152 (63.1%)	89 (36.9%)	.146	203 (84.2%)	38 (15.8%)	.885
	In a relationship without child	178 (69.5%)	78 (30.5%)		109 (42.6%)	147 (57.4%)		142 (55.5%)	114 (44.5%)		213 (83.2%)	43 (16.8%)	
	In a relationship with child	49 (74.2%)	17 (25.8%)		31 (47.0%)	35 (53.0%)		35 (53.0%)	31 (47.0%)		54 (81.8%)	12 (18.2%)	
SRT	1st year	158 (76.3%)	49 (23.7%)	.044	99 (47.8%)	108 (52.2%)	.150	135 (65.2%)	72 (34.8%)	.032	182 (87.9%)	25 (12.1%)	.079
	2nd year	109 (69.0%)	49 (31.0%)		74 (46.8%)	84 (53.2%)		90 (57.0%)	68 (43.0%)		130 (82.3%)	28 (17.7%)	
	3rd year	129 (65.2%)	69 (34.8%)		77 (38.9%)	121 (61.1%)		104 (52.5%)	94 (47.5%)		158 (79.8%)	40 (20.2%)	
Specialty	Anesthesia	65 (79.3%)	17 (20.7%)	.052	24 (29.3%)	58 (70.7%)	.004	45 (54.9%)	37 (45.1%)	.299	71 (86.6%)	11 (13.4%)	.633
	Pediatrics	23 (79.3%)	6 (20.7%)		17 (58.6%)	12 (41.4%)		19 (65.5%)	10 (34.5%)		26 (89.7%)	3 (10.3%)	
	Gynecology and obstetrics	25 (58.1%)	18 (41.9%)		15 (34.9%)	28 (65.1%)		20 (46.5%)	23 (53.5%)		33 (76.7%)	10 (23.3%)	
	Internal medicine	151 (68.3%)	70 (31.7%)		105 (47.5%)	116 (52.5%)		128 (57.9%)	93 (42.1%)		181 (81.9%)	40 (18.1%)	
	Surgery	89 (66.4%)	45 (33.6%)		57 (42.5%)	77 (57.5%)		87 (64.9%)	47 (35.1%)		114 (85.1%)	20 (14.9%)	
	Others	43 (79.6%)	11 (20.4%)		32 (59.3%)	22 (40.7%)		30 (55.6%)	24 (44.4%)		45 (83.3%)	9 (16.7%)	
Working time h/week	<50	165 (78.2%)	46 (21.8%)	.001	127 (60.2%)	84 (39.8%)	<.001	123 (58.3%)	88 (41.7%)	.984	186 (88.2%)	25 (11.8%)	.024
	50–60	107 (71.3%)	43 (28.7%)		65 (43.3%)	85 (56.7%)		87 (58.0%)	63 (42.0%)		126 (84.0%)	24 (16.0%)	
	≥60	124 (61.4%)	78 (38.6%)		58 (28.7%)	144 (71.3%)		119 (58.9%)	83 (41.1%)		158 (78.2%)	44 (21.8%)	
Night shift (per month)	<5	271 (72.8%)	101 (27.2%)	.182	169 (45.4%)	203 (54.6%)	.507	207 (55.6%)	165 (44.4%)	.064	316 (84.9%)	56 (15.1%)	.386
	5–7	112 (65.1%)	60 (34.9%)		71 (41.3%)	101 (58.7%)		107 (62.2%)	65 (37.8%)		138 (80.2%)	34 (19.8%)	
	≥8	13 (68.4%)	6 (31.6%)		10 (52.6%)	9 (47.4%)		15 (78.9%)	4 (21.1%)		16 (84.2%)	3 (15.8%)	
Salary satisfaction	Yes	167 (79.9%)	42 (20.1%)	<.001	125 (59.8%)	84 (40.2%)	<.001	122 (58.4%)	87 (41.6%)	.981	186 (89.0%)	23 (11.0%)	.007
	No	229 (64.7%)	125 (35.3%)		125 (35.3%)	229 (64.7%)		207 (58.5%)	147 (41.5%)		284 (80.2%)	70 (19.8%)	
Sleeping time (h)	<7	185 (67.8%)	88 (32.2%)	.195	110 (40.3%)	163 (59.7%)	.057	153 (56.0%)	120 (44.0%)	.264	220 (80.6%)	53 (19.4%)	.073
	≥7	211 (72.8%)	79 (27.2%)		140 (48.3%)	150 (51.7%)		176 (60.7%)	114 (39.3%)		250 (86.2%)	40 (13.8%)	
Sleeping quality	Good	101 (85.6%)	17 (14.4%)	<.001	72 (61.0%)	46 (39.0%)	<.001	85 (72.0%)	33 (28.0%)	.003	111 (94.1%)	7 (5.9%)	<.001
	Moderate	253 (71.7%)	100 (28.3%)		165 (46.7%)	188 (53.3%)		191 (54.1%)	162 (45.9%)		293 (83.0%)	60 (17.0%)	
	Poor	42 (45.7%)	50 (54.3%)		13 (14.1%)	79 (85.9%)		53 (57.6%)	39 (42.4%)		66 (71.7%)	26 (28.3%)	
Supervisor support in time	Every time	133 (79.6%)	34 (20.4%)	<.001	105 (62.9%)	62 (37.1%)	<.001	114 (68.3%)	53 (31.7%)	.002	149 (89.2%)	18 (10.8%)	<.001
	Most time	252 (69.4%)	111 (30.6%)		142 (39.1%)	221 (60.9%)		202 (55.6%)	161 (44.4%)		302 (83.2%)	61 (16.8%)	
	Sometimes	11 (33.3%)	22 (66.7%)		3 (9.1%)	30 (90.9%)		13 (39.4%)	20 (60.6%)		19 (57.6%)	14 (42.4%)	
Having friends in work	Yes	366 (74.1%)	128 (25.9%)	<.001	238 (48.2%)	256 (51.8%)	<.001	303 (61.3%)	191 (38.7%)	<.001	428 (86.6%)	66 (13.4%)	<.001
	No	30 (43.5%)	39 (56.5%)		12 (17.4%)	57 (82.6%)		26 (37.7%)	43 (62.3%)		42 (60.9%)	27 (39.1%)	
Feeling cared from the hospital	yes	277 (81.2%)	64 (18.8%)	<.001	197 (57.8%)	144 (42.2%)	<.001	224 (65.7%)	117 (34.3%)	<.001	312 (91.5%)	29 (8.5%)	<.001
	no	119 (53.6%)	103 (46.4%)		53 (23.9%)	169 (76.1%)		105 (47.3%)	117 (52.7%)		158 (71.2%)	64 (28.8%)	
Turnover intention	Yes	116 (54.5%)	97 (45.5%)	<.001	59 (27.7%)	154 (72.3%)	<.001	85 (39.9%)	128 (60.1%)	<.001	148 (69.5%)	65 (30.5%)	<.001
	No	280 (80.0%)	70 (20.0%)		191 (54.6%)	159 (45.4%)		244 (69.7%)	106 (30.3%)		322 (92.0%)	28 (8.0%)	

DP = depersonalization, EE = emotional exhaustion, RPA = reduced personal accomplishment, SRT = standardized residency training.

residents reported at least 1 symptom of burnout, which was higher than was found in physicians in previous studies.^[4,9]

Various studies aim to determine the factors associated with burnout. Previous studies have demonstrated, although controversially, that individual factors like gender, age, and marital status might be related to burnout.^[10–13] In our study, as compared to women, men were more prone to developing DP in the univariate but not in the multivariate analysis. In line with previous research, our results demonstrate that residents older than 27 in SRT are more likely to experience burnout compared to those younger than 27. Marital status was not found to be very important in the development of burnout in the present study. This contrasts with a previous study that with anesthesiologists that demonstrated that being in a relationship might protect an individual from burnout.^[11] The present results might imply that these individual factors play different roles in the development of burnout between residents and physicians with longer work experience.

It is notable that good sleep quality, but not sleep time, were related to less burnout. Sleep impairment is highly prevalent among residents.^[14] Prior studies have demonstrated that sleeping impairment decreased concentration and increased burnout.^[15,16] However, in contrast to previous research, our study did not find an association between sleep time with burnout.^[17] Considering the fact that our data regarding sleep time and sleep quality were all self-reported, the definite relationship between sleep and burnout in residents in SRT should be explored in future study through sleep monitoring.

In addition to individual factors, work-related stressors have been well documented. A high prevalence of burnout was already described among trainees.^[8] Present results demonstrated that residents in second and third years of SRT were more likely to develop DP and RPA in the univariate but not in the multivariate analysis. Previous study has demonstrated that burnout challenged for physicians varied by career stage.^[17] Regarding specialties, previous research found that the physicians in

Table 3
The results of multivariate logistic regression analysis.

		DP	EE	RPA	Total burnout
Age (y)	<27				Reference
	≥27				1.885 (1.117–3.181)
SRT	1st year	Reference		Reference	
	2nd year	1.827 (1.085–3.077)		1.554 (0.996–2.423)	
	3rd year	1.735 (1.070–2.813)		1.668 (1.099–2.530)	
Working time h/week	<50		Reference		
	50–60		1.398 (0.850–2.298)		
	≥60		2.026 (1.234–3.328)		
Sleeping quality	Good	Reference	Reference	Reference	Reference
	Moderate	2.036 (1.105–3.754)	1.370 (0.840–2.235)	1.912 (1.190–3.072)	2.958 (1.252–6.986)
	Poor	5.054 (2.444–10.451)	6.127 (2.870–13.275)	1.272 (0.685–2.364)	3.899 (1.490–10.203)
Supervisor support in time	Every time	Reference	Reference		
	Most time	0.991 (0.608–1.616)	1.659 (1.071–2.569)		
	Sometimes	2.871 (1.132–7.285)	7.544 (1.987–28.640)		
Having friends in work	Yes	Reference	Reference	Reference	Reference
	No	1.883 (1.045–3.393)	2.226 (1.085–4.568)	1.915 (1.101–3.330)	2.408 (1.311–4.421)
Feeling cared from the hospital	Yes	Reference	Reference	Reference	Reference
	No	2.508 (1.615–3.897)	2.549 (1.652–3.934)	1.739 (1.186–2.549)	3.047 (1.758–5.284)

DP = depersonalization, EE = emotional exhaustion, RPA = reduced personal accomplishment, SRT = standardized residency training.

different specialties showed varied vulnerability to burnout.^[18] Studies have demonstrated that working in trauma surgery and outpatient specialties had a greater correlation with burnout.^[12,19] However, in the multivariate analysis of the present study, specialty was not associated with burnout. This might be partly due to the specific characteristics of SRT. Although residents in SRT have specialties, they must participate in rotations. They may not work completely as specialists, especially independently. While it was interesting in the present study that more than half of the residents were not satisfied with their salary, after multivariate analysis, salary satisfaction was not associated with burnout. This might be partly because, in most teaching hospitals, salaries are not lower than those of the mean income of the local population, and salary satisfaction was only 1 factor of job satisfaction. In addition to salary, work hours and night shifts capture considerable attention regarding work-related burnout. Of note, more than one third respondents worked more than 60 hours per week. In line with previous research, working more than 60 hours a week was independently related to EE in the present study.^[20] In contrast with previous results,^[21] however, after multivariate regression analysis, the night shift did not predict EE or DP. This could be attributed to the fact that, during SRT in the hospital of our study, night shifts are restricted to no more than 8 per month, and residents on night shift are always under the guidance of a supervisor. Meanwhile, professional and social support were shown as being critical. Supervisors providing sufficient timely support was a protective factor for EE and DP. This was consistent with a previous study that demonstrated that professional support was associated with less EE and total burnout in anesthesiologists.^[22] Feeling cared from the hospital was also related to less EE and DP in the present study; previous studies have demonstrated that increased organizational support for clinical work have benefits in reducing burnout.^[10,23] Regarding social support, having no friends at work was independently related to all 3 symptoms of burnout and total burnout. This is reasonable. Having friends at work could help to share in work irritations and increase encouragement when difficulties arrive.

Compared to residents of European and North America countries, burnout prevalence of residents in SRT in China was fairly high.^[24] Residents in SRT faced significant challenges. To some extent, the organization focused on medical technology while ignoring the residents emotional needs. A bleak future would lessen the residents enthusiasm.^[25] Burnout during residency is vital not only for residents but also for the health care system as a whole. In individuals, burnout might be associated with alcohol and substance use, depression, and even suicide.^[22,26] In the clinical system, the consequences of burnout include not only job dissatisfaction but also increased turnover.^[27,28] The present study demonstrates that the turnover intention is high in residents who are experiencing burnout. Cultivating a certificated doctor in the SRT system is time-consuming, and the high turnover of residents might not be economically beneficial. For residents, although the turnover might benefit the individual, it would also lower the doctor-patient ratio, aggravate the doctor shortage, decrease overall job satisfaction, and lower morale. For patients, burnout also reduces the quality of medical care.^[29,30] Therefore, strategies for managing burnout-related factors among residents should be emphasized. Various studies have demonstrated that both individual-level and structural or organizational strategies are effective in decreasing burnout in physicians.^[31]

Several limitations of the present study should be disclosed. Like all research involving questionnaires, the accuracy might be biased by the participants. The response rates of the questionnaires were fairly low, which might reduce the power of the present results. Meanwhile, variables such as sleep quality, supervisor support, or feeling cared for by the hospital were all self-perceived. Therefore, some more objective assessment tools might be needed to confirm our results in the future. In addition, the data of the present study were collected from the middle of China; the results might not be representative of other areas of China. Finally, the questionnaire should be amended to include more items that refer to more specific individual characteristics such as household financial situation, educational background, and psychological support.

In conclusion, the present study demonstrated that the prevalence of burnout is high in residents in SRT from the middle of China. Organizational, professional, and social support was found to be critical based on their potential roles in protecting against burnout. Residents with burnout were prone to regret choosing their career and considering leaving the profession. Strategies for managing burnout-related factors among residents should be focused on in future studies.

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Author contributions

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