



BMJ Open Mental health of general practitioners in Chongqing, China during COVID-19: a cross-sectional study

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ABSTRACT

Objectives In the context of the COVID-19 pandemic, general practitioners (GPs) continue to face unprecedented challenges that affect their mental health. However, few studies have assessed the mental health status of GPs. This study aimed to provide preliminary understanding of stress, job burn-out and well-being levels among GPs to train and manage them during public health emergencies.

Design We conducted a cross-sectional online self-report survey.

Setting The survey was conducted in Chongqing, China from July to August 2022.

Participants Data were collected from 2145 GPs, with an effective response rate of 91.0%.

Primary and secondary outcome measures The main evaluation indicators were stress (Cohen's Perceived Stress Scale), job burn-out (Maslach Burnout Inventory-Human Services Survey Scale) and well-being (WHO-5 Well-Being Index). Multiple linear regression analysis was used to compare the effect of different demographic characteristics on the impact of stress, job burn-out and decreased well-being.

Results Stress, job burn-out and decreased well-being were common among GPs. In this study, 59.7% experienced job burn-out, 76.1% experienced high levels of stress and 52.0% may have experienced depression. The main factors that influenced stress, burn-out and well-being were differences in age, working hours per week, title, part-time management work, work-life balance, sleep disorders, whether GPs received adequate recognition by patients and the work team and mental toughness ($p < 0.05$).

Conclusion This survey is the first to investigate stress, job burn-out and well-being levels among local GPs in China during the COVID-19 pandemic. Curbing stress and job burn-out levels and ensuring well-being among GPs could be achieved by reducing paperwork, management work and working hours; promoting life and work balance; and increasing resilience among GPs. The findings provide a basis for policy-makers to formulate strategies for developing general practice.

BACKGROUND

In December 2019, the novel coronavirus pneumonia (2019-nCoV) broke out in Wuhan, China. The symptoms of the virus are sudden, highly contagious and widely spread.^{1 2} General practitioners

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ A cross-sectional design was used, which cannot determine the causal relationships between the factors under investigation.
- ⇒ The sample size of this study was large, which provided sufficient statistical power.
- ⇒ Our sample was from a domestic province; the applicability of our data to other general practitioners in the country may be limited.
- ⇒ Other factors potentially related to job burn-out, stress and well-being were not included in the questionnaire—for example, workplace violence, handling complaints, fear of making mistakes, investigations and other occupational health factors.
- ⇒ Self-reported data may be biased, and participants may respond in socially desirable ways.

(GPs) provide general medical services such as diagnosis, treatment and prevention of acute and chronic diseases within the primary healthcare system.³ Since the outbreak of COVID-19, China's GPs have also undertaken nucleic acid collection, centralised medical observation points, fever clinics and other epidemic prevention and control tasks, and the demand for GPs has increased significantly.

Many countries, such as the USA, Canada, the UK and Australia, have long faced a shortage of GPs.⁴ China has a large population, the implementation of the GP system is late and the number of GPs is insufficient. Furthermore, education and qualifications levels among GPs in China are low.⁵ Therefore, in recent years, the Chinese government has focused on GP training, such as the establishment of a special medical school education and in-service training,⁶ but the brain drain is serious. According to statistics, in 2020, the proportion of GPs among registered physicians in China was 9.4%,⁷ much lower than that in Western countries (30%–60%).^{8 9} The talent shortage cannot be solved simply by continuing to train new GPs; rather, improving the management of



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GPs and determining the factors that result in high brain drain are key to addressing the situation.

Stress and job burn-out are becoming increasingly common and culminate in the loss of GPs.^{10–13} Doctors around the world experience severe stress, which reduces productivity and increases GP burn-out, leading to absenteeism, turnover, clinical errors, early retirement, depression, anxiety and other adverse effects, leading to a decline in the number of practitioners.^{14–19} The opposite of stress and burn-out is well-being, which is key to keeping GP teams stable. If subjective well-being among doctors can be enhanced effectively, the problem of job burn-out among them can also be effectively alleviated.^{11 20 21}

Currently, there is an overall lack of research regarding the levels of stress, job burn-out and well-being among GPs in China. Multiple studies have been conducted in other countries on this matter. However, in those countries, the medical systems and cultures, among other aspects, significantly differ from those in China, and therefore, these prior studies cannot provide effective guidance for GP training and management in China. As the COVID-19 pandemic persists, GPs must continue epidemic control measures to enable people to live and work normally. This creates unprecedented challenges. The impact of the COVID-19 pandemic has resulted in a significant proportion of GPs experiencing poor mental health.²² In this context, the combined analysis of job burn-out, the self-perception of stress and well-being among GPs is considerably important and has implications for maintaining their mental stability and enhancing the attractiveness of general practice as a career choice. The research results can also provide a basis for relevant departments to formulate policies aimed at supporting the development of general practice.

METHODS

Study participants and settings

A cross-sectional study was conducted from July to August 2022 in Chongqing municipality. Chongqing is a large city in western China with a large jurisdiction and a large population. Our sample covered urban and rural areas of Chongqing, and a total of 2357 GPs were included. We made the e-questionnaire through the e-questionnaire platform Questionnaire Star (website: <https://www.wjx.cn/>) and sent it to the potential participants through the Chongqing Municipal Health Commission. During this period, Chongqing conducted prevention and control on an ongoing basis. Residents' life and production were normal, and COVID-19-affected persons were isolated and given appropriate treatment. A total of 19 independent variables were included in the multivariate analysis model.

Patient and public involvement

There was no patient involvement.

Questionnaire design and content

The questionnaire was designed based on a literature review and group discussions. First, we considered the

scales found in the literature, discussed the sociodemographic characteristics of GPs to be included in the questionnaire, and integrated the content from the scales and the list of characteristics into a questionnaire format. Then, relevant experts in the medical field were invited to evaluate content validity. After integrating the opinions of the experts, we developed a preliminary version of the questionnaire for pilot testing. Next, we invited some GPs who were training in our hospital to participate in the pilot testing (our hospital is the standardised training base for GPs in Chongqing). After collecting feedback from these GPs, we determined the final questionnaire.

The final version of the questionnaire comprised five parts: demographic characteristics, resilience, perceived stress, job burn-out and subjective psychological well-being.

Measurements

Stress was assessed using the 10-item Cohen's Perceived Stress Scale (PSS-10). Each item is responded to using a 5-point scale ranging from 0=never to 4=very much. The higher the sum of the item responses, the higher the perceived stress. According to previous studies, a total score of 18 or more is considered a high level of perceived stress.^{23–25} The PSS-10 has also shown good applicability in Chinese studies, with a Cronbach's α coefficient of 0.91.²⁶

Occupational burn-out was measured using the Maslach Burnout Inventory-Human Services Survey. Through a series of empirical studies in China and internationally, this scale has shown high reliability and validity. The reliability coefficients of each dimension of the questionnaire were 0.906, 0.873 and 0.838, and Cronbach's α value of the total questionnaire was 0.88. As such, all values were above 0.70, indicating their sufficiency. This scale has three dimensions: emotional exhaustion (EE), depersonalisation (DP) and personal accomplishment (PA). Items are responded to using a 7-point scale ranging from 0 to 6 points. For the essential scoring standards, an EE score below 16 points is considered mild, 16–27 points moderate and higher than 27 points severe. A DP score below 6 is considered mild, 6–13, moderate and higher than 13, severe. A PA score above 39 is considered mild, 31–39, moderate and lower than 31, severe.^{27 28} EE and DP were positively correlated with job burn-out, whereas PA was negatively correlated with job burn-out.

Subjective well-being was measured using the WHO-5 Well-Being Index (WHO-5) which is among the questionnaires most widely used to assess subjective psychological well-being. The Cronbach's α coefficient of WHO-5 has been reported as 0.86.²⁹ The WHO-5 includes five items, each of which is evaluated using a 6-point scale from 0 to 5 points. Items are summed and multiplied by 4 to create a score from 0=worst quality of life possible to 100=best quality of life possible. When screening for depression, a cut-off score of ≤ 50 is recommended. We divided general well-being into three categories: high for a score of >70 , poor for a score of ≤ 50 and moderate for a score in between. The sensitivity and specificity of WHO-5

for detecting depression have been reported as 0.93 and 0.83, respectively.^{11 30}

Resilience is used to cope with stress and restore adversity and is also associated with various positive features such as self-support and well-being.^{31 32} Therefore, we included the Brief Resilience Scale (BRS).^{33 34} The BRS has good applicability in China, with a reported Cronbach's α coefficient of 0.769.³⁵ The BRS comprises six questions that are answered by using a Likert scale where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. High scores indicate increased adaptability among individuals when facing adversity. Items 2, 4 and 6 are reverse-scored.

Additionally, several items were used to collect socio-demographic data on the participants. Personal characteristics included age, gender, marital status, education background and sleep status. Work characteristics included practice setting, contract status, income, working hours, working tenure, professional title, management responsibility, data collection workload, home visits, work-life balance, patient recognition, team recognition and epidemic prevention and control work.

Statistical analysis

We used SPSS V.22.0 (IBM) for the statistical analysis. Quantitative data were described as the mean \pm SD ($\bar{X}\pm s$), and categorical data were represented using frequency and percentage (%). Multiple linear regression was used to compare the relationships between different demographic characteristics (age, gender, marital status, education level, practice setting, contract status, income, working hours and work tenure, professional title, management responsibility and so forth) and stress, job burn-out, and well-being. All tests were two tailed, with a significance level of $p<0.05$.

RESULTS

The participants were GPs working in community health centres in urban areas and township health centres in rural areas. The study was conducted with the assistance of the Chongqing Municipal Health Commission. A web link to the online questionnaire designed using the software Questionnaire Star was disseminated to the GPs through WeChat, and data were collected through the platform. After excluding additional missing data or logic errors, 2145 valid questionnaires were included for an effective response rate of 91.0% (figure 1).

Of the 2145 participants, 59.2% were under 40 years of age, 66.0% were women, 54.9% had a bachelor's degree or above, 65.3% worked for more than 50 hours per week, 43.8% had excessive home visits (>10 times/month), and 49.1% were participating in or had participated in COVID-19 pandemic prevention and control work. The sociodemographic characteristics of the participants are provided in table 1.

The mean stress score was 20.1 (SD=5.4), and 76.1% of GPs had high levels of stress (≥ 18). Detailed results for the mean of the stress scores of the participants are listed in table 1. Table 2 presents the results of the multiple regression analysis. Age, working hours per week, professional title, management responsibilities, work-life balance, insomnia, team recognition and resilience were the significant influencing factors of perceived stress ($p<0.05$).

The mean well-being score of the participants was 49.3 (SD=27.0), and 52.0% of the participants reported poor well-being (≤ 50). Detailed results for the mean of the well-being scores of the participants are listed in table 1. Table 2 presents the multiple regression analysis. Age, work tenure, data collection workload, home visits, work-life balance, insomnia, patient recognition, and

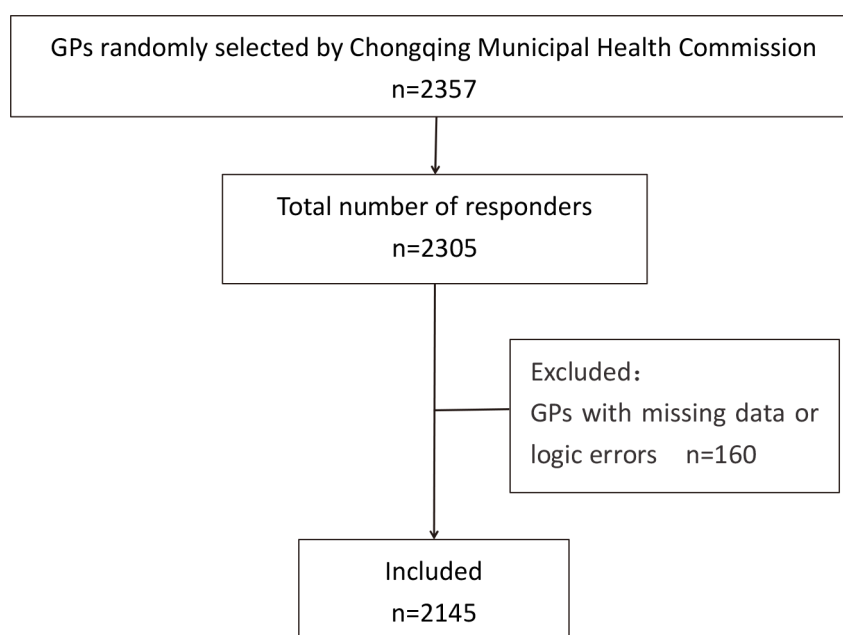


Figure 1 Flow chart of GPs included in the study. GPs, general practitioners.

Table 1 Sociodemographic characteristics and scores of the participants (N=2145)

Characteristic	n (%)	Stress (mean±SD)	Well-being (mean±SD)	Burn-out		
				EE (mean±SD)	DP (mean±SD)	PA (mean±SD)
Age						
<30	555 (25.9)	20.0±0.2	46.4±1.1	18.9±0.5	6.9±0.2	26.5±0.4
30–39	716 (33.3)	20.0±0.2	46.9±1.0	18.8±0.4	6.3±0.2	28.5±0.4
40–49	643 (30.0)	20.3±0.2	51.8±1.0	17.7±0.4	5.7±0.2	31.3±0.4
≥50	231 (10.8)	19.9±0.4	56.5±1.9	16.9±0.8	5.1±0.3	33.2±0.6
Gender						
Male	730 (34.0)	20.1±0.2	51.3±1.0	18.1±0.4	6.0±0.2	31.5±0.3
Female	1415 (66.0)	20.1±0.1	48.2±0.7	18.5±0.3	6.2±0.1	28.2±0.2
Marital status						
Unmarried/widowed/divorced	415 (19.3)	19.9±0.3	46.1±1.3	18.9±0.6	7.1±0.3	26.9±0.5
Married	1730 (80.7)	20.1±0.1	50.1±0.6	18.2±0.3	5.9±0.1	29.9±0.3
Education background						
Associate's degree or vocational diploma	967 (45.1)	19.6±0.2	50.9±0.9	17.1±0.4	5.7±0.2	29.1±0.3
Bachelor's degree or above	1178 (54.9)	20.5±0.2	48.0±0.8	19.3±0.3	6.5±0.2	29.5±0.3
Practice setting						
Community health centre	689 (32.1)	20.0±0.2	48.2±1.0	18.3±0.4	6.0±0.2	28.6±0.4
Township health centre	1456 (67.9)	20.1±0.1	49.8±0.7	18.3±0.3	6.2±0.1	29.6±0.2
Contract status						
Temporary	697 (32.5)	19.1±0.2	49.0±1.0	17.2±0.4	6.0±0.2	28.1±0.4
Permanent	1448 (67.5)	20.5±0.1	49.4±0.7	18.9±0.3	6.2±0.1	29.9±0.2
Average monthly income (¥)						
<2500	114 (5.3)	20.1±0.5	44.0±2.7	19.4±1.0	6.8±0.5	26.7±1.0
2500–4999	764 (35.6)	19.8±0.2	46.5±1.0	18.7±0.4	6.5±0.2	27.6±0.3
5000–7499	1041 (48.5)	20.0±0.2	50.4±0.8	18.1±0.3	6.0±0.2	30.1±0.3
≥7500	226 (10.5)	21.1±0.3	56.5±1.7	17.9±0.7	5.4±0.3	32.8±0.5
Working hours per week						
<50	745 (34.7)	19.0±0.2	52.4±1.0	15.6±0.3	5.3±0.2	28.9±0.4
≥50	1400 (65.3)	20.7±0.1	47.6±0.7	19.8±0.3	6.6±0.1	29.5±0.2
Work tenure (years)						
<5	462 (21.5)	19.5±0.2	48.9±1.3	17.5±0.5	6.5±0.2	26.9±0.4
5–9	484 (22.6)	20.2±0.2	47.1±1.2	19.4±0.5	6.5±0.2	28.1±0.4
10–14	508 (23.7)	20.3±0.3	46.5±1.2	19.6±0.5	6.5±0.2	29.0±0.4
≥15	691 (32.2)	20.2±0.2	53.1±1.0	17.3±0.4	5.4±0.2	32.0±0.3
Professional title						
Junior or less	1384 (64.5)	19.5±0.1	49.2±0.7	17.6±0.3	6.0±0.1	28.5±0.3
Intermediate	564 (26.3)	21.0±0.2	47.6±1.1	19.9±0.5	6.6±0.2	30.2±0.4
Senior	197 (9.2)	21.3±0.3	54.6±1.8	18.7±0.8	5.8±0.3	32.7±0.6
Has management responsibility						
Yes	786 (36.6)	21.1±0.2	48.3±1.0	19.9±0.4	6.6±0.2	30.3±0.3
No	1359 (63.4)	19.5±0.2	49.9±0.7	17.4±0.3	5.9±0.1	28.7±0.3
Has excess data collection workload						
Yes	1204 (56.1)	20.7±0.2	46.4±0.8	20.2±0.3	6.6±0.2	29.1±0.3

Continued

Table 1 Continued

Characteristic	n (%)	Stress (mean±SD)	Well-being (mean±SD)	Burn-out		
				EE (mean±SD)	DP (mean±SD)	PA (mean±SD)
No	941 (43.9)	19.3±0.2	53.0±0.9	16.0±0.3	5.6±0.2	29.6±0.3
Has excessive home visits						
Yes	940 (43.8)	20.6±0.2	47.8±0.9	19.8±0.4	6.6±0.2	29.7±0.3
No	1205 (56.2)	19.7±0.2	50.4±0.8	17.2±0.3	5.8±0.1	29.0±0.3
Reports good work–life balance						
Yes	1441 (67.2)	18.8±0.1	57.7±0.7	14.6±0.2	4.9±0.1	30.7±0.3
No	704 (32.8)	22.6±0.2	32.1±0.8	26.0±0.4	8.8±0.2	26.4±0.3
Has insomnia						
Yes	917 (42.8)	21.5±0.2	40.4±0.8	22.1±0.4	7.6±0.2	27.7±0.3
No	1228 (57.2)	19.0±0.2	55.9±0.8	15.5±0.3	5.1±0.1	30.5±0.3
Receives sufficient recognition from patients						
Yes	1887 (88.0)	19.8±0.1	52.1±0.6	17.3±0.2	5.6±0.1	30.4±0.2
No	258 (12.0)	21.9±0.3	29.1±1.2	26.1±0.7	10.0±0.4	21.4±0.5
Receives sufficient recognition from the medical team						
Yes	1864 (86.9)	19.7±0.1	52.0±0.6	17.2±0.2	5.7±0.1	30.2±0.2
No	281 (13.1)	22.3±0.3	32.4±1.2	25.6±0.7	9.2±0.4	23.4±0.5
Participates in epidemic prevention and control work						
Participates/once participated	1053 (49.1)	20.4±0.2	48.9±0.8	19.3±0.4	6.5±0.2	29.6±0.3
Nonparticipant	1092 (50.9)	19.8±0.2	49.7±0.8	17.4±0.3	5.8±0.1	29.0±0.3

An associate's degree requires 3 years of education in college after graduation from senior middle school (years10–12), or 5 years of education in college after graduation from junior middle school (years7–9). A vocational diploma requires 2 years of education in vocational schools after graduation from senior middle school, or 3 years of education in vocational schools after graduation from junior middle school. Wages and welfare of GPs are paid by the Chinese government's public health services expenditure. GPs that were unable to be freely fired by health institutions. GPs that were junior or without any technical title. GPs that had a mid-professional title. GPs that had a senior professional title.

GPs that were junior or without any technical title.

GPs that had a mid-professional title.

GPs that had a senior professional title.

DP, depersonalisation; EE, emotional exhaustion; GPs, general practitioners; PA, personal accomplishment.

resilience were the significant factors of the GP's well-being ($p<0.05$).

The mean scores of the three dimensions of occupational burn-out were 18.3 for EE (SD=0.2), 6.2 for DP (SD=0.1) and 29.3 for PA (SD=0.2). Detailed results for the mean of the burn-out scores of the participants are listed in table 1. Of the participants, 59.7% had a high level of occupational burn-out in at least one dimension, and 5.6% had a high level of occupational burn-out in all three dimensions. Figure 2 presents the results on the prevalence of occupational burn-out in the three dimensions: 18.8% and 9.8% of participants had a severe level of EE and DP, and 53.3% had a low level of PA. Factors related to job burn-out are listed in table 3 (online supplemental table). Age, working hours per week, epidemic prevention and control work, management responsibilities, data

collection workload, patient recognition, team recognition and resilience were the significant influencing factors of burn-out ($p<0.05$).

DISCUSSION

This study is the first to investigate the current situation and the factors associated with stress, occupational burn-out and well-being among GPs in Chongqing, China in the context of the COVID-19 pandemic. We found that stress, occupational burn-out and decreased well-being were widespread among GPs in China. In this study, more than half of the GPs were in a state of occupational burn-out, most GPs had high stress levels, and half of them reported poor psychological well-being. The main factors that affected stress, occupational burn-out

Table 2 Multiple linear regression analysis of the factors associated with stress and well-being

Characteristic	Stress score			Well-being score		
	β	P value	95% CI	β	P value	95% CI
Age	-0.47	0.007	-0.81 to -0.13	2.90	0.000	0.38 to 1.07
Gender	0.38	0.125	-0.11 to 0.87	0.38	0.699	-0.39 to 0.58
Marital status	0.03	0.931	-0.57 to 0.62	2.26	0.059	-0.02 to 1.15
Education background	0.13	0.590	-0.33 to 0.58	-1.57	0.088	-0.85 to 0.06
Practice setting	0.06	0.798	-0.41 to 0.54	1.21	0.206	-0.17 to 0.77
Contract status	0.51	0.059	-0.02 to 1.03	0.90	0.398	-0.30 to 0.74
Average monthly income	0.23	0.176	-0.10 to 0.57	0.76	0.261	-0.14 to 0.52
Working hours per week	0.97	0.000	0.51 to 1.43	-1.65	0.074	-0.86 to 0.04
Work tenure	0.10	0.473	-0.17 to 0.36	-1.25	0.020	-0.58 to -0.05
Professional title	0.93	0.000	0.54 to 1.33	-0.48	0.552	-0.51 to 0.27
Has management responsibility	-0.88	0.001	-1.38 to -0.38	1.02	0.314	-0.24 to 0.75
Has excess data collection workload	-0.31	0.211	-0.80 to 0.18	2.47	0.012	0.14 to 1.10
Has excessive home visits	0.08	0.750	-0.40 to 0.56	-2.13	0.027	-1.01 to -0.06
Reports good work-life balance	2.47	0.000	1.96 to 2.99	-11.28	0.000	-3.33 to -2.31
Has insomnia	-1.44	0.000	-1.88 to -1.00	5.73	0.000	1.00 to 1.87
Receives sufficient recognition from patients	-0.16	0.684	-0.90 to 0.59	-3.75	0.013	-1.68 to -0.20
Receives sufficient recognition from the medical team	1.00	0.005	0.30 to 1.71	-1.36	0.342	-1.04 to 0.36
Participates in epidemic prevention and control work	-0.33	0.130	-0.76 to 0.10	-0.96	0.269	-0.66 to 0.19
Brief Resilience Scale score	-0.14	0.000	-0.19 to -0.08	3.271	0.000	0.76 to 0.87

The control group was age<30, male, unmarried/widowed/divorced, associate's degree or vocational diploma, community health centre, temporary, average monthly income<2500, working hours per week<50, work tenure<5 years, junior or less, has management responsibility (yes), has excess data collection workload (yes), has excessive home visits (yes), reports good work-life balance (yes), has insomnia (yes), receives sufficient recognition from patients (yes), receives sufficient recognition from the medical team (yes), participates in epidemic prevention and control work (participates/once participated).

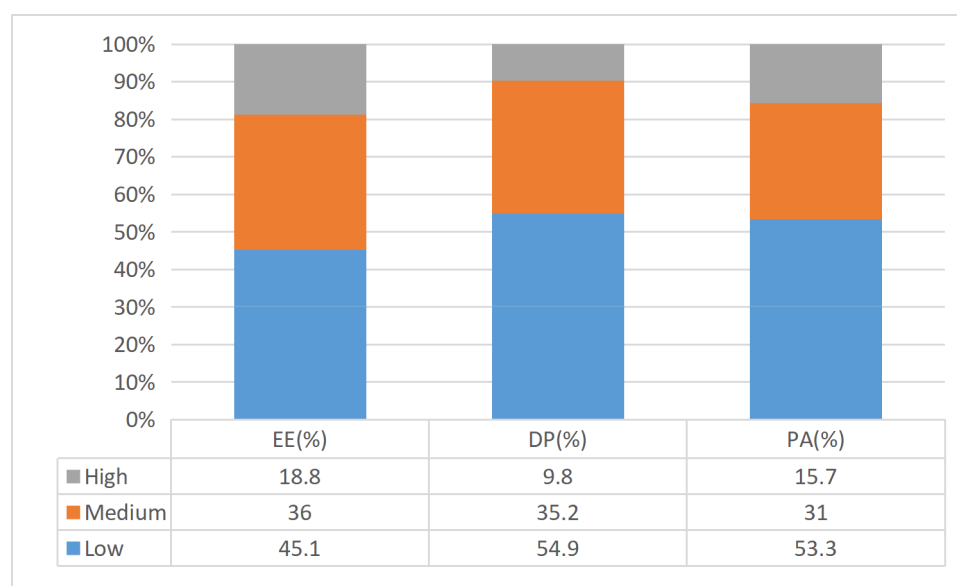
**Figure 2** Burn-out syndrome score results. DP, depersonalisation; EE, emotional exhaustion; PA, personal accomplishment.

Table 3 Multiple linear regression analysis of the factors associated with burn-out

Characteristic	Emotional exhaustion		Depersonalisation		Personal accomplishment	
	β	P value	β	P value	β	P value
Age	-0.95	0.002	-0.52	0.001	1.20	0.000
Gender	0.65	0.130	0.01	0.975	-1.09	0.005
Marital status	-0.64	0.218	-0.89	0.001	0.67	0.149
Education background	0.92	0.021	0.56	0.008	0.39	0.275
Practice setting	0.06	0.886	0.33	0.132	0.88	0.019
Contract status	0.04	0.932	-0.24	0.323	0.02	0.956
Average monthly income	0.17	0.562	-0.08	0.589	0.35	0.185
Working hours per week	2.42	0.000	0.85	0.000	0.30	0.398
Work tenure	0.11	0.639	0.01	0.971	0.30	0.154
Professional title	1.41	0.000	0.59	0.001	0.39	0.212
Has management responsibility	-1.10	0.012	-0.68	0.004	-0.22	0.579
Has excess data collection workload	-1.54	0.000	-0.02	0.947	0.37	0.339
Has excessive home visits	0.00	0.995	-0.05	0.809	-0.39	0.307
Reports good work-life balance	6.36	0.000	1.74	0.000	0.36	0.382
Has insomnia	-2.96	0.000	-1.19	0.000	0.49	0.160
Receives sufficient recognition from patients	1.50	0.022	1.70	0.000	-3.77	0.000
Receives sufficient recognition from medical team	2.19	0.000	0.77	0.019	-1.13	0.043
Participates in epidemic prevention and control work	-1.02	0.007	-0.42	0.033	-0.65	0.054
Brief Resilience Scale score	-0.77	0.000	-0.31	0.000	1.06	0.000

The control group was age<30, male, unmarried/widowed/divorced, associate's degree or vocational diploma, community health centre, temporary, average monthly income<2500, working hours per week<50, work tenure<5 years, junior or less, has management responsibility (yes), has excess data collection workload (yes), has excessive home visits (yes), reports good work-life balance (yes), has insomnia (yes), receives sufficient recognition from patients (yes), receives sufficient recognition from the medical team (yes), participates in epidemic prevention and control work (participates/once participated).

and well-being were age, working hours per week, professional title, management responsibility, work-life balance, sleep disorders, adequate recognition from patients and the work team and psychological resilience.

We found that GPs who were under age 50 experienced a high level of stress. Doctors at this stage face the stress of promotion. Moreover, they also face stress from family, which includes buying a house, raising children, supporting parents and so forth.³⁶ Older GPs had a lower risk of occupational burn-out and a higher sense of well-being than did younger GPs, which was consistent with previous research.¹¹ When retirement is near and a GP has years of clinical experience, work-related stress seems less upsetting. Young GPs have often recently transitioned from medical students to doctors, indicating that they start to shoulder responsibilities and must work hard while constantly updating medical knowledge to improve their quality of diagnosis and treatment. However, our findings should be interpreted with caution because those who burn-out early in their careers may quit, thereby leaving behind those with lower levels of job burn-out.³⁷ GPs with an intermediate professional title had a higher risk of burn-out, consistent with previous findings.¹¹ Stress among GPs at the senior level was higher, which may be

because those with higher titles are faced with higher-risk medical work and academic stress. Patients place high expectations on senior doctors and prefer the services of a GP with many years of experience or a higher professional title, even in cases of minor illnesses.³⁸⁻⁴⁰

An increase in workload can reduce GP well-being, and long working hours significantly increase the levels of stress and the risk of job burn-out (mainly in terms of EE and DP) among GPs. Chinese doctors, including GPs, work more than 48 hours/week on average, and less than a quarter of them can take the full statutory annual leave, thereby leaving the doctors' right to rest unfulfilled.⁴¹ In this study, two-thirds of GPs worked for more than 50 hours, which is a higher proportion than the 41.84% of GPs who worked for more than 40 hours per week, as reported in a Chinese study conducted in 2017.³⁶ This difference may be related to sociodemographic factors, the COVID-19 pandemic and other factors. Owing to the impact of the COVID-19 pandemic, GPs must undertake COVID-19 epidemic prevention and control work. In this study, half of the GPs participated in COVID-19 epidemic prevention and control work, thereby experiencing high levels of EE and DP. One-third of the GPs involved in this study were engaged in management roles (in addition to

routine outpatient service, GPs also undertake the tasks of health management and team management for several contracted residents), which can contribute to increased stress and job burn-out. The high intensity of workload not only affects the health of GPs but also the quality of medical care.⁴² Previous studies have shown that excessive workload is one of the main causes of job dissatisfaction among doctors.⁴³ Transferring administrative tasks to assistants can improve office efficiency, patient satisfaction, productivity and well-being.^{44 45} One-third of GPs in our study reported a work-life imbalance, and they showed higher levels of stress and job burn-out, as well as lower levels of well-being. In a previous study, regular recreation was associated with higher psychological well-being and lower distress symptoms.⁴⁶ However, regular recreation may be difficult to incorporate into one's life given the work-life imbalance of many GPs. Furthermore, our findings indicate that nearly half of the GPs suffer from sleep disorders, displaying elevated levels of stress and fatigue risk, alongside decreased levels of overall well-being. Sleep serves as a vital restorative function for the human body, and insufficient sleep renders individuals more sensitive to emotional and stress-related stimuli, subsequently contributing to the onset, recurrence and perpetuation of mental health issues.^{47–52} A study conducted among primary care physicians in Spain corroborates this, revealing a higher prevalence of sleep disorders among physicians with elevated levels of fatigue compared with those with lower levels of fatigue.⁵³

GPs who felt more supported in practice had higher levels of well-being and were better able to cope with the emotional and clinical demands of their work.^{54 55} Most GPs indicated that they received sufficient recognition from their patients and work team, and the analysis revealed higher levels of well-being and a lower risk of stress and burn-out. Additionally, the findings suggest that resilience can play a significant role in reducing stress and job burn-out levels and improving well-being among GPs. Resilience is a person's ability to adapt to and manage stress and adversity, which can improve health by alleviating suffering.^{56 57} Resilient GPs can provide better quality of care, and they are less likely to make mistakes, fall ill or resign.^{58 59} In the current climate, improving the resilience of GPs is essential. Research shows that improving the working environment of GPs, appropriate education and organisational interventions are feasible measures to improve the resilience of GPs.^{60 61}

Gender was a predictor, but in our study, it had a relatively low impact on well-being and stress. Female GPs reported lower well-being than male GPs, but gender was not an independent predictor of well-being. Our results show that female GPs had a higher level of burn-out than male GPs, which primarily manifested in lower PA. Previous studies have shown that female physicians are more likely to experience work-life conflicts than their male counterparts.⁶² In addition, many female physicians are subject to various hurdles in their careers, such as male-dominant structures of medical society and gender

discrimination.^{63 64} In recent years, an increasing number of women have become doctors.⁶⁵ The proportion of female GPs in the survey was 66.0%; thus, it is particularly important to pay more attention to female GPs.

Compared with other countries (eg, Denmark, Italy and Germany), GPs in China have a lower proportion of burn-out in EE and DP, and a higher proportion of burn-out in PA.^{11 66–69} These differences may be related to the Chinese culture and social environment, among other factors. General practice in China is currently developing, and the effectiveness of primary care gatekeeping is limited.⁷⁰ Currently, China's medical treatment presents an inverted triangle pattern. On the contrary, it is reflected in the inversion of the order of diagnosis and treatment behaviours among GPs, specialists and medical experts. For most people, GPs are not their first choice when they are ill. They do not trust the medical treatment of GPs and are more willing to go to large hospitals to seek medical treatment from specialists. Alternatively, a large proportion of talent is concentrated in large hospitals and large cities, and consequently, primary medical institutions are short of talent and have unstable teams, which is related to imperfect security systems. The factors mentioned above may make it difficult for GPs at the grass roots level in China to feel their value, thereby reducing their sense of accomplishment.

Limitations

A few limitations must be recognised. First, we adopted a cross-sectional design, which cannot determine the causal relationships between the factors under investigation. If conditions are conducive, more valuable conclusions may be drawn using a prospective study design. Second, self-reported data may be biased, such as participants responding in socially desirable ways. Third, owing to differences in the severity of the impact of the COVID-19 pandemic on different parts of the country, the workload and tasks of GPs vary, and our sample was from a domestic province. Therefore, the applicability of our data to other GPs in the country may be limited. A larger sample is required to test whether job burn-out and other related factors differ according to the severity of regional health emergencies. Fourth, other potential factors that affect job burn-out, stress and well-being were not included in our questionnaire—for example, workplace violence, handling complaints, fear of making mistakes, investigations and other occupational health factors. Further studies should incorporate these aspects for analysis.

Conclusions

To the best of our knowledge, this study is the first on job burn-out, stress and well-being among GPs in China during the COVID-19 pandemic. The COVID-19 pandemic has resulted in unprecedented stress. If GPs experiencing stress and burn-out are not adequately supported, then their mental health is likely to worsen. Our study showed that working hours, part-time management, work-life balance and recognition by patients and the work team

influence GPs' levels of stress, job burn-out and well-being. These findings can inform the healthcare sector and human resource management departments, which will help develop specific measures aimed at improving job satisfaction among GPs. At the individual level, resilience training for GPs is needed, such as mindfulness/meditation, yoga/breathing exercises, developing a good lifestyle (exercise and diet advice) and learning relaxation/self-care techniques.⁷¹ At the systemic level, reducing the workload of GPs and providing a supportive working environment are essential. For example, the retention, return and recruitment of GPs can be increased, and workload reduced by increasing resources for GPs.⁷² To promote better teamwork, low-impact team activities, such as regular all-staff morning meetings and daily lunch/coffee breaks can be implemented.⁷³ Improving the current situation of GPs in China and reducing the brain drain among GPs necessitate additional effort from healthcare policy-makers and researchers.

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Patient consent for publication Consent obtained directly from patient(s).

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