Prevalence of burnout and associated factors among general practitioners in Hubei, China: a cross-sectional study

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Abstract

Background: High occupational burnout among general practitioners (GPs) is an important challenge to China’s efforts to strengthen its primary healthcare delivery; however, data to help understand this issue are unavailable. This study aimed to investigate the prevalence of burnout and associated factors among GPs.

Methods: A cross-sectional design was used to collect data from December 12, 2014, to March 10, 2015, with a self-administered structured questionnaire from 1015 GPs (response rate, 85.6%) in Hubei Province, Central China. Burnout was measured using a 22-item Maslach Burnout Inventory-Human Services Survey (MBI-HSS). MBI-HSS scores and frequency were analyzed by the three dimensions of emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). Factors associated with burnout among GPs were estimated using a multiple linear regression model.

Results: Of the respondents, 2.46% had a high level of burnout in all three dimensions, 24.83% reported high levels of EE, 6.21% scored high on DP, and 33.99% were at high risk of PA. GPs who were unmarried, had lower levels of job satisfaction, and had been exposed to workplace violence experienced higher levels of burnout. Intriguingly, no statistically significant associations were found between burnout and the duration of GP practice, age, sex, income, practice setting, and professional level.

Conclusion: This is the first study of occupational burnout in Chinese general practice. Burnout is prevalent among GPs in Hubei, China. Interventions aimed at increasing job satisfaction, improving doctor-patient relationships and providing safer workplace environments may be promising strategies to reduce burnout among GPs in Hubei, China.

Keywords: Burnout, General practitioners, Primary healthcare, Influencing factors

Background

Burnout is a psychological syndrome that is a reaction to the accumulation and long-term negative effect of chronic work-related stress [1]. It is a syndrome characterized by feelings of overextension and the depletion of resources (emotional exhaustion), negative or callous responses to job responsibilities (depersonalization), and feelings of incompetence and a lack of achievement (decreased personal accomplishment) [2]. Burnout has been shown to exert an adverse effect on organizations (e.g., turnover, higher absenteeism, lack of job commitment, and job dissatisfaction), the mental and physical health of healthcare practitioners, and the quality of healthcare delivery [2–7]. Therefore, the primary prevention of occupational burnout should be considered as a public health priority worldwide.

Physicians are particularly vulnerable to experiencing burnout due to heavy workloads and high levels of work-related stresses [8]. A previous study found that physicians were significantly more likely than any other occupational group to experience symptoms of burnout...
Additionally, the degrees of burnout vary among medical specialties. General practitioners (GPs) have been found to have higher levels of burnout than physicians in other specialties [9–11]. Previous studies have mainly focused on burnout and its related factors among GPs in Western countries [10, 12–21]. GPs are the gatekeepers of the primary healthcare system. The efficiency, effectiveness and quality of a nation’s healthcare system is directly associated with the quality and quantity of its workforce, including GPs. In China, GPs work in Primary Health Institutions (PHIs), Township Health Centers (THCs), and Community Health Centers (CHCs), and mainly provide general medical services such as diagnosis, treatment and prevention of acute and chronic diseases. In addition, they provide referrals to secondary or tertiary hospitals. According to the 2014 Chinese Medical Doctors Association report, 66% of GPs worked more than 40 h per week [22]. These long working hours present a risk for GPs to develop burnout [4, 23–25].

Recently, shortages of primary healthcare workers and high GP turnover in China have been major issues. The establishment of a GP team is a key strategy to strengthen PHIs. A high level of burnout among Chinese GPs could lead to a reduction in their numbers of GPs and damage to their well-being, which could consequently affect the quality of healthcare. The above issues could result in serious repercussions on the country’s healthcare system. Few existing studies in China have focused on data on burnout among physicians, and to date, research has not distinguished between GPs or non-GPs [26]. This study aimed to assess the prevalence of burnout and its relevant predictors among GPs who work in PHIs in Hubei, China.

Methods

Study participants and settings

A cross-sectional study was conducted in Central China from December 2014 to March 2015. With a total of 12 independent variables included in the multivariable analysis model, to detect a 2% (effect size) difference between two subgroups (e.g., men vs. women or respondents with low job satisfaction vs. high job satisfaction) with 95% predictive power, the ideal sample size was 652 (computed by G-Power 3.1).

A stratified random sample design was used. According to the China Health Statistics Yearbook 2013 [27], there were 2325 PHIs in 17 prefecture-level cities of Hubei Province, and all of them were included in this study. According to the number of GPs and the scales of PHIs, we randomly selected 30% of the on-post GPs with at least 1 year of work experience from each sampled PHI. Among the 3752 eligible GPs, 1186 were randomly invited to participate in a training seminar on quality health care organized by the general practice training center of Hubei Province. After the training session, they were asked to complete a self-administered questionnaire. Overall, 1101 GPs participated in the survey. However, 86 questionnaires were excluded because of missing information on burnout (more than two items). Finally, 1015 eligible GPs were included in the analysis (response rate, 85.6%).

All respondents provided written informed consent, and the study was approved by the Ethics Committee of the Tongji Medical College Institutional Review Board, Huazhong University of Science and Technology (Wuhan, China).

Questionnaire design and content

The questionnaire was designed based on literature reviews, group discussions, and mock interviews. Furthermore, a pilot study was conducted in Wuhan’s CHCs to improve the questionnaire’s quality. The questionnaire comprised five sections: sociodemographic information, job satisfaction, burnout, workplace violence, and turnover intention. Given the purpose of this study, the data from sections 1, 2, 3 and 4 were included.

Measurements

Burnout was measured with a standardized scale that consisted of 22 items on a six-point Likert scale ranging from 0 (never) to 6 (every day). Burnout was assessed based on three subscales: emotional exhaustion (EE), depersonalization (DP), and personal achievement (PA) were measured with the 22-item Maslach Burnout Inventory (MBI-HSS) [28]. Higher scores on the EE and DP subscales were positively associated with higher levels of burnout, while PA was inversely associated with burnout.

In the analysis of the prevalence of burnout, we analyzed the subscales as categorical variables. The cut-off points for different categories (low, moderate, and high) of each subscale were defined in the study according to the MBI-HSS scoring guidelines [29]. GPs were categorized as having a high level of burnout if they scored high on EE and DP and low on PA. In this study, the Cronbach’s alpha coefficients for the MBI-HSS, EE, DP, and PA were 0.85, 0.91, 0.87 and 0.90, respectively, suggesting that the overall measurement was reliable.

We used the Chinese version of the Workplace Violence Scale developed by Wang et al. [30] consisting of 5 items on a four-point Likert scale ranging from 0 (never) to 3 (more than 3 times/year). Workplace violence included physical violence (physical and sexual assaults) and nonphysical violence (verbal abuse, threats, and sexual harassment). Workplace violence, as an independent variable of burnout, was recoded into yes (encountering one type of workplace violence) and no (not experiencing any type of workplace violence) for the statistical analyses.
Search strategy
We searched PubMed for similar studies that were conducted in the field between the 1990s and 2018 to compare the prevalence and scores of burnout among GPs in China and other countries.

Statistical analysis
Student's t test and a one-way analysis of variance (ANOVA) were applied to examine the differences in burnout and its subscales among groups. Dependent variables (EE, DP, PA, and overall burnout) were treated as continuous variables. A multiple linear regression model was performed to estimate the predictors of GPs' burnout and its three subscales. Predictive variables such as age (continuous), gender, marital status, education level, work tenure, average monthly income, contract status, professional level, managerial responsibility, practice setting, job satisfaction, and workplace violence were included in the multiple linear regression analysis. All statistical analyses were performed with Statistical Analysis System (SAS) version 9.2 (SAS Institute Inc., Cary, NC, USA). Statistical significance was accepted at the 5% level (P < 0.05).

Results
Table 1 shows the basic characteristics of the study respondents. Of the 1015 respondents, most were married (91.92%) and more than half were men. Half of respondents were 40 years or older, and 52.10% had a bachelor's degree or above. Among the respondents, the mean time (standard deviation, SD) in the profession was 16.32 (7.90) years. More than half (55.47%) of the respondents worked in general practice settings in urban areas. In total, 62.2% of the respondents reported exposure to workplace violence in the preceding year.

The participants’ mean scores were 18.70 (SD = 12.06; range = 0–54) on the EE subscale, 3.89 (SD = 4.75; range = 0–30) on the DP subscale, and 34.44 (SD = 11.78; range = 0–48) on the PA subscale. This represents a pattern of moderate EE, low DP, and moderate PA. Higher mean scores of burnout were found among respondents who were male, married, and had experienced workplace violence.

Table 2 shows the prevalence rate of burnout and its subscale among GPs. Among the GPs, 24.83% reported high levels of burnout on EE and 6.21% reported high levels on DP, and 33.99% exhibited reduced feelings of PA. In total, 35% of the respondents scored high for burnout in any dimension, 21% scored high for burnout in at least two dimensions, and 2.46% scored high for all three dimensions.

The factors associated with GPs' burnout and the three subscales are presented in Table 3. GPs who were single/divorced-separated, who had a lower level of job satisfaction, and who had experienced workplace violence were more likely to report a higher risk of burnout.

A high professional level was positively associated with EE. Additionally, GPs who reported workplace violence had significantly higher EE scores than those without exposure to workplace violence. Being single, having a lower level of job satisfaction, and having a low professional title were associated with increased DP scores. GPs who experienced workplace violence had significantly higher DP scores than those who did not. In addition, we found that higher PA scores among GPs were associated with a higher level of job satisfaction.

Table 4 summarizes the comparisons between burnout scores and prevalence rates reported previously in some Western countries and the data from the present study.

Discussion
This is the first study to investigate the prevalence of burnout and related factors among GPs in Hubei, China. We found that 2.46% of GPs had a high level of burnout, with 24.83% scoring high for EE, 6.21% scoring high for DP, and 33.99% at a high risk of PA. Being single, having a lower level of job satisfaction, and experiencing workplace violence were significantly associated with a higher risk of burnout. Factors associated with a higher level of EE included a lower level of job satisfaction, a higher professional level, and experiences of workplace violence. Being single, having a lower level of job satisfaction, and experiencing workplace violence were significantly associated with a higher level of DP. However, a lower level of job satisfaction was the only predictor of a higher level of PA.

Comparison with existing literature
Compared to Western countries, our study showed lower mean EE and DP scores and a higher mean PA score. Chinese GPs were also less often categorized as having a high risk of EE and DP. Specifically, our study found that 33.99% of GPs were at high risk of burnout. Factors associated with a higher level of EE included a lower level of job satisfaction, a higher professional level, and experiences of workplace violence. Being single, having a lower level of job satisfaction, and experiencing workplace violence were significantly associated with a higher level of DP. However, a lower level of job satisfaction was the only predictor of a higher level of PA.
| Variables                          | Burnout |          |          | EE      |          |          | PA      |          |
|-----------------------------------|---------|----------|----------|---------|----------|----------|---------|----------|
|                                   | N (%)   | Mean (SD)| P value  | Mean (SD)| P value  | Mean (SD)| P value  | Mean (SD)| P value  |
| Age group (years)                 |         |          |          |         |          |          |         |          |          |
| < 30                              | 84 (8.28)| 39.00 (20.37)| 0.1751  | 19.71 (11.41)| 0.0124  | 4.36 (4.76)| 0.0280  | 33.07 (11.08)| 0.0683  |
| 30~                               | 405 (39.94)| 37.12 (20.28)| 0.0124  | 19.33 (12.24)| 0.0732  | 4.21 (4.97)| 0.0365  | 34.42 (11.20)| 0.1698  |
| 40~                               | 474 (46.75)| 35.18 (19.90)| 0.0732  | 18.54 (11.83)| 0.1677  | 3.70 (4.65)| 0.0732  | 35.06 (11.78)| 0.0365  |
| 50~                               | 51 (5.03) | 33.04 (19.82)| 0.0365  | 13.61 (12.97)| 0.0908  | 2.31 (3.34)| 0.0365  | 30.88 (16.26)| 0.0365  |
| Sex                               |         |          |          |         |          |          |         |          |          |
| Men                               | 659 (64.99)| 37.5 (20.40)| 0.0032  | 19.17 (12.40)| 0.0732  | 4.19 (5.08)| 0.0061  | 33.87 (12.03)| 0.0365  |
| Women                             | 355 (35.01)| 33.6 (19.3)| 0.0032  | 17.75 (11.28)| 0.1677  | 3.34 (4.02)| 0.0061  | 35.49 (11.28)| 0.0365  |
| Education level                   |         |          |          |         |          |          |         |          |          |
| Associated degree or vocational diploma | 479 (49.90)| 35.92 (20.21)| 0.6347  | 17.98 (12.37)| 0.0492  | 3.84 (4.86)| 0.6805  | 33.90 (12.25)| 0.1698  |
| Bachelor degree or above          | 521 (52.10)| 36.52 (20.03)| 0.0492  | 19.48 (11.78)| 0.0732  | 3.96 (4.69)| 0.0732  | 34.92 (11.32)| 0.0365  |
| Marital status                    |         |          |          |         |          |          |         |          |          |
| Unmarried/widow/divorced          | 67 (6.70) | 42.48 (21.19)| 0.0007  | 22.00 (12.15)| 0.0196  | 5.52 (5.49)| 0.0128  | 33.04 (9.88)| 0.319   |
| Married                           | 933 (93.30)| 35.67 (20.04)| 0.0007  | 18.44 (12.03)| 0.0196  | 3.77 (4.67)| 0.0128  | 34.53 (11.91)| 0.319   |
| Contract status                   |         |          |          |         |          |          |         |          |          |
| Permanent                         | 734 (73.18)| 35.91 (20.27)| 0.3553  | 18.58 (12.16)| 0.5732  | 3.75 (4.74)| 0.0731  | 34.42 (12.20)| 0.7728  |
| Temporaryb                        | 269 (26.82)| 37.24 (19.78)| 0.3553  | 19.07 (11.87)| 0.0397  | 4.36 (4.81)| 0.0397  | 34.19 (10.68)| 0.0397  |
| Average monthly income (RMB Yuan) |         |          |          |         |          |          |         |          |          |
| < 2500                            | 340 (33.76)| 37.9 (20.5)| 0.1322  | 19.85 (12.60)| 0.0951  | 4.17 (4.93)| 0.3162  | 34.15 (11.36)| 0.7700  |
| 2500~                             | 474 (47.07)| 35.0 (20.0)| 0.1322  | 18.04 (11.96)| 0.0951  | 3.67 (4.68)| 0.3162  | 34.70 (12.21)| 0.7700  |
| 3500~                             | 193 (19.17)| 36.1 (19.6)| 0.1322  | 18.32 (11.32)| 0.0951  | 3.97 (4.65)| 0.3162  | 34.20 (11.58)| 0.7700  |
| Professional level                |         |          |          |         |          |          |         |          |          |
| Elementary or lessf               | 482 (47.96)| 35.84 (20.14)| 0.5844  | 17.90 (11.82)| 0.0397  | 4.18 (5.08)| 0.0908  | 34.24 (11.41)| 0.6236  |
| Intermediate or higherd          | 523 (52.04)| 36.53 (20.10)| 0.5844  | 19.47 (12.30)| 0.0397  | 3.67 (4.45)| 0.0908  | 34.60 (12.15)| 0.6236  |
| Has management responsibility     |         |          |          |         |          |          |         |          |          |
| Yes                               | 332 (34.05)| 37.03 (20.89)| 0.3196  | 19.32 (12.61)| 0.2649  | 4.14 (5.23)| 0.1677  | 34.42 (12.20)| 0.9954  |
| No                                | 643 (65.95)| 35.70 (19.49)| 0.3196  | 18.41 (11.70)| 0.2649  | 3.70 (4.33)| 0.1677  | 34.43 (11.54)| 0.9954  |
| Practice setting                  |         |          |          |         |          |          |         |          |          |
| CHC                               | 563 (55.47)| 35.19 (19.47)| 0.0858  | 18.13 (11.36)| 0.0912  | 3.70 (4.47)| 0.1177  | 34.63 (11.40)| 0.5683  |
| THC                               | 452 (44.53)| 37.37 (20.82)| 0.0858  | 19.42 (12.85)| 0.0912  | 4.15 (5.07)| 0.1177  | 34.21 (12.25)| 0.5683  |
In line with earlier studies, our findings showed that exposure to workplace violence was associated with a significantly higher risk of burnout in the areas of EE and DP [7, 32, 33]. Workplace violence is a key occupational hazard [34] which is faced by healthcare professionals worldwide and negatively affects healthcare workers’ mental health and general well-being. It has been associated with reduced job satisfaction, commitment and efficiency, poor quality of life, increased stress, sleep disruption, and occupational burnout, and even death [35–39]. Therefore, establishing an alarm and monitoring system and improving the relationship between patients and GPs are urgently needed to reduce violence in general practice.

We observed in the present study that GPs at higher professional levels were prone to higher risk of DP and EE. In China, the higher the GP’s professional level, the heavier his workload [22]. A highly intensive workload not only affects the health of GPs, but also affects the quality of health care [40]. Patients had high expectations of higher-ranking physicians. They preferred the services of GPs with many years of experience or with higher professional titles, even for minor illnesses or self-limited conditions [41, 42]. Thus, heavy workload increases work pressure on physicians, resulting in overwork. Long-term overwork could lead to the rushed, indifferent and disrespectful management of patients, which is a major constraint in the doctor-patient relationship [41]. The above issues could result in an increased likelihood of violence among GPs. In addition, workplace violence has been identified as an important predictor of occupational burnout [43–46], which is consistent with our findings. More importantly, we found that GPs at a higher professional

| Table 1 Burnout score according to socio-demographic and work-related characteristics (Continued) |
| Variables | Burnout | EE | DP | PA |
|-----------|---------|----|----|----|
| N (%) Mean (SD) P value | Mean (SD) P value | Mean (SD) P value | Mean (SD) P value |
| Work tenure (years) | | | | |
| < 10 | 236 (23.32) 38.75 (19.77) 0.0423 | 19.72 (11.17) 0.3132 | 4.49 (5.08) 0.0506 | 33.46 (10.88) 0.1912 |
| 10– | 385 (38.04) 34.57 (19.88) | 18.24 (12.14) | 3.53 (4.23) | 35.19 (11.41) |
| 20– | 391 (38.64) 36.16 (20.44) | 18.54 (12.50) | 3.86 (4.99) | 34.25 (12.65) |
| Workplace violence | | | | |
| Yes | 631 (62.17) 39.98 (20.52) < 0.0001 | 21.43 (12.54) < 0.0001 | 4.74 (5.29) < 0.0001 | 34.19 (10.90) 0.3963 |
| No | 384 (37.83) 29.88 (17.70) | 14.23 (9.69) | 2.51 (3.25) | 34.86 (13.10) |

Abbreviations: CHC Community health center, DP Depersonalization, EE Emotion exhaustion, PA Personal accomplishment, SD Standard deviation, THC Township health center.

1GPs who have acquired associate degree or vocational diploma. An associate degree required 3 years of education in college after graduation from senior middle school (grade year 10 to year 12), or 5 years of education in college after graduation from junior middle school (grade year 7 to year 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.

2Wages and welfare of GPs would be paid by the Chinese government public health services expenditure. GPs were unable to be freely fired off by health institutions.

3GPs were with junior or without any technical title.

4GPs were with middle or senior professional title.

Table 2 Frequency of GPs by degree of burnout (low, moderate and high) with 95% CI in each of the three dimensions

| Variables | Burnout in all three dimensions | EE | DP | PA |
|-----------|--------------------------------|----|----|----|
| N % (95%CI) | N % (95%CI) | N % (95%CI) | N % (95%CI) |
| Low² | 277 27.29 (24.57–30.14) | 527 51.92 (48.80–55.03) | 830 81.77 (79.26–84.10) | 467 46.01 (42.91–49.13) |
| Moderate | 713 70.25 (67.33–73.05) | 236 23.25 (20.68–25.97) | 122 12.02 (10.08–14.18) | 203 20.00 (17.58–22.60) |
| High² | 25 2.46 (1.60–3.61) | 252 24.83 (22.20–27.61) | 63 6.21 (4.80–7.87) | 345 33.99 (31.08–37.00) |

Note: Abbreviations: DP Depersonalization, EE Emotion exhaustion, PA Personal accomplishment.

²Score ≤ 16 indicated low level; 17 to 26 indicated moderate level; ≥27 indicated high level.

²Score ≤ 6 indicated low level; 7 to 12 indicated moderate level; ≥13 indicated high level.

²Score ≥ 39 indicated low level; 32 to 38 indicated moderate level; ≥31 indicated high level.

²Low degree of burnout was defined by a low score on the subscales for EE and DP, and a high score on the PA subscale.

²High degree of burnout was defined by a high score on the subscales for EE and DP, and a low score on the PA subscale.
level were more likely to experience workplace violence (61.8% vs. 38.2%, \( P < 0.0001 \)).

Expectedly, job satisfaction was identified as a significant predictor of burnout in this study. Previous studies have demonstrated that higher levels of burnout are associated with lower levels of job satisfaction \([12, 19, 47]\). This finding suggests that an improvement in job satisfaction could serve as an effective way to prevent or

| Characteristic                                      | Burnout in all three dimensions | EE          | DP          | PA          |
|----------------------------------------------------|---------------------------------|-------------|-------------|-------------|
| Intercept                                          | 88.84 (7.23)                    | < 0.001     | 50.65 (4.4) | < 0.001     | 13.28 (1.79) | < 0.001     | 23.09 (4.69) | < 0.001     |
| Age (years)                                        | –0.01 (0.22)                    | 0.951       | –0.11 (0.13) | 0.385       | –0.04 (0.05) | 0.463       | –0.14 (0.14) | 0.317       |
| Work tenure (years)                                | –0.10 (0.19)                    | 0.611       | –0.02 (0.11) | 0.842       | 0.01 (0.05)  | 0.866       | 0.08 (0.12)  | 0.509       |
| Job satisfaction                                   | –1.30 (0.10)                    | < 0.001     | –0.65 (4.40) | < 0.001     | –0.20 (0.02) | < 0.001     | 0.46 (0.06)  | < 0.001     |
| Sex                                                |                                 |             |             |             |             |             |             |             |
| Men                                                | 1.95 (1.40)                     | 0.164       | –0.13 (0.85) | 0.878       | 0.55 (0.35)  | 0.111       | –1.53 (0.91) | 0.093       |
| Women                                              | 0.00                            | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Education level                                    |                                 |             |             |             |             |             |             |             |
| Associated degree or vocational diploma\(^a\)     | 1.43 (1.34)                     | 0.287       | –0.07 (0.82) | 0.933       | –0.02 (0.33) | 0.06       | –1.52 (0.87) | 0.08        |
| Bachelor degree or higher                          | 0.00                            | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Marital status                                     |                                 |             |             |             |             |             |             |             |
| Married                                            | –5.37 (2.46)                    | 0.03        | –2.86 (1.50) | 0.056       | –1.17 (0.61) | 0.054       | 1.33 (1.60)  | 0.404       |
| Unmarried/widow/divorced                           | 0.00                            | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Contract status                                    |                                 |             |             |             |             |             |             |             |
| Permanent                                          | 0.25 (1.42)                     | 0.86        | 0.31 (0.86) | 0.723       | –0.23 (0.35) | 0.51       | –0.18 (0.92) | 0.846       |
| Temporary\(^b\)                                    | 0.00                            | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Job title                                          |                                 |             |             |             |             |             |             |             |
| Elementary or less\(^c\)                           | –0.13 (1.46)                    | 0.93        | –1.96 (0.89) | 0.028       | 0.78 (0.36)  | 0.03       | –1.04 (0.95) | 0.271       |
| Intermediate or higher\(^d\)                      | 0.00                            | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Practice setting                                   |                                 |             |             |             |             |             |             |             |
| THC                                                | –0.35 (1.39)                    | 0.804       | 0.33 (0.85) | 0.702       | 0.21 (0.34)  | 0.549       | 0.88 (0.90)  | 0.332       |
| CHC                                                | 0.00                            | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Average monthly income                             |                                 |             |             |             |             |             |             |             |
| < 2500                                             | –1.59 (1.83)                    | 0.387       | 0.06 (1.12) | 0.957       | –0.68 (0.45) | 0.137       | 0.97 (1.19)  | 0.414       |
| 2500~                                              | –1.03 (1.63)                    | 0.526       | –0.12 (0.99) | 0.9       | –0.42 (0.4)  | 0.3        | 0.49 (1.06)  | 0.643       |
| 3500~                                              | 0.00                            | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Has management responsibility                      |                                 |             |             |             |             |             |             |             |
| Yes                                                | 1.08 (1.40)                     | 0.441       | –0.65 (0.85) | 0.446       | 0.49 (0.35)  | 0.158       | 0.06 (0.91)  | 0.948       |
| No                                                 | 0.00                            | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Workplace violence                                 |                                 |             |             |             |             |             |             |             |
| No                                                 | –6.36 (1.26)                    | < 0.001     | –5.3 (0.77)  | < 0.001     | –1.59 (0.31) | < 0.001     | –0.53 (0.82) | 0.519       |
| Yes                                                | 0.00                            | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |

Abbreviations: CHC Community health center, DP Depersonalization, EE Emotion exhaustion, PA Personal accomplishment, THC Township health center
\(^a\)GPs who have acquired associate degree or vocational diploma. An associate degree required 3 years of education in college after graduation from senior middle school (grade year 10 to year 12), or 5 years of education in college after graduation from junior middle school (grade year 7 to year 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
\(^b\)Wages and welfares of GPs would be paid by the Chinese government public health services expenditure. GPs were unable to be freely fired off by health institutions
\(^c\)GPs were with junior or without any technical title
\(^d\)GPs were with middle or senior professional title

Significant values (\( P < 0.05 \)) are presented in bold
minimize burnout, and provides new insights for future studies on ways to improve the job satisfaction of GPs and indirectly address burnout problems.

**Limitations**
This study has several limitations. First, this study used a cross-sectional study design, which precluded the evaluation of the temporality and causality of the observed relationships. Second, data were collected from participants’ self-reports; thus, recall bias was unavoidable. Third, other potential predictors of burnout and the overall health of GPs (such as work schedules, work hours, work stress, sleep quality, job control, social support, other occupational health factors, self-reported health status, and mental health) were not captured in our questionnaire. Fourth, completing the questionnaire after following a seminar on well-being or strategies to re-settling may have affected the results. Finally, this study was based on the data of a cross-sectional study conducted from December 2014 to March 2015. There is a seasonal trend in the work load of GPs that may have affected the results.

**Implications for research and practice**
Based on our findings, we suggest that, first, prospective studies are needed to investigate the association between the determined factors and burnout. Second, this study highlights the need for the investigation or implementation of interventions to improve GPs’ well-being or strategies to reduce work pressure on GPs in China’s primary healthcare settings. Third, a previous study [48] showed that new medical graduates are susceptible to burnout. Additional studies investigating the work demands, job satisfaction, burnout, and turnover intentions of new GPs could provide a valuable insight. Finally, investigating the potential impact of burnout on GPs’ work performance, the quality of patient care delivery, and family life would provide important insights.

**Conclusions**
In conclusion, burnout among GPs, especially single GPs, GPs with lower job satisfaction, and those with exposure to workplace violence, is prevalent in Hubei, China. In total, 25% of GPs suffered from high levels of EE, 6% suffered from high DP and 34% suffered from reduced PA.

### Table 4 Comparison of burnout rates among our sample and previously published studies among GPs in other countries

| Authors and year | Study population | Sample size | Male (%) | Age at baseline | Burnout rates | Comparable the present study data |
|------------------|------------------|-------------|----------|----------------|---------------|----------------------------------|
| Kiwan and Armstrong, 1995 | Britain, British GPs | 245 | 81.6 | NA | Mean score of 26.1 for EE, 9.8 for DP; 36.2 for PA | EE, DP and PA: higher |
| Grassi and Magnani, 2000 | Italy, Italian GPs | 182 | 74.7 | Mean = 42.3 | High EE burnout in 32%; high DP burnout in 27%; high PA burnout in 13% | EE and DP: higher; PA: lower |
| Thomassenet et al., 2001 | Canada, Canada GPs | 131 | 74 | Mean = 43.6 | Moderate to high EE burnout in 80%; moderate to high DP burnout in 61%; moderate to high PA burnout in 44% | EE and DP: higher; PA: lower |
| Cathebras et al., 2004 | France, French GPs | 306 | 39.8 | Mean = 46.9 | 5% scored high in all three dimensions | Overall burnout: higher |
| Goehring et al., 2005 | Switzerland, Swiss primary care doctor | 1755 | 83.6 | Mean = 50.8 | High EE burnout in 19%; high DP burnout in 22%; high PA burnout in 16%; 3.5% scored high in all three dimensions | EE and PA: lower; DP: higher; Overall burnout: higher |
| Soler et al., 2008 | Europe, European GPs | 1393 | 54.6 | Mean = 45.4 | High EE burnout in 43%; high DP burnout in 39%; high PA burnout in 32%; 12% scored high in all three dimensions | EE and DP: higher; PA: comparable; Overall burnout: higher |
| Bredt et al., 2008 | Denmark, Danish GPs | 377 | 60.7 | Mean = 51.8 | 2.8% scored high in all three dimensions | Overall burnout: comparable |
| Lee et al., 2008 | Canada, Canada Family physicians | 123 | 62.6 | Median = 47 | High EE burnout in 47.9%; high DP burnout in 46.3%; high PA burnout in 17.4% | EE and DP: higher; PA: lower |
| Yaman and Soler, 2002 | Europe, European GPs | 98 | 59 | Mean = 43.2 | Mean score of 25.1 for EE, 7.3 for DP; 34.5 for PA | EE and DP: higher; PA: comparable |
| O’Dea et al., 2017 | Ireland, Irish GPs | 683 | 50.2 | <40, 40–70 | High EE burnout in 52.7%; high DP burnout in 31.6%; high PA burnout in 16.3%; 6.6% scored high in all three dimensions | EE and DP: higher; PA: lower; Overall burnout: higher |
| Orton et al., 2012 | UK, UK GPs | 564 | 68.5 | NA | High EE burnout in 46%; high DP burnout in 42%; high PA burnout in 34% | EE and DP: higher; PA: comparable |
| Arigoni et al., 2009 | Switzerland, Swiss GPs | 141 | 32 | NA | High EE burnout in 36%; high DP burnout in 36%; high PA burnout in 15% | EE and DP: higher; PA: lower |

Note: Abbreviations: DP Depersonalization, EE Emotion exhaustion, GP General practitioner, NA Not available, PA Personal accomplishment

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**Note:** All data and references are from the original document. The table and text are presented in a readable format, maintaining the integrity of the original content.
Abbreviations

CHC: Community health center; CHS: Community health service; DP: Depersonalization; EE: Emotional exhaustion; GP: General practitioner; PA: Personal achievement; PHI: Primary healthcare institution; THC: Township health center

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Authors’ contributions

YG and ZXL conceived and designed the study. YDY, CW, JXL, TTY, SH, HBX, and YYC participated in the acquisition of data. YG analyzed the data. HJ, LQL, and POF gave advice on methodology. YG wrote the draft of the paper. All authors contributed to writing, reviewing or revising the paper and read and approved the final manuscript. ZXL is the guarantor of this work and has full access to all the data in the study and takes responsibility for its integrity and the accuracy of the data analysis. All authors read and approved the final manuscript.

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Availability of data and materials

Data may be made available by contacting the corresponding author.

Ethics approval and consent to participate

The study was approved by the Ethics Committee of the Tongji Medical College Institutional Review Board, Huazhong University of Science and Technology, Wuhan, China. Informed consent was obtained from all survey participants.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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