## RESEARCH



# Related factors of turnover intention among general practitioners: a cross-sectional study in 6 provinces of China

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### Abstract

**Background** Turnover among general practitioners (GPs) is an issue of growing concern. Therefore, identification of the variables which associated with GPs' decision in staying in or leaving their employer institutions is necessary. OBJECTIVE: The aim of this study was to investigate the relationship between work stress, job satisfaction, and turnover intention, and explore factors associated with turnover intention of GPs in China.

**Methods** We conducted a cross-sectional survey among GPs in 6 provinces in China, utilizing a combination of stratified and purposive sampling methods, from April to October 2019. Data were collected using self-administered questionnaires and scales measuring their demographic characteristics, work stress, job satisfaction, and turnover intention. Statistical methods such as t test, one-way analysis of variance (ANOVA), multiple linear regression, exploratory factor analysis (EFA), and structural equation modeling (SEM) were used.

**Results** Out of 386 GPs, 10.4% had higher turnover intention and 31.9% had medium turnover intention. The mean score of the overall perception of turnover intention of GPs was 2.24 on a scale ranging from 1 to 6. Over 80.0% of GPs had moderate to high level work stress. The facets that GPs were most dissatisfied were payment, welfare, training opportunity and career development. professional title, practicing setting, and work intensity associated with turnover intention (P < 0.05) significantly. Work stress, not only directly associated with turnover intention ( $\beta = 0.608$ , P < 0.001), but also presented an indirect association on turnover intention through job satisfaction ( $\beta = 0.042$ , P < 0.05). Meanwhile, job satisfaction also had a direct negative effect on turnover intention ( $\beta = -0.345$ , P < 0.001).

**Conclusions** Work stress, job satisfaction, professional title, practicing setting, and work intensity were influencing factors on turnover intention in Chinese GPs. Work stress had not only positive direct effects on turnover intention,

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but also had an indirect effect on turnover intention through job satisfaction as a mediator. Reducing workload, raising income, providing more opportunities for training and career development could potentially contribute to retaining and attracting GPs.

Keywords Turnover intention, Work stress, Job satisfaction, General practitioner

#### Background

There is a broad consensus on the value and principles of primary care (PC) worldwide [1-3]. Empirical evidence shows that good PC is associated with a more equitable distribution of health in population, better health outcome, and lower cost [4-7]. One of the features of PCbased health systems is that patients are required to visit general practitioners (GPs) prior to accessing further specialty care. GPs play multiple roles in the Chinese healthcare system, not only as providers of medical services, but also as disseminators of health education, providers of basic public health services, coordinators of medical resources (such as managing referrals to specialist care and hospitals), and drivers of healthcare system reform. As the main provider of PC service, GPs are the core part of PC human resource, acting as gatekeepers of residents' health and coordinators of health care. The quality and quantity of GPs are directly associated with the effectiveness and quality of the health service of a nation. However, the shortage of GPs has become an emergent problem globally, particularly in rural and remote areas [8–11]. In China, the shortage of GPs is particularly serious [12]..In 2019, the proportion of qualified GPs to registered physicians in China stood at less than 13%, significantly lower than the 30–50% range observed in Western countries [13]. With the aging population and increasing prevalence of chronic disease, residents' demand for GPs service is increasing. China, home to one-fifth of the world's population, has been observed an escalating trend toward an aging society since 2000 [4], which will result in increasing chronic disease prevalence and demand for GPs.

Although many factors result in GPs shortage, high turnover is considered one of the most important contributors. Turnover can be either voluntary which is when an individual quits his/her job at his/her own quest or it can be involuntary which is defined as the organization initiating the turnover. It is an important phenomenon among PC physicians in many countries [14–17], pointing to a great challenge to the relative shortage of GPs, resulting in negative effects such as high cost of physician training and poor quality of care [18–21]. Therefore, GPs' intention to stay in the workplace and retention are critical concepts to PC administrators. China's PC system still faces high turnover. A survey showed that there were 1432 outflow staffs of investigated 86 THCs from 2012 to 2016, of which 85.8% were voluntary turnover [22]. Another survey showed that 71.1% of Chinese urban GPs reported moderate or higher levels of intention to quit their jobs [23]. Therefore, in current Chinese context, understanding the factors related to GPs' turnover intention has become particularly important.

Turnover intention refers to conscious and deliberate willfulness to leave the current organization. Steel and Ovalle reported a correlation coefficient of 0.50 between behavioral intentions and employee turnover [24]. A study of family physicians in England showed that physicians with high turnover intention had 4.48 times the probability of actual leave within the next 5 years compared with those with no turnover intention. These results revealed that higher level of turnover intention could be associated with an increased likelihood of actual leaving. In fact, turnover intention has been widely believed to be the strongest predictor of actual turnover among healthcare personnel [25, 26].Understanding turnover intention may help mitigate actual leave and enable measures to prevent the loss of human resource. Thus, it is more meaningful to study turnover intention rather than actual turnover.

Researchers have studied the predictors of turnover intention. Many studies showed that the decision of employees to stay in or leave their workplace can be influenced by organizational factors (characteristics, climate/culture, interpersonal relations within the organization), work-related factors (role stress, workload, financial rewards, employees' access to power), employee factors (demographic factor, employees' behavioral/attitudinal responses), and external factors (work-life balance, external job market) [27]. Job satisfaction has been stated to be one of the most major predictors of turnover intention with a significant inverse association [28–31]. It also mediated the relationship between work stress and turnover intention [32, 33]. Job satisfaction is defined as the degree to which employees like their work and have positive or negative attitudes toward their jobs [34]. Job satisfaction of healthcare workers arises from relations between experience and work environment and is essential for healthcare workers' retention and performance [35]. Work stress is another important predictor of turnover intention. Work stress has been associated with high turnover intention [36], low job satisfaction [37]. Work stress can be defined as an individual's reactions to characteristic of work environment that appear emotionally and physically threatening to the individual [38]. Work stress among GPs is an issue of growing concern. In an earlier study conducted in 11 high-income countries

showed that the prevalence of work stress varied from 18 to 59% [39]. Chronic exposure to work stress has been shown to lead to adverse consequences to workers' health [40, 41] and organizational outcomes [42].

The Job Demands-Resources (JD-R) model offers a comprehensive framework for understanding how work stress and job satisfaction interact and influence turnover intention. The JD-R model classifiers job characteristics into two general categories: job demands and job resources [43]. Job demands refer to those physical, social, or organizational aspects of the job that require sustained physical and psychological effort, and are therefore associated with certain physical and psychological costs. Job resources refer to those physical, psychological, social, or organizational aspects of the job that may be functional in achieving work goals, reduce job demands and the associated physiological and psychological costs, or stimulate personal growth, learning and development. Work stress arises from increased job demands, such as GPs facing undesirable working conditions or environments that heighten their workload and stress levels. According to the gain path of the JD-R model, sufficient job resources can stimulate employees' intrinsic motivation, enhancing their work engagement and overall motivation. Job satisfaction acts as a positive psychological resource that further boosts work engagement. By enhancing job satisfaction, the negative consequences of increased job demands can be mitigated, and work engagement can be boosted, ultimately resulting in positive work outcomes, including a decreased turnover intention. Thus, an effective strategy to improve job satisfaction and subsequently reduce turnover intention is to alleviate work stress.

Studies on turnover intention of GPs and its factors have been conducted years ago in many developed countries [44–46]. However, in China, there has been limited research discussing the turnover intention and its predictors among GPs. These previous studies primarily focused on demographic factors and job characteristics, while neglecting many other potential factors such as job satisfaction and work stress [47–49]. Currently, there is insufficient evidence regarding how work stress and job satisfaction influence GPs' turnover intention. Therefore, we conducted this study to examine the interplay



between work stress, job satisfaction, and turnover intention, and to explore the predictors of turnover intention among GPs in China.

Based on the above-mentioned theoretical analysis and empirical demonstrations, we proposed the following hypotheses (Fig. 1, hypothetical model):

**Hypothesis 1** Work stress will positively influence turnover intention.

**Hypothesis 2** Work stress will adversely influence job satisfaction.

**Hypothesis 3** Job satisfaction will adversely influence turnover intention.

**Hypothesis 4** Work stress will indirectly influence turnover intention through job satisfaction.

#### Methods

#### Study design and participants

This cross-sectional study was a part of the monographic study of the Sixth National Health Service Survey funded by Center for Health Statistics and Information, National Health Commission of the People's Republic of China. This study was conducted from April to October 2019 in China. To achieve a representative sample encompassing diverse tiered healthcare models, we adopted a hybrid sampling approach combining stratified and purposive methods. In the first stage, we selected provinces that reflected the tiered healthcare model based on China's regional division, which categorizes its provinces into three key regions: Eastern, Central, and Western, considering factors such as economic development, geographical conditions, and national strategic plans. Specifically, we included provinces from Eastern China (Guangdong, Fujian, Jiangsu), Central China (Anhui), and Western China (Guizhou, Qinghai). In the second stage, within the selected provinces, we proceeded to choose one or two cities or prefectures that also exemplified the tiered healthcare model. In the third stage, from each chosen city or prefecture, we identified two counties or districts that similarly demonstrated the tiered healthcare model. In the fourth stage, within the identified counties or districts, we selected representative Community Healthcare Centers (CHCs) or Township Healthcare Centers (THCs) to serve as our survey sample points. The culmination of this process led to the selection of 46 CHCs and 30 THCs. On the investigation day, we invited all GPs on duty to participate, and a total of 386 GPs responded to our invitation. Among them, 225 were from CHCs, typically situated in urban areas with convenient transportation and ample medical resources, while 161 were from

THCs, often located in rural areas with less accessible transportation and relatively limited medical resources.

#### Data collection and variable measurement

The self-administered questionnaire used in this study consisted of questions on the socio-demographic information, work characteristics, measures of work stress, job satisfaction, and turnover intention. An additional file provides a more detailed these contents (please refer to the Additional file). In the design of the questionnaire, this study referred to the Medical Staff Questionnaire of the Sixth National Health Service Survey designed and finalized by a panel of experts of National Health Commission of the People's Republic of China [50].

Work stress was measured by a four-item scale (four items: e.g. "Feel great pressure from work"), which employed a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree), and a higher score

**Table 1** Factor loading of items using exploratory factor analysis (EFA) and Cronbach's  $\alpha$  of different dimensions

	Work stress	Job satisfaction	Turnover intention
Work stress			
Feel great pressure from	0.854		
work			
Feel a high level of tension	0.903		
from work			
Trouble falling asleep	0.629		
because of work			
Feel nervous because of	0.665		
work			
Job satisfaction			
Colleagues		0.578	
Payment		0.640	
Superiors		0.774	
Physical working conditions		0.713	
Promotion and career		0.820	
development			
Organizational		0.841	
management			
Welfare		0.829	
Training opportunity		0.826	
Opportunity to use your		0.792	
abilities			
Turnover intention			
Thought of leaving present			0.817
job			
Thought of leaving profes-			0.785
sional career			
Looking for a new job			0.854
recently			
Looking for a new job next			0.832
year			
Average variance extracted (AVE)	72.425	60.644	76.425
Cronbach'sa	0.848	0.900	0.912

indicates greater work stress. The scores of each item was divided into low (original categories 1, 2), moderate (original categories 3, 4), and high (original categories 5, 6) degrees. Total scores ranged from 4 to 24, the scores of 4 to 8, 9 to 16, and 17 to 24 were assigned for low, moderate, and high degrees of work stress, respectively. The scores of the overall work stress were computed as the average of the scores of the corresponding four items.

**Job satisfaction** tool consisted of 9 items including colleagues, payment, superiors, physical working conditions, promotion and career development, organization management, welfare, training opportunity, and opportunity to use abilities. Each item has six alternatives with 6-point Likert scale ranging from 1 (highly dissatisfied) to 6 (highly satisfied). The higher the score, the higher the job satisfaction was. The scores of each item was divided into low (original categories 1, 2), moderate (original categories 3, 4), and high (original categories 5, 6) degrees. The scores of the overall job satisfaction were computed as the average of the scores of the corresponding 9 items. Total scores ranged from 9 to 54, the scores of 9 to 18, 19 to 36, and 37 to 54 were assigned for low, moderate, and high degrees of overall job satisfaction, respectively.

**Turnover intention** was measured through a four-item scale (four items: e.g. "Thought of leaving present job"), which employed a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree), and a higher score indicates greater turnover intention. The scores of each item was divided into low (original categories 1, 2), moderate (original categories 3, 4), and high (original categories 5, 6) degrees. Total scores ranged from 4 to 24, the scores of 4 to 8, 9 to 16, and 17 to 24 were assigned for low, moderate, and high degrees of turnover intention, respectively. The scores of the overall turnover intention were computed as the average of the scores of the corresponding four items.

#### **Reliability and validity**

In according with the exploratory factor analysis (EFA), the Kaiser-Meyer-Olkin (KMO) of the scale was 0.888, indicating suitability for factor analysis. The Bartlett Test of Sphericity was statistically significant ( $\chi^2$  = 4206.569, *P* < 0.001, df = 136), also supporting the factorability of the correlation matrix. For factor loading analysis, the maximum coefficient of variation method was used for orthogonal rotation (varimax) to obtain the results of the factor load matrix. According to previous studies, factor loading values at 0.3 or greater were considered acceptable, whereas those greater than 0.55 were considered as good [51, 52]. Table 1 showed that the loading values of all items in the corresponding dimensions were greater than 0.55, indicating good questionnaire structure validity.

		,						
Model fit measure	GFI	AGFI	NFI	CFI	IFI	TLI	RMSEA	RMR
Recommended value	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90	< 0.08	< 0.10
Work stress	0.998	0.980	0.998	0.999	0.999	0.996	0.037	0.011
Job satisfaction	0.981	0.961	0.982	0.993	0.993	0.988	0.041	0.028
Turnover intention	0.997	0.966	0.997	0.998	0.998	0.990	0.065	0.017

Table 2 Results of confirmatory factor analysis

Based on structural equation modeling (SEM), the confirmatory factor analysis (CFA) was performed to analyse whether the three one-factor models could be appropriately supported by the investigation data. To investigate the construct validity of the questionnaire, latent variables and manifest variables (items) were used to construct a SEM. The values of goodness-of-fit index (GFI), adjust goodness-of-fit index (AGFI), normed fit index (NFI), comparative fit index (CFI), incremental fit index (IFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and root mean square residual (RMR) are shown in Table 2. It could be observed that the model was good based on the indexes recommended by Hu and Bentler [53]. The model will be considered adequate when GFI, AGFI, NFI, CFI, TLI, IFI>0.90, RMSEA < 0.08, RMR < 0.10. The model will be very good if GFI, AGFI, NFI, CFI, TLI, IFI>0.95, RMSEA<0.05. The EFA and CFA results showed that the survey scales had good construct validity. Additionally, Table 1 showed that the Cronbach's α coefficients for work stress, job satisfaction, and turnover intention were 0.848, 0.900, and 0.912, respectively, indicating good reliability of internal consistency [54].

#### Statistical analysis

In descriptive analysis, frequencies and percentages were used for categorical variables, means and standard deviation (SD) were used for continuous variables. T test and one-way analysis of variance (ANOVA) were applied to examine the difference in turnover intention between or among groups. Dependent variable (turnover intention) was treated as continuous variable. A multiple linear regression model was performed to estimate the predictors of GPs' turnover intention. Predictive variables such as education level, professional title, work intensity, practice setting, work stress (continuous variable) and job satisfaction (continuous variable) were included in the multiple linear regression analysis. Multicolinearity was assessed using the variance inflation factor. To observe the impact of work stress and job satisfaction on turnover intention, SEM with maximum likelihood estimation was conducted to test the hypothetical model [55]. Path analysis was used to identify both direct and indirect effects between the variables with standardized regression coefficients shown on the arrows. Model fit was evaluated with the following indexes: GFI, AGFI, NFI, CFI, IFI, TLI, RMSEA and RMR. Values of GFI, AGFI, NFI, CFI, IFI,

Table 3	Turnover	intention score	according to	o socio-
demogra	aphic and	work-related ch	naracteristics	(n = 386)

Characteristics	n (%)	Score $(\overline{x} + s)$	P value
Gender			0.133
Malo	176 (45 6)	2 35 + 1 37	0.155
Fomalo	210 (54 4)	2.55 ± 1.57	
	210 (34.4)	2.15 ± 1.20	0.755
∠ 25	160 (43.8)	2 30 + 1 30	0.755
25~	109 (45.0)	2.30 ± 1.30	
45~	76 (10 7)	2.10±1.31	
40°	70 (19.7)	2.24±1.37	0 5 2 0
Marital Status		2.22 - 1.22	0.520
Unmarried	66 (17.1)	2.33±1.22	
Married/widow/divorced	320 (82.9)	$2.22 \pm 1.33$	
Education level			0.115
Bachelor degree or above	275 (71.2)	$2.17 \pm 1.26$	
Junior college or below	111 (28.8)	$2.41 \pm 1.44$	
Professional title			0.033
Intermediate or higher	211 (54.7)	$2.11 \pm 1.21$	
Elementary or less	175 (45.3)	$2.40 \pm 1.42$	
Work tenure (years)			0.987
<10	152 (39.4)	$2.25 \pm 1.30$	
10~	139 (36.0)	2.24±1.31	
20~	95 (24.6)	$2.22 \pm 1.35$	
Practice setting			0.010
CHCs	225 (58.3)	2.10+1.21	
THCs	161 (41 7)	245+142	
Work intensity			0.002
Bucy	77 (10.0)	265 + 146	0.002
Duby	200 (20 1)	2.00 ± 1.40	
Kelax	309 (80.1)	2.14±1.20	

and TLI>0.90, RMSEA<0.08, and RMR<0.10 indicate a good fitting model. All statistical analyses were performed using SPSS 22.0 and AMOS 22.0. *P*-value<0.05 was considered statistically significant in all analyses.

#### Results

#### Socio-demographic characteristics of participants

Of the 386 respondents, 58.3% were working in CHCs and 41.7% were working in THCs, most were married (82.9%) and more than half (54.4%) were female. About one fifth (19.7%) were 45 years or above, and about one fourth (24.6%) worked 20 years or above. More than two-thirds (71.2%) had bachelor degree or above, more than half (54.7%) had intermediate or higher professional title (Table 3).

#### Work stress, job satisfaction and turnover intention

Mean scores of work stress, job satisfaction and turnover intention are shown in Table 4. The mean score of work stress was 3.42, and 29.5% GPs described their work as being highly stressful. The mean of overall job satisfaction was 4.23, and of the nine facets, the highest and the lowest mean scores were related to colleagues (4.91) and payment (3.83). Overall, 59.1% of GPs reported high level of job satisfaction. The level of job satisfaction on payment was the lowest, followed by training opportunity, Career development, and welfare. In terms of turnover intention, the mean score was 2.24, and 10.4% of GPs reported high turnover intention. Table 3 showed that higher mean scores of turnover intentions were found among respondents who had elementary or less professional title, felt busy in work, and worked in THCs.

# Factors associated with turnover intention in multiple linear regression

The factors associated with turnover intention are presented in Table 5. Compared with the GPs who worked in CHC, GPs who worked in THC were more likely to report turnover intention. GPs who perceived busy were more likely to report higher turnover intention. We found that higher job satisfaction scores among GPs were associated with a lower level of turnover intention. In addition, the more stressed GPs felt in work, the more they intended to leave.

#### Verification of the hypothetical model

We used SEM to quantify the relationship between the three dimensions. The overall model fit indexes of the hypothetical model in Fig. 2 were  $\chi^2/df = 2.231$ , AGFI = 0.939, P < 0.001, GFI = 0.967, NFI = 0.973, CFI = 0.985, IFI = 0.985, TLI = 0.977, RMSEA = 0.057, and RMR = 0.050, all of which approached the recommended values and showed that the model fitted well. Table 6 showed the standardized direct, indirect, and total effects of the model. The arrows between dimensions in Fig. 2 represent direct relationship. Indirect effect is equal to the product of direct effects. The total effect is the sum of direct and indirect effects. A minus symbol before a coefficient presents a negative effect, for example, higher work stress led to lower job satisfaction. Specifically, work stress was positively associated with turnover intention ( $\beta$  = 0.608, *P* < 0.05), which supported the hypothesis 1. Work stress was negatively associated with job satisfaction ( $\beta$ =-0.123, *P*<0.05), which supported the hypothesis 2. Job satisfaction had a negative effect on turnover intention ( $\beta$ =-0.345, *P*<0.05), which supported the hypothesis 3. Moreover, work stress had an indirect effect on turnover intention through job satisfaction as a mediator  $(\beta = -0.123^* - 0.345 = 0.042, P < 0.05)$ , which supported the hypothesis 4. It can be seen that work stress had smaller

Table 4	Work stress,	job satisfaction	and turnover	intention of
GPs $(n = $	386)			

	Score Stressed		sed/Satisfie ded (%)	d/Satisfied/ ed (%)	
	$(\bar{\mathbf{x}} \pm \mathbf{s})$	Low	Medium	High	
Work stress	$3.42 \pm 1.20$	16.1	54.4	29.5	
Feel great pressure from work	$3.90 \pm 1.47$	19.4	43.8	36.8	
Feel a high level of tension	$3.97 \pm 1.39$	16.6	44.6	38.9	
from work					
Trouble falling asleep because of work	2.92±1.49	44.0	40.7	15.3	
Feel nervous because of work	$2.88 \pm 1.46$	43.0	42.7	14.2	
Overall job satisfaction	4.23±0.99	3.1	37.8	59.1	
Colleagues	4.91±1.08	3.6	25.9	70.5	
Payment	3.83±1.47	17.6	45.9	36.5	
Superiors	$4.65 \pm 1.20$	6.0	30.1	64.0	
Physical working conditions	$4.24 \pm 1.30$	9.8	43.8	46.4	
Career development	$4.07 \pm 1.38$	13.0	45.3	41.7	
Organizational management	$4.20 \pm 1.26$	9.6	47.2	43.3	
Welfare	$3.95 \pm 1.29$	12.7	52.6	34.7	
Training opportunity	$3.94 \pm 1.39$	15.5	47.4	37.0	
Opportunity to use your abilities	4.25±1.25	9.6	44.8	45.6	
Turnover intention	2.24±1.31	57.8	31.9	10.4	
Thought of leaving present	$2.36 \pm 1.53$	63.7	25.4	10.9	
job					
Thought of leaving profes-	$2.37 \pm 1.57$	62.4	25.1	12.4	
sional career					
Looking for a new job	2.27±1.55	64.5	24.1	11.4	
recently					
Looking for a new job next year	1.96±1.34	73.3	19.4	7.3	

Table 5	Factors associated with turnover intention of GPs by
multiple	linear regression analysis

Variables	В	SE	P value	95% CI
Constant	9.414	1.221	< 0.001	7.012–11.815
Education level (ref. = Bachelor degree or above)				
Junior college or below	0.270	0.494	0.585	-0.701-1.242
Technical title (ref. = Elementary or less)				
Intermediate or higher	-0.587	0.451	0.194	-1.474-0.300
Practice setting (ref. = CHC)				
THC	0.905	0.457	0.048	0.008-1.803
Perceived work intensity (ref. = Not busy)				
Busy	1.291	0.504	0.011	0.300-2.283
Job satisfaction	-0.191	0.024	< 0.001	-0.237-0.144
Work stress	0.557	0.046	< 0.001	0.466-0.647



Fig. 2 Path diagram for modified model. \*P<0.05, \*\*P<0.001

**Table 6** Effects of predictor variables in the modified model (n = 386)

Path	Direct effects	SE	CR	Indirect effects	Total effects
Work stress→Job satisfaction	-0.123	0.128	-2.101	N/A	-0.123
Job satisfaction→Turnover intention	-0.345	0.016	-6.755	N/A	-0.345
Work stress→Turnover intention	0.608	0.039	10.607	0.042	0.650

Note. N/A: Not applicable

indirect effect than its direct effect. The total effect of work stress on turnover intention was 0.650 (Table 6).

#### Discussion

As the main provider of PC service, GPs are the core part of PC human resource, acting as gatekeepers of residents' health and coordinators of health care. The quality and quantity of GPs are directly associated with the effectiveness and quality of the health service of a nation. Assessing the turnover intention of GPs and relevant determinants not only solves the problem of human resources stability in PC institutions, but also plays a vital role in improving PC. This study explored the status and relevant determinants of turnover intention of GPs in China. These findings are useful for the development of suitable interventions to reduce the risk of GPs leaving their job.

In our study, the overall perceived average score of general practitioners' turnover intention was 2.24, which was similar to the result (2.26) investigated by Li et al. in Shanghai in 2016 [56]. Intriguingly, our finding was slightly lower than the result (2.71) of a related study conducted by Lu et al.. in Guangdong in 2013 [51]. Our study showed that 42.3% of GPs had a moderate or higher turnover intention, which was smaller than findings of other similar studies conducted in Hubei in 2015 (78.35%) [57] and a national survey carried out between 2017 and 2018 (70.0%) [58]. Our study also indicated that 10.4% of GPs had high turnover intention, which was lower than the result (16.64%) of a similar study conducted by Wang et al. in Shandong in 2017 [59]. Possible reasons for these discrepancies may be that working environment for GPs

has been improving since the latest round of new medical system reform in China launched in 2009. To strengthen the primary health-care system, great efforts have been made by Chinese government, including economic and non-economic incentive measures and other professional incentives aimed at attracting and retaining GPs. In addition, the results varied from country to country. McCombet al. reported that 12% of GPs indicated an intention to leave general practice within 6 months, and nearly 30% indicated an intention to leave within 5 years in New Zealand [60]. Daleet al. found that 41.9% of GPs intended to leave general practice in England [61].

We constructed a structural equation model to explain the effect of work stress and job satisfaction on GPs' turnover intention. Our findings were consistent to the hypothesized model: work stress had prominent direct effect on turnover intention, which means that as GPs' work stress increases, so does their turnover intention. Work stress had an adverse effect on job satisfaction. In addition, Job satisfaction had an adverse effect on turnover intention. The mediation results also supported our hypothesis about job satisfaction as a mediator in the relationship between work stress and turnover intention, which was consistent with previous researches [51, 62] and validated the JD-R model. Work stress, considered a job demand, and job satisfaction, viewed as a psychological resource, demonstrate how job satisfaction acts as a bridge between available resources and intentions, ultimately helping to reduce GPs' turnover intentions. These findings indicate that reducing work stress among GPs can enhance their job satisfaction and decrease turnover intentions. Specifically, work stress negatively impacts turnover intentions in GPs by diminishing their job satisfaction. Therefore, job satisfaction serves as a crucial underlying psychological mechanism through which work stress adversely affects GPs' turnover intentions.

Work stress is a significant predictor of turnover intention. The results of the multiple linear regression analysis also revealed that work stress positively influenced turnover intention, which was consistent with other studies [32, 51]. Work stress is commonly existed among health workers, especially in China where it has the largest number of potential patients in the world. Our study revealed that 83.9% of GPs experienced moderate to high level work stress. A previous study conducted in 11 highincome countries revealed that the prevalence of work stress among primary care physicians varied from 18 to 59% according to country [39]. Work stress was associated with high workload [39], working hours, economic factors [63], structure of knowledge, and working environment [64]. In China, after the government launched the new healthcare system reform plan in 2009, the content of basic public health services was expanded, and primary care doctors are now required to deliver both

basic medical services and public health services [65].In addition, the tiered healthcare system was proposed and established with the implementation of the new healthcare reform, which suggested patients to visit primary care institutions first and then proceeded referral to higher level hospitals if necessary. Therefore, work stress of GPs might gradually increase. Our study revealed that GPs felt busy experienced higher turnover intention. Furthermore, long-term exposure to work stress has been shown to lead to adverse consequences to workers' health [40, 41]and organizational outcomes [42] such as reduction of employees' productivity [66]. Obviously, it is necessary to formulate policies to solve the problem of GPs' increasing workload.

Another significant predictor of turnover intention is job satisfaction: GPs with higher satisfaction are less likely to quit their jobs. Similar findings were reported by Wen et al. [17], Yang et al. [34], and Li et al. [67]. Of the nine items of job satisfaction in our study, GPs were most dissatisfied with payment, welfare, training opportunity, career development, which was similar with previous studies conducted in China [17, 51, 59], and other countries [68–70]. To reduce GPs' turnover intention, measures should be taken to improve their job satisfaction, especially the facets of income, training opportunity and career development. Previous studies revealed that income was one of the main factors on turnover intention in primary care institutions [17, 58]. Hence, GPs were more likely to quit and to pursue higher-level income institutions. Opportunities of training and career development were also the main predictors of turnover intention [71]. One study revealed that doctors worked in primary care institutions transferred to higher-level hospitals because of limited opportunities for career development [72]. Another study reported that fewer training opportunity and career development in primary care institutions were the main reasons for resigning from a job [17]. Fewer opportunities of training and career development may drive GPs away from primary care institutions, and more opportunities of training and career development could help to retain and attract more GPs. With the gradual penetration of medical system reform in China, health workers worked in primary care institutions had more opportunities of training and career development for the purpose of strengthening primary health care system. However, the reform is still underway, and the mechanism for incentive and compensation are still imperfect [73]. For example, income during training is not always guaranteed. In the UK, US, and Australia [74], the general practitioner system was established quite early, and the financial incentive policies for GPs are relatively complete. They all have a general practitioner payment system and a general practitioner service quality and effectiveness evaluation system, adopt a hybrid payment method for GPs, and use financial incentives to promote the improvement of performance quality for GPs. In addition, the United States has explored methods for decentralized management of healthcare insurance funds, allowing primary healthcare institutions to independently redistribute remaining funds and improve the work enthusiasm of GPs. Australia has established a "differential coefficient" and scholarships/ subsidies for GPs, and provided free training to enhance the service capabilities of GPs working in remote areas and increase the attractiveness of their work.

In addition to work stress and job satisfaction, sociodemographic characteristics and work-related factors including professional title, practice setting, and work intensity were also significantly associated with turnover intention of GPs. First, GPs with a lower-level professional title were more likely to have turnover intention than those with a higher-level professional title. Thus, more opportunities should be provided for GPs' promotion. Second, GPs worked in THCs were more likely to have turnover intention than those worked in CHCs. This finding could be explained by the fact that the working conditions of THCs were harder than CHCs. Furthermore, GPs worked in THCs usually had relatively lower income than those worked in CHCs in China. One study reported that health workers with a lower-level income were more likely to have turnover intentions than those with a high-level income [32]. Another study [51] revealed that the turnover intention of physicians worked in rural areas was higher than that of physicians worked in urban areas with better work environment, welfare treatment, etc. Third, GPs felt busy with work were more likely to have turnover intention than those felt not busy with work, which was similar with previous studies [51, 59]. The annual Report on the Development of Chinese Health Resources showed that the number of working hours was 53.4 h. per week in 2011, which was obviously higher than the provisions of 44 h per week established by Chinese labor law [57]. With the promotion of basic public health services and tiered medical services, the workloads of GPs might increase. To solve the gap between the heavy workload and workforce shortage, measures should be taken to retain and attract GPs.

#### Limitations of study

There are some limitations to this study. First, our research sample was relatively small, which may have an impact on statistical reference and test power. Second, a self-administered questionnaire was used to measure work stress, job satisfaction and turnover intention, which may lead to information bias. Finally, due to cross-sectional design, causal inference cannot be reached based on our analytical result.

#### Conclusions

Turnover intention of GPs was significantly associated with work stress, job satisfaction, and socio-demographic factors. Work stress had not only positively directly associated with turnover intention, but also had an indirect effect on turnover intention through job satisfaction as a mediator. GPs were most dissatisfied with their payment, welfare, training opportunity, and career development. To retain and attract GPs to primary care institutions in China, the appropriate strategies should be developed focusing on work stress, especially job factors related to satisfaction. It is important to pay more attention to GPs who had high risk of turnover intention. Reducing workload, raising income, providing more opportunities for training and career development could potentially contribute to retaining and attracting GPs.

#### Abbreviations

GPs	General practitioners
ANOVA	Analysis of variance
EFA	Exploratory factor analysis
SEM	Structural equation modeling
PC	Primary care
CHCs	Community Healthcare Centers
THCs	Township Healthcare Centers
CFA	Confirmatory factor analysis
SD	Standard deviation

#### **Supplementary Information**

The online version contains supplementary material available at https://doi.or g/10.1186/s12875-025-02728-x.

Supplementary Material 1

#### Acknowledgements

We would like to first thank Center for Health Statistics and Information, National Health Commission of the People's Republic of China for its coordination. In carrying out field investigation, we have received substantial assistance from health administrative departments of Guangdong, Fujian, Jiangsu, Anhui, Guizhou and Qinghai provinces. We sincerely acknowledge all the support. We would like to thank the GPs who participated in this study, staff members of Community Healthcare Centers and Township Healthcare Centers.

#### Author contributions

YCS, WW, and FY conceptualized and designed this work. YCS, WW, FY, and FX performed the data collection. XQX and MC coordinated study sites. YCS and WW performed data analyses and drafted the manuscript, figure, and tables. WLZ, YQ, YYX and CZX revised the manuscript. All authors have read and approved the final manuscript.

#### Funding

The project was supported by Center for Health Statistics and Information, National Health Commission, PRC. (Fund program: monographic study "Evaluation of Primary Health Service System under the Background of Hierarchical Medical System" of the Sixth National Health Service Survey)

#### Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

#### Declarations

#### Ethics approval and consent to participate

Our study protocol was approved by Medical Research Ethics Committee of Public Health School, Fudan University, Shanghai, China (IRB#2018-10-0707) and by respective authorities of the selected organizations where data collection took place. In addition, respondents were all informed about the purpose of the study. Data were collected after getting informed consent from each participant. Data were treated confidentially and anonymously. This research was performed in accordance with relevant guidelines and regulations in the Declaration of Helsinki.

#### **Consent for publication**

Not applicable.

#### **Competing interests**

The authors declare no competing interests.

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#### Received: 5 September 2024 / Accepted: 28 January 2025 Published online: 12 February 2025

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