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Job Burnout and Turnover Intention among Chinese Primary Healthcare Staff: The Mediating Effect of Satisfaction

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Abstract

Objectives: To explore the mediating effect of satisfaction and to understand the pathway through which job burnout influences turnover intention.

Methods: A multiple linear regression equation was established to test the relation between burnout and turnover intention in a cross-sectional study. Then, path analysis techniques with structural equation modeling were used to exam the mediating effect of satisfaction.

Results: Job burnout and education were positively associated with turnover intention, while age and monthly income were inversely associated with it. In path analysis, the direct path coefficient of burnout was 0.944, predicting 75.2% of the variance in turnover intentions. The indirect effect was -0.524, making up 21.5% of the total effect. The goodness-of-fit was acceptable (*GFI* = 0.936, *CFI* = 0.969, *RMSEA* = 0.072, *NNFI* = 0.964, *IFI* = 0.969).

Conclusion: Job burnout and satisfaction are both crucial for primary healthcare staff, as they contribute to turnover intention.

Keywords: Burnout; Job Satisfaction; Turnover Intention; Mediating Effect; Healthcare

Strengths and limitations of this study

- Linear regression was established to test factors associated with turnover intention.
- Path analysis was used to exam the relation among satisfaction, job burnout and turnover intention.
- Staff with lower monthly income, younger age and higher education are more likely to have turnover intention.
- Job burnout could directly affect turnover intention, while satisfaction works as a mediated variable.
- Inability to accurately disscuss the representativeness of the cross-sectional study.

1 Background

Health and medical personnel play a seminal role in fulfilling the healthcare needs of the entire population, therefore, a robust allocation of human resources maintains the health system running smoothly and also guarantees people accessing to healthcare priority equally [1]. Unfortunately, the current out-of-balance between healthcare staff supply and demand has challenged this priority and triggered a global problem of continual brain drain. Up to 2013, the scarcity of healthcare workers (including physicians, nurses, and midwives) worldwide was estimated at 7.2 million, and it will sharply rising to 12.9 million by 2035 [2].

As a developing country with a huge population, China's shortage of doctors and nurses is worse. According to the *China health statistics yearbook*, there are only 0.46 pediatricians per 1,000 children, much lower than the staff allocation standard. Equally consistent is the finding that the number of anesthesiologists per 10,000 people is less than 0.65, although the total number reaches 76,000. There are about 3 million registered nurses in China, and the ratio of doctors and nurses is 1:1.4. A grossly inadequate amount of healthcare staff has become a social problem cannot be neglected, which is mainly caused by a growing turnover rate. Results of a survey show that the average turnover rate of nurses in first-class tertiary hospitals is 5.8 percent, which goes up to 8-10 percent in economically advanced regions like Shanghai and Guangzhou in China [3]. Under this circumstance, the turnover intention has been an important and popular study subject in psychology and management field.

Turnover intention reflects an individual's conscious and deliberate willfulness to quit one's job or organization within a certain time period, which would possibly pose a major problem in healthcare system resulting in a high turnover rate [4-6]. That is to say, the turnover intention is the strongest cognitive precursor of turnover, directly affecting the choice of departure. Because of a considerable number of predictive modeling formulas of voluntary turnover has been established, researchers generally recognized and supported that several hypothesized variables are associated with the

intention to leave, involving commuting stress, emotional intelligence, job stress, job burnout, and job satisfaction [7-10]. Among the hypothesized linkages above, job burnout and satisfaction are the most common proposed antecedents.

In the late 1980s, Pines and Aronson defined job burnout as a state of physical, emotional and mental exhaustion [11,12]. Job burnout, in fact, describes the individuals' psychological response to prolonged interpersonal and chronic emotional stressors, dominantly caused by a long term involvement in emotionally demanding situations [13]. Job burnout can be categorized into three dimensions, including emotional exhaustion, depersonalization, and the sense of reduced personalized accomplishment. Looking from the former researches, job burnout has a strong positive relationship with turnover intention whereas a negative relation with job satisfaction [14,15]. Job satisfaction encompasses employees' feelings and thoughts about various aspects of their job. In other words, job satisfaction refers to an individual's cognitive or effective evaluation of his or her occupational duties, presenting the extent people like the job and reflecting the effective judgments people hold toward their work condition [16,17]. Numerous studies have repeatedly verified that job satisfaction is inversely related to turnover and intent to leave. In addition to direct effects, we propose that job satisfaction serves as the pathway through which job burnout affects turnover intention as well. Yet, there is still a lack of literature supporting our hypothesis, hence, it is necessary to conduct this study to make up the gap.

Taken together, the theoretical framework utilized in this study originated from researches suggesting that turnover intention maybe both related to satisfaction and burnout toward the job. Accordingly, we hypothesized that:

H1: Job burnout is positively related to turnover intention.

H2: Job satisfaction is negatively related to turnover intention.

H3: Job satisfaction is negatively related to job burnout.

H4: Job satisfaction has a mediating effect between job burnout and turnover intention.

As shown in Figure 1, we tested this theoretical model with the data from primary healthcare staff in central China with the purpose of exploring the mediating effect of

satisfaction and understanding the pathway through which job burnout influences turnover intention.

2 Methods

2.1 Design and Sample

In this investigation, we utilized survey research methods to make sense of the job burnout, satisfaction and turnover intention of primary healthcare staff. From March to May 2019, this study was conducted in Huangpi District of Wuhan in central China. Huangpi District is an unwell developed economic rural area with 1.13 million population. Its medical resources and clinical ability represents the averaged level in China. All 1279 healthcare workers from 29 medical institutions were randomly recruited to participate in and fill out their own questionnaires for a 100% response rate. The questionnaire consists of the following parts: sociodemographic information, job satisfaction, job burnout, and turnover intention.

2.2 Methods of Measurement

2.2.1 Job Satisfaction

On the bases of the local actual condition, we collected the job satisfaction information utilizing an adjusted satisfaction scale. The adjusted scale referred for the Minnesota Satisfaction Questionnaire (MSQ) [18], Job Satisfaction Survey (JSS) [19], and Job Descriptive Index (JDI) [20], including 14 items (item 1 to 14) about the satisfaction with the internal environment, external environment, remunerations, management, and work itself. Participants responded to a 5-point Likert scale ranging from 1point (the most unsatisfaction) to 5 points (the most satisfaction). A higher score indicates a higher satisfaction.

2.2.2 Job Burnout

The information of participants' job burnout was gathered with an adjusted 5-point Likert burnout scale according to the Maslach Burnout Inventory-General Survey (MBI-GS) developed by Maslach and Jackson [21]. Several emotion-related items were used to describe participants' burnout experience, including " I'm interested in my job" (item 15, reverse coded), "I'm fit for this job" (item 16, reverse coded), " I think my work is challenging" (item 17), " My work is heavy" (item 18), " I think my work is meaningless" (item 19), " I can't find personal accomplishment in my job" (item 20), "I feel exhausted" (item 21), " I'm indifference of my job" (item 22), and "I feel anxious and fretful" (item 23). A higher score indicates a greater propensity of job burnout.

2.2.3 Turnover Intention

The turnover intention was similarly measured with an adjusted scale in regards to several plan-related items. The items in turnover intention include "I once thought to leave my current organization" (item 24), "It is likely that I shall seek a new job within the next year" (item 25), " I shall accept a new job if I have a chance" (item 26), "I consider that the employment situation is favorable" (item 27), and " I can find a good job" (item 28). Above items were evaluated with a 5-point Likert scale, where 1 represent strongly disagree, 2 represent disagree, 3 represent slightly disagree, 4 represent agree, and 5 represent strongly agree.

2.3 Statistical Analysis

All statistical analyses and hypothesis testing were performed using SPSS version 22.0 and AMOS version 21.0, with two-sided tests. In the first stage, an empirical study was processed to optimize items in each scale, including discrimination tests and collinearity diagnostics. Then, an exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and a Crowns Bach coefficient method were applied to check the discriminant validity and reliability of above-mentioned scales. In the next stage, the

Pearson product-moment correlation coefficients were calculated to analyze the correlations between variables, while a multiple linear regression equation was further established to test the quantitative relation between burnout and turnover intention. Last, the effect of job burnout on turnover intention via satisfaction was examined using path analysis techniques within structural equation modeling (SEM) with maximum likelihood estimation. The goodness-of-fit of the model was evaluated with chi-square statistic, the goodness of fit index (GFI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), the non-normed fit index (NNFI), and the incremental fit index (IFI).

3 Results

3.1 Profile of Sample

Among all 1279 participants, the mean age, weekly working hours, and period of employment were respectively 37.79±9.44 years, 47.50±27.25 hours, and 15.72±10.81 years. Over half of the participants (66.50%) were female; 79.10% were married; 63% earned 2001-4000 Chinese Renminbi (RMB, US $ 290.9699-581.649) per month. The most frequent occupational title was junior tile (accounting for 46.80%) and the most frequent education level were separately undergraduate degree (accounting for 45.20%) and junior college degree (accounting for 37.10%).

3.2 Tests of the Hypothetical Model

3.2.1 Reliability and Validity Analysis

Before reliability analysis and validity analysis, we applied discrimination tests and collinearity diagnostics to filter optimal items. Although the adjusted satisfaction scale yields high indices of discrimination, there exists strong collinearity from item 1 to item 7, item 12 and item 13. After all comprehensive considerations, we deleted relative

items except item 1. The Cronbach's α of this scale reaches 0.956, indicating satisfactory reliability. Moreover, the modified scale construction is effective measuring by EFA (Kaiser-Meyer-Olkin = 0.928, $P < 0.001$) and suitable for CFA. The model finally fit the data acceptably ($\chi 2/df$=21.883, $P < 0.001$, *GFI* = 0.973, *CFI* = 0.988, *RMSEA* = 0.128, *NNFI* = 0.987, *IFI* = 0.988).

In the adjusted burnout scale, we omitted the items from 15 to 17, 19 and 21 because of a low distinguishability in discriminant analysis. Cronbach's α of this scale was increasing to 0.802. Besides, the adjusted burnout also has a good validity conducted by EFA and CFA ($\chi 2/df$=8.395, $P < 0.001$, *GFI* = 0.993, *CFI* = 0.994, *RMSEA* = 0.076, *NNFI* = 0.994, *IFI* = 0.994).

Similar in the adjusted turnover intention scale, item 27 was removed. The Cronbach's α coefficient for the remaining 4 items (α = 0.865) indicated good internal consistency reliability. And the validity is acceptable ($\chi 2/df$=29.072, $P < 0.001$, *GFI* = 0.980, *CFI* = 0.979, *RMSEA* = 0.148, *NNFI* = 0.978, *IFI* = 0.979).

3.2.2 Correlation Analysis

Table 1 demonstrates the means, standard deviations, and correlation coefficients among three dimensions of job satisfaction, burnout, and turnover intention. As is indicated that job satisfaction has both a significant negative relation with turnover intention (r = -0.414, $P < 0.001$) and job burnout (r = -0.387, $P < 0.001$), verifying the hypothesis 2 and hypothesis 3. Job burnout showed a significant positive correlation with turnover intention (r = 0.797, $P < 0.001$) confirming the hypothesis 1.

Table 2 presents the results of multiple linear regression analyses between job burnout and turnover intention. The item of "anxious and fretful feeling" was found to have the strongest positive correlation to turnover intention (β=1.416, $P < 0.001$) in model 1. Except for it, "a heavy work", "no personal accomplishment", and "indifference" were positively related to turnover intention as well. From model 2 to model 4, we separately controlled the variable of age, education, and monthly income. As shown in model 5, adjusted all variables aforesaid, both age (β= -0.022, P = 0.005)

and monthly income (β= -0.172, P = 0.011) were inversely associated with turnover intention, while education (β= 0.316, P < 0.001) was positively associated with it. The linear regression model is as follows:

$$\text{Turnover intention} = 2.042 + 0.275 \times \text{heavy work} + 0.803 \times \text{no personal accomplishment} + 0.820 \times \text{indifference} + 1.365 \times \text{anxious and fretful} - 0.022 \times \text{age} + 0.316 \times \text{education} - 0.172 \times \text{monthly income}$$

3.2.3 Path Analysis

Figure 2 presents the results of path analysis, in which two influencing factors have significant relationships with turnover intention, but the path coefficients are the opposite. Job burnout could directly affect turnover intention before introducing satisfaction as a mediated variable, whose path coefficient was significant (c = 0.991, P < 0.001) and the explanatory power was 79.0% (R^2 = path coefficient × correlation coefficient, 0.991 × 0.797 = 0.790). The direct path coefficient of job satisfaction was -0.164 (b), predicting 27.7% (R^2 = -0.670 × -0.414) of the variance in turnover intentions.

After adding satisfaction as an intermediary variable factor, burnout's direct effect (c') on turnover decreased to 0.944 (C.R. = 34.304, P < 0.001). The explanatory power was 75.2% (R^2 = 0.944 × 0.797) (Table 3 and Table 1). Identically, job burnout's direct affect satisfaction decreased to -0.315 (C.R. = -13.612, P < 0.001). The mediating effect of satisfaction was significant (P < 0.001) with the path coefficient of -0.524. The mediating effect makes up 21.5% of the total effect (proportion = a × b/c, 0.318 × 0.67/0.991 = 0.215).

Showing in Figure 2, the hypothetical model yield satisfactory values (*GFI* = 0.936, *CFI* = 0.969, *RMSEA* = 0.072, *NNFI* = 0.964, *IFI* = 0.969), indicating credible data fit.

4 Discussion

Along with the rapid economic growth, healthcare facilities and medical technology in China have achieved long-term progress. However, the development neither

necessarily bring about the corresponding health insurance level, nor the high health condition of Chinese citizens. Mainly attributed to an unbalanced regional economic development, unequal right to health care security (or inequities in the allocation of medical resources) occurs between advanced and poverty-stricken cities, as well as urban and rural areas [22]. In terms of human resources, China's cities occupied 9.18 healthcare staff per 1,000 population, while 1.14 in rural [23]. Primary healthcare institutions play an essential role in medical providing and safeguarding among the broadest masses of people. In past decades, the medical quality and service standard in primary medical institutions was continually enhanced with the in-depth development of national medical and health system reform. But most of the basic healthcare staff still encounter with low salary, less independence, and few promotion prospects, which could lead to job burnout, unsatisfaction even turnover [24,25]. Our study was proposed in Huangpi District, an under-development rural area in central China. As a demonstration plot of health-management, Huangpi is famous for its new and unique management model. Medical innovation and reform were performed since 2009, and it has made great progress. Therefore, a study on job burnout and turnover intention conducted here is noted concerned and generally presentative of China.

Earlier researchers have recognized that job burnout positively predicted turnover intention [26,27]. Our result corroborates previous studies, showing that job burnout, a primary cause of turnover intention, strongly composes a positive correlation (r = 0.797). Burnout's explanatory power to turnover reaches up to 79.0%. Regarding the Pearson correlation analysis, although all of the four latent measures in job burnout are positively and significantly associated with turnover intention, only "a heavy work" shows a relatively weak correlation (r = 0.325). The correlation coefficient of "no personal accomplishment", "indifference", and "anxious and fretful" are respectively 0.679, 0.737, and 0.752. It's obvious that satisfaction is limited for its direct effect on turnover intention, whose predictive power is 6.8% with a path coefficient of -0.164. However, satisfaction's mediating effect on turnover intention is considerable. As it turns out, job burnout leads to 79.0% turnover intention, 21.5% of which were affected through modulating satisfaction. This study confirms the partial mediating effect of

satisfaction, indicating that it plays a crucial role between burnout and turnover. That is to say, more attention should be attached to both job burnout and satisfaction.

The turnover rate would be reduced through enhancing healthcare staff's satisfaction in some degree, involving raising income level, providing more advanced-learning opportunities, improving working condition, and enhancing benefits. In order to fully utilize health resources and to improve the healthcare system overall social impacts, governments and concerned departments should emphasize more attention to optimize medical resources allocation [28]. Under market economy conditions, public hospital managers should also establish and consummate hospital operation and management system. As an occupation with high risk, pressure, and skill, healthcare staffs deserve a high payment. However, some studies reveal that there is a huge income gap between Chinese medical staff and developed countries' [29]. The average monthly salary of Chinese health workers in 2017 was about 6669 RMB (approximately $ 969.5428) [30]. It is necessary to adopt a reasonable mechanism of performance incentive and financial management and to set up a good academic atmosphere at the same time. Through this way, employee's motivation and enthusiasm could be improved to some extent.

Apart from it, the turnover intention is noted to be affected by age, education and monthly income significantly. Along with the increasing of age and monthly income, the turnover intention presents a declining tendency (beta value for age and income are respectively -0.037 and -0.232). On the contrary, the turnover intention is increasing with education with the beta value of 0.342. This phenomenon further supports the above view and is consistent with the existing study [31]. In light of the above factors, more focuses need to raise on healthcare providers' psychological states, especially those youth with a high education background and academic qualification. Meanwhile, higher wages of healthcare workers cannot be overemphasized to retain talents.

Although this study contributes to the knowledge base of the turnover intention related to job burnout and satisfaction, it does have several limitations. First, causal relationships among turnover, burnout, and satisfaction should be cautiously interpreted as this is a cross-sectional study. Future research calls for a longitudinal design to

confirm the causal relationships we found. Second, despite credible reliability and validity, the scales we used were adjusted based on the existing general scales. Hence, it needs to be tested and replicated with additional researches.

5 Conclusion

Preliminary findings suggest that job burnout directly contributes to turnover intention, or via the mediating effect of satisfaction. More attention should be paid to basic healthcare staff's burnout and satisfaction, especially those highly educated youth.

Abbreviations

MSQ: Minnesota Satisfaction Questionnaire, **JSS:** Job Satisfaction Survey, **JDI:** Job Descriptive Index, **MBI-GS:** Maslach Burnout Inventory-General Survey, **EFA:** exploratory factor analysis, **CFA:** confirmatory factor analysis, **SEM:** structural equation modeling, **GFI:** the goodness of fit index, **CFI:** the comparative fit index, **RMSEA:** the root mean square error of approximation, **NNFI:** the non-normed fit index, **IFI:** the incremental fit index.

Figure legends

Figure 1. Hypothesized model of burnout, satisfaction, and turnover intention
Figure 2. Path diagram for the hypothetical model

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Contributors

Conceived and designed this evaluation: Li Ran and Xuyu Chen. Wrote this paper: Li Ran. Calculated data: Li Ran, Xuyu Chen, Shuzhen Peng, and Feng Zheng. Performed the study and collected data: Xuyu Chen and Li Ran. Provided with analysis tools: Professor Xiaodong Tan. Mended and approved the final version: Professor Xiaodong Tan and Ruihua Duan. Li Ran and Xuyu Chen contributed equally to this paper.

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Competing interests

None declared.

Patient and public involvement statement

No patient involved.

Patient consent for publication

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Data sharing statement

Data will be provided if necessary.

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	M	SD	Job satisfaction	Job Burnout	Turnover Intention
Job Satisfaction	**23.06**	**5.377**	**1.000**	**-0.387**	**-0.414**
item 1	4.08	0.921	0.882	-0.298	-0.299
item 8	3.63	1.093	0.902	-0.356	-0.401
item 9	3.84	0.963	0.911	-0.370	-0.403
item 10	3.89	0.960	0.889	-0.342	-0.366
item 11	3.71	1.046	0.917	-0.350	-0.393
item 14	3.91	0.941	0.908	-0.386	-0.384
Job Burnout	**10.87**	**4.392**	**-0.387**	**1.000**	**0.797**
item 18	3.42	1.008	-0.134	0.365	0.325
item 20	2.10	0.990	-0.319	0.889	0.679
item 22	2.02	0.996	-0.352	0.911	0.737
item 23	2.16	1.006	-0.373	0.884	0.752
Turnover Intention	**8.97**	**3.614**	**-0.406**	**0.797**	**1.000**
item 24	2.24	1.104	-0.430	0.765	0.881
item 25	1.86	0.869	-0.297	0.763	0.841
item 26	2.45	1.207	-0.403	0.652	0.881
item 28	2.43	1.076	-0.231	0.543	0.788

Notes: $P < 0.01$. M= mean value; SD=standard deviation

Table 1. Pearson correlation among job satisfaction, burnout and turnover intention of primary healthcare workers

	Model 1				Model 2				Model 3				Model 4				Model 5			
	β	SE	*t*	*P*	***β***	SE	*t*	*P*	***β***	SE	*t*	*P*	***β***	SE	*t*	*P*	***β***	SE	*t*	*P*
Con	1.631	0.231	7.052	<0.001	3.109	0.345	9.023	<0.001	0.609	0.326	1.866	0.062	2.284	0.282	8.11	<0.001	2.042	0.454	4.499	<0.001
HW	0.284	0.064	4.432	<0.001	0.289	0.063	4.576	<0.001	0.250	0.064	3.904	<0.001	0.309	0.064	4.837	<0.001	0.275	0.064	4.326	<0.001
NPA	0.756	0.098	7.684	<0.001	0.792	0.097	8.134	<0.001	0.785	0.098	8.017	<0.001	0.755	0.098	7.718	<0.001	0.803	0.097	8.281	<0.001
Ind	0.856	0.121	7.083	<0.001	0.806	0.120	6.735	<0.001	0.858	0.120	7.152	<0.001	<0.001	0.120	7.033	<0.001	0.820	0.119	6.893	<0.001
AF	1.416	0.105	13.434	<0.001	1.383	0.104	13.265	<0.001	1.385	0.105	13.213	<0.001	1.411	0.105	13.465	<0.001	1.365	0.104	13.148	<0.001
Age	--	--	--	--	-0.037	0.006	-5.730	<0.001	--	--	--	--	--	--	--	--	-0.022	0.008	-2.810	0.005
Edu	--	--	--	--	--	---	--	--	0.342	0.078	4.407	<0.001	--	--	--	--	0.316	0.082	3.841	<0.001
MI	--	--	--	--	--	--	--	--	--	--	--	--	-0.232	0.058	-4.015	<0.001	-0.172	0.068	-2.534	0.011
R^2	0.636 (adjusted R^2 = 0.635)				0.645 (adjusted R^2 = 0.644)				0.642 (adjusted R^2 = 0.640)				0.641 （adjusted R^2 = 0.639）				0.650 (adjusted R^2 = 0.648)			
F	557.327 ($P < 0.001$)				463.567 ($P < 0.001$)				456.191 ($P < 0.001$)				454.377 ($P < 0.001$)				337.435 ($P < 0.001$)			

Notes: Con-constant, HW-a heavy work, NPA-no personal accomplishment, Ind-indifference, AF-anxious and fretful, Edu-education, MI-monthly income

Model 2-adjust for age, Model 3-adjust for education, Model 4-adjust for monthly income, Model 5- adjust for variables above

Table 2. Multiple linear regression examining factors associated with turnover intention

Endogenous variables	Exogenous variables	Estimate	C.R.	Direct effect (*P*)	Indirect effect (*P*)	Total effect (*P*)
Turnover intention	Burnout	0.944	34.304	0.944 (< 0.001)	0.052 (< 0.001)	0.996 (< 0.001)
	Satisfaction	-0.164	-6.002	-0.164 (< 0.001)	——	-0.164 (< 0.001)
Satisfaction	Burnout	-0.315	-13.612	-0.315 (< 0.001)	——	-0.315 (< 0.001)

Notes: C.R.- critical ratio

Table 3. The effects in the hypothetical model

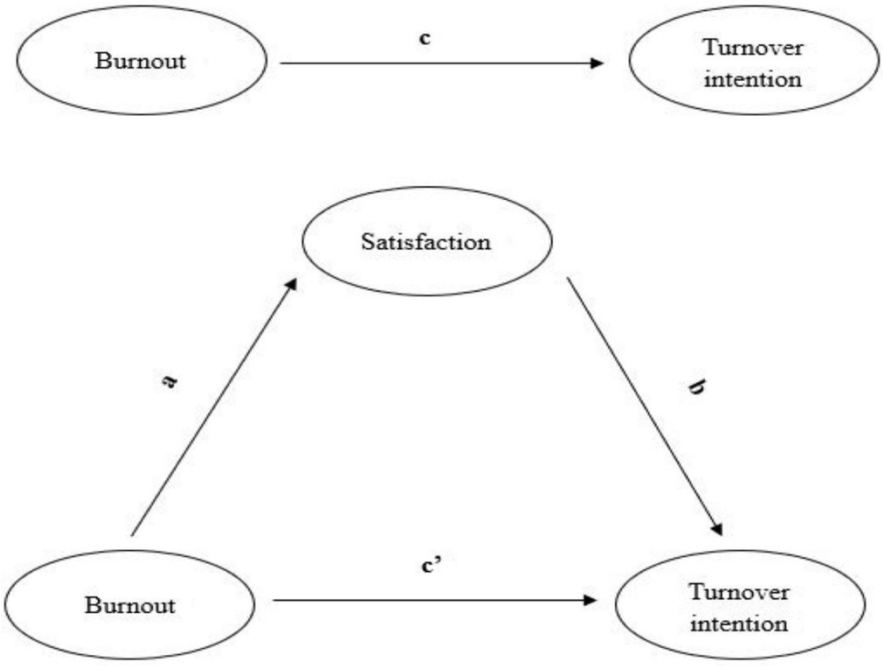

Figure 1. Hypothesized model of burnout, satisfaction, and turnover intention

264x190mm (300 x 300 DPI)

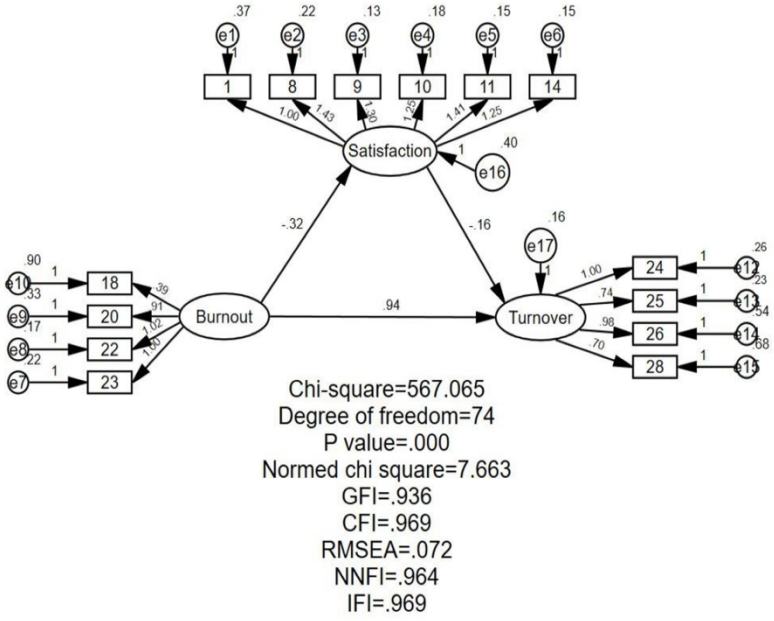

Figure 2. Path diagram for the hypothetical model

264x190mm (300 x 300 DPI)

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-6
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6-7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6-7
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	N/A
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	N/A
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7-8
		(*b*) Describe any methods used to examine subgroups and interactions	7-8
		(*c*) Explain how missing data were addressed	N/A
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A

Continued on next page

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6、8
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	N/A
		Cross-sectional study—Report numbers of outcome events or summary measures	*8*
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	8-10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Job Burnout and Turnover Intention among Chinese Primary Healthcare Staff: The Mediating Effect of Satisfaction

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Abstract

Objectives: Although China has done a lot in strengthening the primary healthcare system, the high turnover intention is still a social problem to be reckoned with. The objective of this study is to explore the mediating effect of satisfaction between job burnout and turnover intention.

Design: Cross-sectional study.

Methods: A cross-sectional study was conducted to make sense of the job burnout, satisfaction, and turnover intention among primary healthcare workers in central China. Structural equation modeling (SEM) was performed to study the mediating effect of satisfaction between job burnout and turnover intention with maximum likelihood estimation. The mediation effect test was carried out by using the bootstrap method.

Results: SEM showed that job burnout was positively related to the turnover intention with the standard path coefficient of 0.857 (C.R. = 34.304, $P < 0.001$). The partial mediating effect of satisfaction was 0.047, making up 5.20% of the total effect. The goodness-of-fit was acceptable (*GFI* = 0.936, *CFI* = 0.969, *RMSEA* = 0.072, *NNFI* = 0.964, *IFI* = 0.969). Age, education level, monthly income, hire form, and night shift were also found significantly correlated with turnover intention, and no difference was found between physicians and nurses.

Conclusions: The turnover intention is significantly affected by job burnout, satisfaction, and demographic characteristics including age, education level, monthly income, hire form, and night shift. Satisfaction can be regarded as a mediator between job burnout and turnover intention. Relative measures can be taken to promote enthusiasm and satisfaction thus decreasing the turnover rate.

Keywords: Burnout; Job Satisfaction; Turnover Intention; Mediating Effect; Healthcare

Strengths and limitations of this study

- Structural equation modeling is adopted so that the qualitative and quantitative analyses can explore the relationship between job burnout, satisfaction, and turnover intention.
- A multiple-group analysis was conducted between the physicians and nurses guaranteeing the applicability.
- This study summarizes the influence demographic characteristics posed on the turnover intention among China's primary healthcare workers, enriching the study content.
- The reliability of structural equation modeling is repeatedly tested.
- Inability to accurately discuss the representativeness of the cross-sectional study.

1 Background

Health and medical personnel play a seminal role in fulfilling the healthcare needs of the entire population, therefore, a robust allocation of human resources maintains the health system running smoothly and also guarantees people accessing to healthcare priority equally [1]. Unfortunately, the current out-of-balance between healthcare staff supply and demand has challenged this priority and triggered a global problem of continual brain drain. Up to 2013, the scarcity of healthcare workers (including physicians, nurses, and midwives) worldwide was estimated at 7.2 million, and it will sharply rising to 12.9 million by 2035 [2].

As a developing country with a huge population, China's shortage of health workforce has posed one of the major obstacles to primary healthcare services. According to the *China health statistics yearbook*, there are only 0.46 pediatricians per 1,000 children, much lower than the staff allocation standard of 2.06. Equally consistent is the finding that the number of anesthesiologists per 10,000 people is less than 0.65, while the number in some developed countries in Europe is 2.5 to 3 [3]. To make matters worse, primary healthcare workers are generally confronted with the challenge of high turnover intention, which has become a social problem to be reckoned with [4]. Results of a survey show that from 2010 to 2016, the proportion of Chinese primary healthcare staff decreased from 44% to 33% [5]. Moreover, the average turnover rate of nurses in first-class tertiary hospitals is 5.8% in China, which goes up to 8-10% in economically advanced regions like Shanghai and Guangzhou [6]. Under this circumstance, the turnover intention has been an important and popular study subject in psychology and management field.

Turnover intention reflects an individual's conscious and deliberate willfulness to quit one's job or organization within a certain period, which would possibly pose a major problem in healthcare system resulting in a high turnover rate [7-9]. That is to say, the turnover intention is the strongest cognitive precursor of turnover, directly affecting the choice of departure. Because of a considerable number of predictive modeling formulas of voluntary turnover has been established, researchers generally recognized and supported that several hypothesized variables are associated with the intention to leave, involving commuting stress, emotional intelligence, job stress, job burnout, and job satisfaction [10-13]. Among the hypothesized linkages above, job burnout and satisfaction are the most common proposed antecedents.

In the late 1980s, Pines and Aronson defined job burnout as a state of physical, emotional, and mental exhaustion [14,15]. It describes the individuals' psychological response to prolonged interpersonal and chronic emotional stressors, dominantly caused by a long-term involvement in emotionally demanding situations [16]. Job burnout can be categorized into three dimensions, including emotional exhaustion, depersonalization, and the sense of reduced personalized accomplishment. Looking from the former researches, job burnout has a strong positive relationship with turnover intention whereas a negative relation with job satisfaction [17,18]. Job satisfaction encompasses employees' feelings and thoughts about various aspects of their job. In other words, job satisfaction refers to an individual's cognitive or effective evaluation of his or her occupational duties, presenting the extent people like the job and reflecting the effective judgments people hold toward their work condition [19,20]. Numerous studies have repeatedly verified that job satisfaction is inversely related to turnover and intent to leave. In addition to direct effects, we propose that job satisfaction serves as a mediator through which job burnout affects turnover intention as well. Yet, there is still a lack of literature supporting our hypothesis, hence, it is necessary to conduct this study to make up the gap.

Taken together, the theoretical framework utilized in this study originated from researches suggesting that turnover intention maybe both related to satisfaction and burnout toward the job. Accordingly, we hypothesized that:

H1: Job burnout is positively related to turnover intention.

H2: Job satisfaction is negatively related to turnover intention.

H3: Job satisfaction is negatively related to job burnout.

H4: Job satisfaction has a mediating effect between job burnout and turnover intention.

As shown in Figure 1, we tested this theoretical model with the data from primary healthcare staff in central China to explore the mediating effect of satisfaction.

2 Methods

2.1 Design and Sample

In this investigation, we utilized survey research methods to make sense of the job burnout, satisfaction, and turnover intention of primary healthcare staff. From March to May 2019, a cross-sectional study was conducted in Huangpi District of Wuhan in central China. The sample size was estimated with the average detection rate of burnout in China with the equation: $n = Z_{(\alpha/2)}{}^2 \times p \times (1-p)/\delta^2$, where α is 0.05, δ is 0.08, and

p is 55%. To compensate for the non-response rate, the sample was increased by 10% with a final sample size of 540. Participants involved met the following inclusion criteria: ① working for at least 6 months; ② did not have a mental illness or obstacle in communication; and ③ volunteered to participate in the survey. All participants were recruited face-to-face, and the study data was anonymous to protect privacy. Ethical approval for this study was granted by the Research Ethics Boards of Wuhan University, and informed consent was obtained. The questionnaire comprised following sections: sociodemographic information, job satisfaction, job burnout, and turnover intention. (See detail in Appendix)

2.2 Methods of Measurement

2.2.1 Job Satisfaction

On the bases of the local actual condition, we collected the job satisfaction information utilizing an adjusted satisfaction scale. The adjusted scale referred for the Minnesota Satisfaction Questionnaire (MSQ) [21], Job Satisfaction Survey (JSS) [22], and Job Descriptive Index (JDI) [23], including 14 items (item 1 to 14) about the satisfaction with the internal environment, external environment, remunerations, management, and work itself. Participants responded to a 5-point Likert scale ranging from 1point (the most unsatisfaction) to 5 points (the most satisfaction). A higher score indicates a higher satisfaction.

2.2.2 Job Burnout

The information on participants' job burnout was gathered with an adjusted 5-point Likert burnout scale according to the Maslach Burnout Inventory-General Survey (MBI-GS) developed by Maslach and Jackson [24]. Several emotion-related items were used to describe participants' burnout experience, including " I'm interested in my job" (item 15, reverse coded), "I'm fit for this job" (item 16, reverse coded), " I think my work is challenging" (item 17), " My work is heavy" (item 18), " I think my work is meaningless" (item 19), " I can't find personal accomplishment in my job" (item 20), "I feel exhausted" (item 21), " I'm indifference of my job" (item 22), and "I feel anxious and fretful" (item 23). A higher score indicates a greater propensity for job burnout.

2.2.3 Turnover Intention

The turnover intention was similarly measured with an adjusted scale concerning several plan-related items. The adjusted scale referred for a six-item version of the

turnover intention scale (TIS-6) explored by Griffeth [25]. The items include "I once thought to leave my current organization" (item 24), "I shall likely seek a new job within the next year" (item 25), " I shall accept a new job if I have a chance" (item 26), "I consider that the employment situation is favorable" (item 27), and "I can find a good job" (item 28). The above items were evaluated with a 5-point Likert scale, where 1 represents strongly disagree, 2 represents disagree, 3 represents slightly disagree, 4 represents agree, and 5 represents strongly agree.

2.3 Statistical Analysis

All statistical analyses and hypothesis testing were performed using SPSS version 22.0 and AMOS version 21.0, with two-sided tests. In the first stage, an empirical study was processed to optimize items in each scale, including discrimination tests and collinearity diagnostics. Then, an exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and a Cronbach's alpha coefficient method were applied to check the discriminant validity and reliability of above-mentioned scales. In the next stage, the Pearson product-moment correlation coefficients were calculated to analyze the correlations between variables. Last, the effect of job burnout on turnover intention via satisfaction was examined using a structural equation modeling (SEM) with maximum likelihood estimation. The mediation effect test was carried out by using the bootstrap method. The goodness-of-fit of the model was evaluated with chi-square statistic, the goodness of fit index (GFI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), the non-normed fit index (NNFI), and the incremental fit index (IFI).

2.4 Patient and public involvement

Participants were not involved in development of the research question and outcome measures, study design or conduct of this study.

3 Results

3.1 Profile of Sample

A total of 1300 electronic questionnaires were sent out, and 1279 eligible participants left after deleting those with uncompleted or suspected unreal answers. The effective rate is 98.38%. As shown in Table 1, over half of the participants (66.50%) were female; 79.12% were married; 43.55% were physicians and 41.83% were nurses; 63.02% earned 2001-4000 Chinese Renminbi (RMB, US $ 290.97-581.65) per month. The most frequent occupational title was junior tile (accounting for 46.76%) and the most

frequent education level was separately undergraduate degree and above (accounting for 47.46%) and junior college degree (accounting for 37.06%). The prevalence rate of satisfaction, job burnout, and turnover intention was separately 79.99%, 18.69%, and 26.04%. The median (range) score of satisfaction, job burnout, and turnover intention was 52 (13-65), 22 (9-37), and 12 (5-25).

3.2 Tests of the Hypothetical Model

3.2.1 Reliability and Validity Analysis

Before reliability analysis and validity analysis, we applied discrimination tests and collinearity diagnostics to filter optimal items. Although the adjusted satisfaction scale yields high indices of discrimination, there exists strong collinearity from item 1 to item 7, item 12, and item 13. After all comprehensive considerations, we deleted relative items except item 1. The Cronbach's α of this scale reaches 0.956, indicating satisfactory reliability. Moreover, the modified scale construction is effective measuring by EFA (Kaiser-Meyer-Olkin = 0.928, $P < 0.001$) and suitable for CFA. The model finally fit the data acceptably ($\chi 2/df$=21.883, $P < 0.001$, GFI = 0.973, CFI = 0.988, $RMSEA$ = 0.128, $NNFI$ = 0.987, IFI = 0.988).

In the adjusted burnout scale, we omitted the items from 15 to 17, 19, and 21 because of a low distinguishability in discriminant analysis. Cronbach's α of this scale was increasing to 0.802. Besides, the adjusted burnout also has a good validity conducted by EFA and CFA ($\chi 2/df$=8.395, $P < 0.001$, GFI = 0.993, CFI = 0.994, $RMSEA$ = 0.076, $NNFI$ = 0.994, IFI = 0.994).

Similar in the adjusted turnover intention scale, item 27 was removed. The Cronbach's α coefficient for the remaining 4 items (α = 0.865) indicated good internal consistency reliability. And the validity is acceptable ($\chi 2/df$=29.072, $P < 0.001$, GFI = 0.980, CFI = 0.979, $RMSEA$ = 0.148, $NNFI$ = 0.978, IFI = 0.979).

3.2.2 Correlation Analysis

Table 2 demonstrates the means, standard deviations, and correlation coefficients among three dimensions of job satisfaction, burnout, and turnover intention. As is indicated that job satisfaction has both a significant negative relation with turnover intention (r = -0.414, $P < 0.001$) and job burnout (r = -0.387, $P < 0.001$). Job burnout showed a significant positive correlation with turnover intention (r = 0.797, $P < 0.001$).

3.2.3 Structural Equation Model

As can be seen in Figure 2 and Table 3, three latent variables in the model were

significantly intercorrelated. The standardized path coefficient of path a (Job burnout →Satisfaction), b (Satisfaction→Turnover intention), and c' (Job burnout→Turnover intention) was respectively -0.406 (C.R. = -14.254, $P < 0.001$), -0.116 (C.R. = -6.054, $P < 0.001$), and 0.857 (C.R. = 34.304, $P < 0.001$). Taken path a as an example, it means that for each one unit decrease in the job burnout, the change in satisfaction increases by 0.406. The mediating effect of satisfaction was significant ($P < 0.001$) with the path coefficient of 0.047, making up 5.20% of the total effect (proportion = a×b/c, 0.406 ×0.116/0.906 = 0.052). The hypothetical model yields satisfactory values (*GFI* = 0.936, *CFI* = 0.969, *RMSEA* = 0.072, *NNFI* = 0.964, *IFI* = 0.969), indicating credible data fit.

Variables such as age, education, income, etc. were introduced in the model to further research on the influences. Figure 3 illustrates the standardized path coefficient between each variable. Educational level, monthly income, and hire form showed a direct (r= 0.078, -0.037, 0.047 respectively) and indirect (r= 0.008, -0.018, 0.015 respectively) effect on turnover intention. Also, age and nigh shift could affect turnover intention through job burnout with the standard path coefficient of -0.112 and 0.064. This model also showed a good fit to the data: *GFI* = 0.939, *CFI* = 0.965, *RMSEA* = 0.059, *NNFI* = 0.957, *IFI* = 0.965.

To further deal with the stability of the model, a multiple-group analysis was conducted between the physicians and nurses. Table 4 summarizes the testing for invariant factorial structure between physicians and nurses. The *P* values of the model of measurement weights and structural weights were separately 0.30 and 0.35, confirming the stability. Although *P* values were lower than 0.05 in the model of structural covariances, structural residuals, and measurement residuals, incredibly small variations were presented in indices of fit (all variations change <0.05). Therefore, the model can be regarded as stable in physicians and nurses.

4 Discussion

Our study demonstrated that the prevalence rate of job burnout and turnover intention was respectively 18.69% and 26.04% in Huangpi District. The results are quite consistent with previous researches in China [26,27]. As we know, Huangpi District is an under-development rural area in central China, whose medical resources and clinical ability represent the averaged level in China. Medical innovation and reform were performed since 2009, and from that time Huangpi District is famous for its new and unique management model as a demonstration plot of health-management. Therefore,

a study on job burnout and turnover intention conducted here is noted concerned.

In line with earlier studies, our results recognized that job burnout positively predicted turnover intention, with an explanatory power up to 68.30% [28,29]. For job burnout and its four latent measures, “no personal accomplishment”, “indifference”, and “anxious and fretful” show a strong correlation with burnout except for “a heavy work”. It is generally believed that burnout is intrinsically related to work factors and secondly to personality factors [30]. Hence, it is necessary for hospital managers to think about the role confilict and the way to solve emotional exhaustion and reduced personalized accomplishment. It was additionally found that satisfaction could directly or indirectly affect turnover intention, although its direct effect and mediating effect were relatively limited. The present study helps illuminate the relations between burnout, satisfaction, and turnover that were not apparent before, as most previous studies focused on satisfaction’s direct impact on turnover instead of a mediator [31,32]. This study confirms the partial mediating effect of satisfaction. Accordingly, more attention should be attached to both job burnout and satisfaction. Considering the items contained in the satisfaction, the improvement of working conditions, welfares, advanced-learning opportunities, and reward mechanisms is worthy of concern.

Apart from it, the turnover intention is noted to be affected by age, education level, monthly income, hire form, and night shift directly or through the mediators of satisfaction and burnout. This influence shows no difference between physicians and nurses. It is generally known that primary healthcare institutions play an essential role in medical providing and safeguarding among the broadest masses of people. In past decades, the medical quality and service standard in primary medical institutions was continually enhanced with the in-depth development of national medical and health system reform. But most of the basic healthcare staff in China still encounter low salaries, less independence, and few promotion prospects, which could lead to job burnout, unsatisfaction even turnover [33,34]. To fully utilize health resources and to improve the healthcare system's overall social impacts, governments and concerned departments should emphasize more attention to optimize medical resources allocation [35]. Under market economy conditions, public hospital managers should also establish and consummate hospital operation and management systems. As an occupation with high risk, pressure, and skill, healthcare staffs deserve a high payment. However, some studies reveal that there is a huge income gap between China and

developed countries [36]. The average monthly salary of Chinese health workers in 2017 was about 6669 RMB (approximately $ 969.54) [37]. It is necessary to adopt a reasonable mechanism of performance incentive and financial management, to regulate and optimize nigh-shift works, and to set up a good academic atmosphere at the same time. Besides, more focuses need to raise on healthcare providers' psychological states, especially those youth with high educational background and academic qualification. In this way, the employee's motivation and enthusiasm could be improved to some extent.

Although this study contributes to the knowledge base of the turnover intention related to job burnout and satisfaction, it does have several limitations. First, causal relationships among turnover, burnout, and satisfaction should be cautiously interpreted as this is a cross-sectional study. Second, despite credible reliability and validity, the scales we used were adjusted based on the existing general scales. Hence, it needs to be tested and replicated with additional researches. Third, other potential predictors such as work stress, social support, and mental health were not captured in our questionnaire. We will continue this study in the future to overcome the shortages.

5 Conclusion

The current findings indicate a positive association between job burnout and turnover intention, while a negative relation between job burnout and satisfaction, as well as satisfaction and turnover intention. Also, satisfaction can be regarded as a mediator between job burnout and turnover intention, whose partial mediating effect is 5.20%. Age, education level, monthly income, hire form, and night shift also influence the turnover intention, hence, relative measures can be taken to promote enthusiasm and satisfaction thus decreasing the turnover rate.

Abbreviations

MSQ: Minnesota Satisfaction Questionnaire, **JSS:** Job Satisfaction Survey, **JDI:** Job Descriptive Index, **MBI-GS:** Maslach Burnout Inventory-General Survey, **EFA:** exploratory factor analysis, **CFA:** confirmatory factor analysis, **SEM:** structural equation modeling, **GFI:** the goodness of fit index, **CFI:** the comparative fit index, **RMSEA:** the root mean square error of approximation, **NNFI:** the non-normed fit index, **IFI:** the incremental fit index.

Figure legends

Figure 1. Hypothesized model of burnout, satisfaction, and turnover intention

Figure 2. The structural equation modeling for the hypothetical model

Figure 3. The structural equation modeling after introducing demographic characteristic

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Contributors

Conceived and designed this paper: Li Ran. Wrote this paper: Li Ran. Calculated data: Li Ran, Xuyu Chen, Shuzhen Peng, and Feng Zheng. Performed the study and collected data: Xuyu Chen and Li Ran. Provided with analysis tools: Professor Xiaodong Tan. Mended and approved the final version: Professor Xiaodong Tan and Ruihua Duan.

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Ethics approval and consent to participate

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Competing interests

The authors declare that they have no competing interests.

Patient consent for publication

Not required.

Data sharing statement

Data may be made available by contacting the corresponding author.

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Table 1. Description of the respondents (n=1279)

Variables	N (%)	Satisfaction		Job Burnout		Turnover Intention	
		Prevalence rate (%)	x^2	Prevalence rate (%)	x^2	Prevalence rate (%)	x^2
Sex			0.016		3.233		2.328
male	429 (33.50)	26.9		7.19		9.62	
female	850 (66.50)	53.09		11.5		16.42	
Age (years)			13.853**		33.398**		55.014**
⩽30	380 (29.71)	23.31		7.74		10.48	
31-40	366 (28.62)	21.5		5.79		8.99	
41-50	436 (34.09)	28.46		4.85		5.94	
⩾51	97 (7.58)	6.72		0.31		0.63	
Occupation			2.562		3.045		3.698
physician	557 (43.55)	34.4		8.29		12.28	
nurse	535 (41.83)	34.09		7.27		10.63	
specialists in laboratory medicine	89 (6.96)	5.71		1.72		1.41	
public health physician	65 (5.08)	3.83		0.86		1.17	
pharmacist	33 (2.55)	1.95		0.55		0.55	
Educational level			4.146		7.692		23.072**
junior school and below	16 (1.25)	0.94		0.31		0.39	
high school/technical school	182 (14.23)	11.73		1.8		1.88	
junior college degree	474 (37.06)	30.34		6.57		9.23	
undergraduate degree and above	607 (47.46)	36.98		10.01		14.54	
Marital status			8.618		13.308*		26.538**
married	1012 (79.12)	64.12		13.29		18.22	
unmarried	227 (17.75)	13.76		4.77		6.96	
divorced/Widowed	40 (3.13)	2.11		0.63		0.86	

Technical post title			8.8	7.039		4.691
no title	286 (22.36)	18.45		4.53	6.25	
junior title	598 (46.76)	36.75		9.23	12.9	
intermediate title	288 (22.52)	17.36		4.07	5.16	
senior title	107 (8.36)	7.43		0.86	1.73	
Monthly income (RMB)			16.713**	12.166*		19.817**
⩽2000	71 (5.55)	3.99		1.25	2.19	
2001-3000	339 (26.51)	19.55		6.18	8.61	
3001-4000	467 (36.51)	30.18		6.25	8.05	
4001-5000	266 (20.80)	17.51		2.74	4.69	
⩾5001	136 (10.63)	8.76		2.27	2.5	
Hire from			5.467	9.631*		19.637**
personnel agent staff	171 (13.37)	52.15		10.63	14.78	
permanent staff	825 (64.50)	9.93		3.45	5.08	
contract staff	173 (13.53)	10.87		2.58	3.29	
temporary staff	110 (8.60)	7.04		2.03	2.89	
Working time (hours/week)			30.865**	34.103**		37.055**
⩽30	15 (1.17)	0.78		0.39	0.47	
31-40	629 (49.18)	41.91		6.25	9.38	
41-50	427 (33.39)	26.19		7.35	9.93	
⩾51	208 (16.26)	11.11		4.69	6.25	
Working years			13.485**	26.683**		44.637**
1-5	326 (25.49)	20.17		6.57	8.99	
6-10	202 (15.79)	11.57		3.21	5.39	
11-15	115 (8.99)	7.04		1.95	2.51	
16-20	201 (15.72)	12.28		3.05	3.68	
⩾21	435 (34.01)	28.93		3.91	5.47	
Night shift			3.406	18.827**		17.374**
0	769 (60.13)	49.02		9.07	13.21	

1-3	471 (36.83)	28.46		8.6		11.65	
>3	39 (3.04)	2.51		1.02		1.18	
Total	**1279 (100)**	**79.99**	**——**	**18.69**	**——**	**26.04**	**——**

Notes: * P <0.05, ** P <0.01

Table 2. Pearson correlation among job satisfaction, burnout, and turnover intention of primary healthcare workers

	M	SD	Job Satisfaction	Job Burnout	Turnover Intention
Job Satisfaction	**23.06**	**5.377**	**1.000**	**-0.387**	**-0.414**
Working environment	4.08	0.921	0.882	-0.298	-0.299
Welfare	3.63	1.093	0.902	-0.356	-0.401
Prospect of my job	3.84	0.963	0.911	-0.370	-0.403
Training and learning opportunities	3.89	0.960	0.889	-0.342	-0.366
Income distribution	3.71	1.046	0.917	-0.350	-0.393
Management system and business process	3.91	0.941	0.908	-0.386	-0.384
Job Burnout	**10.87**	**4.392**	**-0.387**	**1.000**	**0.797**
My work is heavy	3.42	1.008	-0.134	0.365	0.325
I can't find personal accomplishment in my job	2.10	0.990	-0.319	0.889	0.679
I'm indifference of my job	2.02	0.996	-0.352	0.911	0.737
I feel anxious and fretful	2.16	1.006	-0.373	0.884	0.752
Turnover Intention	**8.97**	**3.614**	**-0.414**	**0.797**	**1.000**
I once thought to leave my current organization	2.24	1.104	-0.430	0.765	0.881
I shall likely seek a new job within the next year	1.86	0.869	-0.297	0.763	0.841
I shall accept a new job if I have a chance	2.45	1.207	-0.403	0.652	0.881
I can find a good job	2.43	1.076	-0.231	0.543	0.788

Notes: All $P_s < 0.01$. M- mean value; SD- standard deviation

Table 3. The standard effects in the hypothetical model

Endogenous variables	Exogenous variables	Estimate	C.R.	Direct effect (*P*)	Indirect effect (*P*)	Total effect (*P*)
Turnover intention	Burnout	0.857	34.304	0.857 (< 0.001)	0.047 (< 0.001)	0.904 (< 0.001)
	Satisfaction	-0.116	-6.054	-0.116 (< 0.001)	——	-0.116 (< 0.001)
Satisfaction	Burnout	-0.406	-14.254	-0.406 (< 0.001)	——	-0.406 (< 0.001)

Notes: C.R.- critical ratios

Table 4. Testing for invariant factorial structure of a measuring instrument

Model	delta-x^2	delta-df	*P*	delta-x^2/df	delta-GFI	delta-AGFI	delta-NFI	delta-RFI	delta-IFI	delta-TLI
Measurement weights	12.868	11	0.30	-0.001	0.002	-0.001	0.002	-0.001	0.002	0
Structural weights	23.876	22	0.35	-0.002	0.005	-0.002	0.004	-0.001	0.003	0
Structural covariances	96.197	36	< 0.05	-0.007	0.003	-0.006	0.002	-0.004	0.002	-0.003
Structural residuals	99.981	39	< 0.05	-0.007	0.003	-0.006	0.002	-0.004	0.002	-0.003
Measurement residuals	199.256	53	< 0.05	-0.016	-0.003	-0.012	-0.001	-0.009	-0.001	-0.008

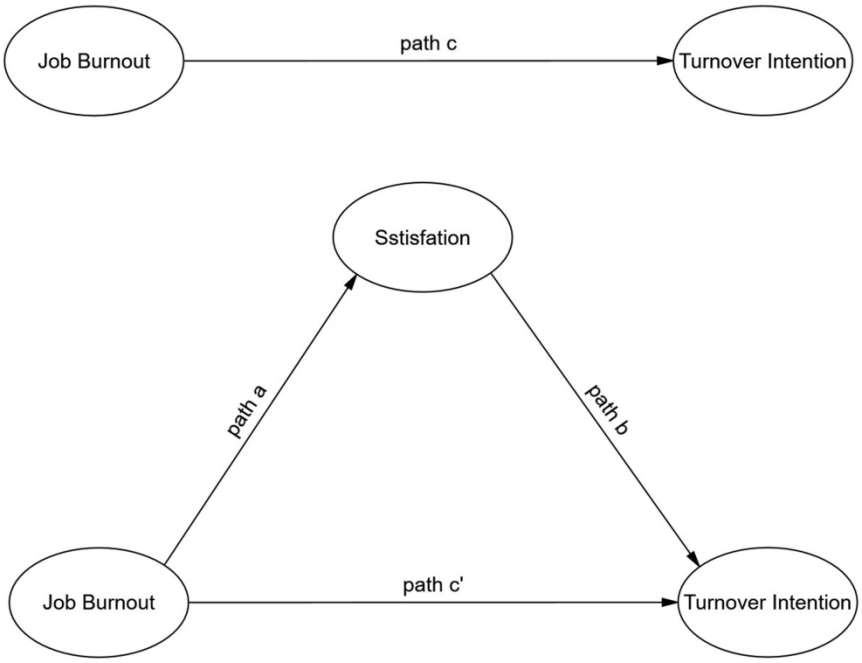

Figure 1. Hypothesized model of burnout, satisfaction, and turnover intention

370x370mm (300 x 300 DPI)

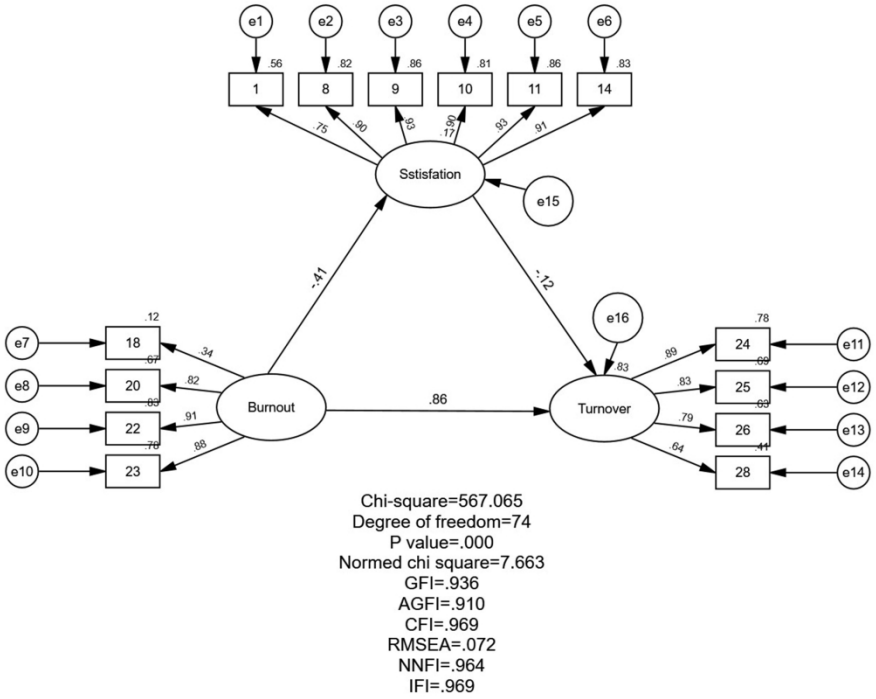

Figure 2. The structural equation modeling for the hypothetical model

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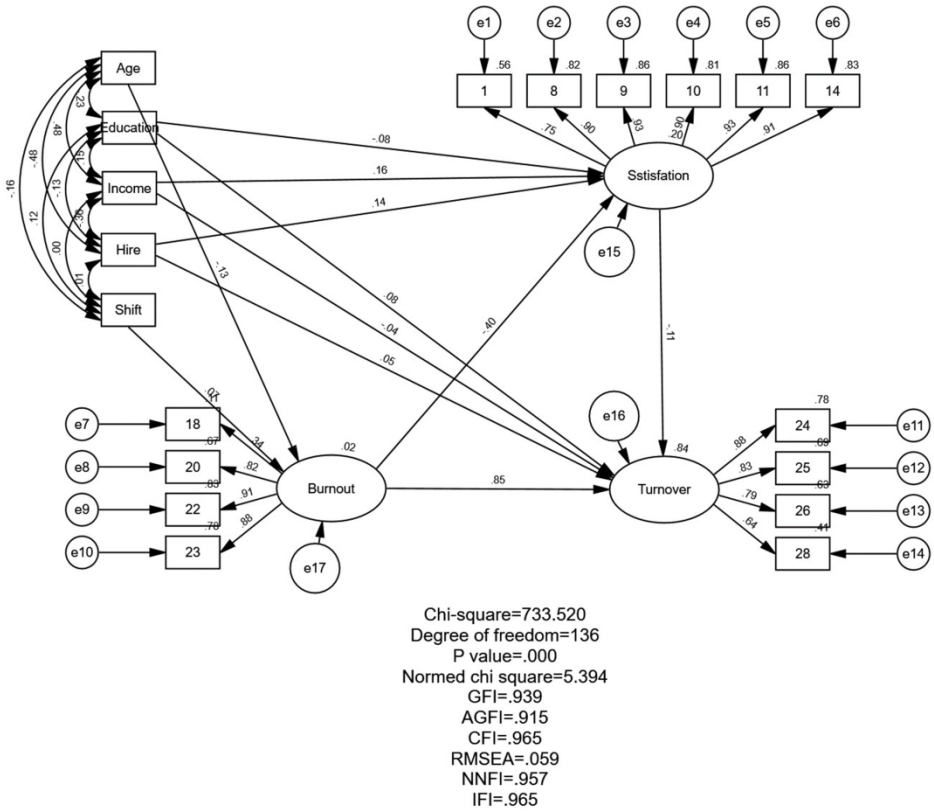

Figure 3. The structural equation modeling after introducing demographic characteristic

370x370mm (300 x 300 DPI)

Dear medical staff,

Attention, please! We are students at Wuhan University. To realize the job burnout, job satisfaction, and turnover intention of medical staff, and provide a reference for administration, we sincerely invite you to conduct a questionnaire survey. This research will not harm your health and will not affect your current work. All your information will be treated in strict confidence and kept by the investigator. There are 41 questions in the questionnaire. Please answer the questions based on real conditions.

Thank you for your active participation again!

Q1 Would you like to participate in this survey? yes☐ no☐

If yes, please fill in the following question. If no, the investigation ends.

Q2 Hospital Name: _____

Q3 Gender: male☐ female☐

Q4 Age: _____ years

Q5 Educational level: Junior school and below☐ High school/Technical school☐ Junior college degree ☐ Undergraduate degree and above☐

Q6 Marital status: Married☐ Unmarried☐ Divorced/Widowed☐

Q7 Occupation: Physician☐ Nurse☐ Specialists in laboratory medicine☐ Public health physician☐ Pharmacist☐

Q8 Technical post title: No title☐ Junior title☐ Intermediate title☐ Senior title☐

Q9 Monthly income (RMB): ⩽2000 ☐ 2001-3000☐ 3001-4000☐ 4001-5000☐ ⩾5001☐

Q10 Hire from: Personnel agent staff ☐ Permanent staff☐ Contract staff☐ Temporary staff☐

Q11 Working time (hours per week): _____

Q12 Working years: _____

Q13 Night shift (per week): 0☐ 1-3☐ >3☐

About job satisfaction:

Q14 I feel comfortable about the working environment (office environment, virescence, light, ventilation, et.): [item 1]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q15 Sufficient technical equipment (professional information inquiry resources, instruments, etc.) for work use: [item 2]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q16 Harmonious interpersonal relationship (between superiors and subordinates): [item 3]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q17 Good cooperation between different departments: [item 4]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q18 The atmosphere is good: [item 5]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q19 The leadership is good: [item 6]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q20 I am satisfied with current income level: [item 7]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q21 I am satisfied with the welfare: [item 8]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q22 I am satisfied with the prospect of my job: [item 9]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q23 I am satisfied with the training and learning opportunities offered (frequency, form, and content): [item 10]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q24 The income distribution is reasonable: [item 11]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q25 The performance reward mechanism is reasonable: [item 12]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q26 The performance reward system has achieved good results: [item13]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q27 The management system and business process are good: [item 14]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

About job burnout:

Q28 I'm interested in my job: [item 15]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q29 I'm fit for this job: [item 16]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q30 I think my work is challenging: [item 17]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q31 My work is heavy: [item 18]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q32 I think my work is meaningless: [item 19]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q33 I can't find personal accomplishment in my job: [item 20]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q34 I feel exhausted: [item 21]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q35 I'm indifference of my job: [item 22]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q36 I feel anxious and fretful: [item 23]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

About turnover intention:

Q37 I once thought to leave my current organization: [item 24]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q38 I shall likely seek a new job within the next year: [item 25]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q39 I shall accept a new job if I have a chance: [item 26]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q40 I consider that the employment situation is favorable: [item 27]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q41 I can find a good job: [item 28]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Thank you for your participation!

Survey date: _____Y/_____M/_____D

Questionnaire coding: _____

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-6
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6-7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6-7
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	N/A
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	N/A
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7-8
		(*b*) Describe any methods used to examine subgroups and interactions	7-8
		(*c*) Explain how missing data were addressed	N/A
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A

Continued on next page

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6、8
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	N/A
		Cross-sectional study—Report numbers of outcome events or summary measures	*8*
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	8-10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Job Burnout and Turnover Intention among Chinese Primary Healthcare Staff: The Mediating Effect of Satisfaction

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Abstract

Objectives: Although China has done a lot in strengthening the primary healthcare system, the high turnover intention is still a social problem to be reckoned with. The objective of this study is to explore the mediating effect of satisfaction between job burnout and turnover intention.

Design: Cross-sectional study.

Methods: A cross-sectional study was conducted to make sense of the job burnout, satisfaction, and turnover intention among primary healthcare workers in central China. Structural equation modeling (SEM) was performed to study the mediating effect of satisfaction between job burnout and turnover intention with maximum likelihood estimation. The mediation effect test was carried out by using the bootstrap method.

Results: SEM showed that job burnout was positively related to the turnover intention with the standard path coefficient of 0.845 (C.R. = 34.055, $P < 0.001$). The partial mediating effect of satisfaction was 0.047, making up 5.32% of the total effect. The goodness-of-fit was acceptable (*GFI* = 0.947, *CFI* = 0.975, *RMSEA* = 0.067, *NNFI* = 0.971, *IFI* = 0.975). Age, education level, monthly income, hire form, and night shift were also found significantly correlated with turnover intention, and no difference was found between physicians and nurses.

Conclusions: The turnover intention is significantly affected by job burnout, satisfaction, and demographic characteristics including age, education level, monthly income, hire form, and night shift. Satisfaction can be regarded as a mediator between job burnout and turnover intention. Relative measures can be taken to promote enthusiasm and satisfaction thus decreasing the turnover rate.

Keywords: Burnout; Job Satisfaction; Turnover Intention; Mediating Effect; Healthcare

Strengths and limitations of this study

- Structural equation modeling is adopted so that the qualitative and quantitative analyses can explore the relationship between job burnout, satisfaction, and turnover intention.
- A multiple-group analysis was conducted between the physicians and nurses guaranteeing the applicability.
- This study summarizes the influence demographic characteristics posed on the turnover intention among China's primary healthcare workers, enriching the study content.
- The reliability of structural equation modeling is repeatedly tested.
- Inability to accurately discuss the representativeness of the cross-sectional study.

1 Background

Health and medical personnel play a seminal role in fulfilling the healthcare needs of the entire population, therefore, a robust allocation of human resources maintains the health system running smoothly and also guarantees people accessing to healthcare priority equally [1]. Unfortunately, the current out-of-balance between healthcare staff supply and demand has challenged this priority and triggered a global problem of continual brain drain. Up to 2013, the scarcity of healthcare workers (including physicians, nurses, and midwives) worldwide was estimated at 7.2 million, and it will sharply rising to 12.9 million by 2035 [2].

As a developing country with a huge population, China's shortage of health workforce has posed one of the major obstacles to primary healthcare services. According to the *China health statistics yearbook*, there are only 0.46 pediatricians per 1,000 children, much lower than the goal number of 2.06 per 1,000 children. Equally consistent is the finding that the number of anesthesiologists per 10,000 people is less than 0.65, while the number in some developed countries in Europe is 2.5 to 3 [3]. To make matters worse, primary healthcare workers are generally confronted with the challenge of high turnover intention, which has become a social problem to be reckoned with [4]. Results of a survey show that from 2010 to 2016, the proportion of Chinese primary healthcare staff decreased from 44% to 33% [5]. Moreover, the average turnover rate of nurses in first-class tertiary hospitals is 5.8% in China, which goes up to 8-10% in economically advanced regions like Shanghai and Guangzhou [6]. Under this circumstance, the turnover intention has been an important and popular study subject in psychology and management field.

Turnover intention reflects an individual's conscious and deliberate willfulness to quit one's job or organization within a certain period, which would possibly pose a major problem in healthcare system resulting in a high turnover rate [7-9]. That is to say, the turnover intention is the strongest cognitive precursor of turnover, directly affecting the choice of departure. Because of a considerable number of predictive modeling formulas of voluntary turnover has been established, researchers generally recognized and supported that several hypothesized variables are associated with the intention to leave, involving commuting stress, emotional intelligence, job stress, job burnout, and job satisfaction [10-13]. Among the hypothesized linkages above, job burnout and satisfaction are the most common proposed antecedents.

In the late 1980s, Pines and Aronson defined job burnout as a state of physical, emotional, and mental exhaustion [14,15]. It describes the individuals' psychological response to prolonged interpersonal and chronic emotional stressors, dominantly caused by a long-term involvement in emotionally demanding situations [16]. Job burnout can be categorized into three dimensions, including emotional exhaustion, depersonalization, and the sense of reduced personalized accomplishment. Looking from the former researches, job burnout has a strong positive relationship with turnover intention whereas a negative relation with job satisfaction [17,18]. Job satisfaction encompasses employees' feelings and thoughts about various aspects of their job. In other words, job satisfaction refers to an individual's cognitive or effective evaluation of his or her occupational duties, presenting the extent people like the job and reflecting the effective judgments people hold toward their work condition [19,20]. Numerous studies have repeatedly verified that job satisfaction is inversely related to turnover and intent to leave. In addition to direct effects, we propose that job satisfaction serves as a mediator through which job burnout affects turnover intention as well. Yet, there is still a lack of literature supporting our hypothesis, hence, it is necessary to conduct this study to make up the gap.

Taken together, the theoretical framework utilized in this study originated from researches suggesting that turnover intention maybe both related to satisfaction and burnout toward the job. Accordingly, we hypothesized that:

H1: Job burnout is positively related to turnover intention.

H2: Job satisfaction is negatively related to turnover intention.

H3: Job satisfaction is negatively related to job burnout.

H4: Job satisfaction has a mediating effect between job burnout and turnover intention.

As shown in Figure 1, we tested this theoretical model with the data from primary healthcare staff in central China to explore the mediating effect of satisfaction.

2 Methods

2.1 Design and Sample

In this investigation, we utilized survey research methods to make sense of the job burnout, satisfaction, and turnover intention of primary healthcare staff. From March to May 2019, a cross-sectional study was conducted in Huangpi District of Wuhan in central China. The sample size was estimated with the average detection rate of burnout in China with the equation: $n = Z_{(\alpha/2)}{}^2 \times p \times (1-p)/\delta^2$, where α is 0.05, δ is 0.08, and

p is 55%. To compensate for the non-response rate, the sample was increased by 10% with a final sample size of 540. Participants involved met the following inclusion criteria: ① working for at least 6 months; ② did not have a mental illness or obstacle in communication; and ③ volunteered to participate in the survey. All participants were recruited face-to-face from 29 primary health care institutions in Huangpi District by our research group. Participants fulfilled electronic questionnaires with a mobile application or they orally answered questions and the results were synchronously typed in. The study data was anonymous to protect privacy. Ethical approval for this study was granted by the Research Ethics Boards of Wuhan University, and informed consent was obtained. The questionnaire comprised following sections: sociodemographic information, job satisfaction, job burnout, and turnover intention. (See detail in Appendix)

2.2 Methods of Measurement

2.2.1 Job Satisfaction

On the bases of the local actual condition, we collected the job satisfaction information utilizing an adjusted satisfaction scale. The adjusted scale referred for the Minnesota Satisfaction Questionnaire (MSQ) [21], Job Satisfaction Survey (JSS) [22], and Job Descriptive Index (JDI) [23], including 14 items (item 1 to 14) about the satisfaction with the internal environment, external environment, remunerations, management, and work itself. Participants responded to a 5-point Likert scale ranging from 1point (the most unsatisfaction) to 5 points (the most satisfaction). A higher score indicates a higher satisfaction.

2.2.2 Job Burnout

The information on participants' job burnout was gathered with an adjusted 5-point Likert burnout scale according to the Maslach Burnout Inventory-General Survey (MBI-GS) developed by Maslach and Jackson [24]. Several emotion-related items were used to describe participants' burnout experience, including " I'm interested in my job" (item 15, reverse coded), "I'm fit for this job" (item 16, reverse coded), " I think my work is challenging" (item 17), " My work is heavy" (item 18), " I think my work is meaningless" (item 19), " I can't find personal accomplishment in my job" (item 20), "I feel exhausted" (item 21), " I'm indifference of my job" (item 22), and "I feel anxious and fretful" (item 23). A higher score indicates a greater propensity for job burnout.

2.2.3 Turnover Intention

The turnover intention was similarly measured with an adjusted scale concerning several plan-related items. The adjusted scale referred for a six-item version of the turnover intention scale (TIS-6) explored by Griffeth [25]. The items include "I once thought to leave my current organization" (item 24), "I shall likely seek a new job within the next year" (item 25), " I shall accept a new job if I have a chance" (item 26), "I consider that the employment situation is favorable" (item 27), and "I can find a good job" (item 28). The above items were evaluated with a 5-point Likert scale, where 1 represents strongly disagree, 2 represents disagree, 3 represents slightly disagree, 4 represents agree, and 5 represents strongly agree.

2.3 Statistical Analysis

All statistical analyses and hypothesis testing were performed using SPSS version 22.0 and AMOS version 21.0, with two-sided tests. In the first stage, an empirical study was processed to optimize items in each scale, including discrimination tests and collinearity diagnostics. Then, an exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and a Cronbach's alpha coefficient method were applied to check the discriminant validity and reliability of above-mentioned scales. In the next stage, the Pearson product-moment correlation coefficients were calculated to analyze the correlations between variables. Last, the effect of job burnout on turnover intention via satisfaction was examined using a structural equation modeling (SEM) with maximum likelihood estimation. The mediation effect test was carried out by using the bootstrap method. The goodness-of-fit of the model was evaluated with chi-square statistic, the goodness of fit index (GFI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), the non-normed fit index (NNFI), and the incremental fit index (IFI). The model fitted well when $GFI > 0.90$, $CFI > 0.90$, $RMSEA < 0.05$, $NNFI > 0.90$, and $IFI > 0.90$.

2.4 Patient and public involvement

Participants were not involved in development of the research question and outcome measures, study design or conduct of this study.

3 Results

3.1 Profile of Sample

A total of 1300 electronic questionnaires were sent out, and 1279 eligible participants

left after deleting those with uncompleted or suspected unreal answers. The effective rate is 98.38%. As shown in Table 1, over half of the participants (66.50%) were female; 79.12% were married; 43.55% were physicians and 41.83% were nurses; 63.02% earned 2001-4000 Chinese Renminbi (RMB, US $ 290.97-581.65) per month. The most frequent occupational title was junior tile (accounting for 46.76%) and the most frequent education level was separately undergraduate degree and above (accounting for 47.46%) and junior college degree (accounting for 37.06%). The prevalence rate of satisfaction, job burnout, and turnover intention was separately 79.99%, 18.69%, and 26.04%. The median (range) score of satisfaction, job burnout, and turnover intention was 52 (13-65), 22 (9-37), and 12 (5-25).

3.2 Tests of the Hypothetical Model

3.2.1 Reliability and Validity Analysis

Before reliability analysis and validity analysis, we applied discrimination tests and collinearity diagnostics to filter optimal items. Although the adjusted satisfaction scale yields high indices of discrimination, there exists strong collinearity from item 1 to item 7, item 12, and item 13. After all comprehensive considerations, we deleted relative items except item 1. The Cronbach's α of this scale reaches 0.956, indicating satisfactory reliability. Moreover, the modified scale construction is effective measuring by EFA (Kaiser-Meyer-Olkin = 0.928, $P < 0.001$) and suitable for CFA. The model finally fit the data acceptably ($\chi 2/df$ = 7.889, *GFI* = 0.986 ~~0.973~~, *CFI* = 0.994, *RMSEA* = 0.073, *NNFI* = 0.994, *IFI* = 0.994).

In the adjusted burnout scale, we omitted the items from 15 to 17, 19, and 21 because of a low distinguishability in discriminant analysis. Cronbach's α of this scale was increasing to 0.802. Besides, the adjusted burnout also has a good validity conducted by EFA and CFA ($\chi 2/df$ = 8.395, *GFI* = 0.993, *CFI* = 0.994, *RMSEA* = 0.076, *NNFI* = 0.994, *IFI* = 0.994).

Similar in the adjusted turnover intention scale, item 27 was removed. The Cronbach's α coefficient for the remaining 4 items (α = 0.865) indicated good internal consistency reliability. And the validity is acceptable ($\chi 2/df$ = 6.889, *GFI* = 0.948, *CFI* = 0.973, *RMSEA* = 0.067, *NNFI* = 0.969, *IFI* = 0.973).

3.2.2 Correlation Analysis

Table 2 demonstrates the means, standard deviations, and correlation coefficients among three dimensions of job satisfaction, burnout, and turnover intention. As is

indicated that job satisfaction has both a significant negative relation with turnover intention (r = -0.414, P < 0.001) and job burnout (r = -0.387, P < 0.001). Job burnout showed a significant positive correlation with turnover intention (r = 0.797, P < 0.001).

3.2.3 Structural Equation Model

As can be seen in Figure 2 and Table 3, three latent variables in the model were significantly intercorrelated. The standardized path coefficient of path a (Job burnout → Satisfaction), b (Satisfaction → Turnover intention), and c' (Job burnout → Turnover intention) was respectively -0.409 (C.R. = -14.298, P < 0.001), -0.116 (C.R. = -6.023, P < 0.001), and 0.845 (C.R. = 34.055, P < 0.001). Higher standardized path coefficients suggest stronger correlations, with values over 0.200 considered very correlated. Taken path a as an example, it means that for each one standard deviation decreases in the job burnout, the change in satisfaction will increase by 0.409 standard deviation. The mediating effect of satisfaction was significant (P < 0.001) with the path coefficient of 0.047, making up 5.32% of the total effect (proportion = a × b/c, 0.409 × 0.116/0.892 = 0.053). The hypothetical model yields satisfactory values (*GFI* = 0.947, *CFI* = 0.975, *RMSEA* = 0.067, *NNFI* = 0.971, *IFI* = 0.975), indicating credible data fit.

Variables such as age, education, income, etc. were introduced in the model to further research on the influences. Figure 3 illustrates the standardized path coefficient between each variable. Educational level, monthly income, and hire form showed a direct (r= 0.084, -0.037, 0.048 respectively) and indirect (r= -0.008, -0.018, -0.015 respectively) effect on turnover intention. Also, age and nigh shift could affect turnover intention through job burnout with the standard path coefficient of -0.111 and 0.062. This model also showed a good fit to the data: *GFI* = 0.947, *CFI* = 0.971, *RMSEA* = 0.054, *NNFI* = 0.963, *IFI* = 0.971.

To further deal with the stability of the model, a multiple-group analysis was conducted between physicians and nurses. Table 4 summarizes the testing for invariant factorial structure between physicians and nurses. The P values of the model of measurement weights and structural weights were separately 0.35 and 0.39, confirming the stability. Although P values were lower than 0.05 in the model of structural covariances, structural residuals, and measurement residuals, incredibly small variations were presented in indices of fit (all variations change <0.05). Therefore, the model can be regarded as stable in physicians and nurses.

4 Discussion

This study was conducted to investigate the mediating effect of job satisfaction in the relationship between job burnout and turnover intention among primary medical staff in Huangpi District where the medical resources and clinical ability represent the averaged level in China. Through it, we confirmed the direct influence of job burnout and satisfaction drew on the turnover intention and the mediating effect of satisfaction. Our study additionally demonstrated that the prevalence rate of job burnout and turnover intention was respectively 18.69% and 26.04%. The results are quite consistent with previous researches in China [26,27].

In line with earlier studies, our results recognized that job burnout positively predicted turnover intention with an explanatory power of 94.73% [28,29]. For job burnout and its four latent measures, “no personal accomplishment”, “indifference”, and “anxious and fretful” show a strong correlation with burnout except for “a heavy work”. It is generally believed that burnout is intrinsically related to work factors and secondly to personality factors [30]. Hence, hospital managers must think about the role conflict and the way to solve emotional exhaustion and reduced personalized accomplishment. Our results also found that satisfaction could directly or indirectly affect turnover intention with a relatively limited effect. This finding helps to illuminate the relations between burnout, satisfaction, and turnover that were not apparent before, as most previous studies focused on satisfaction’s direct impact on turnover instead of a mediator [31,32]. Seen from the partial mediating effect of satisfaction, job burnout, to a very small degree, would increase the turnover tendency by reducing the satisfaction levels. That is to say, the fundamental reason for turnover tendency is job burnout while only 5.32% is related to low satisfaction. Therefore, the improvement of working conditions, welfares, advanced-learning opportunities, and reward mechanisms is worthy of concern but limited effect. The effective ways to solve this problem are to understand how burnout generates, focus on staff’s physical and mental changes, and do in science.

Apart from it, the turnover intention was noted to be affected by age, education level, monthly income, hire form, and night shift directly or through the mediators of satisfaction and burnout in our study. This influence shows no difference between physicians and nurses. Primary healthcare institutions generally play an essential role in medical providing and safeguarding among the broadest masses of people. In past

decades, the medical quality and service standard in primary medical institutions was continually enhanced with the in-depth development of national medical and health system reform. But most of the basic healthcare staff in China still encounter low salaries, less independence, insufficient social support, and few promotion prospects, which could lead to job burnout, unsatisfaction even turnover [33,34]. To fully utilize health resources and to improve the healthcare system's overall social impacts, governments and concerned departments should emphasize more attention to optimize medical resources allocation [35]. Under market economy conditions, public hospital managers should also establish and consummate hospital operation and management systems. As an occupation with high risk, pressure, and skill, healthcare staffs deserve a high payment. However, there is a huge income gap between China and developed countries [36]. The average monthly salary of Chinese health workers in 2017 was about 6669 RMB (approximately $ 969.54) [37]. It is necessary to adopt a reasonable mechanism of performance incentive and financial management, to regulate and optimize nigh-shift works, and to set up a good academic atmosphere at the same time. Besides, more focuses need to raise on healthcare providers' psychological states, especially those youth with high educational background and academic qualification. In this way, the employee's motivation and enthusiasm could be improved to some extent.

Although this study contributes to the knowledge base of the turnover intention related to job burnout and satisfaction, it does have several limitations. First, causal relationships among turnover, burnout, and satisfaction should be cautiously interpreted as this is a cross-sectional study. Second, despite the credible reliability and validity, the scales we used were adjusted based on the existing general scales. Hence, it needs to be tested and replicated with additional researches. Third, other potential predictors such as work stress, social support, and mental health were not captured in our questionnaire. We will continue this study in the future to overcome the shortages.

5 Conclusion

The current findings indicate a positive association between job burnout and turnover intention, while a negative relation between job burnout and satisfaction, as well as satisfaction and turnover intention. Also, satisfaction can be regarded as a mediator between job burnout and turnover intention, whose partial mediating effect is 5.32%. Age, education level, monthly income, hire form, and night shift also influence the

turnover intention, hence, relative measures can be taken to promote enthusiasm and satisfaction thus decreasing the turnover rate.

Abbreviations

MSQ: Minnesota Satisfaction Questionnaire, **JSS:** Job Satisfaction Survey, **JDI:** Job Descriptive Index, **MBI-GS:** Maslach Burnout Inventory-General Survey, **EFA:** exploratory factor analysis, **CFA:** confirmatory factor analysis, **SEM:** structural equation modeling, **GFI:** the goodness of fit index, **CFI:** the comparative fit index, **RMSEA:** the root mean square error of approximation, **NNFI:** the non-normed fit index, **IFI:** the incremental fit index.

Figure legends

Figure 1. Hypothesized model of burnout, satisfaction, and turnover intention

Figure 2. The structural equation modeling for the hypothetical model

Figure 3. The structural equation modeling after introducing demographic characteristic

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Contributors

Conceived and designed this paper: Li Ran. Wrote this paper: Li Ran. Calculated data: Li Ran, Xuyu Chen, Shuzhen Peng, and Feng Zheng. Performed the study and collected data: Xuyu Chen and Li Ran. Provided with analysis tools: Professor Xiaodong Tan. Mended and approved the final version: Professor Xiaodong Tan and Ruihua Duan.

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Ethics approval and consent to participate

Ethical approval for this study was granted by the Research Ethics Boards of Wuhan University (No.2018YF0080). Informed consent was obtained from all survey participants.

Competing interests

The authors declare that they have no competing interests.

Patient consent for publication

Not required.

Data sharing statement

Data may be made available by contacting the corresponding author.

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Table 1. Description of the respondents (n=1279)

Variables	N (%)	Satisfaction		Job Burnout		Turnover Intention	
		Prevalence rate (%)	x^2	Prevalence rate (%)	x^2	Prevalence rate (%)	x^2
Sex			0.016		3.233		2.328
male	429 (33.50)	26.9		7.19		9.62	
female	850 (66.50)	53.09		11.5		16.42	
Age (years)			13.853**		33.398**		55.014**
⩽30	380 (29.71)	23.31		7.74		10.48	
31-40	366 (28.62)	21.5		5.79		8.99	
41-50	436 (34.09)	28.46		4.85		5.94	
⩾51	97 (7.58)	6.72		0.31		0.63	
Occupation			2.562		3.045		3.698
physician	557 (43.55)	34.4		8.29		12.28	
nurse	535 (41.83)	34.09		7.27		10.63	
specialists in laboratory medicine	89 (6.96)	5.71		1.72		1.41	
public health physician	65 (5.08)	3.83		0.86		1.17	
pharmacist	33 (2.55)	1.95		0.55		0.55	
Educational level			4.146		7.692		23.072**
junior school and below	16 (1.25)	0.94		0.31		0.39	
high school/technical school	182 (14.23)	11.73		1.8		1.88	
junior college degree	474 (37.06)	30.34		6.57		9.23	
undergraduate degree and above	607 (47.46)	36.98		10.01		14.54	
Marital status			8.618		13.308*		26.538**
married	1012 (79.12)	64.12		13.29		18.22	
unmarried	227 (17.75)	13.76		4.77		6.96	
divorced/Widowed	40 (3.13)	2.11		0.63		0.86	

Technical post title			8.8	7.039		4.691
no title	286 (22.36)	18.45		4.53	6.25	
junior title	598 (46.76)	36.75		9.23	12.9	
intermediate title	288 (22.52)	17.36		4.07	5.16	
senior title	107 (8.36)	7.43		0.86	1.73	
Monthly income (RMB)			16.713**	12.166*		19.817**
⩽2000	71 (5.55)	3.99		1.25	2.19	
2001-3000	339 (26.51)	19.55		6.18	8.61	
3001-4000	467 (36.51)	30.18		6.25	8.05	
4001-5000	266 (20.80)	17.51		2.74	4.69	
⩾5001	136 (10.63)	8.76		2.27	2.5	
Hire from			5.467	9.631*		19.637**
personnel agent staff	171 (13.37)	52.15		10.63	14.78	
permanent staff	825 (64.50)	9.93		3.45	5.08	
contract staff	173 (13.53)	10.87		2.58	3.29	
temporary staff	110 (8.60)	7.04		2.03	2.89	
Working time (hours/week)			30.865**	34.103**		37.055**
⩽30	15 (1.17)	0.78		0.39	0.47	
31-40	629 (49.18)	41.91		6.25	9.38	
41-50	427 (33.39)	26.19		7.35	9.93	
⩾51	208 (16.26)	11.11		4.69	6.25	
Working years			13.485**	26.683**		44.637**
1-5	326 (25.49)	20.17		6.57	8.99	
6-10	202 (15.79)	11.57		3.21	5.39	
11-15	115 (8.99)	7.04		1.95	2.51	
16-20	201 (15.72)	12.28		3.05	3.68	
⩾21	435 (34.01)	28.93		3.91	5.47	
Night shift			3.406	18.827**		17.374**
0	769 (60.13)	49.02		9.07	13.21	

1-3	471 (36.83)	28.46		8.6		11.65	
>3	39 (3.04)	2.51		1.02		1.18	
Total	**1279 (100)**	**79.99**	—	**18.69**	—	**26.04**	—

Notes: * P <0.05, ** P <0.01

Table 2. Pearson correlation among job satisfaction, burnout, and turnover intention of primary healthcare workers

	M	SD	Job Satisfaction	Job Burnout	Turnover Intention
Job Satisfaction	**23.06**	**5.377**	**1.000**	**-0.387**	**-0.414**
Working environment	4.08	0.921	0.882	-0.298	-0.299
Welfare	3.63	1.093	0.902	-0.356	-0.401
Prospect of my job	3.84	0.963	0.911	-0.370	-0.403
Training and learning opportunities	3.89	0.960	0.889	-0.342	-0.366
Income distribution	3.71	1.046	0.917	-0.350	-0.393
Management system and business process	3.91	0.941	0.908	-0.386	-0.384
Job Burnout	**10.87**	**4.392**	**-0.387**	**1.000**	**0.797**
My work is heavy	3.42	1.008	-0.134	0.365	0.325
I can't find personal accomplishment in my job	2.10	0.990	-0.319	0.889	0.679
I'm indifference of my job	2.02	0.996	-0.352	0.911	0.737
I feel anxious and fretful	2.16	1.006	-0.373	0.884	0.752
Turnover Intention	**8.97**	**3.614**	**-0.414**	**0.797**	**1.000**
I once thought to leave my current organization	2.24	1.104	-0.430	0.765	0.881
I shall likely seek a new job within the next year	1.86	0.869	-0.297	0.763	0.841
I shall accept a new job if I have a chance	2.45	1.207	-0.403	0.652	0.881
I can find a good job	2.43	1.076	-0.231	0.543	0.788

Notes: All $P_s < 0.01$. M- mean value; SD- standard deviation

Table 3. The standard effects in the hypothetical model

Endogenous variables	Exogenous variables	Estimate	C.R.	Direct effect (*P*)	Indirect effect (*P*)	Total effect (*P*)
Turnover intention	Burnout	0.845	34.055	0.845 (< 0.001)	0.047 (< 0.001)	0.892 (< 0.001)
	Satisfaction	-0.116	-6.023	-0.116 (< 0.001)	——	-0.116 (< 0.001)
Satisfaction	Burnout	-0.409	-14.298	-0.409 (< 0.001)	——	-0.409 (< 0.001)

Notes: C.R.- critical ratios

Table 4. Testing for invariant factorial structure of a measuring instrument

Model	delta-x^2	delta-df	*P*	delta-x^2/df	delta-GFI	delta-AGFI	delta-NFI	delta-RFI	delta-IFI	delta-TLI
Measurement weights	12.207	11	0.35	0	0.003	-0.001	0.002	0	0.002	0
Structural weights	23.296	22	0.39	-0.001	0.005	-0.002	0.003	0	0.003	0
Structural covariances	95.617	36	< 0.05	-0.007	0.003	-0.006	0.001	-0.003	0.001	-0.003
Structural residuals	98.133	39	< 0.05	-0.007	0.003	-0.006	0.002	-0.003	0.001	-0.003
Measurement residuals	196.600	53	< 0.05	-0.015	-0.003	-0.012	-0.002	-0.008	-0.002	-0.008

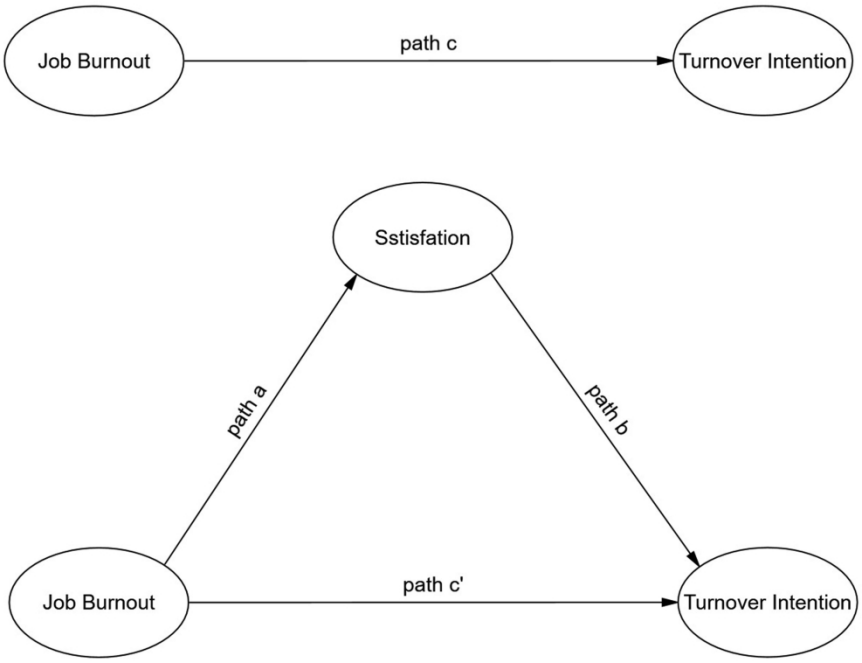

Figure 1. Hypothesized model of burnout, satisfaction, and turnover intention

370x370mm (300 x 300 DPI)

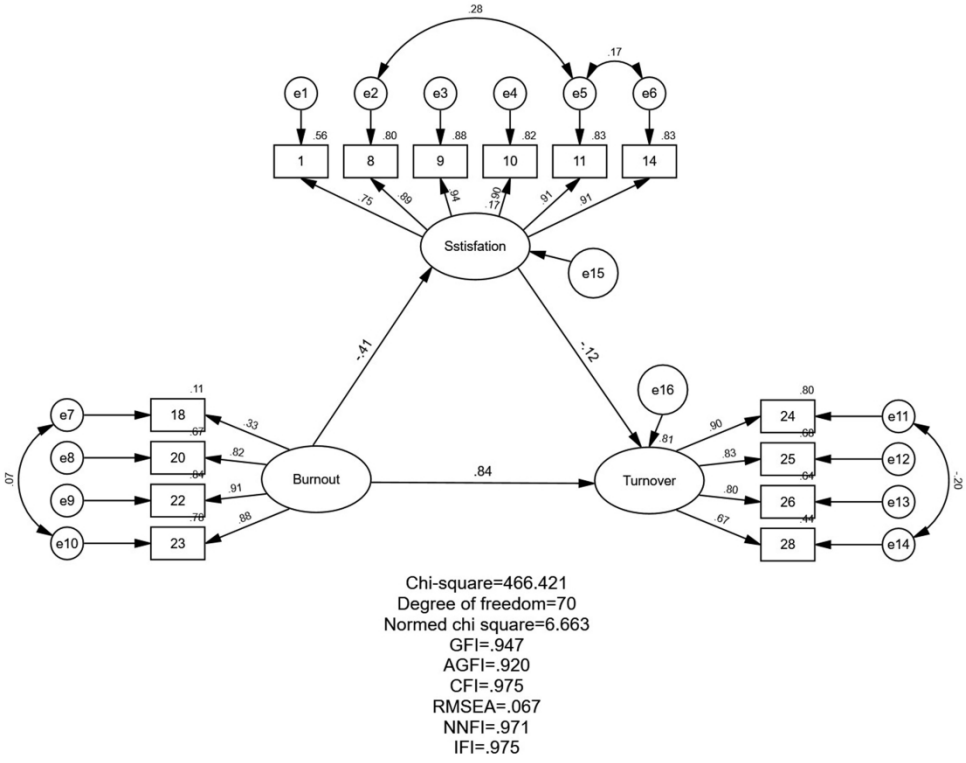

Figure 2. The structural equation modeling for the hypothetical model

370x370mm (300 x 300 DPI)

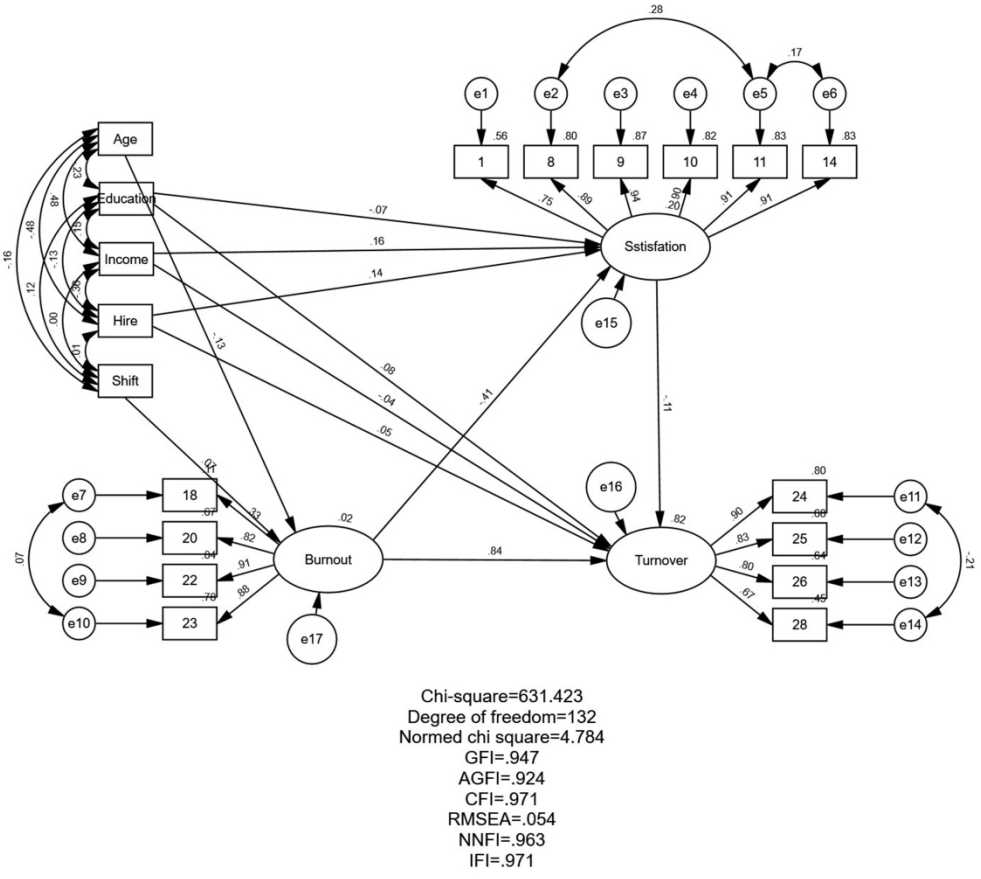

Figure 3. The structural equation modeling after introducing demographic characteristic

370x370mm (300 x 300 DPI)

Dear medical staff,

Attention, please! We are students at Wuhan University. To realize the job burnout, job satisfaction, and turnover intention of medical staff, and provide a reference for administration, we sincerely invite you to conduct a questionnaire survey. This research will not harm your health and will not affect your current work. All your information will be treated in strict confidence and kept by the investigator. There are 41 questions in the questionnaire. Please answer the questions based on real conditions.

Thank you for your active participation again!

Q1 Would you like to participate in this survey? yes☐ no☐

If yes, please fill in the following question. If no, the investigation ends.

Q2 Hospital Name: _____

Q3 Gender: male☐ female☐

Q4 Age: _____ years

Q5 Educational level: Junior school and below☐ High school/Technical school☐ Junior college degree ☐ Undergraduate degree and above☐

Q6 Marital status: Married☐ Unmarried☐ Divorced/Widowed☐

Q7 Occupation: Physician☐ Nurse☐ Specialists in laboratory medicine☐ Public health physician☐ Pharmacist☐

Q8 Technical post title: No title☐ Junior title☐ Intermediate title☐ Senior title☐

Q9 Monthly income (RMB): ⩽2000 ☐ 2001-3000☐ 3001-4000☐ 4001-5000☐ ⩾5001☐

Q10 Hire from: Personnel agent staff ☐ Permanent staff☐ Contract staff☐ Temporary staff☐

Q11 Working time (hours per week): _____

Q12 Working years: _____

Q13 Night shift (per week): 0☐ 1-3☐ >3☐

About job satisfaction:

Q14 I feel comfortable about the working environment (office environment, virescence, light, ventilation, et.): [item 1]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q15 Sufficient technical equipment (professional information inquiry resources, instruments, etc.) for work use: [item 2]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q16 Harmonious interpersonal relationship (between superiors and subordinates): [item 3]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q17 Good cooperation between different departments: [item 4]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q18 The atmosphere is good: [item 5]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q19 The leadership is good: [item 6]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q20 I am satisfied with current income level: [item 7]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q21 I am satisfied with the welfare: [item 8]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q22 I am satisfied with the prospect of my job: [item 9]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q23 I am satisfied with the training and learning opportunities offered (frequency, form, and content): [item 10]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q24 The income distribution is reasonable: [item 11]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q25 The performance reward mechanism is reasonable: [item 12]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q26 The performance reward system has achieved good results: [item13]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q27 The management system and business process are good: [item 14]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

About job burnout:

Q28 I'm interested in my job: [item 15]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q29 I'm fit for this job: [item 16]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q30 I think my work is challenging: [item 17]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q31 My work is heavy: [item 18]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q32 I think my work is meaningless: [item 19]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q33 I can't find personal accomplishment in my job: [item 20]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q34 I feel exhausted: [item 21]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q35 I'm indifference of my job: [item 22]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q36 I feel anxious and fretful: [item 23]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

About turnover intention:

Q37 I once thought to leave my current organization: [item 24]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q38 I shall likely seek a new job within the next year: [item 25]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q39 I shall accept a new job if I have a chance: [item 26]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q40 I consider that the employment situation is favorable: [item 27]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q41 I can find a good job: [item 28]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Thank you for your participation!

Survey date: _____Y/_____M/_____D

Questionnaire coding: _____

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-6
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6-7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6-7
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	N/A
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	N/A
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7-8
		(*b*) Describe any methods used to examine subgroups and interactions	7-8
		(*c*) Explain how missing data were addressed	N/A
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A

Continued on next page

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6、8
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	N/A
		Cross-sectional study—Report numbers of outcome events or summary measures	*8*
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	8-10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

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Job Burnout and Turnover Intention among Chinese Primary Healthcare Staff: The Mediating Effect of Satisfaction

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Abstract

Objectives: Although China has done a lot in strengthening the primary healthcare system, the high turnover intention is still a social problem to be reckoned with. The objective of this study is to explore the mediating effect of satisfaction between job burnout and turnover intention.

Design: Cross-sectional study.

Methods: A cross-sectional study was conducted to make sense of the job burnout, satisfaction, and turnover intention among primary healthcare workers in central China. Structural equation modeling (SEM) was performed to study the mediating effect of satisfaction between job burnout and turnover intention with maximum likelihood estimation. The mediation effect test was carried out by using the bootstrap method.

Results: SEM showed that job burnout was positively related to the turnover intention with the standard path coefficient of 0.845 (C.R. = 34.055, $P < 0.001$). The partial mediating effect of satisfaction was 0.047, making up 5.32% of the total effect. The goodness-of-fit was acceptable (*GFI* = 0.947, *CFI* = 0.975, *RMSEA* = 0.067, *NNFI* = 0.971, *IFI* = 0.975). Age, education level, monthly income, hire form, and night shift were also found significantly correlated with turnover intention, and no difference was found between physicians and nurses.

Conclusions: The turnover intention is significantly affected by job burnout, satisfaction, and demographic characteristics including age, education level, monthly income, hire form, and night shift. Satisfaction can be regarded as a mediator between job burnout and turnover intention. Relative measures can be taken to promote enthusiasm and satisfaction thus decreasing the turnover rate.

Keywords: Burnout; Job Satisfaction; Turnover Intention; Mediating Effect; Healthcare

Strengths and limitations of this study

- Structural equation modeling is adopted so that the qualitative and quantitative analyses can explore the relationship between job burnout, satisfaction, and turnover intention.
- A multiple-group analysis was conducted between the physicians and nurses guaranteeing the applicability.
- This study summarizes the influence demographic characteristics posed on the turnover intention among China's primary healthcare workers, enriching the study content.
- The reliability of structural equation modeling is repeatedly tested.
- Inability to accurately discuss the representativeness of the cross-sectional study.

1 Background

Health and medical personnel play a seminal role in fulfilling the healthcare needs of the entire population, therefore, a robust allocation of human resources maintains the health system running smoothly and also guarantees people accessing to healthcare priority equally [1]. Unfortunately, the current out-of-balance between healthcare staff supply and demand has challenged this priority and triggered a global problem of continual brain drain. Up to 2013, the scarcity of healthcare workers (including physicians, nurses, and midwives) worldwide was estimated at 7.2 million, and it will sharply rising to 12.9 million by 2035 [2].

As a developing country with a huge population, China's shortage of health workforce has posed one of the major obstacles to primary healthcare services. According to the *China health statistics yearbook*, there are only 0.46 pediatricians per 1,000 children, much lower than the goal number of 2.06 per 1,000 children. Equally consistent is the finding that the number of anesthesiologists per 10,000 people is less than 0.65, while the number in some developed countries in Europe is 2.5 to 3 [3]. To make matters worse, primary healthcare workers are generally confronted with the challenge of high turnover intention, which has become a social problem to be reckoned with [4]. Results of a survey show that from 2010 to 2016, the proportion of Chinese primary healthcare staff decreased from 44% to 33% [5]. Moreover, the average turnover rate of nurses in first-class tertiary hospitals is 5.8% in China, which goes up to 8-10% in economically advanced regions like Shanghai and Guangzhou [6]. Under this circumstance, the turnover intention has been an important and popular study subject in psychology and management field.

Turnover intention reflects an individual's conscious and deliberate willfulness to quit one's job or organization within a certain period, which would possibly pose a major problem in healthcare system resulting in a high turnover rate [7-9]. That is to say, the turnover intention is the strongest cognitive precursor of turnover, directly affecting the choice of departure. Because of a considerable number of predictive modeling formulas of voluntary turnover has been established, researchers generally recognized and supported that several hypothesized variables are associated with the intention to leave, involving commuting stress, emotional intelligence, job stress, job burnout, and job satisfaction [10-13]. Among the hypothesized linkages above, job burnout and satisfaction are the most common proposed antecedents.

In the late 1980s, Pines and Aronson defined job burnout as a state of physical, emotional, and mental exhaustion [14,15]. It describes the individuals' psychological response to prolonged interpersonal and chronic emotional stressors, dominantly caused by a long-term involvement in emotionally demanding situations [16]. Job burnout can be categorized into three dimensions, including emotional exhaustion, depersonalization, and the sense of reduced personalized accomplishment. Looking from the former researches, job burnout has a strong positive relationship with turnover intention whereas a negative relation with job satisfaction [17,18]. Job satisfaction encompasses employees' feelings and thoughts about various aspects of their job. In other words, job satisfaction refers to an individual's cognitive or effective evaluation of his or her occupational duties, presenting the extent people like the job and reflecting the effective judgments people hold toward their work condition [19,20]. Numerous studies have repeatedly verified that job satisfaction is inversely related to turnover and intent to leave. In addition to direct effects, we propose that job satisfaction serves as a mediator through which job burnout affects turnover intention as well. Yet, there is still a lack of literature supporting our hypothesis, hence, it is necessary to conduct this study to make up the gap.

Taken together, the theoretical framework utilized in this study originated from researches suggesting that turnover intention maybe both related to satisfaction and burnout toward the job. Accordingly, we hypothesized that:

H1: Job burnout is positively related to turnover intention.

H2: Job satisfaction is negatively related to turnover intention.

H3: Job satisfaction is negatively related to job burnout.

H4: Job satisfaction has a mediating effect between job burnout and turnover intention.

As shown in Figure 1, we tested this theoretical model with the data from primary healthcare staff in central China to explore the mediating effect of satisfaction.

2 Methods

2.1 Design and Sample

In this investigation, we utilized survey research methods to make sense of the job burnout, satisfaction, and turnover intention of primary healthcare staff. From March to May 2019, a cross-sectional study was conducted in Huangpi District of Wuhan in central China. The sample size was estimated with the average detection rate of burnout in China with the equation: $n = Z_{(\alpha/2)}{}^2 \times p \times (1-p)/\delta^2$, where α is 0.05, δ is 0.08, and

p is 55%. To compensate for the non-response rate, the sample was increased by 10% with a final sample size of 540. Participants involved met the following inclusion criteria: ① working for at least 6 months; and ② being volunteered to participate in the survey. All participants were recruited face-to-face from 29 primary health care institutions in Huangpi District by our research group. Participants fulfilled electronic questionnaires with a mobile application or they orally answered questions and the results were synchronously typed in. The study data was anonymous to protect privacy. Ethical approval for this study was granted by the Research Ethics Boards of Wuhan University, and informed consent was obtained. The questionnaire comprised following sections: sociodemographic information, job satisfaction, job burnout, and turnover intention. (See detail in Appendix)

2.2 Methods of Measurement

2.2.1 Job Satisfaction

On the bases of the local actual condition, we collected the job satisfaction information utilizing an adjusted satisfaction scale. The adjusted scale referred for the Minnesota Satisfaction Questionnaire (MSQ) [21], Job Satisfaction Survey (JSS) [22], and Job Descriptive Index (JDI) [23], including 14 items (item 1 to 14) about the satisfaction with the internal environment, external environment, remunerations, management, and work itself. Participants responded to a 5-point Likert scale ranging from 1point (the most unsatisfaction) to 5 points (the most satisfaction). A higher score indicates a higher satisfaction.

2.2.2 Job Burnout

The information on participants' job burnout was gathered with an adjusted 5-point Likert burnout scale according to the Maslach Burnout Inventory-General Survey (MBI-GS) developed by Maslach and Jackson [24]. Several emotion-related items were used to describe participants' burnout experience, including " I'm interested in my job" (item 15, reverse coded), "I'm fit for this job" (item 16, reverse coded), " I think my work is challenging" (item 17), " My work is heavy" (item 18), " I think my work is meaningless" (item 19), " I can't find personal accomplishment in my job" (item 20), "I feel exhausted" (item 21), " I'm indifference of my job" (item 22), and "I feel anxious and fretful" (item 23). A higher score indicates a greater propensity for job burnout.

2.2.3 Turnover Intention

The turnover intention was similarly measured with an adjusted scale concerning several plan-related items. The adjusted scale referred for a six-item version of the turnover intention scale (TIS-6) explored by Griffeth [25]. The items include "I once thought to leave my current organization" (item 24), "I shall likely seek a new job within the next year" (item 25), " I shall accept a new job if I have a chance" (item 26), "I consider that the employment situation is favorable" (item 27), and "I can find a good job" (item 28). The above items were evaluated with a 5-point Likert scale, where 1 represents strongly disagree, 2 represents disagree, 3 represents slightly disagree, 4 represents agree, and 5 represents strongly agree.

2.3 Statistical Analysis

All statistical analyses and hypothesis testing were performed using SPSS version 22.0 and AMOS version 21.0, with two-sided tests. In the first stage, an empirical study was processed to optimize items in each scale, including discrimination tests and collinearity diagnostics. Then, an exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and a Cronbach's alpha coefficient method were applied to check the discriminant validity and reliability of above-mentioned scales. In the next stage, the Pearson product-moment correlation coefficients were calculated to analyze the correlations between variables. Last, the effect of job burnout on turnover intention via satisfaction was examined using a structural equation modeling (SEM) with maximum likelihood estimation. The mediation effect test was carried out by using the bootstrap method. The goodness-of-fit of the model was evaluated with chi-square statistic, the goodness of fit index (GFI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), the non-normed fit index (NNFI), and the incremental fit index (IFI). The model fitted well when $GFI > 0.90$, $CFI > 0.90$, $RMSEA < 0.05$, $NNFI > 0.90$, and $IFI > 0.90$.

2.4 Patient and public involvement

Participants were not involved in development of the research question and outcome measures, study design or conduct of this study.

3 Results

3.1 Profile of Sample

A total of 1300 electronic questionnaires were sent out, and 1279 eligible participants

left after deleting those with uncompleted or suspected unreal answers. The effective rate is 98.38%. As shown in Table 1, over half of the participants (66.50%) were female; 79.12% were married; 43.55% were physicians and 41.83% were nurses; 63.02% earned 2001-4000 Chinese Renminbi (RMB, US $ 290.97-581.65) per month. The most frequent occupational title was junior tile (accounting for 46.76%) and the most frequent education level was separately undergraduate degree and above (accounting for 47.46%) and junior college degree (accounting for 37.06%). The prevalence rate of satisfaction, job burnout, and turnover intention was separately 79.99%, 18.69%, and 26.04%. The median (range) score of satisfaction, job burnout, and turnover intention was 52 (13-65), 22 (9-37), and 12 (5-25).

3.2 Tests of the Hypothetical Model

3.2.1 Reliability and Validity Analysis

Before reliability analysis and validity analysis, we applied discrimination tests and collinearity diagnostics to filter optimal items. Although the adjusted satisfaction scale yields high indices of discrimination, there exists strong collinearity from item 1 to item 7, item 12, and item 13. After all comprehensive considerations, we deleted relative items except item 1. The Cronbach's α of this scale reaches 0.956, indicating satisfactory reliability. Moreover, the modified scale construction is effective measuring by EFA (Kaiser-Meyer-Olkin = 0.928, $P < 0.001$) and suitable for CFA. The model finally fit the data acceptably ($\chi 2/df$ = 7.889, *GFI* = 0.986 ~~0.973~~, *CFI* = 0.994, *RMSEA* = 0.073, *NNFI* = 0.994, *IFI* = 0.994).

In the adjusted burnout scale, we omitted the items from 15 to 17, 19, and 21 because of a low distinguishability in discriminant analysis. Cronbach's α of this scale was increasing to 0.802. Besides, the adjusted burnout also has a good validity conducted by EFA and CFA ($\chi 2/df$ = 8.395, *GFI* = 0.993, *CFI* = 0.994, *RMSEA* = 0.076, *NNFI* = 0.994, *IFI* = 0.994).

Similar in the adjusted turnover intention scale, item 27 was removed. The Cronbach's α coefficient for the remaining 4 items (α = 0.865) indicated good internal consistency reliability. And the validity is acceptable ($\chi 2/df$ = 6.889, *GFI* = 0.948, *CFI* = 0.973, *RMSEA* = 0.067, *NNFI* = 0.969, *IFI* = 0.973).

3.2.2 Correlation Analysis

Table 2 demonstrates the means, standard deviations, and correlation coefficients among three dimensions of job satisfaction, burnout, and turnover intention. As is

indicated that job satisfaction has both a significant negative relation with turnover intention (r = -0.414, P < 0.001) and job burnout (r = -0.387, P < 0.001). Job burnout showed a significant positive correlation with turnover intention (r = 0.797, P < 0.001).

3.2.3 Structural Equation Model

As can be seen in Figure 2 and Table 3, three latent variables in the model were significantly intercorrelated. The standardized path coefficient of path a (Job burnout → Satisfaction), b (Satisfaction → Turnover intention), and c' (Job burnout → Turnover intention) was respectively -0.409 (C.R. = -14.298, P < 0.001), -0.116 (C.R. = -6.023, P < 0.001), and 0.845 (C.R. = 34.055, P < 0.001). Higher standardized path coefficients suggest stronger correlations, with values over 0.200 considered very correlated. Taken path a as an example, it means that for each one standard deviation decreases in the job burnout, the change in satisfaction will increase by 0.409 standard deviation. The mediating effect of satisfaction was significant (P < 0.001) with the path coefficient of 0.047, making up 5.32% of the total effect (proportion = a × b/c, 0.409 × 0.116/0.892 = 0.053). The hypothetical model yields satisfactory values (*GFI* = 0.947, *CFI* = 0.975, *RMSEA* = 0.067, *NNFI* = 0.971, *IFI* = 0.975), indicating credible data fit.

Variables such as age, education, income, etc. were introduced in the model to further research on the influences. Figure 3 illustrates the standardized path coefficient between each variable. Educational level, monthly income, and hire form showed a direct (r= 0.084, -0.037, 0.048 respectively) and indirect (r= -0.008, -0.018, -0.015 respectively) effect on turnover intention. Also, age and nigh shift could affect turnover intention through job burnout with the standard path coefficient of -0.111 and 0.062. This model also showed a good fit to the data: *GFI* = 0.947, *CFI* = 0.971, *RMSEA* = 0.054, *NNFI* = 0.963, *IFI* = 0.971.

To further deal with the stability of the model, a multiple-group analysis was conducted between physicians and nurses. Table 4 summarizes the testing for invariant factorial structure between physicians and nurses. The P values of the model of measurement weights and structural weights were separately 0.35 and 0.39, confirming the stability. Although P values were lower than 0.05 in the model of structural covariances, structural residuals, and measurement residuals, incredibly small variations were presented in indices of fit (all variations change <0.05). Therefore, the model can be regarded as stable in physicians and nurses.

4 Discussion

This study was conducted to investigate the mediating effect of job satisfaction in the relationship between job burnout and turnover intention among primary medical staff in Huangpi District where the medical resources and clinical ability represent the averaged level in China. Through it, we confirmed the direct influence of job burnout and satisfaction drew on the turnover intention and the mediating effect of satisfaction. Our study additionally demonstrated that the prevalence rate of job burnout and turnover intention was respectively 18.69% and 26.04%. The results are quite consistent with previous researches in China [26,27].

In line with earlier studies, our results recognized that job burnout positively predicted turnover intention with an explanatory power of 94.73% [28,29]. For job burnout and its four latent measures, “no personal accomplishment”, “indifference”, and “anxious and fretful” show a strong correlation with burnout except for “a heavy work”. It is generally believed that burnout is intrinsically related to work factors and secondly to personality factors [30]. Hence, hospital managers must think about the role conflict and the way to solve emotional exhaustion and reduced personalized accomplishment. Our results also found that satisfaction could directly or indirectly affect turnover intention with a relatively limited effect. This finding helps to illuminate the relations between burnout, satisfaction, and turnover that were not apparent before, as most previous studies focused on satisfaction’s direct impact on turnover instead of a mediator [31,32]. Seen from the partial mediating effect of satisfaction, job burnout, to a very small degree, would increase the turnover tendency by reducing the satisfaction levels. That is to say, the fundamental reason for turnover tendency is job burnout while only 5.32% is related to low satisfaction. Therefore, the improvement of working conditions, welfares, advanced-learning opportunities, and reward mechanisms is worthy of concern but limited effect. The effective ways to solve this problem are to understand how burnout generates, focus on staff’s physical and mental changes, and do in science.

Apart from it, the turnover intention was noted to be affected by age, education level, monthly income, hire form, and night shift directly or through the mediators of satisfaction and burnout in our study. This influence shows no difference between physicians and nurses. Primary healthcare institutions generally play an essential role in medical providing and safeguarding among the broadest masses of people. In past

decades, the medical quality and service standard in primary medical institutions was continually enhanced with the in-depth development of national medical and health system reform. But most of the basic healthcare staff in China still encounter low salaries, less independence, insufficient social support, and few promotion prospects, which could lead to job burnout, unsatisfaction even turnover [33,34]. To fully utilize health resources and to improve the healthcare system's overall social impacts, governments and concerned departments should emphasize more attention to optimize medical resources allocation [35]. Under market economy conditions, public hospital managers should also establish and consummate hospital operation and management systems. As an occupation with high risk, pressure, and skill, healthcare staffs deserve a high payment. However, there is a huge income gap between China and developed countries [36]. The average monthly salary of Chinese health workers in 2017 was about 6669 RMB (approximately $ 969.54) [37]. It is necessary to adopt a reasonable mechanism of performance incentive and financial management, to regulate and optimize nigh-shift works, and to set up a good academic atmosphere at the same time. Besides, more focuses need to raise on healthcare providers' psychological states, especially those youth with high educational background and academic qualification. In this way, the employee's motivation and enthusiasm could be improved to some extent.

Although this study contributes to the knowledge base of the turnover intention related to job burnout and satisfaction, it does have several limitations. First, causal relationships among turnover, burnout, and satisfaction should be cautiously interpreted as this is a cross-sectional study. Second, despite the credible reliability and validity, the scales we used were adjusted based on the existing general scales. Hence, it needs to be tested and replicated with additional researches. Third, other potential predictors such as work stress, social support, and mental health were not captured in our questionnaire. We will continue this study in the future to overcome the shortages.

5 Conclusion

The current findings indicate a positive association between job burnout and turnover intention, while a negative relation between job burnout and satisfaction, as well as satisfaction and turnover intention. Also, satisfaction can be regarded as a mediator between job burnout and turnover intention, whose partial mediating effect is 5.32%. Age, education level, monthly income, hire form, and night shift also influence the

turnover intention, hence, relative measures can be taken to promote enthusiasm and satisfaction thus decreasing the turnover rate.

Abbreviations

MSQ: Minnesota Satisfaction Questionnaire, **JSS:** Job Satisfaction Survey, **JDI:** Job Descriptive Index, **MBI-GS:** Maslach Burnout Inventory-General Survey, **EFA:** exploratory factor analysis, **CFA:** confirmatory factor analysis, **SEM:** structural equation modeling, **GFI:** the goodness of fit index, **CFI:** the comparative fit index, **RMSEA:** the root mean square error of approximation, **NNFI:** the non-normed fit index, **IFI:** the incremental fit index.

Figure legends

Figure 1. Hypothesized model of burnout, satisfaction, and turnover intention

Figure 2. The structural equation modeling for the hypothetical model

Figure 3. The structural equation modeling after introducing demographic characteristic

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Contributors

Conceived and designed this paper: Li Ran. Wrote this paper: Li Ran. Calculated data: Li Ran, Xuyu Chen, Shuzhen Peng, and Feng Zheng. Performed the study and collected data: Xuyu Chen and Li Ran. Provided with analysis tools: Professor Xiaodong Tan. Mended and approved the final version: Professor Xiaodong Tan and Ruihua Duan.

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Ethics approval and consent to participate

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Competing interests

The authors declare that they have no competing interests.

Patient consent for publication

Not required.

Data sharing statement

Data may be made available by contacting the corresponding author.

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Table 1. Description of the respondents (n=1279)

Variables	N (%)	Satisfaction		Job Burnout		Turnover Intention	
		Prevalence rate (%)	x^2	Prevalence rate (%)	x^2	Prevalence rate (%)	x^2
Sex			0.016		3.233		2.328
male	429 (33.50)	26.9		7.19		9.62	
female	850 (66.50)	53.09		11.5		16.42	
Age (years)			13.853**		33.398**		55.014**
⩽30	380 (29.71)	23.31		7.74		10.48	
31-40	366 (28.62)	21.5		5.79		8.99	
41-50	436 (34.09)	28.46		4.85		5.94	
⩾51	97 (7.58)	6.72		0.31		0.63	
Occupation			2.562		3.045		3.698
physician	557 (43.55)	34.4		8.29		12.28	
nurse	535 (41.83)	34.09		7.27		10.63	
specialists in laboratory medicine	89 (6.96)	5.71		1.72		1.41	
public health physician	65 (5.08)	3.83		0.86		1.17	
pharmacist	33 (2.55)	1.95		0.55		0.55	
Educational level			4.146		7.692		23.072**
junior school and below	16 (1.25)	0.94		0.31		0.39	
high school/technical school	182 (14.23)	11.73		1.8		1.88	
junior college degree	474 (37.06)	30.34		6.57		9.23	
undergraduate degree and above	607 (47.46)	36.98		10.01		14.54	
Marital status			8.618		13.308*		26.538**
married	1012 (79.12)	64.12		13.29		18.22	
unmarried	227 (17.75)	13.76		4.77		6.96	
divorced/Widowed	40 (3.13)	2.11		0.63		0.86	

Technical post title			8.8	7.039		4.691
no title	286 (22.36)	18.45		4.53	6.25	
junior title	598 (46.76)	36.75		9.23	12.9	
intermediate title	288 (22.52)	17.36		4.07	5.16	
senior title	107 (8.36)	7.43		0.86	1.73	
Monthly income (RMB)			16.713**	12.166*		19.817**
⩽2000	71 (5.55)	3.99		1.25	2.19	
2001-3000	339 (26.51)	19.55		6.18	8.61	
3001-4000	467 (36.51)	30.18		6.25	8.05	
4001-5000	266 (20.80)	17.51		2.74	4.69	
⩾5001	136 (10.63)	8.76		2.27	2.5	
Hire from			5.467	9.631*		19.637**
personnel agent staff	171 (13.37)	52.15		10.63	14.78	
permanent staff	825 (64.50)	9.93		3.45	5.08	
contract staff	173 (13.53)	10.87		2.58	3.29	
temporary staff	110 (8.60)	7.04		2.03	2.89	
Working time (hours/week)			30.865**	34.103**		37.055**
⩽30	15 (1.17)	0.78		0.39	0.47	
31-40	629 (49.18)	41.91		6.25	9.38	
41-50	427 (33.39)	26.19		7.35	9.93	
⩾51	208 (16.26)	11.11		4.69	6.25	
Working years			13.485**	26.683**		44.637**
1-5	326 (25.49)	20.17		6.57	8.99	
6-10	202 (15.79)	11.57		3.21	5.39	
11-15	115 (8.99)	7.04		1.95	2.51	
16-20	201 (15.72)	12.28		3.05	3.68	
⩾21	435 (34.01)	28.93		3.91	5.47	
Night shift			3.406	18.827**		17.374**
0	769 (60.13)	49.02		9.07	13.21	

1-3	471 (36.83)	28.46		8.6		11.65	
>3	39 (3.04)	2.51		1.02		1.18	
Total	**1279 (100)**	**79.99**	—	**18.69**	—	**26.04**	—

Notes: * P <0.05, ** P <0.01

Table 2. Pearson correlation among job satisfaction, burnout, and turnover intention of primary healthcare workers

	M	SD	Job Satisfaction	Job Burnout	Turnover Intention
Job Satisfaction	**23.06**	**5.377**	**1.000**	**-0.387**	**-0.414**
Working environment	4.08	0.921	0.882	-0.298	-0.299
Welfare	3.63	1.093	0.902	-0.356	-0.401
Prospect of my job	3.84	0.963	0.911	-0.370	-0.403
Training and learning opportunities	3.89	0.960	0.889	-0.342	-0.366
Income distribution	3.71	1.046	0.917	-0.350	-0.393
Management system and business process	3.91	0.941	0.908	-0.386	-0.384
Job Burnout	**10.87**	**4.392**	**-0.387**	**1.000**	**0.797**
My work is heavy	3.42	1.008	-0.134	0.365	0.325
I can't find personal accomplishment in my job	2.10	0.990	-0.319	0.889	0.679
I'm indifference of my job	2.02	0.996	-0.352	0.911	0.737
I feel anxious and fretful	2.16	1.006	-0.373	0.884	0.752
Turnover Intention	**8.97**	**3.614**	**-0.414**	**0.797**	**1.000**
I once thought to leave my current organization	2.24	1.104	-0.430	0.765	0.881
I shall likely seek a new job within the next year	1.86	0.869	-0.297	0.763	0.841
I shall accept a new job if I have a chance	2.45	1.207	-0.403	0.652	0.881
I can find a good job	2.43	1.076	-0.231	0.543	0.788

Notes: All $P_s < 0.01$. M- mean value; SD- standard deviation

Table 3. The standard effects in the hypothetical model

Endogenous variables	Exogenous variables	Estimate	C.R.	Direct effect (*P*)	Indirect effect (*P*)	Total effect (*P*)
Turnover intention	Burnout	0.845	34.055	0.845 (< 0.001)	0.047 (< 0.001)	0.892 (< 0.001)
	Satisfaction	-0.116	-6.023	-0.116 (< 0.001)	——	-0.116 (< 0.001)
Satisfaction	Burnout	-0.409	-14.298	-0.409 (< 0.001)	——	-0.409 (< 0.001)

Notes: C.R.- critical ratios

Table 4. Testing for invariant factorial structure of a measuring instrument

Model	delta-x^2	delta-df	*P*	delta-x^2/df	delta-GFI	delta-AGFI	delta-NFI	delta-RFI	delta-IFI	delta-TLI
Measurement weights	12.207	11	0.35	0	0.003	-0.001	0.002	0	0.002	0
Structural weights	23.296	22	0.39	-0.001	0.005	-0.002	0.003	0	0.003	0
Structural covariances	95.617	36	< 0.05	-0.007	0.003	-0.006	0.001	-0.003	0.001	-0.003
Structural residuals	98.133	39	< 0.05	-0.007	0.003	-0.006	0.002	-0.003	0.001	-0.003
Measurement residuals	196.600	53	< 0.05	-0.015	-0.003	-0.012	-0.002	-0.008	-0.002	-0.008

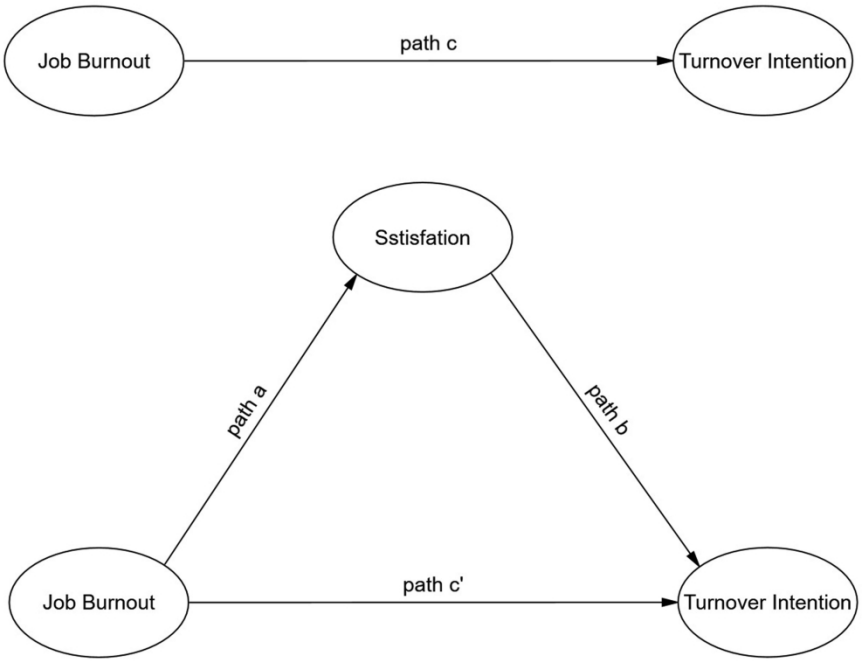

Figure 1. Hypothesized model of burnout, satisfaction, and turnover intention

370x370mm (300 x 300 DPI)

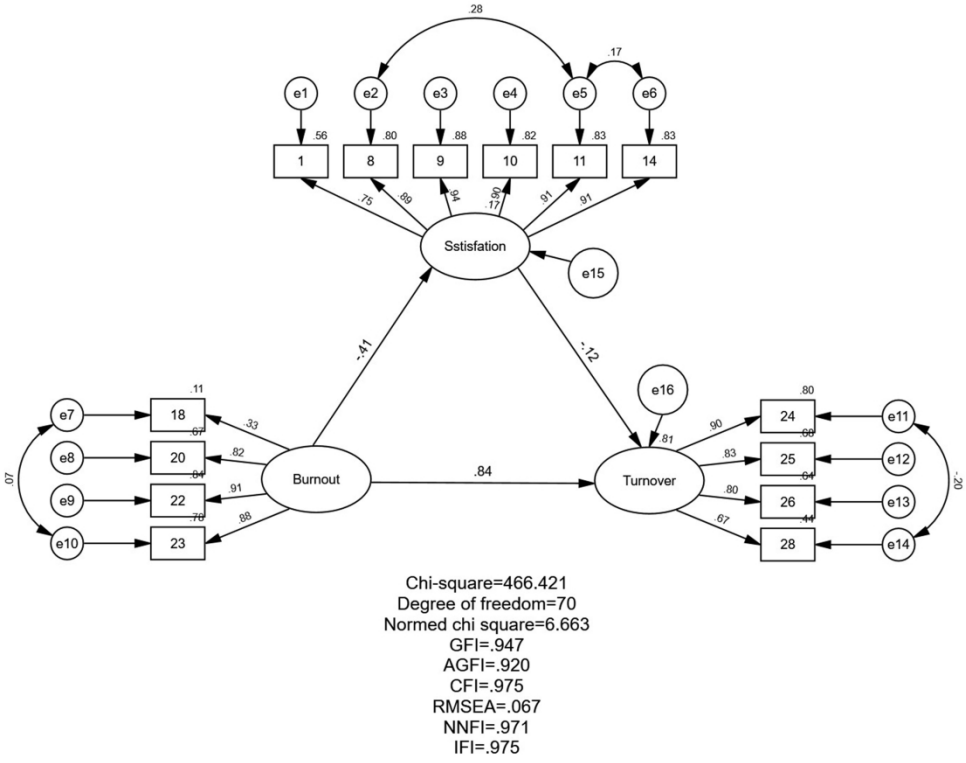

Figure 2. The structural equation modeling for the hypothetical model

370x370mm (300 x 300 DPI)

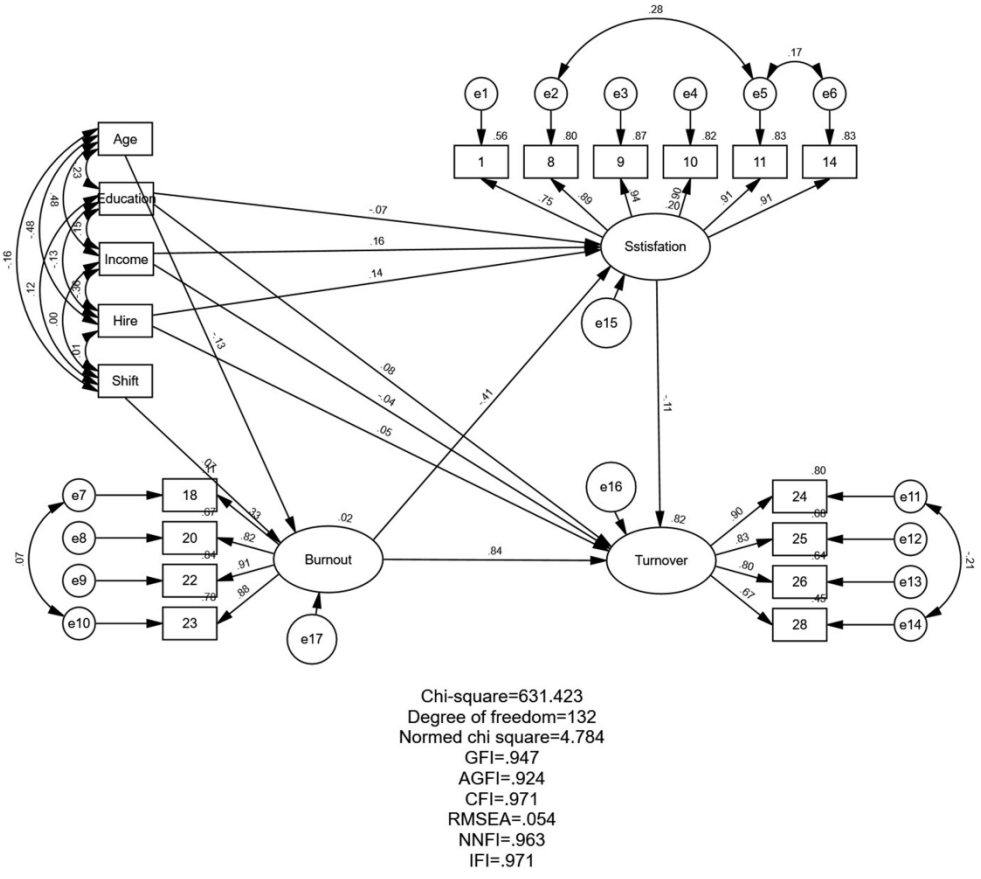

Figure 3. The structural equation modeling after introducing demographic characteristic

370x370mm (300 x 300 DPI)

Dear medical staff,

Attention, please! We are students at Wuhan University. To realize the job burnout, job satisfaction, and turnover intention of medical staff, and provide a reference for administration, we sincerely invite you to conduct a questionnaire survey. This research will not harm your health and will not affect your current work. All your information will be treated in strict confidence and kept by the investigator. There are 41 questions in the questionnaire. Please answer the questions based on real conditions.

Thank you for your active participation again!

Q1 Would you like to participate in this survey? yes☐ no☐

If yes, please fill in the following question. If no, the investigation ends.

Q2 Hospital Name: _____

Q3 Gender: male☐ female☐

Q4 Age: _____ years

Q5 Educational level: Junior school and below☐ High school/Technical school☐ Junior college degree ☐ Undergraduate degree and above☐

Q6 Marital status: Married☐ Unmarried☐ Divorced/Widowed☐

Q7 Occupation: Physician☐ Nurse☐ Specialists in laboratory medicine☐ Public health physician☐ Pharmacist☐

Q8 Technical post title: No title☐ Junior title☐ Intermediate title☐ Senior title☐

Q9 Monthly income (RMB): ⩽2000 ☐ 2001-3000☐ 3001-4000☐ 4001-5000☐ ⩾5001☐

Q10 Hire from: Personnel agent staff ☐ Permanent staff☐ Contract staff☐ Temporary staff☐

Q11 Working time (hours per week): _____

Q12 Working years: _____

Q13 Night shift (per week): 0☐ 1-3☐ >3☐

About job satisfaction:

Q14 I feel comfortable about the working environment (office environment, virescence, light, ventilation, et.): [item 1]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q15 Sufficient technical equipment (professional information inquiry resources, instruments, etc.) for work use: [item 2]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q16 Harmonious interpersonal relationship (between superiors and subordinates): [item 3]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q17 Good cooperation between different departments: [item 4]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q18 The atmosphere is good: [item 5]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q19 The leadership is good: [item 6]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q20 I am satisfied with current income level: [item 7]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q21 I am satisfied with the welfare: [item 8]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q22 I am satisfied with the prospect of my job: [item 9]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q23 I am satisfied with the training and learning opportunities offered (frequency, form, and content): [item 10]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q24 The income distribution is reasonable: [item 11]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q25 The performance reward mechanism is reasonable: [item 12]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q26 The performance reward system has achieved good results: [item13]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

Q27 The management system and business process are good: [item 14]

Very dissatisfied☐ Dissatisfied☐ Average☐ Satisfied☐ Very satisfied☐

About job burnout:

Q28 I'm interested in my job: [item 15]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q29 I'm fit for this job: [item 16]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q30 I think my work is challenging: [item 17]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q31 My work is heavy: [item 18]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q32 I think my work is meaningless: [item 19]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q33 I can't find personal accomplishment in my job: [item 20]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q34 I feel exhausted: [item 21]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q35 I'm indifference of my job: [item 22]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q36 I feel anxious and fretful: [item 23]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

About turnover intention:

Q37 I once thought to leave my current organization: [item 24]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q38 I shall likely seek a new job within the next year: [item 25]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q39 I shall accept a new job if I have a chance: [item 26]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q40 I consider that the employment situation is favorable: [item 27]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Q41 I can find a good job: [item 28]

Strongly disagree☐ Disagree☐ Average☐ Agree☐ Strongly agree☐

Thank you for your participation!

Survey date: _____Y/_____M/_____D

Questionnaire coding: _____

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-6
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6-7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6-7
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	N/A
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	N/A
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7-8
		(*b*) Describe any methods used to examine subgroups and interactions	7-8
		(*c*) Explain how missing data were addressed	N/A
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A

Continued on next page

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6、8
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	N/A
		Cross-sectional study—Report numbers of outcome events or summary measures	*8*
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	8-10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.