

The Influence of Job Satisfaction, Resilience and Work Engagement on Turnover Intention among Village Doctors in China—a cross-sectional study

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Research article

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Abstract

Background: As the gatekeepers of rural residents' health, teams of village doctors play a vital role in improving rural residents' health. However, the high turnover of village doctors – both individually and collectively – threaten the stability of village medical teams. This research evaluated the influence of job satisfaction, resilience, and work engagement on the turnover intention of village doctors, and explored the mediating role of resilience and work engagement between job satisfaction and the turnover intention of village doctors in China. **Methods:** A quantitative study using a self-administered questionnaire containing mostly structured items was conducted among village doctors with a sample size of 2693 from 1345 rural clinics in Shandong province, China, during May and June 2019. All variables including demographic characteristics, job satisfaction, resilience, work engagement and turnover intention were based on available literature, and measured on a 5- or 6-point Likert scale. Such statistical methods as one-way ANOVA, bivariate correlation, exploratory factor analysis (EFA), and Structural Equation Modelling (SEM) were used. **Results:** As high as 46.9% of participants had a high turnover intention and no less than 26.3% of participants had a medium turnover intention. Job satisfaction not only has a direct negative effect on turnover intention ($\beta = -0.37, p < 0.001$), but also an indirect effect through work engagement ($\beta = -0.04, p < 0.001$), which has a direct negative impact on turnover intention ($\beta = -0.13, p < 0.002$), and resilience had an indirect negative effect on turnover intention through the mediating effect of work engagement ($\beta = -0.09, p < 0.001$). The results of this study strongly verified that job satisfaction, resilience, and work engagement were early, powerful predictors of turnover intention. **Conclusion:** According to the results, the following should be taken seriously to improve job satisfaction: reasonable and fair income, effective promotion mechanism, fair social old-age security, reasonable workload, and strong psychological coping mechanisms for work stress. The turnover intention of village doctors could be reduced through improving job satisfaction, resilience and work engagement.

Background

In 2010, China began to implement integrated management of rural health services, and built standardized village clinics in villages, fundamentally changing the practice mode of village doctors, that is, village doctors must enter village clinics to practice diagnosis and treatment, and they are no longer allowed to operate clinics. Village doctors have changed from self-employed to public service providers and play a fundamental role in the Chinese rural health care system, they are responsible for providing rural residents with life-cycle care involving prevention, treatment, health protection and rehabilitation, as well as two-way referral between village clinics and urban general hospitals, so that village doctors are the gatekeepers of health for the vast majority of rural residents in China[1]. With a rural population over 900 million, village doctors in China conduct a much broader scope of work compared to other countries. With the rapid development of China's economy in recent years, the overall quality of village doctors, their service conditions, and the fairness and accessibility of health services for rural residents have been continuously improved[2].

Yet village doctors are confronting serious challenges and pressures brought by some reformist policies concerning the medical and health system. The new national essential drugs system requires village doctors to use essential medicines and sell them to patients at zero-profit purchase price, which has shifted the income of village doctors from drug prices to local government compensation. The low level of government compensation and the delay in receiving such compensation have greatly reduced the income of village doctors. In 2014, the average monthly income of village doctors in Beijing, a more developed region in China, was only 1,293.07 yuan (166.637 euro) [3]. Meanwhile, many current situations in rural areas such as strong demand for health care, poor working conditions and environment, unsmooth promotion mechanism, limited training opportunities, lacking supervision and competition system, the aging of village medical team, and shortages of new doctors with professional knowledge and comprehensive quality[4] with incomes lower than urban doctors, and rural residents' distrust of their medical qualifications and medical technology, make the occupational environment of village doctors increasingly severe[5]. All these factors have been found to have an impact on burnout and subsequently village doctor turnover[3, 6]. The detection rate of burnout among village doctors is as high as 68.60%, 45.3% of which had high turnover intention[7]. Recently, China's Henan province saw two serious cases of village doctors' collective turnover, one involving 36 doctors and the other 28 doctors. As an important part of China's medical and health service team, when village doctors collectively leave their jobs then the rural medical institutions may face a "stall" and rural residents may fall into an incurable predicament, resulting in more serious social consequences[1, 8].

Turnover intention refers to an employee's option to voluntarily vacate their work in a certain period of time[9]. Research on turnover can be traced to 1958 when March and Simon established the participant determination model[7, 10]. Subsequently, scholars have developed a series of theoretical models on turnover research; although the emphases of such models are different, they all state that turnover intention is the main cognitive precursor of turnover behaviour and has a strong explanatory power[11, 12]. Compared with turnover behaviour, turnover intention can better reflect the real management level of an organization. Based on this, this study finds that it is more meaningful to explore turnover intention than actual turnover behaviour. Hence the turnover intention of village doctors, rather than their actual behaviour, is the theme of this study.

Since the training of doctors requires a long period of education and practice[13], high turnover tendency may lead to huge transition costs and serious loss of patient confidence, which is a serious problem for the stability of hospitals and the medical system[14, 15]. Numerous studies have analysed the influencing factors of doctors' turnover intention, including a country's medical system, occupational environment, doctor-patient relationship, level of employment and alternative job opportunities, and other external environmental factors[3, 16-18]. Internal individual factors include gender, age, marital status and work ability[4, 19, 20]. The most widely studied job-related factors including working hours, salary levels, social security, job stress and burnout, emotional commitment, job autonomy, fairness of remuneration[21, 22] were always incorporated into studies to explore the comprehensive impact on turnover intention. However, the influence of resilience on the turnover intention of village doctors has not been included in such studies. At the same time, existing studies have mostly used the t-test, ANOVA and

chi-square test, multivariate linear regression analysis, and binary logistic regression analysis to analyse the influencing factors of turnover intention[3, 4, 16-22]. Structural Equation Modelling (SEM) can not only measure the correlation between observed variables, but also the correlation between latent variables, and even the causal relationship between measured variables. Therefore, this study adopts SEM to study the linear regression relationship between variables, which can compensate for current studies' limitations.

Job satisfaction, defined as a personal positive subjective evaluation or attitude towards all aspects of a work environment, is affected by many factors such as the work itself, work challenge, salary system, interpersonal relationships, working conditions, work motivation, organizational environment, and so on, and has been typically considered to be the most representative antecedent variable that directly predicts turnover intention in health care providers[21, 23, 24]. Many empirical studies have found that job satisfaction is negatively correlated with turnover intention, and influence it through direct and indirect paths[8, 24, 25]. A meta-analysis demonstrated a strong negative correlation between job satisfaction and turnover intention among nurses[26]. For example, improving job satisfaction in terms of salary, promotion and job security is crucial to reduce the turnover intention of urban primary care physicians in rural South Africa[27]. Furthermore, job satisfaction is often the mediator between other factors and turnover intention, such as professional identity, which has an indirect negative effect on turnover intention through job satisfaction among township health inspectors in China[7]. The doctor-patient relationship and work engagement has also been found to play an indirect role in nursing staffs' turnover through job satisfaction in southern Italy[28].

Work engagement is defined as a positive, affective-motivational state of work-related well-being, with the characteristics of vigour, dedication and absorption[7, 29]. In countries or regions with limited medical resources, the work engagement of medical staff, in contrast to job burnout and high turnover intention, is recognized as an irreplaceable and much-desired organizational asset[30]. Personal characteristics such as psychological status, job identity and personality affect work engagement. Meanwhile, available work resources, organizational support and fairness, and other work characteristics are also highly positively correlated with work engagement[31, 32]. Accordingly, the outcome variables of work engagement include organizational variables such as organizational efficiency and performance, and personal variables such as job burnout and turnover intention[33, 34]. The total score of work engagement, vigour, dedication and absorption were negatively correlated with turnover intention. Some studies have explored the mediating role of work engagement in turnover intention[28, 35, 36]. Silvia De Simone et al found that patient satisfaction had a negative effect on nurses' turnover intention through the mediating effect of work engagement in southern Italy[35]. A cross-sectional and correlational study in a Portuguese hospital revealed the mediating effect of job engagement between social support, job satisfaction and turnover intention[37].

Yet even in the same working environment, facing the same pressure and adversity, not every village doctor will have job burnout or turnover intention. This can be explained by the concept of individual resilience, which refers to a person's ability to recover from a traumatic or painful event and to achieve

good adjustment and higher development[20]. Research shows that individuals become stronger, more confident and more productive by experiencing stressful events and overcoming them through resilience[38]. In addition, resilience may not alleviate the stress experienced by village doctors, but it can enhance their ability to overcome stress, thus improving overall job satisfaction and work engagement, and reducing job burnout and turnover tendency[39]. A national survey of nurses' turnover intentions in South Korea found that resilience had a positive direct effect on work engagement, which had a negative direct effect on turnover intention. Resilience and work engagement mediated the effect of work satisfaction and burnout on turnover intention[40].

Based on the above-mentioned theoretical analysis and empirical demonstration, we attempted to link the relationships among job satisfaction, resilience, work engagement and turnover intention, and a double mediator model is presented in Table 1 and Figure 1. We assumed that job satisfaction, resilience and work engagement directly affect turnover intention. Meanwhile, through resilience and work engagement, job satisfaction has an indirect effect on turnover intention, and work engagement mediated the effect of resilience on turnover intention. So this study aims to verify the direct impact of job satisfaction, resilience and work engagement on turnover intention, and to analyse and quantify the mediating role of resilience and work engagement between job satisfaction and turnover intention among village doctors in China. This study is the first to consider the influence of job satisfaction, resilience, and work engagement on village doctors' turnover intention in China.

Table 1. The Theoretical Hypotheses

Hypotheses
1. Job satisfaction has a direct negative effect on turnover intention
2. Job satisfaction has a positive effect on resilience
3. Job satisfaction has a positive effect on work engagement
4. Resilience has a positive effect on work engagement
5. Resilience has a negative effect on turnover intention
6. Work engagement has a negative effect on turnover intention
7. Job satisfaction has an indirect negative effect on turnover intention through the mediating effect of resilience
8. Job satisfaction has an indirect negative effect on turnover intention through the mediating effect of work engagement
9. Job satisfaction has an indirect positive effect on work engagement through the mediating effect of resilience
10. Resilience has an indirect negative effect on turnover intention through the mediating effect of work engagement

Methods

Setting and Participants

Jining in southwest Shandong province lags behind the province's eastern part in terms of economic development. According to 2018 statistics, the total population of Jining is 8.375 million, of which the rural population is 3.5916 million. Jining has 6,489 villages with 5,307 village clinics. There were 11,715 village doctors, 870 fewer than in 2017, averaging 2.99 per village. The number of consultations in village clinics was 21,262,000, with an average annual consultation volume of 4006.41 per clinic [41]. As village doctors have a heavy workload, Jining city is taken as the research site to ascertain the turnover intention of village doctors and the influencing factors.

This cross-sectional study was performed among rural clinics in Jining from March to May in 2019. A hierarchical cluster random sampling technique was used to obtain the ultimate sample. Firstly, according to the level of economic development, Jining City's 11 counties are divided into three layers: better areas, general areas, and poor areas. Secondly, a county is randomly selected from each economic layer as a sample county, i.e. three counties were selected altogether. Thirdly, all village doctors from the selected three counties were taken as survey samples.

The data was collected by self-administered questionnaires, consisting of four parts in addition to cover letters. In order to reduce survey bias, firstly, in the cover letters we explained the purpose and significance of this study, and informed that the questionnaire was filled in anonymously, thus improving the response rate of the respondents. Secondly, the questionnaires were distributed through cities, counties, townships and villages. At each level, there are personnel in charge of issuing, collecting and verifying questionnaires, thus reducing the loss and omission of questionnaires. The questionnaires were delivered to 1345 rural clinics through an official letter by Jining Municipal Health Commission, they were completed by 2789 village doctors and 2693 useable questionnaires were returned, i.e. the effective response rate was 96.6%.

Measures

In the design of the questionnaire, this study referred to the National Health Service Questionnaire designed by the expert group of the National Health and Family Planning Commission of the People's Republic of China[42]. The main part of the questionnaire consisted of five parts: social demographic characteristics (age, gender, marital status, major, professional ranks and titles, salary, average weekly working hours, educational background, years of work), and questions related to job satisfaction, resilience, work engagement and turnover intention.

Job Satisfaction

The Chinese version of the Medical Job Descriptive Index, with a Cronbach's alpha coefficient of 0.828 [7, 43], was used to measure medical staff's job satisfaction. It comprised eight items: workload, colleagues, superiors, environment and facility, promotion, income, social security, and training opportunities. A six-point Likert scale ranging from 1 (highly disagree) to 6 (highly agree) was utilized to evaluate all these

items, and all items are scored in the positive direction. The higher the score, the greater the job satisfaction.

Work Engagement

The work engagement of village doctors was measured using the Chinese version of the Utrecht Work Engagement Scale[44] with a Cronbach's alpha coefficient of 0.782[7]. It comprised 32 items, and 3 dimensions were represented by sub-scales: work dedication (5 items), work vigour (6 items), and work absorption (6 items). Items were scored using a 7-point Likert scale ranging from 0 (never) to 6 (every day). The responses of each village doctor were merged into a summary scale. The higher the score the higher the work engagement.

Resilience

Resilience was assessed with the Connor-Davidson Elasticity Scale (CD-RISC), and the Cronbach's alpha was 0.92[45]. The CD-RISC with 25 items was a self-reported scale with good reliability and validity, and divided into five dimensions: ability, tolerance of negative emotion, acceptance of change, control, and spiritual influence. Yu Xiaonan et al. failed to support the five-dimensional model of the original scale through confirmatory factor analysis when measuring the general population of China with CD-RISC; they instead found three dimensions of psychological resilience: tenacity (13 items), strength (8 items), and optimism (4 items)[46]. The response to the items is based on a Likert scale of 5 points, ranging from 1 (complete disagreement) to 5 (complete agreement). A higher score indicated higher resilience.

Turnover intention

Turnover intention was measured by the Chinese version of the turnover intention questionnaire with 4 items, and the Cronbach's Alpha coefficient was 0.659[7]. The four items in the questionnaire were: "I often want to leave my present job", "I often want to leave my present career", "Recently, I often want to change my job", and "I'll probably find a new job next year". A six-point Likert scale ranging from 1 (highly disagree) to 6 (highly agree) was utilized to evaluate all these items. A higher score indicated higher turnover intention.

Statistical Analysis

Although the reliability and validity of the scales related to this study have been proven by numerous studies, this was the first study of village doctors. In this study, exploratory factor analysis (EFA) was used to scientifically assess the responsibility and validity of the whole questionnaire. Descriptive statistics were used to test the demographic characteristics of village doctors in the sample. We then undertook a descriptive analysis of participants' job satisfaction, resilience, work engagement and turnover intention, and the values of means and standard deviations (SD) were calculated. The Pearson correlation coefficient was used to investigate and quantify the correlation between the main observational variables of latent constructs. Then Structural Equation Modelling (SEM) was used to further explore the relationships between the four dimensions: job satisfaction, resilience, work

engagement, and turnover intention. Maximum likelihood estimators based on the bootstrap was applied in the SEM. Several indicators including adjusted goodness of fit index (AGFI), normed fit index (NFI), goodness of fit index (GFI), comparative fit index (CFI), the Tucker-Lewis index (TLI) and incremental (IFI) of 0.90 or above, and root mean square error of approximation (RMSEA) less than 0.08, reflect an acceptable fit between the current data and hypothesized model.

Reliability and Validity

In accordance with the EFA results, the Kaiser-Meyer-Olkin (KMO) of this questionnaire was 0.826 greater than 0.70, indicating a better possibility of factor analysis. Bartlett's test of sphericity was significant ($\chi^2=23795.504, P< 0.001$). In the factor load analysis, the maximum coefficient of variation method was used for orthogonal rotation (varimax) so as to obtain the result of factor load matrix after rotation. The eigen values of the four evaluation indexes were all greater than 1, and the cumulative variance contribution rate was 80.353%. The load value of each item on the corresponding dimension was greater than 0.727, so the questionnaire structure validity was good. The total Cronbach's Alpha coefficient of the questionnaire was 0.848, indicating good reliability of internal consistency.

Results

Demographic Characteristics of Participants

The social and demographic characteristics of the 2693 village doctors are shown in Table 2. Their average age was 44.64 ± 7.25 years, and the proportion aged 30 and under only 1.30%. Most respondents had only technical secondary school education (68.18%), and 3.76% had middle and senior professional titles. 41.13% of respondents had worked between 20 and 29 years, 46.46% earned less than 2,000 yuan per month, and 69.86% needed to work 60 hours or more per week.

Table 2. Demographic characteristics of participants (n =2693).

Socio-Demographic	N	%	Socio-Demographic	N	%
Gender			Marital status		
Male	1736	64.42	Unmarried	68	2.50
Female	922	34.27	Married	2551	94.75
Missing	35	1.30	Missing	72	2.75
Age, Group			Education background		
<30	36	1.30	University or above	71	2.61
30□	624	23.17	Junior College	658	24.41
40□	1302	48.36	Technical secondary school	1836	68.18
50□	685	25.45	high school education or below	91	3.38
Missing	46	1.71	Missing	37	1.38
Professional ranks			Monthly income (yuan) *		
Senior title	15	0.57	<1000	311	11.59
Mid-level title	86	3.19	1000□	939	34.87
Primary title	1306	48.50	2000□	769	28.58
No title	1166	43.30	3000□	506	18.82
Missing	120	4.46	Missing	168	6.14
Years of work			Weekly working hours		
<10	87	3.23	<40	390	14.46
10-19	830	30.92	40□	336	12.52
20-29	1104	41.13	60□	1880	69.86
>30	587	21.87	Missing	87	3.16
Missing	76	2.83			

* As of the date of this paper writing, the exchange yuan-euro exchange rate according to the People's Bank of China was 0.1278.

Descriptive Analysis of Study Variable

The total item scores of job satisfaction, resilience, work engagement and turnover intention were 32.48 ± 8.93 , 74.01 ± 17.06 , 66.14 ± 20.26 , and 12.16 ± 6.09 respectively. The item scores contained in each dimension are shown in Table 3. According to the scores, 722 (26.8%) of village doctors had low turnover intention, 708 (26.3%) had moderate turnover intention, and 1263 (46.9%) had high turnover intention. Job satisfaction with workload (3.79 ± 1.50), promotion (3.74 ± 1.53), income (3.54 ± 1.55), and social security (3.70 ± 1.28) was lower than the other items.

Table 3. Item scores in job satisfaction, resilience, work engagement and turnover intention.

Items	Mean±SD
Job satisfaction	32.48±8.93
Workload	3.79±1.50
Colleagues	4.71±1.30
Superiors	4.72±1.37
Environment and facility	4.12±1.44
Promotion	3.74±1.53
Income	3.54±1.55
Social Security	3.70±1.28
Training opportunities	4.16±1.28
Resilience	74.01±17.06
Tenacity	37.53±9.79
Strength	23.93±5.66
Optimism	12.54±3.06
Work engagement	66.14±20.26
Work vigour	23.56±7.02
Work dedication	19.7±6.28
Work absorption	22.87±7.63
Turnover intention	12.16±6.09
Thought of leaving the organization you serve now	3.11±1.59
Thought of leaving this industry	3.11±1.62
Looking for a new job recently	3.05±1.64
Looking for a new job next year	2.88±1.61

Correlations of Study Variables

The correlation coefficient between variables are shown in Table 4. Job satisfaction was positively correlated with resilience and work engagement, and negatively correlated with turnover intension. Resilience was positively correlated with work engagement and negatively correlated with turnover intension. Work engagement was negatively correlated with turnover intension.

Table 4. Correlation coefficients among study variables.

Items	Job Satisfaction	Resilience	Work Engagement	Turnover Intention
Job Satisfaction				
Resilience	0.45**			
Work Engagement	0.41**	0.67**		
Turnover Intention	-0.39**	-0.24**	-0.27**	

* p < 0.01.

Test of Study Model

The SEM was constructed to interlink and assess the relationship among the four variables (job satisfaction, resilience, work engagement, turnover intention). The data and theoretical model were fitted by generalized least square method, and the theoretical model was modified according to the model fitting index. The relationship and valid path among four variables were indicated in the final model (Figure 2). The final modified hypothetical model's fit indices were AGFI = 0.911, GFI = 0.935, NFI = 0.964, CFI = 0.966, IFI = 0.966, TLI = 0.959, RMSEA = 0.068, all of which complied with the reference value that presented it as an acceptable model fit.

Each path was guided by 2000 repetitions of Bias-corrected bootstrap using maximum likelihood estimation; the results of mediation analysis are shown in Table 5. The mediation effect has statistical significance when the 95% CI of the estimation of the mediate effect does not include 0. Job satisfaction had a direct positive effect on work engagement ($\beta = 0.11$, $p < 0.001$) and resilience ($\beta = 0.51$, $p < 0.001$), but a negative effect on turnover intention ($\beta = -0.37$, $p < 0.001$); Work engagement had a direct negative effect on turnover intention ($\beta = -0.13$, $p < 0.002$); Resilience had a direct positive effect on work engagement ($\beta = 0.63$, $p < 0.001$), but no direct effect on turnover intention ($\beta = 0.03$, $p = 0.03$), the final result therefore did not support hypothesis 5 (resilience has a negative effect on turnover intention).

Table 5. Significance test of the mediating test.

Model Pathways	Estimated	95% CI	Hypothesis
Total effects			
Resilience ← Job satisfaction	0.51	0.47–0.55	
Work engagement ← Job satisfaction	0.44	0.39–0.47	
Turnover intention ← Job satisfaction	−0.42	(−0.46)– (−0.37)	
Work engagement ← Resilience	0.63	0.59–0.68	
Turnover intention ← Resilience	0.06	(−0.11) – (0.01)	
Turnover intention ← Work engagement	−0.13	(−0.19)– (−0.07)	
Direct effects			
Resilience ← Job satisfaction	0.51	0.47–0.55	2
Work engagement ← Job satisfaction	0.11	0.07–0.16	3
Turnover intention ← Job satisfaction	−0.37	(−0.42)– (−0.32)	1
Work engagement ← Resilience	0.63	0.59–0.68	4
Turnover intention ← Resilience	0.03	(−0.04)–0.09	5
Turnover intention ← Work engagement	−0.13	(−0.19)– (−0.07)	6
Indirect effects			
Work engagement ← Job satisfaction	0.32	0.29–0.36	
Turnover intention ← Job satisfaction	−0.04	(−0.07)– (−0.02)	
Turnover intention ← Resilience	−0.09	(−0.12)– (−0.04)	

Table 6 shows Significance test of every mediating pathway. Regarding the path between job satisfaction and turnover intention, work engagement had a significant mediate effect, 95% CI (0.03)– (0.01), which was consistent with hypothesis 8. But resilience had no mediate effect, 95% CI (0.02)–0.06, which was contrary to hypothesis 7. However, in-depth studies had found that resilience played a mediating role between job satisfaction and work engagement, 95% CI: 1.90–2.41, (hypothesis 9), and indirectly affected turnover intention through the mediating role of work engagement, 95% CI (0.02)– (0.01) (hypothesis 10).

Table 6. Significance test of every mediating pathway.

Model Pathways	95% CI	Hypothesis
Turnover intention ← Resilience ← Job satisfaction	(0.02)–0.06	7
Turnover intention ← Work engagement ← Job satisfaction	(0.03)– (0.01)	8
Work engagement ← Resilience ← Job satisfaction	1.90–2.41	9
Turnover intention ← Work engagement ← Resilience	(0.02)– (0.01)	10

Discussion

This study aimed to explore the status of turnover intention and the effects of job satisfaction, resilience, and work engagement on turnover intention among village doctors in China. The unique value of this study lies not only in the selection of village doctors as the research object, but also and for the first time, to study these four variables in a structural model.

The results showed that among the 2693 village doctors surveyed, nearly half 1263 (46.9%) had high turnover intention, which was not only far higher than second-class and higher hospital doctors (6.1%) [47], but also significantly higher than urban community doctors (18.13%) in China [48] and grassroots doctors in other countries, a British national survey showed that only 11.8% of primary care family physicians had high turnover intention [49]. Our study also inquired into the current quality of village doctors. Only 71 (2.61%) had university qualifications or above, and less than 5% had middle and senior professional titles. Although the Chinese government has further lowered the professional title assessment requirements for village doctors, many village doctors nevertheless remain unable to meet the requirements for middle and senior professional titles, which also impacts their income. Chen Zhongqiang, a member of the National Committee of the Chinese People's Political Consultative Conference (CPPCC), found in a rural survey that with no chance of promotion and low pay, village doctors were not treated as well as veterinarians, and even switched to veterinary medicine [50]. Meanwhile, the aging demographic of doctors has become an international issue, and is even more serious in terms of village doctors due to comparatively less funded rural medical resources. Our survey shows that 1987 (73.81%) of village doctors were 40 years old or above, and only 36 (1.30%) were under 30 years old; hence the age structure of such doctors is older than at the city's third level hospitals (32.51% aged 40 and over, 17.84% aged 30 and under). At the same time, due to the influence of family structure, health literacy, and lifestyle, the health evaluation age of village doctors is higher than

that of urban doctors of the same age, so the retirement of older village doctors is also a reason for high turnover intention. Therefore, more research is urgently needed to explore the key factors and influencing mechanism of village doctors' turnover in order to alleviate the phenomenon of village doctors' massive turnover in China.

The equation model proved whether it was the direct or indirect path effect, village doctors' job satisfaction as the strongest contributor to turnover intention, which was also mentioned in other studies. A cross-sectional survey of rural physicians in China showed that job satisfaction had significant negative effects on turnover intention through work engagement and job burnout as mediators [2]. In our study, village doctors were less satisfied with their jobs, especially in terms of workload, promotion, income, social security, and training opportunities (Table 2). The results conformed with a nationwide survey of village doctors' mobility which found that 70% of village doctors were unsatisfied with their income, had no hopes for promotion, and lacked old-age security after retirement [47].

The model also demonstrated that work engagement played a mediating role between job satisfaction and turnover intention, and between resilience and turnover intention, a result consistent with other studies. Mi Yu found that, under the direct influence of resilience, work engagement played a mediating role between job environment satisfaction and turnover intention among new nurses [21]. Work engagement is an important evaluation indicator for individual work potential and work efficiency optimization. The improvement of doctors' work engagement can effectively increase an individual's physical and mental health, improve job quality, satisfaction and performance, and reduce depression, and thus positively affect the health of patients.

All hypotheses in this study were supported except for hypothesis 5 (resilience has a negative effect on turnover intention) and hypothesis 7 (job satisfaction has an indirect negative effect on turnover intention through the mediating effect of resilience) — i.e. that resilience had no direct effect on turnover intention, nor did it mediate between job satisfaction and turnover intention, a result contrary to many previous studies [38, 40]. Hodges HF et al. found that Improving the resilience of nurses in hospital emergency rooms can significantly reduce their turnover rate. Wang M et al. found that the resilience of nurses in first-class tertiary hospitals in China played an intermediary role in job satisfaction and turnover intention. The reason why our finding is different from the above results may be that village doctors mainly deal with frequent and common diseases, and their work stress, work intensity, work trauma and other factors that affect their resilience are lower than hospital nurses, so resilience are not the direct reason for village doctors to leave. However, the study proved that resilience affected turnover intention indirectly through the mediating role of work engagement, and played a significant mediating role in job satisfaction and work engagement. These findings indicated that job satisfaction and work engagement were necessary ways for village doctors to transform the unification of personal value and professional value into continuing their rural medical work. Inspired by these mediation paths, interventions that can sufficiently lower the turnover intention of village doctors should be encouraged. The Chinese government should increase investment in village doctors' income, establish a long-term, reasonable, and effective promotion mechanism, and provide social security to improve the work efficiency and engagement of

village doctors. Another possible strategy is to reduce the work loads of village doctors, improve their resilience, and guide them towards positive coping approaches in their daily work.

In conclusion, our study revealed four affecting paths of turnover intention, and that job satisfaction, resilience, and work engagement were all accurate predictors of the turnover intention of village doctors. Job satisfaction had the most significant impact, followed by work engagement. The reason was that resilience cannot directly affect turnover intention, but rather through the mediating effect of work engagement. Hence, this suggests a more sophisticated mechanism in the relationship between resilience and turnover intention. However, the research on the resilience of village doctors is very insufficient at present. In the future, we should not only study the influencing factors, but also study the intervention measures of the resilience, and construct the protective intervention measures of village doctors from the perspective of predictors, so as to improve their resilience. In addition, as resilience is a multi-dimensional variable, it is difficult to obtain in-depth and detailed understanding through quantitative research. In the future, qualitative research methods should be adopted to conduct micro and in-depth exploration on the resilience of village doctors.

Two limitations of the study should be addressed. Firstly, although the SEM was used to verify the relationship among variables, this study still has limitations to draw definite conclusions based on the cross-sectional design. Secondly, we collected the data through the participants' self-report and returned questionnaires through an official letter by Jining Municipal Health Commission, rather than face to face investigation.

Conclusions

The results show that higher job satisfaction, work engagement, and resilience contribute to reduce turnover intention, which not only provide new ideas to explain the numerous village doctors leaving their jobs, but also offer possible and feasible new methods to reduce turnover intention and behaviour. Future research is proposed to introduce other mediating factors and construct different models to test the influence mechanism of resilience on turnover intention.

Based on our findings, the health sector may consider various measures to improve the job satisfaction, job engagement, and resilience of village doctors. Work-related dimensions should be paid attention to, including establishing effective promotion mechanisms, increase training opportunities, and providing higher and more reasonable income. Simultaneously, qualitative research should be used to explore the factors influencing resilience in depth and detail, and the protective intervention measures should be structured from the perspective of predictors, so as to improve the resilience of village doctors and their adaptability to stress. In this way, the high turnover rate of village doctors should be effectively contained, and the medical team working in China's rural primary medical care can develop stably and dynamically.

Abbreviations

EFA: exploratory factor analysis; SEM: Structural Equation Modeling; AGFI : adjust goodness of fit index; NFI: normed fit index; GFI: goodness of fit index; CFI: comparative fit index; TLI: Tucker-Lewis index; IFI: incremental; RMSEA: root mean square error of approximation

Declarations

Author Contributions:

X.Z., N.L. conceptualized the idea. X.Z. performed the analyses and wrote the first draft of the manuscript. L.B., Q.C., X.B. checked and entered the data. N.L., D.K. and L.L. critically revised the manuscript. All the authors read and approved the final manuscript.

Ethics approval and consent to participate

Ethical approval to conduct the study was obtained from Medical ethics committee of West China School of Public Health and West China Fourth Hospital, Sichuan University. All participants provided oral consent before any data were collected. Oral consent was obtained instead of written consent, because the survey was anonymous and did not involve personal privacy.

Consent for publication

Not applicable.

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Availability of data and materials

The datasets generated and/or analyzed during this study are quantitative in nature and not publicly available due to the assurances of confidentiality given to research participants in accordance with ethical approval granted, but where possible the author will discuss access to aggregate datasets upon reasonable request. All datasets are located on a secure server at the West China School of Public Health and West China Fourth Hospital, Sichuan University.

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have no regrets, no conditions and actively participated in the front-line work of epidemic prevention and control in China.

Conflicts of Interest:

The authors declare no conflicts of interest.

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Figures

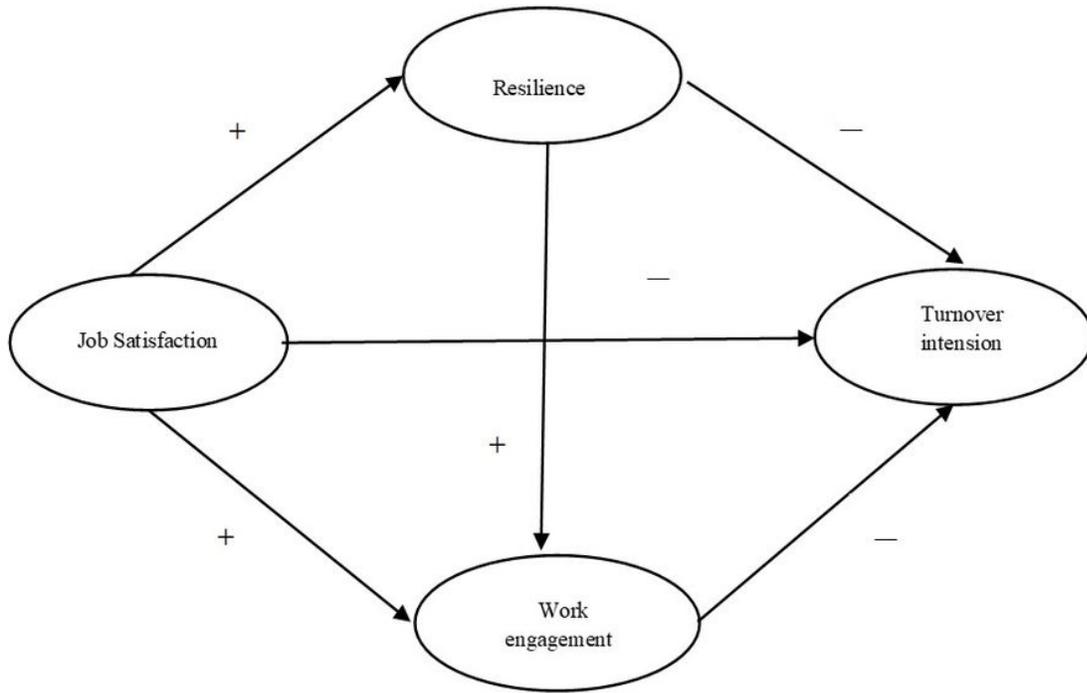


Figure 1. The theoretical model and hypotheses.

Figure 1

The theoretical model and hypotheses.

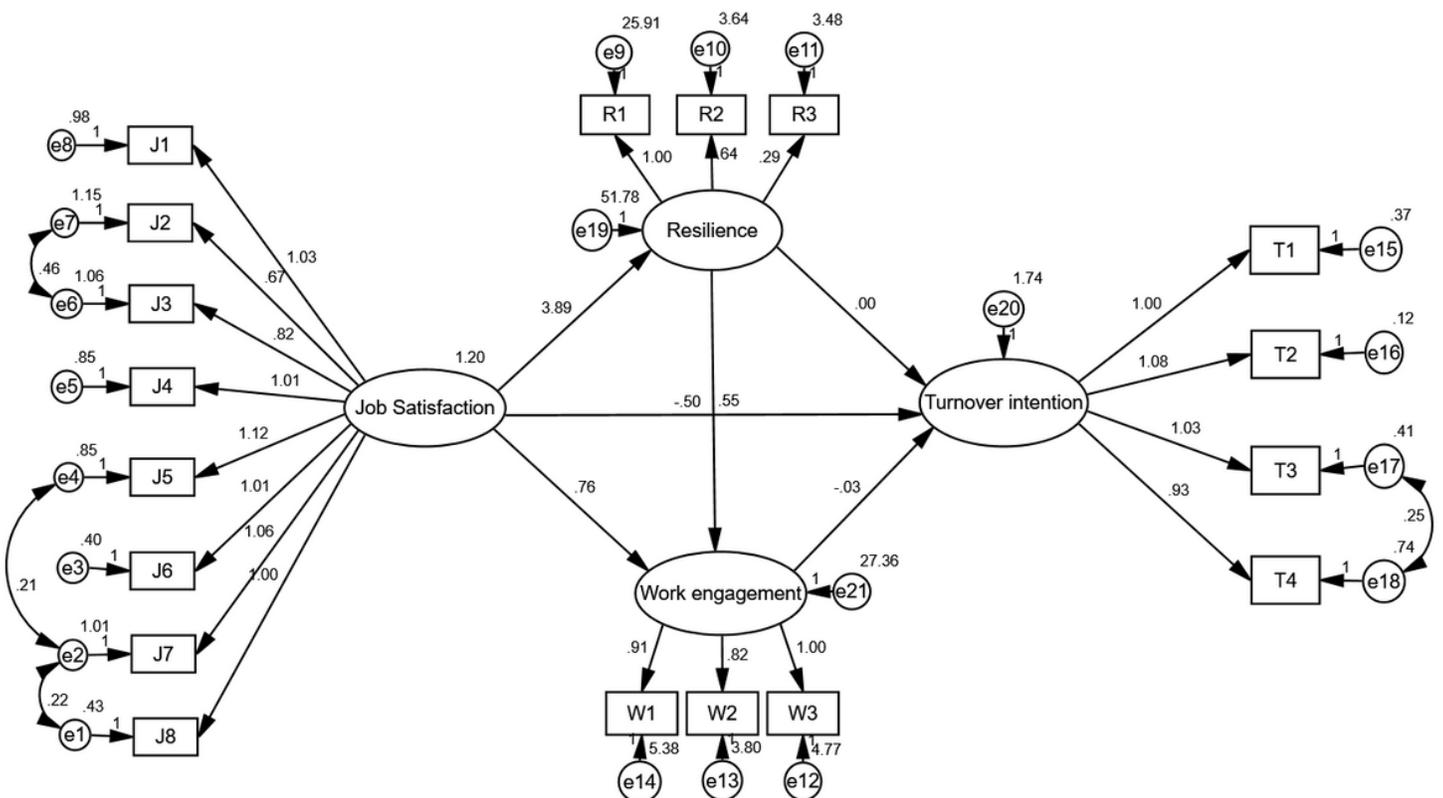


Figure 2

The final model and standardized model path

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