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The relationship between job satisfaction, work stress, work–family conflict, and turnover intention among physicians in Guangdong, China: a cross-sectional study

Scientific Method
1. Problem Identification
2. Expectations/Theory/Rationale
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Conclusion, Interpretation

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Problem

Study Plan, Data Collection

ABSTRACT = Summary

Objective To investigate the relationship between job satisfaction, work stress, work–family conflict and turnover intention, and explore factors associated with turnover intention, among physicians in Guangdong Province, China.

Methods From August to October 2013, physicians completed questionnaires and scales with regard to their job satisfaction, work stress, work–family conflict, and turnover intention. Binary logistic regression and structural equation modelling (SEM) were used in data analysis.

Results A total of 3963 physicians were approached, with 3563 completing the questionnaire. The mean score of the overall perception of turnover intention of physicians who worked in Guangdong was 2.71 on a scale ranging from 1 to 6. Hours worked per week, working in an urban/rural area, type of institution, and age significantly impacted on turnover intention. Turnover intention was directly and negatively related to job satisfaction, and it was directly, indirectly and positively related to work stress and work–family conflict.

Conclusion Job satisfaction, work stress, work–family conflict, hours worked per week, working in an urban/rural area, types of institution and age are influencing factors of turnover intention. Reducing working hours, raising salary, providing more opportunities for career development and training, supporting and encouraging physicians by senior managers could potentially contribute to the reduction in turnover intention.

1. Problem - doctors leave

INTRODUCTION

In 2009, the number of physicians per 10 000 population was 16 in Guangdong Province in southern China,[1] smaller than the average of 17.5 in China.[2] According to WHO statistics,[3] the number of physicians per 10 000 population was 24.2 in the United States in 2009. An insufficient supply of health workers has been a long-existing problem in Guangdong.

Turnover intention is defined as the probability that an employee will leave his or her job within a certain time period.[4] Since March and Simon[5] proposed a participant

Strengths and limitations of this study

▶ This study was the first to investigate the turnover intention of physicians in Guangdong with a large sample of 3563 physicians since the inception of health system reforms in 2009.

▶ This study used structural equation modelling to quantify the impact of different perceptions and to distinguish direct and indirect effects on turnover intention.

▶ The questionnaire in this study might not be suitable for other research.

▶ Since it was a cross-sectional study, the causal relationships between influencing factors and turnover intention could not be determined.

Data Analysis, Findings

determination model on turnover in 1958, different models on turnover have been proposed,[6–13] focusing on the linkages of factors, turnover behaviours, and turnover intention, etc. Among these models, turnover intention was regarded as one of the best predictors of turnover behaviours and it could explain a certain amount of variance in turnover behaviours.[14]

High turnover intention in physicians has become a critical problem in the development of the healthcare system. More than half of Iraqi doctors (55.2%) had turnover intention because of poor working conditions and serious security concerns.[15] Due to ineffective human resource management practices, 69% of health workers were reported to have turnover intentions in Ghana.[16] In China, Li *et al*[17] disclosed that about half of clinical physicians in public hospitals had turnover intention because of concerns about burnout, lack of support and chance of promotion. A survey implemented in Liaoning Province, China indicated that 41.4% of physicians intended

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to leave their workplace because of high work stress.[18] An investigation in Xiangyang City, Hubei Province showed that over one-third (36.8%) of village doctors had turnover intention and revealed that job satisfaction had an impact on turnover intention.[19] Based on a self-developed questionnaire, a survey conducted in Hubei Province revealed that physicians from urban state-owned medical institutions had a mean score of turnover intention of 3.18 (neutral) out of 5 and indicated that job satisfaction and burnout were influencing factors for turnover intention.[20] Tsai et al[21] showed that 14.5%, 30.0% and 55.5% of physicians in Taiwan had strong, moderate and mild intention to leave their current hospital. Since education and training for physicians takes a long time, high turnover intention will add to the already-existing shortage in physicians. A chain of consequences will take place, including increased workload for physicians, compromised medical service quality, and strained physician–patient relationships. In the US it has been estimated that the turnover cost at a major medical centre might be more than 5% of the total annual operating budget, due to recruitment and training costs and productivity loss.[22] Measures should be taken to prevent turnover to ensure the stability of the physician team.

However, turnover intention is always affected by various aspects, for example job strain,[23] workplace violence,[24] physician burnout,[25] job satisfaction,[26] income,[21] organisational commitment,[27] among others. Job satisfaction was one of the earliest proposed and frequently mentioned influencing factors for turnover intention.[14] A study of Iraqi doctors found low job satisfaction was associated with turnover intention (OR=0.97, 95% CI 0.95 to 0.99).[15] Most researchers reported that job satisfaction highly influenced turnover intention.[28 29] However, not all items of job satisfaction have a relationship with turnover intention. Gu et al[14] reported that there were no relationships between social status satisfaction (r=−0.041, p=0.32), work conditions satisfaction (r=−0.017, p=0.68), physician–patient relationship satisfaction (r=−0.070, p=0.09), and turnover intention among physicians.

Work stress is defined as an employee's reaction to characteristics at the workplace that seem mentally and physically threatening.[30] A high level of work stress could make employees unhealthy, poorly motivated, less productive, and less safe at work.[31] Work stress not only affects their health but also their work performance, leading to absences or turnover. Work stress is widely regarded as one of the influencing factors of job satisfaction. A series of studies revealed that work stress was negatively correlated to job satisfaction,[32–38] whereas some studies disclosed that work stress had a positive effect on turnover intention.[39–41]

Work–family conflict is defined as a form of inter-role conflict that will appear when it is difficult to balance the pressure of work and family.[42] The three main types of work–family conflict are time based, strain based and behaviour based.[43] Some research in other countries indicated that work–family conflict could positively affect turnover intention.[44 45] Some studies reported that there were neither direct nor indirect relationships between work–family conflict and turnover intention.[46] Armstrong et al[47] indicated that work–family conflict was significantly related to both work stress and job satisfaction.[47]

Up till now, there was no study on turnover intention among physicians in Guangdong since the most recent health system reform (2009–2012). The reform involved the increase of health insurance coverage, the introduction of an essential drug list, fixed salaries for health workers set by the local government, and improvement in the delivery of public health services in primary care.[48 49] One priority of the reform was to provide medical insurance to at least 90% of the population of China.[50] The reform also aimed to improve medication availability, quality, rational use, and to establish a national essential medicines system. Although the reform made health resources more available, there was an increase in workload for physicians. Before the salary reform, drug sales were the main source of income for medical institutions and physicians' income was directly related to the profits of their prescriptions. After the salary reform in 2009, a fixed basic salary and performance-based bonus were introduced to replace the previous income sources. According to Wu et al and Zhou et al,[48 49] after the reform, physicians in poor areas might be able to enjoy a higher income and financial stability, and those in wealthy areas might have a serious salary reduction. However, salary in poor areas was still lower than that in wealthy areas. It is necessary to investigate the turnover intention after the health system reform.

The purposes of this study were: (1) to assess the turnover intention of physicians in Guangdong after the recent reforms and (2) to explore the relationship between turnover intention and job satisfaction, work stress and work–family conflict.

3. Study Plans/Data Collection plans

METHODS

Participants and sampling = How study participants selected
Based on the available official data, there were 192 107 physicians in Guangdong Province, China in 2012, including assistant practising physicians.[1] The data used in this study were from the Fifth National Health Service Survey in Guangdong Province. All physicians who had a practising qualified certificate on file were eligible for admittance to this study.

The sample size in this study was evaluated by $n_c = \frac{n_1}{1 - n_1/N}$, where $n_1 = n \times deff$, $n = \left(\frac{Z_{\alpha/2}\sigma}{\delta}\right)^2$ with $\alpha = 0.05$, $Z_{\alpha/2} = 1.96$, estimate of SD $\sigma = 1.31$, allowance error $\delta = 0.05$, design effect $deff$=1.2, n=192 107. Here, is the sample size after the design effect correction to the calculated sample size n. After finite population sampling correction, n_c is the final sample size. The values of σ and $deff$ were obtained based on the results of the Fourth National Health Service Survey in Guangdong Province.[20 51 52] The value of n_c was computed as 3217, and the sample size should not be smaller than this figure. In this

study, a total number of 3963 physicians in Guangdong Province were selected to participate in the survey.

The method of multistage stratified cluster random sampling was adopted to acquire the sample. First, 40 sample districts and counties from 21 prefecture-level cities of Guangdong province were randomly selected. Second, all tertiary hospitals and some of the secondary hospitals were selected as sample units. At the same time, 200 towns/streets and 400 villages/neighbourhoods were chosen randomly. All community health service centres and health clinics in the selected 200 towns/streets and 400 villages/neighbourhoods were chosen as sample units. Third, the sample group was selected from each sample unit (20 physicians per hospital, seven physicians per community health service centre/health clinic) by simple random sampling. If the real number of physicians in the institution was not enough, all physicians were selected.

Measuring instruments = Data collection tools; measured four primary variables

The questionnaire was produced by the National Health and Family Planning Commission, consisting of eight parts along with a covering letter outlining the survey objective and reply methods.[53] The questionnaire related to this study contained the following five sections: basic socio-demographic information, job satisfaction, work stress, work–family conflict, and turnover intention.

Section 1 consisted of basic socio-demographic information: gender, age, marital status, education background, professional status, occupation, years of service, type of institution, employment status, administrative duties, department, hours worked per week, night shift frequency (per month), annual income, working in urban/rural area, working in Pearl River Delta or not. The regions in Pearl River Delta are considered part of an emerging megacity, which is more prosperous than the other regions in Guangdong. In China, a bachelor's degree in medicine is an undergraduate academic degree awarded by colleges and universities on completion of a course of study lasting 5 years. A college degree is a qualification awarded on successful completion of a course of study that continues for 3 years in junior college. Lower than junior college includes technician training school, senior high school and junior high school, etc.

Sections 2–5 were the variables measured. Job satisfaction includes eight items developed from the Job Descriptive Index (JDI),[54] that is, colleagues, the work itself, promotions, remunerations, environment, facility, superiors and current job. An example of the item format is 'I'm very satisfied with my superiors'. Work stress includes four items, that is, feel great pressure from work, feel a high level of tension from work, have trouble falling asleep because of work, feel nervous because of work. These items were adapted from the report.[55] Turnover intention includes four items, that is, thought of leaving the organisation you served now, thought of leaving this industry, looking for a new job recently, looking for a new job next year. They were selected from a questionnaire developed by Cammann *et al*[56] and Mobley.[57] Work–family conflict was assessed

using a nine-item work–family questionnaire developed by Carlson.[58] The job satisfaction, work stress and turnover intention dimensions included 16 items on a six-point Likert scale ranging from 1 (highly disagree) to 6 (highly agree). The work–family conflict was assessed on a five-point Likert scale ranging from 1 (highly disagree) to 5 (highly agree).

Although the questionnaire has been used in the pilot pre-survey, this survey is the first large-scale use of this questionnaire. Therefore, it is necessary to investigate the reliability and validity of the questionnaire. Exploratory factor analysis (EFA) based on principal components for the dimensions on the formal samples showed that four factors were extracted (table 1). According to previous studies,[59–61] factor loading values at 0.3 or greater were considered acceptable, whereas those greater than 0.55 were considered good. table 1 showed that all the loading values of the items to the corresponding dimensions were greater than 0.55, so the construct validity of the questionnaire was good.

In order to analyse whether the four one-factor models could be appropriately supported by the investigation data, the confirmatory factor analysis (CFA) based on structural equation modelling (SEM) was performed on the samples. We used latent variables and manifest variables (items) to construct a SEM to investigate the construct validity of the questionnaire. The values of goodness of fit index (GFI), adjust goodness of fit index (AGFI), normed fit index (NFI), comparative fit index (CFI), incremental fit index (IFI), Tucker–Lewis incremental fit index (TLI), root mean square error of approximation (RMSEA), and root mean square residual (RMR) are shown in table 2. The magnitudes of these indices were evaluated according to the recommendations of Hu and Bentler.[62] The model will be considered to be adequate when GFI, AGFI, NFI, CFI, TLI, IFI>0.90, RMSEA <0.08, RMR <0.10. The model will be very good if GFI, AGFI, NFI, CFI, TLI, IFI>0.95, RMSEA <0.05. It could be observed that the model was good based on all the values of the above indices. The EFA and CFA results showed that the survey instruments had good construct validity. Additionally, the Cronbach α coefficients[63] reflecting the internal consistency were from 0.870 to 0.930 for these dimensions (table 1), indicating a good level of reliability.

Data collection = Procedures - data collection process

A cross-sectional survey was carried out from August to October 2013 in all selected sample units. Participants self-administered a questionnaire and scales. Each health bureau was responsible for the training of investigators, who regained completed questionnaires under detailed inspections on the spot to ensure the quality of the questionnaires.

The Ethics Review Committee of the Health Department of Guangdong Province approved the study protocol. All participants in the study had provided written informed consent before participating in this survey. Participation was voluntary and anonymous.

Table 1 Factor loading of items using the exploratory factor analysis (EFA) and cronbach α of difference dimensions

	Job satisfaction	Work stress	Work-family conflict	Turnover intention
Colleagues	0.591			
The work itself	0.736			
Promotions	0.771			
Remunerations	0.769			
Environment	0.776			
Facility	0.759			
Current job	0.841			
Superiors	0.649			
Feel great pressure from work		0.844		
Feel a high level of tension from work		0.861		
Trouble falling asleep because of work		0.853		
Feel nervous because of work		0.854		
Work keeps me from family activities			0.787	
Time I devote to job keeps me from participating in household activities			0.830	
Miss family activities due to work			0.837	
Problem-solving behaviours make no sense at home			0.761	
Behaviour that is effective and necessary at work would be counterproductive at home			0.706	
Behaviours make me effective at work do not help me to be a better parent or spouse			0.774	
Too frazzled to participate in family activities			0.844	
Drain prevents me from contributing to family			0.858	
Owing to the pressures from work, I do not want to do favourite things at home			0.806	
Thought of leaving the organisation you served now				0.877
Thought of leaving this industry				0.863
Looking for a new job recently				0.921
Looking for a new job next year				0.835
Average variance extracted (AVE)	54.789	72.795	76.502	64.273
Cronbach's α	0.881	0.870	0.930	0.897

Statistical analysis = Data analysis

First, a χ^2 test was conducted to compare the difference between the socio-demographic information from invalid questionnaires and valid questionnaires. The results indicated whether there was significant difference between them. Then we undertook a descriptive analysis of physicians' basic socio-demographic characteristics, job satisfaction, work stress, work–family conflict and turnover intention. For categorical variables, frequencies and percentages were used. For continuous variables, means and SD were used.

Table 2 Results of confirmatory factor analysis

	AGFI	GFI	NFI	CFI	IFI	TLI	RMSEA	RMR
Recommended value	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	<0.08	<0.10
Job satisfaction	0.954	0.983	0.983	0.983	0.983	0.964	0.071	0.050
Work stress	0.992	0.999	0.999	0.999	0.999	0.997	0.036	0.005
Work–family conflict	0.951	0.977	0.986	0.986	0.986	0.951	0.068	0.058
Turnover intention	0.983	0.998	0.999	0.999	0.999	0.993	0.055	0.014

AGFI, adjusted goodness of fit index; CFI, comparative fit index; GFI, goodness of fit index; IFI,incremental fit index; NFI,normed fit index; RMR, root mean squareresidual; RMSEA, root mean square error of approximation; TLI, Tucker–Lewis incremental fit.

Binary logistic regression with a stepwise selection approach was employed to examine whether the items of job satisfaction, work stress and work–family conflict dimensions could significantly affect turnover intention, with the socio-demographic characteristics simultaneously used as controlled variables.

Physicians with an average score greater than 3.5 for turnover intention were classified as the 'high turnover intention' (1) group; the rest were 'low turnover intention' (0). The following statistics in the binary logistic model were reported: Hosmer–Lemeshow test, Cox & Snell R², Nagelkerke R², OR and 95% CI with a p value. The above analyses were conducted using SPSS 20.0. p-values<0.05 were considered to be statistically significant in all analyses.

The relationship between job satisfaction, work stress, work–family conflict, turnover intention, and the fitness of the hypothetical model were verified via SEM. The SEM using maximum likelihood estimation was conducted by SPSS/AMOS 17.0. SEM[64] is a method that allows the simultaneous estimation of all relationships between observed (manifest or unmeasured) and unobserved (or latent) variables of a model. It uses rectangles to represent manifest variables and circles to represent latent variables. An assumed causal path between two variables is represented by a one-way arrow. Path coefficients on the arrows are standardised partial regression coefficients, which indicate the effect of one variable on another, while controlling all other variables in the model. All coefficients without a sign reveal a positive association, whereas those with a minus sign show a negative association. Model fit was evaluated using GFI, AGFI, NFI, CFI, IFI, RMSEA, RMR and TLI.

Hypothetical model and hypothesis
= Predictions, see Figure 1 on page 8 for model

The hypotheses applied to the model were tabulated as follows:

Hypothesis 1: Job satisfaction will negatively influence turnover intention.

Hypothesis 2: Work stress will positively influence turnover intention.

Hypothesis 3: Work stress will negatively influence job satisfaction.

Hypothesis 4: Work–family conflict will positively influence turnover intention.

Hypothesis 5: Work–family conflict will negatively influence job satisfaction.

Hypothesis 6: Work–family conflict will positively influence work stress.

RESULTS = Data analysis findings
Socio-demographic information of participants

A total of 3963 paper questionnaires were delivered to physicians, all of which were returned. After reviewing, 400 copies were incomplete or blank, resulting in 3563 valid responses and a response rate of 89.91%.

The socio-demographic information of participants and distribution of dimensions are presented in table 3.

In the samples, 37.9% were women and 62.1% were men. The largest proportion of respondents (43.8%) was in the 19–34 age group, followed by the 35–44 age group (34.7%). The average age of the respondents was 37.6±8.5 years. Respondents' average years of service were 14.2±9.5 years. Most of the respondents had obtained a bachelor's degree (57.6%), followed by junior college (21.0%). Most respondents were resident physicians (39.5%), followed by attending physicians (30.6%). The majority of the respondents worked in hospitals (62.4%), 20.5% at community health service centres and the remaining 17.1% at health clinics. Additionally, 68.5% of respondents worked more than 40 hours per week and 58.9% had at least four night shifts (per month).

Effect of job satisfaction, work stress and work–family conflict on turnover intention

The item scores of the survey were shown in table 4. The item scores of job satisfaction, work stress, and turnover intention were from 3.03 to 4.71, 3.52 to 4.91, 2.21 to 3.01, respectively, whereas the overall mean scores of overall perception were 3.93, 4.17 and 2.71, respectively. The item scores of work–family conflict ranged from 3.30 to 3.93, and the overall mean score of overall perception was 3.65.

table 5 tabulates the results of binary logistic regression. The binary logistic regression model had goodness-of-fit under the Hosmer–Lemeshow test (χ^2=10.755, p=0.216). For the socio-demographic variables, hours worked per week, working in an urban/rural area, type of institution, and age contributed significantly to turnover intention (p<0.05 for all). The model showed that promotions satisfaction (OR=0.836, p<0.001), remunerations satisfaction (OR=0.896, p=0.009), current job satisfaction (OR=0.628, p<0.001), and superior satisfaction (OR=0.894, p=0.006) for the job-satisfaction dimension; trouble falling asleep because of work (OR=1.140, p=0.008), feel nervous because of work (OR=1.480, p<0.001) for the work stress dimension; and items in the work–family conflict dimension such as 'behaviour that is effective and necessary at work would be counterproductive at home' (OR=1.174, p=0.004), 'behaviour makes me effective at work do not help me to be a better parent or spouse' (OR=1.176, p=0.002), and 'owing to the pressures from work, I do not want to do favourite things at home' (OR=1.171, p=0.002) proved to be significant to turnover intention under the control of socio-demographic variables.

Physicians who worked 40–56 hours per week were 1.374 times more likely to have turnover intention, in comparison to those who worked 0–40 hours per week (p=0.006). Physicians who worked in rural areas had a greater likelihood of turnover intention, in comparison to those who worked in urban areas (OR=1.269, p=0.016). Compared with the physicians who worked in hospitals, physicians who worked in community health service centres were 1.353 times more likely to have turnover intention (p=0.016) and physicians who worked in health clinics were 1.482 times more likely to have turnover intention (p=0.002). The turnover intention of physicians

Table 3 Socio-demographic information of the participating physicians

Socio-demographic information	N (%)	Socio-demographic information	N (%)
Gender		Employment status	
Female	1352 (37.9)	Permanent	2731 (76.6)
Male	2211 (62.1)	Temporary	832 (23.4)
Age		Having administrative duties	
19~34	1561 (43.8)	Yes	872 (24.5)
35~44	1236 (34.7)	No	2691 (75.5)
45~	766 (21.5)	Department	
Marital status		Internal medicine	1127 (31.6)
Unmarried	532 (14.9)	Surgery	619 (17.4)
Married	2944 (82.6)	Gynaecology & Obstetrics Paediatrics	504 (14.1)
Other	87 (2.4)	Traditional Chinese Medicine	196 (5.5)
Education background		Prevention and Care	338 (9.5)
Doctor/Master	495 (13.9)	Other	779 (21.9)
Bachelor	2051 (57.6)	Hours worked per week	
Junior college	750 (21.0)	0~40	1123 (31.5)
Lower than junior college[*]	267 (7.5)	41~56	1507 (42.3)
Professional status		57~	933 (26.2)
Chief physician Associate Chief physician	724 (20.3)	Night shift frequency (per month)	
Attending physician	1092 (30.6)	0~3	1462 (41.0)
Resident physician	1407 (39.5)	4~7	1227 (34.4)
No title	340 (9.5)	8~	874 (24.5)
Occupation		Annual income (RMB)	
Clinical medical	3218 (90.3)	10 000~19 999	166 (4.7)
Other	345 (9.6)	20 000~39 999	866 (24.3)
Years of service		40 000~59 999	794 (22.3)
0~4	537 (15.1)	60 000~79 999	601 (16.9)
5~9	864 (24.2)	80 000~	1136 (31.9)
10~19	1123 (31.5)	Urban/rural area	
20~	1039 (29.2)	Urban	2152 (60.4)
Type of institution		Rural	1411 (39.6)
Hospital	2222 (62.4)	Pearl River Delta or not	
Community health service centre	731 (20.5)	Yes	2025 (56.8)
Health clinics	610 (17.1)	No	1538 (43.2)

*Lower than junior college includes technician training school, senior high school and junior high school, etc.

who were older than 45 years was lower than those aged 19–34 (OR=0.753, p=0.028).

Test of study models

We used the SEM to quantify the relationship between the four dimensions. The overall model fit indices of the hypothetical model in figure 1 were GFI=0.927, NFI=0.948, CFI=0.952, IFI=0.952, TLI=0.945, RMSEA=0.057, RMR=0.085, and AGFI=0.910, all of which approached the recommended values and showed that the model fitted well. table 6 summarises the results of the direct and indirect effect of the model.

The edge between the dimensions in figure 1 represents the direct relationship. The direct effect of a dimension on another dimension is equal to the regression coefficient of the two dimensions. Based on figure 1, job satisfaction had a direct effect on turnover intention (γ=−1.061, t value=−22.734), which supports Hypothesis 1. A minus symbol before a coefficient represents a negative effect, for example, higher job satisfaction led to lower turnover

Table 4 Item scores in job satisfaction, work stress, work–family conflict, and turnover intention

Items	Mean±SD	Items	Mean±SD
Job satisfaction*	**3.93±1.00**	**Work–family conflict***	**3.65±0.94**
Colleagues	4.71±1.10	Work keeps me from family activities	3.85±1.19
The work itself	4.39±1.33	Time I devote to job keeps me from participating in household activities	3.93±1.14
Promotions	3.73±1.43	Miss family activities due to work	3.93±1.11
Remunerations	3.03±1.48	Problem-solving behaviours make no sense at home	3.69±1.12
Environment	3.56±1.45	Behaviour that is effective and necessary at work would be counterproductive at home	3.30±1.08
Facility	3.41±1.39	Behaviours make me effective at work do not help me to be a better parent or spouse	3.48±1.23
Current job	3.93±1.31	Too frazzled to participate in family activities	3.62±1.21
Superiors	4.66±1.25	Drain prevents me from contributing to family	3.51±1.25
Work stress*	**4.17±1.17**	Owing to the pressures from work, I do not want to do favourite things at home	3.55±1.26
Feel great pressure from work	4.73±1.21	**Turnover intention***	**2.71±1.31**
Feel a high level of tension from work	4.91±1.19	Thought of leaving the organisation you served now	2.79±1.46
Trouble falling asleep because of work	3.62±1.55	Thought of leaving this industry	3.01±1.61
Feel nervous because of work	3.52±1.53	Looking for a new job recently	2.83±1.56
		Looking for a new job next year	2.21±1.35

*The overall perception of the four dimensions mentioned in table 4 for each respondent was the mean scores of the corresponding items.

Table 5 Results of the significant variables by the binary regression

| Explanatory variables	OR (95% CI)	p	Explanatory variables	OR (95% CI)	p
Hours worked per week			Job satisfaction		
0~40	1		Promotions	0.836 (0.769 to 0.908)	<0.001
41~56	1.374 (1.097 to 1.721)	0.006	Remunerations	0.896 (0.825 to 0.973)	0.009
57~	1.174 (0.904 to 1.525)	0.228	Current job	0.628 (0.573 to 0.688)	<0.001
Urban/rural area			Superiors	0.894 (0.825 to 0.968)	0.006
Urban	1		Work stress		
Rural	1.269 (1.045 to 1.541)	0.016	Trouble falling asleep because of work	1.140 (1.034 to 1.256)	0.008
Type of institution			Nerves caused by work	1.480 (1.339 to 1.636)	<0.001
Hospital	1		Work-family conflict		
Community health service centre	1.353 (1.058 to 1.731)	0.016	The behaviour that is effective and necessary at work would be counterproductive at home	1.174 (1.054 to 1.308)	0.004
Health clinics	1.482 (1.154 to 1.904)	0.002			
Age					
19~34	1		The behaviour makes me effective at work do not help me to be a better parent or spouse	1.176 (1.060 to 1.305)	0.002
35~44	1.030 (0.842 to 1.260)	0.772			
45~	0.753 (0.585 to 0.969)	0.028			
			Owing to the pressures from work, I do not want to do favourite things at home	1.171 (1.062 to 1.291)	0.002
Cox & Snell R^2	0.296		Nagelkerke R^2	0.421	
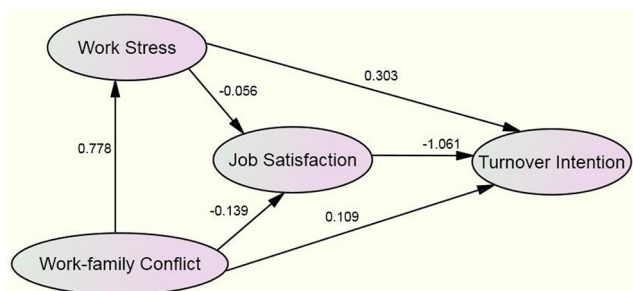
Figure 1 The hypothetical model used in the study.

intention. Work stress had a direct effect on turnover intention ($\gamma=0.303$, t value=18.940) and job satisfaction ($\gamma=-0.056$, t value=−5.948), which supports Hypotheses 2 and 3. Further, work–family conflict had a direct effect on turnover intention ($\gamma=0.109$, t value=5.409), job satisfaction ($\gamma=-0.139$, t value=−11.026), and work stress ($\gamma=0.778$, t value=35.797), which supports Hypotheses 4, 5, and 6, respectively. It should be noted that the absolute value of the direct effect of job satisfaction on turnover intention was much larger than the effect of work stress and work–family conflict on turnover intention.

Indirect effects were also evaluated in this study. The indirect effect of a dimension on another dimension was equal to the product of the regression coefficients of the directly connected dimensions. Therefore, the indirect effect of work stress on turnover intention was equal to the product of the regression coefficient of work stress and job satisfaction and the regression coefficient of job satisfaction and turnover intention. The indirect effect of work stress on turnover intention was found to be significant at 0.060 (−0.056×−1.061). Moreover, the indirect effect of work–family conflict on turnover intention was significant at 0.430 (−0.139×−1.061+0.778×0.303+0.778×−0.056×−1.061), which was larger than its direct effect on turnover intention.

table 6 shows that the total effect of job satisfaction, work stress, and work–family conflict on turnover intention was −1.061, 0.363 and 0.539, respectively. The impact of job satisfaction on turnover intention was the largest. The squared multiple correlations value was 0.555, which means that the established SEM explained 55.5% of the total variance of turnover intention.

DISCUSSION
Turnover intention
Although different measuring instruments for turnover intention had been used in the literature, the mean scores

and the percentages of high perception of turnover intention could be used as a reference to the potential turnover behaviour.[14] In our study, the scores for the four items in the turnover intention were smaller than (ie, 2.79, 2.83, 2.21) or close to (3.01) the median 3 in the six range scales, that is, 1 – strongly disagree, 2 – disagree, 3 – slightly disagree, 4 – slightly agree, 5 – agree, 6 – strongly agree and the mean score of overall perception of turnover intention was 2.71 (lower than slightly disagree). The overall perception of turnover intention exceeded 'I prefer to stay' (score 2) and approached 'I have half a mind to stay' (score 3). A score greater than 3.5 is considered a high score, the percentages of higher scores for each item of turnover intention were 30.3%, 38.3%, 33.7% and 16.9%, respectively. Based on the results, 2697 (75.7%) participants had low turnover intention, but 866 (24.3%) participants had high turnover intention. About a quarter of physicians had high turnover intention in Guangdong Province compared with the investigations made in Hubei Province (eg, 36.8% of the village doctors had turnover intention in Xiangyang City,[19] turnover intention to be 3.18 out of 5[20]); the turnover intention in Guangdong was relatively smaller. However, the turnover intention of physicians in Guangdong was still higher than that in Taiwan.[21] Generally, for the areas with better medical welfare, such as Finland[23 24] and Madrid,[25] the turnover intention of physicians was low. However, due to poor working conditions and serious security concerns, the turnover intention of Iraqi doctors was very high (55.2%).[15] Based on our study, more attention should be paid to the physicians in Guangdong to reduce their turnover intention.

Studies conducted in other countries or areas mentioned a series of influencing factors of turnover intention. In China, Fang et al[19] showed that income satisfaction, 'the way organisation policies are put into practice', 'my pay' and 'the amount of work I do', promotions and the work environment had an impact on turnover intention of village doctors. Zhang and Feng's[20] study disclosed that several dimensions of both job satisfaction and burnout syndrome were influencing factors of physicians' turnover intention. Liu and Quan[27] revealed organisational commitment had an indirect effect on the turnover intention of doctors through the mediating effect of job satisfaction and self-expectation. In other countries, Heponiemi et al[23 24] performed two studies that showed that physicians who had on-call duty, high demands, and experienced physical violence were more likely to have higher turnover intention. Moreno-Jiménez et al[25] carried

Table 6	Effects of factors on turnover intention (p<0.05)			
Turnover intention	**Job satisfaction**	**Work stress**	**Work–family conflict**	**Squared multiple correlations**
Direct effect	−1.061	0.303	0.109	0.555
Indirect effect	–	0.060	0.430	
Total effect	−1.061	0.363	0.539	

out a study indicating commitment had a negative effect, and difficult patients had a positive effect on turnover intention of physicians. Tziner *et al*[26] showed that work stress and burnout had a positive effect on turnover intention and job satisfaction had a negative effect on turnover intention. Income satisfaction, promotion, job satisfaction and work stress were also mentioned in our study and the results were in line with the previous studies.

Socio-demographic characteristics

According to the models of binary logistic analysis, hours worked per week, working in an urban/rural area, type of institution and age were four important socio-demographic variables influencing the turnover intention of physicians. The results indicated that turnover intention was related to hours worked per week. Physicians who worked 41~56 hours per week had a 1.374 times higher turnover intention than those who worked up to 40 hours per week. The model revealed the more hours the physicians worked, the higher turnover intention they would have. The result was consistent with the findings by Jadoo,[15] Ruan[65] and Steinmetz.[66] Long working time might cause fatigue, tension and burnout, which had an indirect effect on turnover intention.[67 68] Especially, on-call physicians faced enormous work stress. A study revealed that work stress alone and working on-call combined with high work stress might induce thoughts of leaving the job.[23] The results also showed that the turnover intention of physicians who worked in rural areas was higher than that of physicians who worked in urban areas. The results were consistent with the findings of Lagerlund *et al*.[69] Physicians prefer to stay in urban areas because of better welfare treatment, work environment and social resources. A serious consequence of the Healthcare reform was the brain drain from basic medical institutions because of the reduction of income and limitations of clinical autonomy caused by the essential drug list.[49] Similar results were reported by other studies.[70 71] Meanwhile, physicians who worked in health clinics had a 1.482 times higher turnover intention than those who worked in hospitals. Physicians who worked in community health service centres had a 1.353 times higher turnover intention than those who worked in hospitals. The results are similar to those on medical personnel reported by Ruan[65] and Song.[70] Ruan *et al*[65] mentioned that non-indigene, low-welfare treatment, a big gap between actual and expected income, low job satisfaction, and few career development opportunities caused high turnover intention in primary medical institutions. Besides, our research also revealed that younger physicians had a higher turnover intention, which was in accordance with the results reported by Heponiemi *et al*.[72]

Job satisfaction

Under the control of socio-demographic variables, the results of our model indicated that the four job satisfaction items including promotion, remuneration, current job and superiors had a significant impact on turnover intention. The results were consistent with previous studies in China[14] and other countries.[73–75] According to a study conducted by Gu,[14] not all dimensions of satisfaction had an effect on turnover intention. The empirical study[14] undertaken in Shanghai found that promotions, remunerations, superiors, of the work itself and the total job satisfaction, had a negative effect on physicians who worked in tertiary hospitals in Shanghai. Lack of promotion opportunities may reduce efficiency, cut enthusiasm or even lead to the staff resignation. Some studies mentioned that an attractive remuneration was a key factor of job satisfaction. Low remunerations may lead to trouble in attracting and recruiting new staff.[73 74] However, the salary reform which started in 2009 introduced a fixed basic salary and a performance bonus to replace the previous income sources. Physicians from poor areas might have a higher income and financial security, and those in wealthy areas might have serious income reduction after the reform.[48 49] A more reasonable salary distribution system is needed to guarantee the remunerations of physicians. Other studies revealed that support from superiors and interactions with managers are important. Encouragement from superiors will result in better performance in the workplace.[73] Physicians may have a turnover intention because of lack of trust and respect from their superiors.[75 76]

Work stress

The results of the logistic regression also revealed that trouble falling asleep because of work and nerves caused by work were significant predictors of turnover intention. Work stress positively influenced turnover intention, which was consistent with other studies.[31 39 77–83] The studies from different areas, different industries and different populations presented the same results. Trouble falling asleep led to a higher turnover intention. As an item of working stress, trouble falling asleep meant the pressure was relatively high, and physical health problems began to appear. Cary mentioned that mental health problems and lack of mental well-being at work were related to work stress, and they could result in a reduction of employees' productivity.[79] Matthias *et al* mentioned that work stress not only caused a decrease in work ability and mental health problems but also resulted in problems of physical function.[80] Health problems and lack of rest might be the reasons for a higher turnover intention. Another item caused by work was mentioned in a study undertaken by Liu *et al*.[81] The study indicated that acts of violence which happened in hospitals would cause fear, nervous problems, and psychological burden, eventually leading to departure. However, after the Healthcare reform, significant increases in insurance coverage were accompanied by increased use of Healthcare.[82] Healthcare became more accessible, so that the workload of physicians had increased significantly, especially in secondary and tertiary hospitals.[48 49] It is necessary to formulate policies to reduce the workload of physicians.

Work–family conflict

The model also showed work–family conflict positively influenced turnover intention, which had also been mentioned in other studies.[45 81–84] Stefanie *et al* revealed that women who suffered from higher work–family conflict showed higher family-related stress.[85] We could regard work–family conflict as a stressor. Work characteristics, such as night shifts, minimal control over work hours and unpredictable scheduling requirements are important stressors which are positively related to work–family conflict.[45 86] These work characteristics are applicable to physicians. Hence, there is a positive relationship between work–family conflict and turnover intention with work stress as a mediator. Some studies[77 87] mentioned that work–family conflict had indirect effects on turnover intention, but had no direct impact on turnover intention. As the results showed, the indirect effect is much greater than the direct effect, so the small samples of other studies did not have enough power to detect the direct effect.

According to the empirical analytical results using SEM, work–family conflict of physicians directly affected turnover intention and also indirectly influenced turnover intention through work stress and job satisfaction. Meanwhile, work stress of physicians not only directly affected turnover intention but also indirectly influenced turnover intention through job satisfaction, which was in accordance with the results mentioned in other studies.[88 89] Besides, the results using SEM also indicated that job satisfaction had a direct effect on turnover intention. This was consistent with the results of binary logistic regression and many other studies.[16 26 88]

Some of the factors which influence the turnover intention of physicians such as working in an urban/rural area, type of institution, and age cannot be resolved by health system reform or policy formulation. However, reduction of working hours, increasing income, providing opportunities for development and training may be useful to reduce turnover intention of physicians.

The main limitation of this study was that, as a cross-sectional design, the study had limited ability to infer causal relationships between job satisfaction, work stress, work–family conflict and turnover intention. The second limitation was that the instrument in this study was not a commonly used international scale. They were developed according to the national conditions of China, so it may not be suitable for other countries and areas.

CONCLUSIONS

The mean score of the overall perception of turnover intention of physicians working in Guangdong was 2.71 (neutral) on a six-point scale (1=strongly disagree, 6=strongly agree). A total of 75.7% of participants had low turnover intention, and 24.3% of participants had a high turnover intention. It is concluded that turnover intention of physicians was significantly associated with job satisfaction, work stress, work–family conflict and

socio-demographic factors, including hours worked per week, working in an urban/rural area, type of institution, and age. The results may be useful for policy makers and health administrators wishing to stop more doctors leaving the profession, especially in rural areas and basic medical institutions. To achieve the goal of reducing turnover intention, the appropriate policies should be developed focusing on job satisfaction, work stress and work–family conflict, especially job satisfaction. Administrative departments should pay more attention to the physicians who work in rural areas and basic medical institutions. Measures should be taken to reduce working hours, raise income, provide opportunities for career development and training, encourage support of healthcare staff from senior managers, reduce work stress and balance work–family conflict.

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