BMJ Open

Workplace violence, job satisfaction, burnout, perceived organizational support and their effects on turnover intention among Chinese nurses in tertiary hospitals: a cross-sectional study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-019525
Article Type:	Research
Date Submitted by the Author:	08-Sep-2017
Complete List of Authors:	Liu, Wenhui; Harbin Medical University School of Public Health, Department of Health Management Zhao, Shihong; The Second Affiliated Hospital of Harbin Medical University, Department of Neurosurgery; School of Public Health, Harbin Medical University, Department of Health Management Shi, Lei; School of Public Health, Harbin Medical University, Department of Health Management Zhang, Zhong; School of Public Health, Harbin Medical University, Department of Medical Education Liu, Xinyan; Harbin Medical University, Department of Medical Education, School of Public Health Li, Li; School of Public Health, Harbin Medical University, Department of Health Management Duan, Xiaojian; School of Public Health, Harbin Medical University, Department of Health Management Li, Guoqiang; Harbin Medical University, Department of Health Management, School of Public Health Lou, Fengge; School of Public Health, Qiqihar Medical University, Department of Public Health Research Jia, Xiaoli; Chinese Hospital Association, Department of Autonomous Protection Fan, Lihua; Harbin Medical University, Department of Health Management , School of Public Health; School of Public Health, Harbin Medical University, Department of Medical Education Sun, Tao; School of Public Health, Harbin Medical University, Harbin, Department of Medical Education; School of Public Health, Harbin Medical University, Harbin, Department of Health Management Ni, Xin; National Center for Children's Health, Beijing Children's Hospital affiliated to Capital Medical University , Department of the Hospital Director
Primary Subject Heading:	Health policy
Secondary Subject Heading:	Health policy, Health services research, Nursing, Medical management
Keywords:	Workplace violence, job satisfaction, burnout, organizational support, turnover intention, nurses

Workplace violence, job satisfaction, burnout, perceived organizational support and their effects on turnover intention among Chinese nurses in tertiary hospitals: a cross-sectional study

Wenhui Liu,[1*] Shihong Zhao,[1, 2*] Lei Shi,[1*] Zhong Zhang,[3] Xinyan Liu,[3] Li Li,[1] Xiaojian Duan,[1] Guoqiang Li,[1] Fengge Lou,[4] Xiaoli Jia,[5] Lihua Fan,[1, 3] Tao Sun, [1, 3] Xin Ni[6]

[*] WL, SZ and LS contributed equally to this work.

Correspondence to: Lihua Fan, School of Public Health, Harbin Medical University, No.157 Baojian Road, Nangang District, Harbin 150081, China; E-mail: lihuafan@126.com; Tao Sun, School of Public Health, Harbin Medical University, No.157 Baojian Road, Nangang District, Harbin 150081, China; E-mail: hydsunntao@126.com; Xin Ni, No.56 Nanlishi Road, Xicheng District, Beijing 100045, China; E-mail: nixin@bch.com.cn

[1] Department of Health Management, School of Public Health, Harbin Medical University, Harbin, Heilongjiang, China

[2] Department of Neurosurgery, The Second Affiliated Hospital of Harbin Medical University, Harbin, Heilongjiang, China

[3] Department of Medical Education, School of Public Health, Harbin Medical University, Harbin, Heilongjiang, China

[4] Department of Public Health Research, School of Public Health, Qiqihar Medical University, Qiqihar, Heilongjiang, China

[5] Department of Autonomous Protection, Chinese Hospital Association, Beijing, China

[6]Department of the Hospital Director, National Center for Children's Health, Beijing Children's Hospital affiliated to Capital Medical University, Beijing, China

Abstract

Objective

Our aim was to assess the relationship between workplace violence, job satisfaction, burnout, organizational support and turnover intention, and explore factors associated with turnover intention among nurses in Chinese tertiary hospitals.

Methods

A cross-sectional study was conducted using the Workplace Violence Scale, the Chinese Maslach Burnout Inventory General Survey, the Minnesota Job Satisfaction Questionnaire Revised Short Version, the Perceived Organizational Support–Simplified Version Scale, and the Turnover Intention Scale. The purposive sampling method was used to collect data from August 2016 through January 2017. A total of 1761 nurses from 9 public tertiary hospitals in 4 provinces (municipalities) located in eastern (Beijing), central (Heilongjiang, Anhui), and western (Shaanxi) of China completed the questionnaires (effective response rate = 85.20%).

Results

A total of 1216 of 1706 (69.1%) participants had high turnover intention. During the previous 12 months, the prevalence of physical violence and psychological violence toward nurses was 9.60% and 59.64%, respectively. As expected, the level of turnover intention was negatively correlated with participants' scores on job satisfaction ($r= -0.367$, $P < 0.001$) and perceived organizational support ($r= -0.379$, $P < 0.001$), respectively. Burnout was positively associated with turnover intention ($r = 0.444$, $P < 0.001$). Workplace violence was positively associated with turnover intention ($\beta = 0.035$, $P < 0.001$) in linear regression analysis. The total effect ($\beta = 0.53$) of workplace violence on turnover intention comprised its direct effect ($\beta = 0.36$), and its indirect effect ($\beta = 0.17$).

Conclusions

The turnover intention of nurses in tertiary hospitals is close to our expected results in the present study. The results suggest that job satisfaction and organizational support can reduce nurses' turnover intention. A series of measures should be taken by hospital administrations to improve nurses' sense of organizational belonging and job satisfaction, reduce the loss of nursing human resources, and foster job stability for nurses.

Strengths and limitations of this study

- We explored factors associated with turnover intention among nurses in Chinese tertiary hospitals.
- A variety of statistical methods were employed to investigate the relationship between independent variables and turnover intention.
- The retrospective approach to collecting data using self-reports of workplace violence might have led to recall and report bias.
- The results of purposive sampling were greatly influenced due to the preconceptions of the researchers. Therefore, the researchers need to clearly understand the basic characteristics of the population under study.

INTRODUCTION

In 2015, the total number of registered nurses in China reached 3.241 million. Compared with 2010, the number of registered nurses per 1,000 population increased from 1.52 to 2.36.[1] The ratio of physicians to nurses in China has increased from 1:0.85 in 2010 to 1:1.07 in 2015, and the inverse ratio of physician and nurse has been fundamentally reversed for a long time. In 2001-2002, the results of the Health Resources Report for the Western Pacific Region concerning the present situation, shortages, and future trends within the world of nursing showed that the ratio of physicians to nurses in Hongkong, Japan, Thailand, Germany, and the United Kingdom was more than 1:4, and that the ratio of physicians to nurses in Finland, Norway, and Canada was over 1:6.[2] In view of this, an inadequate supply of nurses has been a long-existing problem in China.

Turnover intention is defined as the possibility that employees will leave a job within a certain period.[3] The first study on turnover used the participant determination model proposed by March and Simon in 1958.[4] Following on from that study, standardized models, for example, the decision-making process model, the employee-withdrawal behavior model, and the intermediate chain extension model, have been constructed, using the peak mutation model, the unfolding model, and the loss motivation model.[8-12] Among these theoretical models and studies, turnover intention has been considered to be one of the best factors to predict turnover behavior, and has shown significant explanatory power.[13] Therefore, turnover intention has been the focus of this study.

High turnover among nurses has been a major challenge for many healthcare organizations.[14] About 40% of the registered nurses in a teaching hospital in Malaysia were reported to have a turnover intention, and the results indicated that age, work experience, nursing education, and overall job satisfaction significantly influence an intention to leave.[15] A survey was conducted in 4 general

hospitals in Seoul, and the findings showed that factors influencing turnover intention involve the organizational system, depersonalization, the physical environment, work role, and the organizational climate.[16] A review of the research literature revealed that factors related to the work environment were the most important in respect of nurses' turnover intentions.[17] A study has been conducted among nurses in 1,105 general acute care hospitals in Europe and the United States, and showed that the rates of nurse burnout ranged from 10% to 78%, with the job dissatisfaction rate ranging from 11% to 56% and the intention to leave rate ranging from 14% to 49%.[18] In China, an investigation in Tianjin showed that work support had an impact on turnover intention. Thus, some precautions need to be taken to prevent turnover to ensure the job stability of the nursing workforce.

However, turnover intention is usually affected through a variety of factors, for example, work stress,[19] workplace violence,[20] job satisfaction,[15] burnout,[21] perceived organizational support,[22] organizational commitment,[22] among others. Workplace violence is a widely-reported phenomenon among nurses in medical settings, and it influences the turnover intention of nurses.[23-26] China, in particular, has reported that healthcare workers have experienced a series of violent incidents, and this has attracted worldwide attention.[27] Workplace violence can be divided into physical (including hitting, shooting, kicking, slapping, pushing, biting, pinching, wounding using sharp objects, and sexual assault and rape) and psychological violence (including verbal abuse, threats and sexual harassment).[28-29] A study revealed that 28% of the nurses in New Jersey were leaving their work because of workplace violence exposure.[30] A previous study showed that most nurses had experienced verbal violence (93.7%) and physical violence (23.4%) at their workplace.[31] A total of 78.1% of nurses who had experienced verbal violence and 86.2% of nurses who had experienced physical violence reported that they were inclined to turnover after those violence episodes.[32] Therefore, workplace violence is one of the

influential factors in turnover intention.[26] McDowell found workplace violence was significantly related to burnout (r = 0.56, P < 0.01) and turnover intention (r = 0.24, P < 0.01) for all direct care paraprofessionals.[32]

Job satisfaction represents the extent to which personnel's demands and desires are met within the workplace.[33] It has been considered as a major contributory factor to intending to stay in a job, in previous studies.[15 17 34] In contrast to this viewpoint, previous studies have also shown that job satisfaction mainly affects turnover intention in respect of organizational commitment.[35-36] Furthermore, a third view has showed that two considerations, namely having demands and desires met and organizational commitment, exist simultaneously regarding job satisfaction and turnover intention.[37]

Burnout is a syndrome involving emotional exhaustion and depersonalization and where personal accomplishments are reduced, resulting in continuous work stress that has not been effectively handled.[38] Moreover, substantial evidence has indicated that employees with high levels of burnout are more prone to turnover intention.[32 39] Perceived organizational support refers to the overall perception and beliefs of employees about how organizations view their contributions and care about their interests.[40] Some studies have reported that perceived organizational support is a predictor of turnover intention.[22 35 41] One study has indicated that perceived organizational support is negatively associated with turnover intention.[42] However, there has been little research conducted on the moderating effects of perceived organizational support and job satisfaction in relation to workplace violence, burnout, and turnover intention for Chinese nurses.

The present study aims to examine the relationship between workplace violence, job satisfaction, burnout, organizational support and turnover intention, and explore factors associated with turnover intention among nurses in Chinese tertiary hospitals.

METHODS

Participants and sampling

A cross–sectional study of nurses was conducted from August 2016 through January 2017 in eastern (Beijing), central (Heilongjiang, Anhui), and western (Shaanxi) of China. A total of nine public tertiary hospitals in four provinces (municipalities) were selected using a purposive sampling method. All investigators were subject to unified training before starting the investigation and could act as investigators when qualified. We acquired permission to conduct our study from the managers, and the medical dispute resolution and human resources departments, of the hospitals concerned. An anonymous, self–administered questionnaire was used to conduct face–to–face surveys. We selected 2 public hospitals in Harbin (the Fourth Affiliated Hospital of Harbin Medical University and the principal hospital of Harbin) as the locations for our pre–study before the formal investigation (200 questionnaires were distributed and returned, and these data were excluded in the formal survey data). The investigators and hospital coordinators distributed and took back the questionnaires immediately from the participants. A total of 2,067 questionnaires were distributed to nurses, all of which were returned. However, 306 questionnaires were missing data or blank, which left 1,761 valid questionnaires (effective response rate = 85.20%). The following conditions were selected as the inclusion criteria for this study: (1) having a practicing nurse certificate; (2) having at least one year of clinical nursing experience; (3) being still engaged in clinical nursing work during the investigation; and (4) voluntary participation without prejudice to the participants' work. The exclusion criteria for this study were rehire after retirement nurses, refresher nurses, and nurses who had not passed the probation period.

Questionnaire

Demographic characteristics

Demographic information on the nurses was collected, including sex, age, marital status, educational background, technical title, employment role, department, years of experience, and daily working hours. Age was categorized as ≤ 30, 31–50, and ≥ 51 years old. Marital status was categorized as married and single/divorced/widowed. Educational background was classified as junior college or below, undergraduate, and master's degree or above. Technical title was categorized as primary, intermediate, and senior. Department was classified as emergency department, internal medicine, surgery, obstetrics and gynecology, pediatrics, and other. Work experience was divided into 4 categories: ≤ 4, 5–10, 11–20, and ≥ 21 years. Daily working time was categorized as ≤ 8, 8–10, 10–12, and ≥ 12 hours.

Workplace Violence Scale

The Workplace Violence Scale developed by the International Labour Office, the International Council of Nurses, the World Health Organization, and Public Services International Joint Program on Workplace Violence in the Health Sector in 2003 was used to measure workplace violence.[43] The scale used in this study consists of 2 dimensions (physical violence and psychological violence) and has 9 items that were adopted from these scales. Each item is scored on a 4–point scale reflecting respondents' frequency of exposure to workplace violence (0 = 0 times, 1 = 1 time, 2 = 2–3 times, and 3 = ≥ 4 times). The total possible score ranges from 0 to 27, with a higher total score indicating a higher frequency of exposure to workplace violence. In the present study, Cronbach's α for the Workplace Violence Scale was 0.86.

Burnout

Burnout was assessed using the Chinese Maslach Burnout Inventory General Survey (CMBI–GS) in the present study, with a total of 15 items, developed by Li YX, and proven to be vaild.[44-46] The

CMBI-GS is categorized into 3 subscales reflecting job burnout: emotional exhaustion, depersonalization, and reduced personal accomplishment. The response options for each item on the CMBI–GS are rated from 0 (never) to 6 (daily), based on the frequency of occurrence of the specific work feelings of the respondent. The score of the 3 subscales is equal to the average of the sum of items for each of the subscales. The total possible score is calculated through adding the scores for 3 subscales, and it ranges from 0 to 18 points, with a higher score indicating a higher level of burnout. In terms of the average score of all items, a score less than 8.5 points indicates lower job burnout, a score of 8.5–14.2 points indicates that burnout is serious, and burnout is extremely serious when the score is greater than 14.2 points. In this study, Cronbach's α for the CMBI–GS was 0.873. The internal consistency coefficients were 0.834, 0.826, 0.806, and 0.812, for emotional exhaustion, depersonalization, and reduced personal accomplishment, respectively.

Job satisfaction

The Minnesota Job Satisfaction Questionnaire Revised Short Version (MJSQ–RSV) was used in this study to assess participants' satisfaction with their job.[47-48] The MJSQ–RSV consists of 20 items, including 12 items measuring intrinsic satisfaction and 8 items measuring extrinsic satisfaction. Each item is rated on a 5–point Likert scale (1 = strongly unsatisfied, 2 = unsatisfied, 3 = uncertain, 4 = satisfied, and 5 = strongly satisfied).Intrinsic satisfaction refers to the degree of satisfaction with the factors involved in the job content. Extrinsic satisfaction refers to the degree of satisfaction of the individual in terms of current job rewards, promotion, and leadership style. The higher the participant's self–rating, the higher their satisfaction with the job. The present study revealed that Cronbach's α for the MJSQ–RSV was 0.882, and for the two subscales it was 0.872 (intrinsic satisfaction) and 0.896 (extrinsic satisfaction).

Perceived organizational support scale

Perceived organizational support was measured using the Perceived Organizational Support–Simplified Version Scale (POS–SVS). Previous studies have found the POS–SVS to have high reliability and validity as a measure of perceived organizational support.[41-42 49] It consists of nine self–report items, which comprise two reverse questions. Each item is rated on a 5–point Likert scale, and ranged from 1 (extremely inconsistent) to 5 (extremely consistent). The total possible score is calculated through adding the scores for all items, and it ranges from 9 to 45 points, with a higher score indicating a higher organizational support. In this study, Cronbach's α for the POS–SVS was 0.89.

Turnover intention scale

The Turnover Intention Scale, which has been used to measure turnover intention among nurses was used in the present study. The turnover intention scale was developed by Lee and Lee,[50] and has been widely used in many studies.[3 51] This 6–item scale is divided into 3 dimensions: the possibility of an employee quitting his/her present job, the motivation for employees to find other jobs, and the possibility of employees having access to external work. Each item is scored on a 4–point scale reflecting participants' intention to leave (1 = never, 2 = seldom, 3 = occasionally, and 4 = often). The total possible score is counted through adding the scores for all items, and it ranges from 6 to 24 points, with a higher score indicating a stronger intention to leave. The extent of turnover intention is divided into 4 levels according to the different total average score of turnover intention. A total average score ≤ 1 indicates that turnover intention is particularly low, less low when it is from 1 to 2, higher when it is from 2 to 3, and exceptionally high when it is greater than 3. In the present study, Cronbach's α for the Turnover Intention Scale was 0.89.

Data Analysis

EpiData version 3.1 was used to establish the study's database. We eliminated the questions with missing data or quality issues. To ensure accuracy, two trained personnel entered the data after all the surveys were completed. IBM SPSS V.19.0 was used for the data analysis in this study. Descriptive statistics, including numbers (n), percentages (%), means, and standard deviations (SD) were calculated for the demographic variables. We used one-way analysis of variance (ANOVA) or independent sample t–tests to compare group differences concerning the measurements of the continuous variables. Pearson's correlations were used to examine correlations among the continuous variables. Linear regression analysis was used to examine the associations of the demographic variables and workplace violence, job satisfaction, burnout, perceived organizational support, and turnover intention variables. Statistics, including F values, R^2, R^2–changes (ΔR^2), standardized regression coefficients (β), and P–values for each step in the regression model were reported. All study variables were tested for multicollinearity. A P–value < 0.05 was considered statistically significant.

Path analysis was used to examine the relationship among the five variables, including workplace violence, job satisfaction, burnout, perceived organizational support, and turnover intention. A structural equation model (SEM) for path analysis was constructed using the AMOS 17.0 program to analyze the effect of workplace violence on job satisfaction, burnout, perceived organizational support, and turnover intention. The model was considered to have a good fit when all path coefficients were significant at the level of 0.05; χ^2/df, was below 5; the standardized root mean square residual (SRMR) was below 0.08; the root mean square error of approximation (RMSEA) was below 0.08; the root mean squareresidual (RMR)was below 0.10; as well as the goodness of fit index (GFI), the normed fit index (NFI), Tacker–Lewis incremental fit (TLI) and comparative fit index (CFI) being ≥ 0.90.

STROBE Statement

We declared that the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines are followed in this study.

Ethical Considerations

Ethical approval to conduct this study was granted by the Research Ethics Committee of Harbin Medical University, and informed consent was obtained from each hospital and the nurses involved in the investigation. All participants gave their informed consent before the survey; they were assured that their personal information would be kept confidential.

RESULTS

Demographic Characteristics of the Participants

The demographic characteristics of the respondents are shown in Table 1.

Table 1. Demographic characteristics of participants (N=1761).

Demographic variables	n	%
Gender		
Male	60	3.4
Female	1701	96.6
Age group (years)		
≤ 30	899	51.1
31-50	793	45.0
≥ 51	69	3.9
Level of education		
Junior college or below	715	40.6
Undergraduate	1020	57.9
Master's degree or above	26	1.5
Marital status		
Married	1128	64.1
Single/ divorced/ widowed	633	35.9
Technical title		
Primary	1161	65.9
Intermediate	528	30.0
Senior	72	4.1
Employment role		
Formal staff	693	39.4

Appointment staff	1068	60.6
Department		
Emergency Department	299	17.0
Internal Medicine	559	31.7
Surgery	543	30.8
Obstetrics and Gynecology	93	5.3
Pediatrics	101	5.7
ENT*	82	4.7
Other	84	4.8
Years of experience		
≤4	529	30.0
5-10	619	35.2
11-20	346	19.6
≥21	267	15.2
Daily working hours		
≤ 8	113	6.4
8-10	1485	84.3
10-12	126	7.2
≥ 12	37	2.1

* ENT stand for eyes, nose, throat

Prevalence of Workplace Violence in the Preceding 12 Months

During the previous 12 months, the prevalence of physical violence and psychological violence toward nurses was 9.60% (169/1761) and 59.64% (1111/1761), respectively. In the past year, respondents reported an exposure frequency of workplace violence at less than or equal to 3, accounting for 65.9% of all incidents. The respondents reported that the patients' relatives were the main perpetrators (71.2%, n = 797), followed by the patients (25.4%, n = 284).

The Difference Between Participants' Characteristics and the Multiple Variables Score

Table 2 shows the descriptive association between respondents' characteristics and the burnout, job satisfaction, organizational support, and turnover intention scores. There was a significant difference in the score of turnover intention among characteristics involving age group, educational level, different professional titles, employment form, department, years of experience and daily working hours for nurses in the tertiary hospitals.

Table 2. Burnout, job satisfaction, perceived organizational support and turnover intention according to general characteristics.

Characteristics	Burnout	Job satisfaction	Perceived organizational support	Turnover intention
	M±SD	M±SD	M±SD	M±SD
Gender				
Male	6.23±3.34	3.54±0.55	3.27±0.57	2.30±0.71
Female	6.53±3.08	3.52±0.54	3.10±0.64	2.40±0.60
F/t	-0.757	0.256	1.991*	-1.263
Age group (years)				
≤ 30	6.58±3.03	3.54±0.54	3.13±0.64	2.44±0.61
31-50	6.53±3.16	3.50±0.55	3.07±0.65	2.39±0.60
≥ 51	5.80±3.07	3.55±0.52	3.14±0.57	2.04±0.56
F/t	2.040	1.672	1.986	14.144**
Level of education				
Junior college or below	6.62±3.01	3.52±0.54	3.11±0.61	2.38±0.63
Undergraduate	6.48±3.13	3.53±0.55	3.10±0.65	2.42±0.58
Master's degree or above	5.54±3.40	3.58±0.54	3.27±0.78	2.08±0.61
F/t	1.737	0.202	0.888	4.468*
Marital status				
Married	6.45±3.12	3.52±0.54	3.10±0.65	2.38±0.60
Single/ divorced/ widowed	6.65±3.03	3.53±0.56	3.12±0.63	2.43±0.61
F/t	-1.304	-0.203	-0.843	-1.658
Technical title				
Primary	6.67±3.04	3.53±0.54	3.11±0.65	2.45±0.60
Intermediate	6.42±3.17	3.49±0.56	3.07±0.62	2.31±0.61
Senior	4.87±2.77	3.70±0.50	3.25±0.68	2.17±0.59
F/t	12.077**	4.781**	2.735	15.543**

Employment role				
Formal staff	6.71±3.30	3.48±0.57	3.05±0.65	2.32±0.60
Appointment staff	6.40±2.94	3.55±0.52	3.14±0.63	2.45±0.61
F/t	2.025*	-2.460*	-2.779**	-4.377**
Department				
Emergency Department	6.51±3.21	3.51±0.60	3.12±0.70	2.37±0.63
Internal Medicine	6.40±3.06	3.55±0.55	3.15±0.64	2.38±0.60
Surgery	6.73±3.05	3.50±0.54	3.05±0.63	2.45±0.59
Obstetrics and Gynecology	6.19±2.71	3.54±0.50	3.13±0.58	2.44±0.56
Pediatrics	7.09±3.23	3.47±0.51	3.08±0.64	2.35±0,67
ENT	5.87±3.20	3.56±0.48	3.12±0.62	2.25±0.54
Other	6.36±3.13	3.55±0.55	3.11±0.57	2.32±0.66
F/t	1.938	0.639	1.211	2.234*
Years of experience				
≤4	6.26±2.78	3.60±0.51	3.21±0.58	2.37±0.57
5-10	6.88±3.18	3.49±0.55	3.06±0.67	2.49±0.63
11-20	6.75±3.10	3.45±0.58	3.04±0.67	2.46±0.59
≥21	5.94±3.33	3.53±0.53	3.08±0.65	2.18±0.58
F/t	7.859**	6.249**	6.690**	18.233**
Daily working hours				
≤ 8	6.08±3.01	3.65±0.51	3.25±0.69	2.24±0.59
8-10	6.53±3.09	3.52±0.55	3.10±0.64	2.41±0.60
10-12	6.73±2.95	3.45±0.49	3.05±0.57	2.42±0.64
≥ 12	7.11±3.71	3.49±0.58	3.10±0.62	2.37±0.68
F/t	1.415	3.096*	2.229	2.826*

** P < 0.05, * P<0.01

Table 3. Pearson correlations among workplace violence, burnout, job satisfaction, perceived organizational support and turnover intention.

Variables	1	2	3	4	5	6	7	8	9	
Turnover intention	1									
Workplace violence	0.122**	1								
Burnout	0.444**	0.206**	1							
Emotional exhaustion	0.418**	0.213**	0.792**	1						
Depersonalization	0.460**	0.220**	0.846**	0.754**	1					
Reduced Personal Accomplishment	0.102**	0.025	0.545**	0.017	0.116**	1				
Perceived organizational support	-0.379**	-0.172**	-0.527**	-0.445**	-0.495**	-0.216**	1			
Job satisfaction	-0.367**	-0.188**	-0.562**	-0.478**	-0.524**	-0.231**	0.675**	1		
Intrinsic satisfaction	-0.330**	-0.171**	-0.532**	-0.441**	-0.493**	-0.232*	0.626**	0.946**	1	
Extrinsic satisfaction	-0.390**	-0.176**	-0.505**	-0.456**	-0.476**	-0.178**	0.673**	0.900**	0.795**	1

* P<0.05, ** P<0.01

Pearson correlations between different measurement variables

Table 3 shows the correlations among the respondents' turnover intention and scores on workplace violence, burnout, job satisfaction, and perceived organizational support. As expected, the level of turnover intention was positively correlated with respondents' scores on workplace violence ($r = 0.122$ $P < 0.001$). Burnout was positively associated with turnover intention ($r = 0.444$, $P < 0.001$). The level of turnover intention was negatively correlated with participants' scores on job satisfaction ($r= -0.367$, $P < 0.001$) and perceived organizational support ($r= -0.379$, $P < 0.001$), respectively.

Linear Regression Analysis and Path Analysis of Factors Related to Turnover Intention

The predicting factors of turnover intention are presented in Table 4. Demographic variables that were significantly related to turnover intention were used as control variables. A technical title had a significant effect on turnover intention in the model (Block 1). As shown in Block 2, workplace violence was positively associated with turnover intention ($\beta = 0.035$, $P < 0.001$). In Block 3, emotional exhaustion ($\beta = 0.054$, $P < 0.001$) and depersonalization ($\beta = 0.054$, $P < 0.001$) were positively associated with turnover intention, whereas extrinsic satisfaction was negatively associated with turnover intention in the regression model ($\beta = -0.270$, $P < 0.001$). As shown in Block 4, perceived organizational support was negatively associated with turnover intention ($\beta = -0.110$, $P < 0.001$).

Path analysis using the SEM was performed, which is shown in Figure 1. workplace violence had a negative effect on job satisfaction, which was mediated through perceived organizational support. The total effect ($\beta = -0.19$) of workplace violence on job satisfaction was comprised of not only its direct effect ($\beta = -0.12$), but also its indirect effect ($\beta = -0.07 = -0.13 \times 0.50$), mediated through perceived organizational support. The total effect ($\beta = 0.53$) of workplace violence on turnover intention comprised its direct effect ($\beta = 0.36$), and its indirect effect ($\beta = 0.17 = (-0.12) \times 0.19 + (-0.13)$

Table 4. Predicting factors of turnover intention.

Variables	Block 1 (β)	Block 2 (β)	Block 3 (β)	Block 4 (β)
Age group	-0.054	-0.074*	-0.058	-0.055
Level of education	0.029	0.024	0.027	0.028
Technical title	0.116**	0.120**	0.043	0.043
Employment role	0.085*	0.098**	0.147**	0.147**
Department	0.021	0.042	0.008	0.007
Years of experience	0.033	0.036	0.005	0.002
Daily working hours	0.056	0.046	0.005	0.007
Workplace violence		0.035**	0.006	0.005
Emotional exhaustion			0.054**	0.051**
Depersonalization			0.123**	0.115**
Reduced Personal Accomplishment			0.008	0.004
Job satisfaction			0.142	0.158
Intrinsic satisfaction			-0.019	-0.005
Extrinsic satisfaction			-0.270**	-0.231**
Perceived organizational support				-0.110**
F	6.334**	10.788**	50.041**	48.209**
R^2	0.025	0.047	0.287	0.294
ΔR^2	0.025**	0.022**	0.240**	0.007**

* P<0.05, ** P<0.01

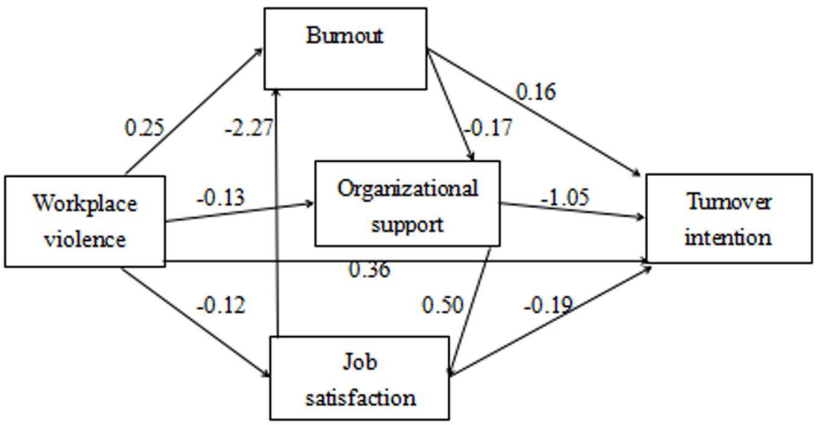

Figure 1. The final model in this study. (CFI = 0.956, GFI = 0.924, IFI = 0.942, NFI=0.931, RMR = 0,050, RMSEA = 0.053, TLI = 0.926)

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

× (-1.05) + 0.25 × (-0.17) × (-1.05) + (-0.13) × 0.50 × (-0.19)). Job satisfaction was negatively associated with burnout. On the other hand, job burnout was positively related to turnover intention. The squared multiple correlations value was 0.432, which implies that the built SEM explained 43.2% of the total variance of turnover intention.

DISCUSSION

In this cross–sectional hospital–based study of nurses, we evaluated the incidence rate of workplace violence and the mean score of overall perceptions of turnover intention. The total incidence rate of workplace violence was 63.6% (1120/1761) during the past year. This finding was close to a finding from a large sample cross-sectional survey on the prevalence of workplace violence among Chinese nurses.[29] Moreover, the incidence of Chinese nurses experiencing workplace violence is higher than that of nurses in other countries.[52-53] This may be due to cultural variations across different countries in terms of workplace violence perceptions, and the variety of assessment scales used in different studies.

Although different measurement tools for turnover intention were used in different studies, the average scores and percentages of perceived high turnover intention have been used as a reference for measuring potential turnover behavior.[54] The total mean score of overall perception of turnover intention is greater than 2 points, which means that the turnover intention of nurses is high. Based on this standard, 545 participants had a low turnover intention, but 1216 (69.1%) participants had a high turnover intention. Meanwhile, a total of 291 of the 1216 nurses (23.9%) with a higher turnover intention tended to want to leave more strongly (mean score of turnover intention > 3).The Chinese nurses intending to leave their current profession was higher than in Malaysia,[15] America,[18] Finland,[18] and Greece.[18] The reason for this phenomenon may be attributed to two aspects. On the one hand,

nursing is a technical, intellectual and practical specialty. With the increase in social demand for nurses, nurses have certain advantages in obtaining employment. They can more readily find jobs, which increases the likelihood of nurses leaving their current jobs. On the other hand, the contradiction between the low social status of nurses and patient expectations is becoming a prominent problem in China's medical environment, which is leading to a crisis of confidence. It is worth noting that historical reasons have led to low status and poor professional recognition of Chinese nurses.[20] However, patients place high demands on the level of health services provided by nurses. This significant contrast between expectations and reality can easily lead to nurses' resignations. Based on the present study, more attention need to be paid to nurses in China to reduce their turnover intention.

In the univariate analysis, this study found that there were significant differences in self–ratings of job burnout and job satisfaction among nurses with different technical titles. Furthermore, the results also indicated that nurses with primary technical titles had higher job burnout and lower job satisfaction. This finding may be attributed to these nurses often having more direct contact with patients, a busier work schedule, and work pressure being greater than for nurses with other technical titles. A Pearson correlation analysis also showed that workplace violence was positively related to job burnout. Workplace violence not only causes physical and psychological harm to nurses, but also aggravates nurses' stress and reluctance to work,[29] resulting in an increase in burnout. This study also found that burnout has a negative impact on the job satisfaction of nurses, which is consistent with previous studies.[19 32] The higher the level of burnout, the lower the job satisfaction of nurses. This may be related to the particularity of the nurses' profession, which requires nurses to have a keen sense of responsibility, high professional skills, carefulness and patience, and nurses work in stressful conditions for prolonged periods. Furthermore, a crisis of trust has emerged in China's medical

environment, so nurses need to spend a lot of emotional labor in dealing with the relationship between nurses and patients. However, positive feedback is rarely received and patient mistrust often remains, resulting in a state of emotional exhaustion and reduced personal accomplishment, which then negatively affects the judgment of nurses concerning their work environment and conditions, reducing in turn the level of their job satisfaction.

Previous studies have mentioned a series of influencing factors regarding turnover intention in other countries or areas.[14-18] According to linear regression analysis, Block 1 showed that technical titles and employment roles are two important demographic variables that affect nurses' turnover intention, which is different from the findings of Almalki *et al.*'s study.[14] The results of single factor analysis indicated that nurses with lower–level professional titles had a higher turnover intention, and full–time employed nurses had a lower turnover intention than temporarily employed nurses. This may be attributed to nurses with low professional titles being generally in first-line clinical work, facing a heavy workload and finding it difficult to cope with the patients or their relatives. They are confronted with an imbalance between pay and return, as well as social ignorance of their role, which affects their work enthusiasm, and thereby increasing the possibility of leaving. In addition, the temporarily employed nurses'' income is unstable and these nurses do not have a strong sense of belonging to the hospital, so a turnover intention possibility is stronger. In Block 2, workplace violence had a significant effect on turnover intention, which was consistent with earlier findings.[20 30 32 55] Workplace violence is a particularly shocking event within our model. Workplace violence can provoke in nurses a sense of extreme insecurity and reduced self–value which may directly lead to a turnover intention. Path analysis stated clearly that perceived organizational support played a moderating role in the impact of workplace violence on turnover intention. At the same time, in the Pearson correlation and linear

regression analysis, perceived organizational support had a negative influence on turnover intention, that is, the higher the sense of organizational support, the lower the turnover intention. The psychological mechanism embodied in the perceived organizational support is the social exchange between employees and organizations.[56] From the view of social exchange, the exchange consciousness of employees concerning perceived organizational support depends entirely on the level of that organizational support. The fundamental reason employees are willing to stay in an organization is that they feel the contributions of employees to the organization are equal or fair in respect of what they receive in return from the relevant organization. After workplace violence has occurred, hospitals need to provide care and support to nurses as far as possible to reduce the harm of violence inflicted on them, which, in turn, is likely to increase their emotional commitment to the hospital, and reduce the possibility of leaving. Therefore, the hospital should provide active support measures, including: giving respect, welfare support, and practical support; effectively conveying the support of upper management; ensuring a relationship of trust and support between employees and their immediate supervisors; emphasizing procedural justice in the organization; and creating a supportive organizational climate. These measures are likely to encourage nurses to stay in their present position and improve their job satisfaction, thus reducing their turnover rate.[22 35 42]

Our findings showed that job burnout is positively related to turnover intention, which is similar to previous results.[16 21 32 39] The results of linear regression analysis also demonstrated that emotional burnout and depersonalization had a significant influence on turnover intention. At present, there are various theories and models (for example, the conservation of resources theory,[57] the job demand-resource model,[58] and the effort-reward imbalance model[59]) which have been used to explain burnout. One aspect in common arising from these theories involves an employee's experiencing a

sense of inconsistency in relation to what the job promises and what it delivers, which leads to job burnout. Nurses often face shocking events, for example, workplace violence and organizational injustice, during their work, and negative attitudes, for example patient mistrust, which fosters job burnout, affecting their work enthusiasm and work quality, and increasing the possibility of leaving.[57-59] Another noteworthy result of our study was that job satisfaction was found to be negatively related to turnover intention, similar to previous results.[3 5 15 17 19] Therefore, hospitals should pay greater attention to the working conditions and health status of nurses, and increase their job satisfaction and sense of organizational belonging, to reduce their job burnout and turnover intention.

The present study has several limitations. First, we collected data concerning whether nurses had experienced workplace violence in the last 12 months, so there may be recall bias in the results. Second, purposive sampling results are greatly influenced due to the preconceptions of researchers. To the extent that subjective judgment may be biased, this can readily lead to sampling bias and cannot provide complete confidence in the results of the overall investigation. Thus, the researchers involved clearly understand the basic characteristics of the population under investigation, so that the selected samples can be representative and typical.

CONCLUSIONS

In this study, the turnover intention of nurses in tertiary hospitals was found to be close to our expected results. The results of our study suggest that job satisfaction and organizational support can reduce nurses' turnover intention. A series of measures, for example, to provide material improvements and psychological/emotional support, and to facilitate greater organizational justice, should be undertaken by hospital administrations to improve nurses' sense of organizational belonging and job satisfaction, reduce the loss of nursing human resources and foster the job stability of nurses.

Acknowledgments

The authors thank all the nurses, managers and Chinese Hospital Association for their assistance and support for this project.

Author Contributions

LF, TS and XN designed the study. WL, LS, ZZ, XL, XJ, and LL collected data. WL, SZ, LS, XD, GL, LL and FL analysed the data. WL, SZ and LS drafted the manuscript. WL, LF, TS and XN revised the manuscript.

Funding

This study was funded by the National Natural Science Foundation of China (NSFC), grant number 71473063.

Competing interests None declared.

Data sharing statement No additional data are available.

REFERENCES

1. National Health and Family Planning Commission of the People's Republic of China. National nursing development program (2016-2020). [internet] http://www.nhfpc.gov.cn/yzygj/s3593/201611/92b2e8f8cc644a899e9d0fd572aefef3. Shtml.
2. Xiaoyan W. Analysis of the situation of nursing human resources in public hospitals. *The World Clinical Medicine* 2016;10(4):247-248.
3. Chao MC, Jou RC, Liao CC, *et al*. Workplace stress, job satisfaction, job performance, and

turnover intention of health care workers in rural Taiwan. *Asia Pac J Public Health* 2015; 27:NP1827-NP1836.

4. March JG, Simon HA. *Organizations*. New York: Wiley, 1958.
5. Mobley WH. Intermediate linkages in the relationship between job satisfaction and employee turnover. *Journal of Applied Psychology* 1977;62:237-240.
6. Mobley WH, Horner SO, Hollingsworth AT. An evaluation of precursors of hospital employee turnover. *Journal of Applied Psychology* 1978;63:408-414.
7. Mobley WH, Griffeth RW, Hand HH, *et al*. Review and conceptual analysis of the employee turnover process. *Psychol Bull* 1979;86:493-522.
8. Bluedorn AC. A unified model of turnover from organizations. *Human Relations* 1982;35:135-53.
9. Sheridan JE, Abelson MA. Cusp catastrophe model of employee turnover. *Academy of Management Journal* 1983;26:418-36.
10. Lee TW, Mitchell TR. An alternative approach: the unfolding model of voluntary employee turnover. *Academy of Management Review* 1994;1:51-89.
11. Price JL. The study of turnover. *Iowa State University Press: Ames* 1977.
12. Price JL. The development of a causal model of voluntary turnover. *Iowa State University Press: Ames* 2000.
13. Griffeth RW, Hom PW, Gaertner S. A meta-analysis of antecedents and correlates of employee turnover: update, moderator tests, and research implications for the next millennium. *Journal of Management* 2000;26(3):463-488.
14. Almalki MJ, Gerry FG, Michele C. The relationship between quality of work life and turnover

intention of primary health care nurses in Saudi Arabia. *BMC Health Serv Res* 2012;12(1):314.

15. Ramoo V, Abdullah KL, Piaw CY. The relationship between job satisfaction and intention to leave current employment among registered nurses in a teaching hospital. *J Clin Nurs* 2013; 22(21-22):3141-3152.

16. Yoon GS, Kim SY. Influences of Job Stress and Burnout on Turnover Intention of Nurses. *J Korean Acad Nurs Admin* 2010;16(4):507-516.

17. Coomber B, Barriball KL. Impact of job satisfaction components on intent to leave and turnover for hospital-based nurses:A review of the research literature. *Int J Nurs Stud* 2007;44(2):297-314.

18. Aiken LH, Sermeus W, Van den Heede K, *et al*. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ* 2012;344:e1717.

19. Li L, Hu H, Zhou H, *et al*. Work stress, work motivation and their effects on job satisfaction in community health workers: a cross-sectional survey in China. *BMJ Open* 2014;4(6):e004897.

20. Fang B. Study on the correlation between nurses' intention to leave and workplace violence. *Hainan Medical Journal* 2013;24 (22):3413-3414.

21. Oyeleye O, Hanson P, O'Connor N, *et al*. Relationship of workplace incivility, stress, and burnout on nurses' turnover intentions and psychological empowerment. *J Nurs Admin* 2013; 43(10):536 -542.

22. Abou Hashish E A. Relationship between ethical work climate and nurses' perception of organizational support, commitment, job satisfaction and turnover intent. *Nurs Ethics* 2015;1-16.

23. Schablon A, Zeh A, Wendeler D, *et al.* Frequency and consequences of violence and aggression towards employees in the German healthcare and welfare system: a cross-sectional study. *BMJ*

Open 2011;2(5):421-421.

24. Sato K, Wakabayashi T, Kiyoshi-Teo H, *et al*. Factors associated with nurses' reporting of patients' aggressive behavior: A cross-sectional survey. *Int J Nurs Stud* 2013;50(10):1368.

25. Lei S, Min H, Tao S, et al. Analysis of the status quo and risk factors of workplace violence among nurses in county hospitals. *Chinese Nursing Research* 2017;31(5):592-594.

26. Choi S, Lee H. Workplace violence against nurses in Korea and its impact on professional quality of life and turnover intention. *Journal of Nursing Management* 2017;1-11.

27. Jia XL, Zhou HZ, Zhao Y, *et al*. Investigation on hospital violence during 2003 to 2012 in China. *Chinese Hospitals* 2014;18(3):1-3.

28. Boyle MJ, Wallis J. Working towards a definition for workplace violence actions in the health sector. *Safety in Health* 2016;2(1):4.

29. Shi L, Zhang D, Zhou C, et al. A cross-sectional study on the prevalence and associated risk factors for workplace violence against Chinese nurses. *BMJ open* 2017;7(6):e013105.

30. Christensen MP. Relationships between workplace violence, burnout, and intent to leave in emergency department nurses. *Dissertations & Theses-Gradworks* 2014;21(21):984-90.

31. Kim JI, Kim TS. Violence episodes and turnover among clinical nurses. *Journal of Korean Academy of Nursing Administration* 2004;10(4):427-436.

32. Mcdowell SS. Client-Inflicted Workplace Violence, Burnout, Job Satisfaction, and Turnover Intention: A Comparative Analysis Between Institution-Based and Home-Based Direct Care Paraprofessionals. *Dissertations & Theses - Gradworks* 2015;208.

33. Utriainen K, Kyngäs H. Hospital nurses' job satisfaction: a literature review. *J Nurs Manag* 2009;17:1002-1010.

34. Tnay E, Othman AEA, Siong HC, *et al*. The Influences of Job Satisfaction and Organizational Commitment on Turnover Intention. *Procedia Social and Behavioral Sciences* 2013;97(2):201-208.

35. Islam T, Latif I, Ali G. The relationship between perceived organizational support and turnover intention: mediating role of affective commitment and job satisfaction. *Research Journal of Applied Sciences Engineering & Technology* 2014;8(24):2422-2425.

36. Samad S, Yasmin S, Yusuf M. The Role of Organizational Commitment in Mediating the Relationship between Job Satisfaction and Turnover Intention. *European Journal of Social Sciences* 2012;30(2):135-137.

37. Yücel I. Examining the Relationships among Job Satisfaction, Organizational Commitment, and Turnover Intention: An Empirical Study. *International Journal of Business & Management* 2012;7(20):1-15.

38. Maslach C, Jackson SE. The measurement of experienced burnout. *Journal of Organizational Behavior* 1981;2(2):99-113.

39. Shimizu T, Feng Q, Nagata S. Relationship between turnover and burnout among Japanese hospital nurses. *J Occup Health* 2005;47(4):334.

40. Rhoades L, Eisenberger R. Perceived organizational support: A review of the literature. *Journal of Applied Psychology* 2002;87(4):698-714.

41 Dawley D, Houghton JD, Bucklew NS. Perceived organizational support and turnover intention: the mediating effects of personal sacrifice and job fit. *Journal of Social Psychology* 2010;150(3): 238-257.

42. Tumwesigye G. The relationship between perceived organizational support and turnover

intentions in a developing country: The mediating role of organizational commitment. African *Journal of Business Management* 2010;4(6):942-952.

43 ILO/ICN/WHO/PSI. Framework Guidelines for Addressing Workplace Violence in the Health Sector. Geneva: ILO/ICN/WHO/PSI Joint Programme on Workplace Violence in the Health Sector; 2002.

44. Richardsen AM, Martinussen M. Factorial validity and consistency of the MBI-GS across occupational groups in Norway[J]. *International Journal of Stress Management* 2005; 12(3):289-297.

45. Li YX, Zhang K, Zhao GX. Confirmatory factor analysis of job burnout. *Psychological Exploration (in China)* 2005;4:70-74.

46. Li CP, Shi K. The influence of distributive justice and procedural justice on Job Burnout. *Acta Psychologica Sinica* 2003;35(5):677-684.

47. Lin Y, Jing-Xiang MA, Chen WQ, et al. Relationship between Perception of Job Characteristics and Job Satisfaction of Pediatric Nurses. *Journal of Nursing* 2013.

48. Hirschfeld RR. Does Revising the Intrinsic and Extrinsic Subscales of the Minnesota Satisfaction Questionnaire Short Form Make a Difference? *Educational & Psychological Measurement* 2000;60(60):255-270.

49. Chen ZX, Aryee S, Lee C. Test of a mediation model of perceived organizational support. *Journal of Vocational Behavior* 2005;66(3):457-470.

50. Lee G, Lee D. A study on the relationships among role conflict, organizational commitment and intent to quit matrix organizational structure: using employees from industrial technology research institute as example. *Graduate School of management, National Chiao Tung*

University 2000.

51. Zhao X, Sun T, Cao Q, *et al*. The impact of quality of work life on job embeddedness and affective commitment and their co-effect on turnover intention of nurses. *J Clin Nurs* 2013; 22 (5-6):780-788.

52. Tiruneh BT, Bifftu BB, Tumebo AA, *et al.* Prevalence of workplace violence in Northwest Ethiopia: a multivariate analysis. *BMC Nurs* 2016;15:1-6.

53. Franz S, Zeh A, Schablon A, *et al.* Aggression and violence against health care workers in Germany-a cross sectional retrospective survey. *BMC Health Serv Res* 2010;10:51.

54. Gu St, Huang QM, Chen ZHQ, *et al*. Relationship between job satisfaction and turnover intention among physicians from three grade hospitals. *Chinese Journal of Hospital Administration* 2006;9:586-589.

55 Choi SH, Lee H. Workplace violence against nurses in Korea and its impact on professional quality of life and turnover intention. *J Nurs Manage* 2017.

56 Settoon RP, Bennett N, Liden RC. Social exchange in organizations: Perceived organizational support, leader‐member exchange, and employee reciprocity. *Social Science Electronic Publishing* 2014;81(3):219-227.

57. Hobfoll SE. The influence of culture, community, and the nested-self in the stress process: Advancing Conservation of Resources theory. *Applied Psychology* 2001; 50(3):337-421.

58. Yom YH. Analysis of burnout and job satisfaction among nurses based on the Job Demand-Resource Model. *J Koren Acad Nurs* 2013;43(1):114-122.

59. Siegrist J, Starke D, Chandola T, *et al*. The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med* 2004;58(8):1483-1499.

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Page 2, line 4-9
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	P. 3 ; p.4, line 4-17
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	P. 5; p. 6; p. 7, line 4-49
Objectives	3	State specific objectives, including any prespecified hypotheses	P. 7, line52-57
Methods			
Study design	4	Present key elements of study design early in the paper	P. 8, line 9
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	P. 8, line 9-42
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	P. 8, line 42-54; p.9, 14
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	P. 9, line 4-24
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	P. 9; p.9; p.10

Bias	9	Describe any efforts to address potential sources of bias	P.4, line 4-17
Study size	10	Explain how the study size was arrived at	P. 8, line 14-19
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	p. 12, line9-14
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	P. 12, line 4-50
		(*b*) Describe any methods used to examine subgroups and interactions	P. 12, line 4-19
		(*c*) Explain how missing data were addressed	P. 12, line 4-9
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	P. 12, line 4-16
		(*e*) Describe any sensitivity analyses	P. 12, line 14-32
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	P. 8,line 37-42
		(b) Give reasons for non-participation at each stage	P. 8, line 42-54
		(c) Consider use of a flow diagram	No
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	P. 13, line 27-59; P. 14, line 3-27;
		(b) Indicate number of participants with missing data for each variable of interest	P.8, line 38
Outcome data	15*	Report numbers of outcome events or summary measures	P. 15; P. 16; P. 17; P. 19

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	P. 18, line 20-58; p. 20, line 4-12
		(*b*) Report category boundaries when continuous variables were categorized	P. 14, line 15-26
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	P. 17, p.18
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	P. 14, line 29-57; P. 18, line 3-18
Discussion			
Key results	18	Summarise key results with reference to study objectives	P. 20, line 15-57; p. 22. Line 17-57; P. 23
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	P. 24, Line 24-39
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	P. 20, line 19-57; p.21; p.21; p. 22; P. 24, line4-22
Generalisability	21	Discuss the generalisability (external validity) of the study results	P. 23, line 29-42; P. 24, line 17-22, 44-57
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	P. 25, line 24-29

		which the present article is based	

*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.

BMJ Open

Workplace violence, job satisfaction, burnout, perceived organizational support and their effects on turnover intention among Chinese nurses in tertiary hospitals: a cross-sectional study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-019525.R1
Article Type:	Research
Date Submitted by the Author:	30-Nov-2017
Complete List of Authors:	Liu, Wenhui; Harbin Medical University School of Public Health, Department of Health Management Zhao, Shihong; The Second Affiliated Hospital of Harbin Medical University, Department of Neurosurgery Shi, Lei; School of Public Health, Harbin Medical University, Department of Health Management Zhang, Zhong; School of Public Health, Harbin Medical University, Department of Medical Education Liu, Xinyan; Harbin Medical University, Department of Medical Education, School of Public Health Li, Li; School of Public Health, Harbin Medical University, Department of Health Management Duan, Xiaojian; School of Public Health, Harbin Medical University, Department of Health Management Li, Guoqiang; Harbin Medical University, Department of Health Management, School of Public Health Lou, Fengge; School of Public Health, Qiqihar Medical University, Department of Public Health Research Jia, Xiaoli; Chinese Hospital Association, Department of Autonomous Protection Fan, Lihua; Harbin Medical University, Department of Health Management , School of Public Health; School of Public Health, Harbin Medical University, Department of Medical Education Sun, Tao; Harbin Medical University School of Public Health, Ni, Xin; National Center for Children's Health, Beijing Children's Hospital affiliated to Capital Medical University , Department of the Hospital Director
Primary Subject Heading:	Health policy
Secondary Subject Heading:	Health policy, Health services research, Nursing, Medical management
Keywords:	Workplace violence, job satisfaction, burnout, organizational support, turnover intention, nurses

Abstract

Objective

Our aim was to assess the relationship between workplace violence, job satisfaction, burnout, organizational support, and turnover intention, and explore factors associated with turnover intention among nurses in Chinese tertiary hospitals.

Methods

The purposive sampling method was used to collect data from August 2016 through January 2017. A total of 1761 nurses from 9 public tertiary hospitals in 4 provinces (municipalities) located in eastern (Beijing), central (Heilongjiang, Anhui), and western (Shaanxi) of China completed the questionnaires (effective response rate = 85.20%). A cross-sectional study was conducted using the Workplace Violence Scale, Chinese Maslach Burnout Inventory General Survey, Minnesota Job Satisfaction Questionnaire Revised Short Version, Perceived Organizational Support–Simplified Version Scale, and Turnover Intention Scale.

Results

A total of 1216 of 1706 (69.1%) participants had high turnover intention. During the previous 12 months, the prevalence of physical violence and psychological violence toward nurses was 9.60% and 59.64%, respectively. As expected, the level of turnover intention was negatively correlated with participants' scores on job satisfaction ($r= -0.367$, $P < 0.001$) and perceived organizational support ($r= -0.379$, $P < 0.001$), respectively. Burnout was positively associated with turnover intention ($r = 0.444$, $P < 0.001$). Workplace violence was positively associated with turnover intention ($\beta = 0.035$, $P < 0.001$) in linear regression analysis. The total effect ($\beta = 0.53$) of workplace violence on turnover intention comprised its direct effect ($\beta = 0.36$), and its indirect effect ($\beta = 0.17$).

Conclusions

The turnover intention of nurses in tertiary hospitals is close to our expected results in the present study. A series of measures, for example, to provide material improvements and psychological/emotional support, to facilitate greater organizational justice, to prevent the occurrence of workplace violence, and to relieve the job burnout of nurses should be undertaken by hospital administrations. The hospital can improve nurses' sense of organizational belonging, reduce the loss of nursing human resources and foster the job stability of nurses.

Strengths and limitations of this study

- The aim was to explore factors associated with turnover intention among nurses in Chinese tertiary hospitals.
- A variety of statistical methods were employed to investigate the relationship between independent variables and turnover intention.
- The retrospective approach to collecting data using self-reports of workplace violence might have led to recall and report bias.
- The results of purposive sampling were greatly influenced due to the preconceptions of the researchers. Therefore, the researchers need to clearly understand the basic characteristics of the population under study.

INTRODUCTION

A nursing shortage is occurring worldwide and is arousing great concern.[1] The European Commission reported that 590,000 nurses would be shortage by the end of 2020.[2] In the United States, by the end of 2020, the nursing shortage will reach 340,000 nurses.[3] In 2016, the total number of registered nurses in China reached 3.507 million. Compared with 2010, the number of registered nurses per 1,000 people increased from 1.52 to 2.54.[4] The ratio of physicians to nurses in China has increased from 1:1.16 in 2010 to 1:45 in 2016, and the inverse ratio of physician and nurse was fundamentally reversed for a long time.[4] In 2001–2002, the results of the Health Resources Report for the Western Pacific Region concerning the present situation, shortages, and future trends within the world of nursing showed that the ratio of physicians to nurses in Hongkong, Japan, Thailand, Germany, and the United Kingdom was more than 1:4, and that the ratio of physicians to nurses in Finland, Norway, and Canada was over 1:6.[5] Without a doubt, an inadequate supply of nurses has been a long-existing problem in China. The most recognized cause of nursing shortage seems to be nurses leaves the nursing profession.[6-7] Many nurses tend to leave the nursing profession, and this is regarded as a global political concern.[8]

Turnover intention is defined as the possibility that employees will leave a job within a certain period.[9] The first study on turnover used the participant determination model proposed by March and Simon in 1958.[10] Following on from that study, standardized models, for example, the decision-making process model, the employee-withdrawal behavior model, and the intermediate chain extension model, have been constructed, using the peak mutation model, the unfolding model, and the loss motivation model.[11-15] Among these theoretical models and studies, turnover intention has been considered to be one of the best factors to predict turnover behavior, and has shown significant explanatory power.[16] Therefore, turnover intention has been the focus of this study.

Workplace violence can be divided into physical violence (including hitting, shooting, kicking, slapping, pushing, biting, pinching, wounding using sharp objects, and sexual assault and rape) and psychological violence (including verbal abuse, threats and sexual harassment).[17] Job satisfaction represents the extent to which personnel's demands and desires are met within the workplace.[18] Burnout is a syndrome involving emotional exhaustion and depersonalization and one where personal accomplishments are reduced, resulting in continuous work stress that has not been effectively handled.[19] Perceived organizational support refers to the overall perception and beliefs of employees about how organizations view their contributions and care about their interests.[20]

In Kim's review, it was reported that the mean score for turnover intention among Korean nurses was between 2.40 and 3.85.[21] About 40% of the registered nurses in a teaching hospital in Malaysia were reported to have a turnover intention, and the results indicated that age, work experience, nursing education, and overall job satisfaction significantly influence an intention to leave.[22] A survey was conducted in 4 general hospitals in Seoul, and the findings showed that factors influencing turnover intention involve the organizational system, depersonalization, the physical environment, work role, and the organizational climate.[23] A review of the research literature revealed that factors related to the work environment were the most important in respect of nurses' turnover intentions.[24] A study has been conducted among nurses in 1,105 general acute care hospitals in Europe and the United States, and showed that the rates of nurse burnout ranged from 10% to 78%, with the job dissatisfaction rate ranging from 11% to 56% and the intention to leave rate ranging from 14% to 49%.[25]

However, turnover intention is usually affected through a variety of factors, for example, work stress,[9] [26] workplace violence,[27] job satisfaction,[28] burnout,[28] perceived organizational support,[29] organizational commitment,[29] among others.

Workplace violence is a widely reported phenomenon among nurses in medical settings, and it influences the turnover intention of nurses.[30] A study indicated that turnover intention was positively associated with exposure types of violence.[27] McDowell found workplace violence to be significantly related to burnout (r = 0.56, $P < 0.01$) and turnover intention (r = 0.24, $P < 0.01$) for all direct care paraprofessionals.[31] The previous results determined that a statistically significant relationship existed between turnover intention and workplace violence.[32 33] Therefore, workplace violence is one of the influential factors in turnover intention.[34 35]

Job satisfaction has been considered as a major contributory factor to intending to stay in a job, in previous studies.[24 26 36] In contrast to this viewpoint, previous studies have also shown that job satisfaction mainly affects turnover intention in respect of organizational commitment.[37 38] Furthermore, a third view has showed that two considerations, namely having demands and desires met and organizational commitment, exist simultaneously regarding job satisfaction and turnover intention.[39]

Moreover, substantial evidence has indicated that employees with high levels of burnout are more prone to turnover intention.[33 40] Some studies have reported that perceived organizational support is a predictor of turnover intention.[37 39 41 42] One study has indicated that perceived organizational support is negatively associated with turnover intention.[43]

In China, a study from Shanghai indicated that 22.5% of nurses expressed their intention to leave the emergency department within the following year.[44] The mean score for turnover intention of ICU nurses was between 1.95 and 2.92 in Shandong.[45] A survey of turnover intention among 10 tertiary hospitals' nurses in Beijing showed that 16.5% of nurses may leave the current work unit in the following year.[46] An investigation in Tianjin showed that work support had a negative influence on turnover intention.[47] Previous results reflected a significant correlation between psychological capital,

work engagement, and turnover intention among primary nurses.[48] Substantial studies have mainly investigated the relationship among job stress, job satisfaction, job engagement, organizational support and turnover intention among Chinese nurses in one province.[6 45-49] Therefore, the researchers selected nurses from tertiary hospitals in several provinces and further verified the relationship between workplace violence frequency and turnover intention in this study.

Based on the above evidence, researchers proposed the present study with the following hypotheses: (1) workplace violence, job satisfaction, burnout and organizational support had different effects on turnover intention; (2) workplace violence had a significant impact on job satisfaction and burnout; (3) organizational support served as a moderator between workplace violence and turnover intention; and (4) organizational support served as a moderator between job satisfaction and burnout.

The present study aims to examine the relationship between workplace violence, job satisfaction, burnout, organizational support and turnover intention, and explore factors associated with turnover intention among nurses in Chinese tertiary hospitals.

METHODS

Participants and sampling

A cross–sectional study of nurses was conducted from August 2016 through January 2017 in eastern (Beijing), central (Heilongjiang, Anhui), and western (Shaanxi) of China. A total of nine public tertiary hospitals in four provinces (municipalities) were selected using a purposive sampling method. The total number of nurses in 9 hospitals (the hospitals were similar in size, department setting, and number of nurses) is about 18,900; a total of 2,067 samples were extracted , with these nurses accounting for 10.9% of the total nurses. On average, 225 nurses from each hospital were extracted (in the actual sampling process, the sample size of each hospital was slightly different, but it was roughly 225

people). All investigators were subject to unified training before starting the investigation and could act as investigators when qualified. Permission to conduct the study was acquired from the managers, and the medical dispute resolution and human resources departments of the hospitals concerned. An anonymous, self–administered questionnaire was used to conduct face–to–face surveys. The Cronbach alpha of each original scale was as follows: Workplace Violence Scale was 0.873,[50] Chinese Maslach Burnout Inventory General Survey was 0.864,[51] Minnesota Job Satisfaction Questionnaire Revised Short Version was 0.891,[52] Perceived Organizational Support–Simplified Version Scale was 0.921,[53] and Turnover Intention Scale was 0.770.[54] The two public hospitals in Harbin (the Fourth Affiliated Hospital of Harbin Medical University and the principal hospital of Harbin) were selected as the locations for our pre–study before the formal investigation (200 questionnaires were distributed and returned, and these data were excluded in the formal survey data). The investigators and hospital coordinators distributed and took back the questionnaires immediately from the participants. A total of 2,067 questionnaires were distributed to nurses, all of which were returned. However, 306 questionnaires were missing data or blank, which left 1,761 valid questionnaires (effective response rate = 85.20%). The following conditions were selected as the inclusion criteria for this study: (1) having a practicing nurse certificate; (2) having at least one year of clinical nursing experience; (3) being still engaged in clinical nursing work during the investigation; and (4) voluntary participation without prejudice to the participants' work. The exclusion criteria for this study were rehire after retirement nurses, refresher nurses, and nurses who had not passed the probation period.

Questionnaire

Demographic characteristics

Demographic information on the nurses was collected, including sex, age, marital status, educational

background, professional qualifications, employment role, department, years of experience, and daily working hours. Age was categorized as ≤ 30, 31–50, and ≥ 51 years old. Marital status was categorized as married and single/divorced/widowed. Educational background was classified as junior college or below, undergraduate, and master's degree or above. Professional qualifications were categorized as primary title, intermediate title, and senior title. Department was classified as emergency department, internal medicine, surgery, obstetrics and gynecology, pediatrics, and other. Work experience was divided into 4 categories: ≤ 4, 5–10, 11–20, and ≥ 21 years. Daily working time was categorized as ≤ 8, 8–10, 10–12, and ≥ 12 hours.

Workplace Violence Scale

The Workplace Violence Scale developed by the International Labour Office, the International Council of Nurses, the World Health Organization, and Public Services International Joint Program on Workplace Violence in the Health Sector in 2003 was used to measure workplace violence.[50] The scale used in this study consists of 2 dimensions (physical violence and psychological violence) and has 9 items that were adopted from these scales. Each item is scored on a 4–point scale reflecting respondents' frequency of exposure to workplace violence (0 = 0 times, 1 = 1 time, 2 = 2–3 times, and 3 = ≥ 4 times). The total possible score ranges from 0 to 27, with a higher total score indicating a higher frequency of exposure to workplace violence. In the present study, Cronbach's α for the Workplace Violence Scale was 0.860.

Burnout

Burnout was assessed using the Chinese Maslach Burnout Inventory General Survey (CMBI–GS) in the present study, with a total of 15 items, developed by Li YX, and proven to be vaild.[51 55-56] The CMBI-GS is categorized into 3 subscales reflecting job burnout: emotional exhaustion,

depersonalization, and reduced personal accomplishment. The response options for each item on the CMBI–GS are rated from 0 (never) to 6 (daily), based on the frequency of occurrence of the specific work feelings of the respondent. The score of the 3 subscales is equal to the average of the sum of items for each of the subscales. The total possible score is calculated through adding the scores for 3 subscales, and it ranges from 0 to 18 points, with a higher score indicating a higher level of burnout. In terms of the average score of all items, a score less than 8.5 points indicates lower job burnout, a score of 8.5–14.2 points indicates that burnout is serious, and burnout is extremely serious when the score is greater than 14.2 points. In this study, Cronbach's α for the CMBI–GS was 0.873. The internal consistency coefficients were 0.834, 0.826, 0.806, and 0.812, for emotional exhaustion, depersonalization, and reduced personal accomplishment, respectively.

Job satisfaction

The Minnesota Job Satisfaction Questionnaire Revised Short Version (MJSQ–RSV) was used in this study to assess participants' satisfaction with their job.[52 57] The MJSQ–RSV consists of 20 items, including 12 items measuring intrinsic satisfaction and 8 items measuring extrinsic satisfaction. Each item is rated on a 5–point Likert scale (1 = strongly unsatisfied, 2 = unsatisfied, 3 = uncertain, 4 = satisfied, and 5 = strongly satisfied). Intrinsic satisfaction refers to the degree of satisfaction with the factors involved in the job content. Extrinsic satisfaction refers to the degree of satisfaction of the individual in terms of current job rewards, promotion, and leadership style. The higher the participant's self–rating, the higher their satisfaction with the job. The present study revealed that Cronbach's α for the MJSQ–RSV was 0.882, and for the two subscales it was 0.872 (intrinsic satisfaction) and 0.896 (extrinsic satisfaction).

Perceived organizational support scale

Perceived organizational support was measured using the Perceived Organizational Support–Simplified Version Scale (POS–SVS). Previous studies have found the POS–SVS to have high reliability and validity as a measure of perceived organizational support.[37 42 53] It consists of nine self–report items, which comprise two reverse questions (even if employees try to do the best job they can, the work unit doesn not notice it; the work unit rarely cares about employees). The other 7 items mainly indicate that work unit cares about the well–being and job satisfaction of employees and pays attention to the work goals and values and employees' opinions; employees can get help when they encounter difficulties; and the unit will be proud of what employees have achieved. Each item is rated on a 5–point Likert scale, and ranged from 1 (extremely inconsistent) to 5 (extremely consistent). The total possible score is calculated through adding the scores for all items, and it ranges from 9 to 45 points, with a higher score indicating a higher organizational support. In this study, Cronbach's α for the POS–SVS was 0.890.

Turnover intention scale

The Turnover Intention Scale, which has been used to measure turnover intention among nurses was used in the present study. The turnover intention scale was developed by Lee and Lee,[54] and has been widely used in many studies.[9 46 47] This 6–item scale is divided into 3 dimensions: the possibility of an employee quitting his/her present job, the motivation for employees to find other jobs, and the possibility of employees having access to external work. Each item is scored on a 4–point scale reflecting participants' intention to leave (1 = never, 2 = seldom, 3 = occasionally, and 4 = often). The total possible score is counted through adding the scores for all items, and it ranges from 6 to 24 points, with a higher score indicating a stronger intention to leave. The extent of turnover intention is divided into 4 levels according to the different total average score of turnover intention. A total average score ≤

1 indicates that turnover intention is particularly low, less low when it is from 1 to 2, higher when it is from 2 to 3, and exceptionally high when it is greater than 3. In the present study, Cronbach's α for the Turnover Intention Scale was 0.862.

Data Analysis

EpiData version 3.1 was used to establish the study's database. Missing data or poor–quality questionnaires were eliminated. To ensure accuracy, two trained personnel entered the data after all the surveys were completed. IBM SPSS V.19.0 was used for the data analysis in this study. Descriptive statistics, including numbers (n), percentages (%), means, and standard deviations (SD) were calculated for the demographic variables. We used one-way analysis of variance (ANOVA) or independent sample t–tests to compare group differences concerning the measurements of the continuous variables. Pearson's correlations were used to examine correlations among the continuous variables. Linear regression analysis was used to examine the associations of the demographic variables and workplace violence, job satisfaction, burnout, perceived organizational support, and turnover intention variables. Statistics, including F values, R^2, R^2–changes (ΔR^2), standardized regression coefficients (β), and P–values for each step in the regression model were reported. All study variables were tested for multicollinearity. A P–value < 0.05 was considered statistically significant.

Path analysis was used to examine the relationship among the five variables, including workplace violence, job satisfaction, burnout, perceived organizational support, and turnover intention. A structural equation model (SEM) for path analysis was constructed using the AMOS 17.0 program to analyze the effect of workplace violence on job satisfaction, burnout, perceived organizational support, and turnover intention. The model was considered to have a good fit when all path coefficients were significant at the level of 0.05; χ^2/df, was below 5; the standardized root mean square residual (SRMR)

was below 0.08; the root mean square error of approximation (RMSEA) was below 0.08; the root mean squareresidual (RMR)was below 0.10; as well as the goodness of fit index (GFI), the normed fit index (NFI), Tacker–Lewis incremental fit (TLI) and comparative fit index (CFI) being ≥ 0.90.

STROBE Statement

The STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines are followed in this study.

Ethical Considerations

Ethical approval to conduct this study was granted by the Research Ethics Committee of Harbin Medical University, and informed consent was obtained from each hospital and the nurses involved in the investigation. All participants gave their informed consent before the survey; they were assured that their personal information would be kept confidential.

RESULTS

Demographic Characteristics of the Participants

The demographic characteristics of the respondents are shown in Table 1.

Table 1. Demographic characteristics of participants (N=1761).

Demographic variables	n	%
Gender		
Male	60	3.4
Female	1701	96.6
Age group (years)		
≤ 30	899	51.1
31-50	793	45.0
≥ 51	69	3.9
Level of education		
Below undergraduate	715	40.6
Undergraduate	1020	57.9
Master's degree or above	26	1.5
Marital status		

Married	1128	64.1
Single/ divorced/ widowed	633	35.9
Professional qualifications		
Primary title	1161	65.9
Intermediate title	528	30.0
Senior title	72	4.1
Employment role		
Formal employee	693	39.4
Temporary employee	1068	60.6
Department		
Emergency Department	299	17.0
Internal Medicine	559	31.7
Surgery	543	30.8
Obstetrics and Gynecology	93	5.3
Pediatrics	101	5.7
ENT*	82	4.7
Other	84	4.8
Years of experience		
≤4	529	30.0
5-10	619	35.2
11-20	346	19.6
≥21	267	15.2
Daily working hours		
≤ 8	113	6.4
8-10	1485	84.3
10-12	126	7.2
≥ 12	37	2.1

* ENT stand for eyes, nose, throat

Prevalence of Workplace Violence in the Preceding 12 Months

During the previous 12 months, the prevalence of physical violence and psychological violence toward nurses was 9.60% (169/1761) and 59.64% (1111/1761), respectively. In the past year, respondents reported an exposure frequency of workplace violence at less than or equal to 3, accounting for 65.9% of all incidents. The respondents reported that the patients' relatives were the main perpetrators (71.2%, n = 797), followed by the patients (25.4%, n = 284).

The Difference Between Participants' Characteristics and the Multiple Variables Score

Table 2 shows the descriptive association between respondents' characteristics and the burnout, job

satisfaction, organizational support, and turnover intention scores. There was a significant difference in the score of turnover intention among characteristics involving age group, educational level, different professional titles, employment form, department, years of experience and daily working hours for nurses in the tertiary hospitals.

Pearson correlations between different measurement variables

Table 3 shows the correlations among the respondents' turnover intention and scores on workplace violence, burnout, job satisfaction, and perceived organizational support. As expected, the level of turnover intention was positively correlated with respondents' scores on workplace violence ($r = 0.122$ $P < 0.001$). Burnout was positively associated with turnover intention ($r = 0.444$, $P < 0.001$). The level of turnover intention was negatively correlated with participants' scores on job satisfaction ($r= -0.367$, $P < 0.001$) and perceived organizational support ($r= -0.379$, $P < 0.001$), respectively.

Linear Regression Analysis and Path Analysis of Factors Related to Turnover Intention

The predicting factors of turnover intention are presented in Table 4. Demographic variables that were significantly related to turnover intention were used as control variables. A professional title had a significant effect on turnover intention in the model (Block 1). As shown in Block 2, workplace violence was positively associated with turnover intention ($\beta = 0.035$, $P < 0.001$). In Block 3, emotional exhaustion ($\beta = 0.054$, $P < 0.001$) and depersonalization ($\beta = 0.054$, $P < 0.001$) were positively associated with turnover intention, whereas extrinsic satisfaction was negatively associated with turnover intention in the regression model ($\beta = -0.270$, $P < 0.001$). As shown in Block 4, perceived organizational support was negatively associated with turnover intention ($\beta = -0.110$, $P < 0.001$).

Table 2. Burnout, job satisfaction, perceived organizational support and turnover intention according to general characteristics.

Characteristics	Burnout	Job satisfaction	Workplace violence	Perceived organizational support	Turnover intention
	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD
Gender					
Male	6.23 ± 3.34	3.54 ± 0.55	3.15 ± 3.92	3.27 ± 0.57	2.30 ± 0.71
Female	6.53 ± 3.08	3.52 ± 0.54	2.11 ± 2.60	3.10 ± 0.64	2.40 ± 0.60
F/t	-0.757	0.256	8.931**	1.991*	-1.263
Age group (years)					
≤ 30	6.58 ± 3.03	3.54 ± 0.54	1.81 ± 2.38	3.13 ± 0.64	2.44 ± 0.61
31-50	6.53 ± 3.16	3.50 ± 0.55	2.36 ± 2.73	3.07 ± 0.65	2.39 ± 0.60
≥ 51	5.80 ± 3.07	3.55 ± 0.52	3.97 ± 4.09	3.14 ± 0.57	2.04 ± 0.56
F/t	2.040	1.672	26.537**	1.986	14.144**
Level of education					
Below undergraduate	6.62 ± 3.01	3.52 ± 0.54	1.96 ± 2.45	3.11 ± 0.61	2.38 ± 0.63
Undergraduate	6.48 ± 3.13	3.53 ± 0.55	2.26 ± 2.77	3.10 ± 0.65	2.42 ± 0.58
Master's degree or above	5.54 ± 3.40	3.58 ± 0.54	2.58 ± 3.76	3.27 ± 0.78	2.08 ± 0.61
F/t	1.737	0.202	3.161*	0.888	4.468*
Marital status					
Married	6.45 ± 3.12	3.52 ± 0.54	2.25 ± 2.69	3.10 ± 0.65	2.38 ± 0.60
Single/ divorced/ widowed	6.65 ± 3.03	3.53 ± 0.56	1.96 ± 2.61	3.12 ± 0.63	2.43 ± 0.61
F/t	-1.304	-0.203	4.789*	-0.843	-1.658
Professional qualifications					
Primary title	6.67 ± 3.04	3.53 ± 0.54	1.90 ± 2.38	3.11 ± 0.65	2.45 ± 0.60
Intermediate title	6.42 ± 3.17	3.49 ± 0.56	2.57 ± 3.05	3.07 ± 0.62	2.31 ± 0.61
Senior title	4.87 ± 2.77	3.70 ± 0.50	2.86 ± 3.34	3.25 ± 0.68	2.17 ± 0.59
F/t	12.077**	4.781**	14.412**	2.735	15.543**

Employment role					
Formal employee	6.71 ± 3.30	3.48 ± 0.57	2.46 ± 2.80	3.05 ± 0.65	2.32 ± 0.60
Temporary employee	6.40 ± 2.94	3.55 ± 0.52	1.93 ± 2.55	3.14 ± 0.63	2.45 ± 0.61
F/t	2.025*	-2.460*	16.717**	-2.779**	-4.377**
Department					
Emergency Department	6.51 ± 3.21	3.51 ± 0.60		3.12 ± 0.70	2.37 ± 0.63
Internal Medicine	6.40 ± 3.06	3.55 ± 0.55	1.90 ± 2.38	3.15 ± 0.64	2.38 ± 0.60
Surgery	6.73 ± 3.05	3.50 ± 0.54	2.00 ± 2.47	3.05 ± 0.63	2.45 ± 0.59
Obstetrics and Gynecology	6.19 ± 2.71	3.54 ± 0.50	2.65 ± 3.31	3.13 ± 0.58	2.44 ± 0.56
Pediatrics	7.09 ± 3.23	3.47 ± 0.51	2.40 ± 2.76	3.08 ± 0.64	2.35 ± 0,67
ENT	5.87 ± 3.20	3.56 ± 0.48	1.74 ± 2.31	3.12 ± 0.62	2.25 ± 0.54
Other	6.36 ± 3.13	3.55 ± 0.55	2.58 ± 3.29	3.11 ± 0.57	2.32 ± 0.66
F/t	1.938	0.639	3.905*	1.211	2.234*
Years of experience					
≤4	6.26 ± 2.78	3.60 ± 0.51	1.70 ± 2.56	3.21 ± 0.58	2.37 ± 0.57
5-10	6.88 ± 3.18	3.49 ± 0.55	2.22 ± 2.65	3.06 ± 0.67	2.49 ± 0.63
11-20	6.75 ± 3.10	3.45 ± 0.58	2.28 ± 2.54	3.04 ± 0.67	2.46 ± 0.59
≥21	5.94 ± 3.33	3.53 ± 0.53	2.66 ± 2.92	3.08 ± 0.65	2.18 ± 0.58
F/t	7.859**	6.249**	8.745**	6.690**	18.233**
Daily working hours					
≤ 8	6.08 ± 3.01	3.65 ± 0.51	2.20 ± 2.96	3.25 ± 0.69	2.24 ± 0.59
8-10	6.53 ± 3.09	3.52 ± 0.55	2.09 ± 2.55	3.10 ± 0.64	2.41 ± 0.60
10-12	6.73 ± 2.95	3.45 ± 0.49	2.06 ± 2.78	3.05 ± 0.57	2.42 ± 0.64
≥ 12	7.11 ± 3.71	3.49 ± 0.58	4.14 ± 4.58	3.10 ± 0.62	2.37 ± 0.68
F/t	1.415	3.096*	7.195**	2.229	2.826*

* P < 0.05, ** P<0.01

Table 3. Pearson correlations among workplace violence, burnout, job satisfaction, perceived organizational support and turnover intention.

Variables	1	2	3	4	5	6	7	8	9	10
1. Turnover intention	1									
2. Workplace violence	0.122**	1								
3. Burnout	0.444**	0.206**	1							
4. Emotional exhaustion	0.418**	0.213**	0.792**	1						
5. Depersonalization	0.460**	0.220**	0.846**	0.754**	1					
6. Reduced Personal Accomplishment	0.102**	0.025	0.545**	0.017	0.116**	1				
7. Perceived organizational support	-0.379**	-0.172**	-0.527**	-0.445**	-0.495**	-0.216**	1			
8. Job satisfaction	-0.367**	-0.188**	-0.562**	-0.478**	-0.524**	-0.231**	0.675**	1		
9. Intrinsic satisfaction	-0.330**	-0.171**	-0.532**	-0.441**	-0.493**	-0.232*	0.626**	0.946**	1	
10. Extrinsic satisfaction	-0.390**	-0.176**	-0.505**	-0.456**	-0.476**	-0.178**	0.673**	0.900**	0.795**	1

* P<0.05, ** P<0.01

Path analysis using the SEM was performed, which is shown in Figure 1. workplace violence had a negative effect on job satisfaction, which was mediated through perceived organizational support. The total effect (β = −0.19) of workplace violence on job satisfaction was comprised of not only its direct effect (β = −0.12), but also its indirect effect (β = −0.07 = -0.13×0.50), mediated through perceived organizational support. The total effect (β = 0.53) of workplace violence on turnover intention comprised its direct effect (β = 0.36), and its indirect effect (β = 0.17=(-0.12) × 0.19 + (-0.13)× (-1.05) + 0.25 × (-0.17) × (-1.05) + (-0.13) × 0.50 × (-0.19)). Job satisfaction was negatively associated with burnout. On the other hand, job burnout was positively related to turnover intention. The squared multiple correlations value was 0.432, which implies that the built SEM explained 43.2% of the total variance of turnover intention.

DISCUSSION

In this cross–sectional hospital–based study of nurses, we evaluated the incidence rate of workplace violence and the mean score of overall perceptions of turnover intention. The total incidence rate of workplace violence was 63.6% (1120/1761) during the past year. This finding was close to a finding from a large sample cross-sectional survey on the prevalence of workplace violence among Chinese nurses.[17] Moreover, the incidence of Chinese nurses experiencing workplace violence is higher than that of nurses in other countries.[58-59] This may be due to cultural variations across different countries in terms of workplace violence perceptions, and the variety of assessment scales used in different studies. As far as the personal characteristics of nurses are concerned, previous studies have proved that young age, lack of life and work experience, low professional titles, low education levels and poor interpersonal relationships are the risk factors for workplace violence against Chinese

Table 4. Predicting factors of turnover intention.

Variables	Block 1 (β)	Block 2 (β)	Block 3 (β)	Block 4 (β)	Block 5 (β)
Age group	-0.055	-0.076*	-0.055	-0.055	-0.051
Level of education	0.028	0.022	0.028	0.025	0.026
Professional qualifications	0.120**	0.128**	0.098**	0.095**	0.044
Employment role	0.081*	0.087*	0.108**	0.098**	0.146**
Department	0.008	0.011	0.010	0.011	0.007
Years of experience	0.034	0.038	0.014	0.006	0.001
Daily working hours	0.056	0.046	0.030	0.012	0.009
Workplace violence		0.034**	0.019**	0.016**	0.005
Organizational support			-0.039**	-0.022**	-0.012**
Intrinsic satisfaction				0.001	0.008*
Extrinsic satisfaction				-0.037**	-0.030**
Emotional exhaustion					0.051**
Depersonalization					0.113**
Reduced Personal Accomplishment					0.004
F	6.374**	10.553**	41.686**	41.863**	51.582**
R^2	0.025	0.046	0.176	0.208	0.293
ΔR^2	0.025**	0.021**	0.130**	0.032**	0.085**

* P<0.05, ** P<0.01

nurses.[17] In terms of organizational characteristics, high–risk departments (emergency department, orthopedics department, and pediatrics department), poor organizational climate, lack of team spirit, heavy workload, and shortage of nurses are also frequent factors of occupational violence among nurses. In China, imperfect healthcare laws and regulations, insufficient practice in dealing with medical disputes, and negative reports from the media are also an important inducing factor. Regarding aspect of patients and their relatives, high medical service expectations, long waiting times, high medical costs, unmet requirements, and poor communication between nurses and patients also lead to workplace violence. Therefore, we suggest that the government should supervise the media to ensure the accuracy and authenticity of media coverage. Ward management needs strengthening; for example, surveillance cameras and alarms should be installed in hospital ward corridors, lights should be

sufficiently bright in work areas during the night, etc. We further advise hospitals to provide violence–related training for nurses and provide psychological support, to instruct all staff about the value of nurses, and to foster nurses' pride in their work and develop an excellent hospital culture. These measures are conducive to reducing the occurrence of hospital workplace violence.

Although different measurement tools for turnover intention were used in different studies, the average scores and percentages of perceived high turnover intention have been used as a reference for measuring potential turnover behavior.[60] The total mean score of overall perception of turnover intention is greater than 2 points, which means that the turnover intention of nurses is high. Based on this standard, 545 participants had a low turnover intention, but 1216 (69.1%) participants had a high turnover intention. Meanwhile, a total of 291 of the 1216 nurses (23.9%) with a higher turnover intention tended to want to leave more strongly (mean score of turnover intention > 3).The Chinese nurses intending to leave their current profession was higher than in Malaysia,[22] America,[25] Finland,[25] and Greece.[25] The reason for this phenomenon may be attributed to two aspects. On the one hand, nursing is a professional, intellectual and practical specialty. With the increase in social demand for nurses, nurses have certain advantages in obtaining employment. They can more readily find jobs, which increases the likelihood of nurses leaving their current jobs. On the other hand, the contradiction between the low social status of nurses and patient expectations is becoming a prominent problem in China's medical environment, which is leading to a crisis of confidence. It is worth noting that historical reasons have led to low status and poor professional recognition of Chinese nurses. However, patients place high demands on the level of health services provided by nurses. This significant contrast between expectations and reality can easily lead to nurses' resignations. Based on the present study, more attention need to be paid to nurses in China to reduce their turnover intention.

In the univariate analysis, this study found that there were significant differences in self–ratings of job burnout and job satisfaction among nurses with different professional titles. Furthermore, the results also indicated that nurses with primary professional titles had higher job burnout and lower job satisfaction. This finding may be attributed to these nurses often having more direct contact with patients, a busier work schedule, and work pressure being greater than for nurses with other professional titles.

This study also found that burnout has a negative impact on the job satisfaction of nurses, which is consistent with previous studies.[26 31] The higher the level of burnout, the lower the job satisfaction of nurses. This may be related to the particularity of the nurses' profession, which requires nurses to have a keen sense of responsibility, high professional skills, carefulness and patience, and nurses work in stressful conditions for prolonged periods. Furthermore, a crisis of trust has emerged in China's medical environment, so nurses need to spend a lot of emotional labor in dealing with the relationship between nurses and patients. However, positive feedback is rarely received and patient mistrust often remains, resulting in a state of emotional exhaustion and reduced personal accomplishment, which then negatively affects the judgment of nurses concerning their work environment and conditions, reducing in turn the level of their job satisfaction. The SEM results clearly stated that organizational support serves as a moderator between job satisfaction and burnout. This means that organizational support (paying attention to employees' feelings and salary benefits) can relieve nurses' job burnout to some extent and then improve their satisfaction with various systems and policies of the organization. As a reward for the organization, employees will also enhance their commitment and loyalty to the organization and will improve their efforts to work. To improve the job satisfaction of nurses, it is suggested that hospital managers provide organizational support for nurses from the following three

aspects: first, strengthen communication, understand the needs of nurses, and take targeted organizational support measures so that nurses can really appreciate the hospitals' support; second, pay attention to the work of nurses, provide necessary work resources and condition support for them, pay attention to the problems faced by nurses and try their best to provide help to alleviate nurses' emotional exhaustion and reduce the degree of depersonalization; and finally, pay attention to the welfare of nurses, implement reasonable salaries and performance incentive system, pay attention to the interests of nurses in decision-making, and at the same time, pay attention to the professional development of nurses, and provide more development platforms for nurses so that they can find their own value and personal accomplishment in the process of career development.

Previous studies have mentioned a series of influencing factors regarding turnover intention in other countries or areas.[22-25] According to linear regression analysis, Block 1 showed that professional titles and employment roles are two important demographic variables that affect nurses' turnover intention, which is different from the findings of Almalki *et al.*'s study.[61] The results of single factor analysis indicated that nurses with lower–level professional titles had a higher turnover intention, and full–time employed nurses had a lower turnover intention than temporarily employed nurses. This may be attributed to nurses with low professional titles being generally in first-line clinical work, facing a heavy workload and finding it difficult to cope with the patients or their relatives. They are confronted with an imbalance between pay and return, as well as social ignorance of their role, which affects their work enthusiasm, and thereby increasing the possibility of leaving. In addition, the temporarily employed nurses' income is unstable and these nurses do not have a strong sense of belonging to the hospital, so a turnover intention possibility is stronger.

In the linear regression analysis, Block 2 showed that workplace violence has a significant effect

on turnover intention, which was consistent with earlier findings.[31-35] Based on the SEM, the total impact of workplace violence on turnover intention was 0.53. Workplace violence is a particularly shocking event within our model. Workplace violence can provoke in nurses a sense of extreme insecurity and reduced self–value which may directly lead to turnover intention. SEM also stated clearly that perceived organizational support played a moderating role in the impact of workplace violence on turnover intention. Workplace violence not only causes physical and psychological harm to nurses but also aggravates nurses' stress and reluctance to work,[17] resulting in an increase in turnover intention. Hospitals can carry out a variety of amateur activities to reduce the work stress of nurses. The hospital can also set up a psychological decompression room, regularly conduct psychological counseling for nurses through a psychologist, and conduct emotional management well.[17] In brief, the more comprehensive the support provided by the organization, the less likely the nurses are to have bad emotions. Moreover, hospitals can provide diverse emotional support for nurses who have experienced different types of workplace violence so that they feel the concern of the hospital, reduce the harm to nurses.

At the same time, in the Pearson correlation and linear regression analysis, perceived organizational support had a negative influence on turnover intention, that is, the higher the sense of organizational support, the lower the turnover intention. The psychological mechanism embodied in the perceived organizational support is the social exchange between employees and organizations.[62] From the view of social exchange, the exchange consciousness of employees concerning perceived organizational support depends entirely on the level of that organizational support. The fundamental reason employees are willing to stay in an organization is that they feel the contributions of employees to the organization are equal or fair in respect of what they receive in return from the relevant

organization. After workplace violence has occurred, hospitals need to provide care and support to nurses as far as possible to reduce the harm of violence inflicted on them, which, in turn, is likely to increase their emotional commitment to the hospital, and reduce the possibility of leaving. Therefore, the hospital should provide active support measures, including: giving respect, welfare support, and practical support; effectively conveying the support of upper management; ensuring a relationship of trust and support between employees and their immediate supervisors; emphasizing procedural justice in the organization; and creating a supportive organizational climate.[20] These measures are likely to encourage nurses to stay in their present position and improve their job satisfaction, thus reducing their turnover rate.[37 43]

Our findings showed that job burnout is positively related to turnover intention, which is similar to previous results.[23 29 31 40] The results of linear regression analysis also demonstrated that emotional burnout and depersonalization had a significant influence on turnover intention. At present, there are various theories and models (for example, the conservation of resources theory,[63] the job demand-resource model,[64] and the effort-reward imbalance model[65]) which have been used to explain burnout. One aspect in common arising from these theories involves an employee's experiencing a sense of inconsistency in relation to what the job promises and what it delivers, which leads to job burnout. Another noteworthy result of our study was that job satisfaction was found to be negatively related to turnover intention in the SEM, similar to previous results.[9 11 24 26 66] Therefore, hospitals should pay greater attention to the working conditions and health status of nurses and increase their job satisfaction and sense of organizational belonging to reduce their job burnout and turnover intention.

A Pearson correlation analysis also showed that workplace violence was positively related to job burnout. Nurses often face shocking events, for example, workplace violence and organizational

injustice, during their work, and negative attitudes, for example patient mistrust, which fosters job burnout, affecting their work enthusiasm and work quality, and increasing the possibility of leaving.[57-59]

The present study has several limitations. First, researchers collected data concerning whether nurses had experienced workplace violence in the last 12 months, so there may be recall bias in the results. Second, it was not known whether those returning incomplete questionnaires differed in any significant way from those who completed them. Third, purposive sampling results are greatly influenced due to the preconceptions of researchers. To the extent that subjective judgment may be biased, this can readily lead to sampling bias and cannot provide complete confidence in the results of the overall investigation. Thus, the researchers involved clearly understand the basic characteristics of the population under investigation, so that the selected samples can be representative and typical.

CONCLUSIONS

In this study, the turnover intention of nurses in tertiary hospitals was found to be close to our expected results. A series of measures, for example, to provide material improvements and psychological /emotional support, to facilitate greater organizational justice, to prevent the occurrence of workplace violence, and to relieve the job burnout of nurses should be undertaken by hospital administrations. The hospital can improve nurses' sense of organizational belonging, reduce the loss of nursing human resources, and foster the job stability of nurses.

Acknowledgments

The authors thank all the nurses, managers and Chinese Hospital Association for their assistance and support for this project.

Author Contributions

LF, TS and XN designed the study. WL, LS, ZZ, XL, XJ, and LL collected data. WL, SZ, LS, XD, GL, LL and FL analysed the data. WL, SZ and LS drafted the manuscript. WL, LF, TS and XN revised the manuscript.

Funding

This study was funded by the National Natural Science Foundation of China (NSFC), grant number 71473063.

Competing interests None declared.

Data sharing statement No additional data are available.

REFERENCES

1. Nardi DA, Gyurko CC. The Global Nursing Faculty Shortage: Status and Solutions for Change. *J Nurs Scholarship* 2013;45(3):317-26.
2. Sermeus W, Bruyneel L. Investing in Europe's health workforce of tomorrow: Scope for innovation and collaboration. Summary report of the three Policy Dialogues. European Observatory on Health Systems and Policies. *Effect of Growth Rate of Load on Strain Aging of Soft Soil in Marsh* 2010;1995-2001.
3. Auerbach D, Buerhaus P D. Better late than never: workforce supply implications of later entry into nursing. *Health Affairs* 2007;26(1):178-185.
4. National Health and Family Planning Commission of the People's Republic of China. National nursing development program (2016-2020). [internet] http://www.nhfpc.gov.cn/yzygj/s3593/

201611/92b2e8f8cc644a899e9d0fd572aefef3. Shtml.

5. Xiaoyan W. Analysis of the situation of nursing human resources in public hospitals. *The World Clinical Medicine* 2016;10(4):247-248.

6. You LM, Ke YY, Zheng J, *et al*. The development and issues of nursing education in China: a national data analysis. *Nurse Educ Today* 2015;35(2):310-314.

7. Janiszewski GH. The nursing shortage in the United States of America: an integrative review of the literature. *J Adv Nurs* 2003;43(4):335-350.

8. Anderson DJ, Chan E, Dresner P, *et al*. Nursing and Midwifery Services Strategic Directions, 2011-2015. *World Health Organization* 2010.

9. Chao MC, Jou RC, Liao CC, *et al*. Workplace stress, job satisfaction, job performance, and turnover intention of health care workers in rural Taiwan. *Asia Pac J Public Health* 2015; 27:NP1827-NP1836.

10. March JG, Simon HA. *Organizations*. New York: Wiley, 1958.

11. Mobley WH, Griffeth RW, Hand HH, *et al*. Review and conceptual analysis of the employee turnover process. *Psychol Bull* 1979;86:493-522.

12. Bluedorn AC. A unified model of turnover from organizations. *Human Relations* 1982;35:135-53.

13. Sheridan JE, Abelson MA. Cusp catastrophe model of employee turnover. *Academy of Management Journal* 1983;26:418-36.

14. Lee TW, Mitchell TR. An alternative approach: the unfolding model of voluntary employee turnover. *Academy of Management Review* 1994;1:51-89.

15. Price JL. The development of a causal model of voluntary turnover. *Iowa State University Press:*

Ames 2000.

16. Griffeth RW, Hom PW, Gaertner S. A meta-analysis of antecedents and correlates of employee turnover: update, moderator tests, and research implications for the next millennium. *Journal of Management* 2000;26(3):463-488.

17. Shi L, Zhang D, Zhou C, *et al*. A cross-sectional study on the prevalence and associated risk factors for workplace violence against Chinese nurses. *BMJ open* 2017;7(6):e013105.

18. Utriainen K, Kyngäs H. Hospital nurses' job satisfaction: a literature review. *J Nurs Manag* 2009;17:1002-1010.

19. Maslach C, Jackson SE. The measurement of experienced burnout. *Journal of Organizational Behavior* 1981;2(2):99-113.

20. Rhoades L, Eisenberger R. Perceived organizational support: A review of the literature. *Journal of Applied Psychology* 2002;87(4):698-714.

21. Kim JK, Kim MJ. A Review of Research on Hospital Nurses' Turnover Intention. *Journal of Korean Academy of Nursing Administration* 2011;17(4):538.

22. Ramoo V, Abdullah KL, Piaw CY. The relationship between job satisfaction and intention to leave current employment among registered nurses in a teaching hospital. *J Clin Nurs* 2013; 22(21-22):3141-3152.

23. Yoon GS, Kim SY. Influences of Job Stress and Burnout on Turnover Intention of Nurses. *J Korean Acad Nurs Admin* 2010;16(4):507-516.

24. Coomber B, Barriball KL. Impact of job satisfaction components on intent to leave and turnover for hospital-based nurses:A review of the research literature. *Int J Nurs Stud* 2007;44(2):297-314.

25. Aiken LH, Sermeus W, Van den Heede K, *et al*. Patient safety, satisfaction, and quality of

hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ* 2012;344:e1717.

26. Li L, Hu H, Zhou H, *et al*. Work stress, work motivation and their effects on job satisfaction in community health workers: a cross-sectional survey in China. *BMJ Open* 2014;4(6):e004897.

27. Choi SH, Lee H. Workplace violence against nurses in Korea and its impact on professional quality of life and turnover intention. *J Nurs Manage* 2017;1-11.

28. Labrague LJ, Mcenro cc Etitte DM, Gloe D, *et al*. Organizational politics, nurses' stress, burnout levels, turnover intention and job satisfaction. *Int Nurs Rev* 2017;64(1):109.

29. Oyeleye O, Hanson P, O'Connor N, *et al*. Relationship of workplace incivility, stress, and burnout on nurses' turnover intentions and psychological empowerment. *J Nurs Admin* 2013; 43(10):536-542.

30. Seo, Min S, Kim, *et al*. Effect of Workplace Bullying, Job Satisfaction and Self-Esteem on Turnover Intention in Clinical Nurses. *Journal of the Korean Society for Wellness* 2017;12(2):105-115.

31. Mcdowell SS. Client-Inflicted Workplace Violence, Burnout, Job Satisfaction, and Turnover Intention: A Comparative Analysis Between Institution-Based and Home-Based Direct Care Paraprofessionals. *Dissertations & Theses - Gradworks* 2015;208.

32. Olsen E, Bjaalid G, Mikkelsen A. Work climate and the mediating role of workplace bullying related to job performance, job satisfaction, and work ability: A study among hospital nurses. *J Adv Nurs* 2017.

33. Tarja H, Anne K, Marianna V, *et al*. The prospective effects of workplace violence on physicians' job satisfaction and turnover intentions: the buffering effect of job control. *BMC Health Serv*

Res 2014;14(1):1-8.

34. Christensen MP. Relationships between workplace violence, burnout, and intent to leave in emergency department nurses. *Dissertations & Theses-Gradworks* 2014;21(21):984-90.

35. Kim JI, Kim TS. Violence episodes and turnover among clinical nurses. *Journal of Korean Academy of Nursing Administration* 2004;10(4):427-436.

36. Tnay E, Othman AEA, Siong HC, *et al*. The Influences of Job Satisfaction and Organizational Commitment on Turnover Intention. *Procedia Social and Behavioral Sciences* 2013;97(2):201-208.

37. Islam T, Latif I, Ali G. The relationship between perceived organizational support and turnover intention: mediating role of affective commitment and job satisfaction. *Research Journal of Applied Sciences Engineering & Technology* 2014;8(24):2422-2425.

38. Samad S, Yasmin S, Yusuf M. The Role of Organizational Commitment in Mediating the Relationship between Job Satisfaction and Turnover Intention. *European Journal of Social Sciences* 2012;30(2):135-137.

39. Yücel I. Examining the Relationships among Job Satisfaction, Organizational Commitment, and Turnover Intention: An Empirical Study. *International Journal of Business & Management* 2012;7(20):1-15.

40. Shimizu T, Feng Q, Nagata S. Relationship between turnover and burnout among Japanese hospital nurses. *J Occup Health* 2005;47(4):334.

41. Abou Hashish E A. Relationship between ethical work climate and nurses' perception of organizational support, commitment, job satisfaction and turnover intent. *Nurs Ethics* 2015;1-16.

42. Dawley D, Houghton JD, Bucklew NS. Perceived organizational support and turnover intention: the mediating effects of personal sacrifice and job fit. *Journal of Social Psychology* 2010;150(3): 238-257.

43. Tumwesigye G. The relationship between perceived organizational support and turnover intentions in a developing country: The mediating role of organizational commitment. *African Journal of Business Management* 2010;4(6):942-952.

44. Zhang Y, Wu J, Fang Z, *et al*. Newly graduated nurses' intention to leave in their first year of practice in Shanghai: A longitudinal study. *Nurs Outlook* 2017;65(2):202-209.

45. Sun FF, Xu CP. Job stress and its relationship with quality of life and turnover intention of ICU nurses in general hospital. *Shandong University* 2016.

46. Lei W, Hong S, Xin G, *et al*. Correlation research between nurses' status of career planning and job satisfaction, turnover intention. *Chin J Mod Nurs* 2015;21(31):3721-3723.

47. Zhang HF, Liu YH, Yang Y, *et al*. The influencing factors of nurses' turnover tendency. *Chinese Journal of Nursing* 2015;50(2):155-160.

48. Hongmei YI, Lanxian YU, Tang J, *et al*. Relationship between psychological capital, work engagement and turnover intention among primary nurses in Traditional Chinese Medicine hospitals. *Chinese Nursing Management* 2015.

49. Li L, Ai H, Gao L, *et al*. Moderating effects of coping on work stress and job performance for nurses in tertiary hospitals: a cross-sectional survey in China. *BMC Health Serv Res* 2017; 17(1):401.

50. ILO/ICN/WHO/PSI. Framework Guidelines for Addressing Workplace Violence in the Health Sector. Geneva: ILO/ICN/WHO/PSI Joint Programme on Workplace Violence in the Health

Sector; 2002.

51. Richardsen AM, Martinussen M. Factorial validity and consistency of the MBI-GS across occupational groups in Norway. *International Journal of Stress Management* 2005; 12(3):289-297.

52. Lin Y, Jing-Xiang MA, Chen WQ, *et al*. Relationship between Perception of Job Characteristics and Job Satisfaction of Pediatric Nurses. *Journal of Nursing* 2013.

53. Chen ZX, Aryee S, Lee C. Test of a mediation model of perceived organizational support. *Journal of Vocational Behavior* 2005;66(3):457-470.

54. Lee G, Lee D. A study on the relationships among role conflict, organizational commitment and intent to quit matrix organizational structure: using employees from industrial technology research institute as example. *Graduate School of management, National Chiao Tung University* 2000.

55. Li YX, Zhang K, Zhao GX. Confirmatory factor analysis of job burnout. *Psychological Exploration (in China)* 2005;4:70-74.

56. Li CP, Shi K. The influence of distributive justice and procedural justice on Job Burnout. *Acta Psychologica Sinica* 2003;35(5):677-684.

57. Hirschfeld RR. Does Revising the Intrinsic and Extrinsic Subscales of the Minnesota Satisfaction Questionnaire Short Form Make a Difference? *Educational & Psychological Measurement* 2000;60(60):255-270.

58. Tiruneh BT, Bifftu BB, Tumebo AA, *et al.* Prevalence of workplace violence in Northwest Ethiopia: a multivariate analysis. *BMC Nurs* 2016;15:1-6.

59. Franz S, Zeh A, Schablon A, *et al.* Aggression and violence against health care workers in

Germany-a cross sectional retrospective survey. *BMC Health Serv Res* 2010;10:51.

60. Gu St, Huang QM, Chen ZHQ, *et al*. Relationship between job satisfaction and turnover intention among physicians from three grade hospitals. *Chinese Journal of Hospital Administration* 2006;9:586-589.

61. Almalki MJ, Gerry FG, Michele C. The relationship between quality of work life and turnover intention of primary health care nurses in Saudi Arabia. BMC Health Serv Res 2012;12(1):314.

62. Settoon RP, Bennett N, Liden RC. Social exchange in organizations: Perceived organizational support, leader-member exchange, and employee reciprocity. *Social Science Electronic Publishing* 2014;81(3):219-227.

63. Hobfoll SE. The influence of culture, community, and the nested-self in the stress process: Advancing Conservation of Resources theory. *Applied Psychology* 2001; 50(3):337-421.

64. Yom YH. Analysis of burnout and job satisfaction among nurses based on the Job Demand-Resource Model. *J Koren Acad Nurs* 2013;43(1):114-122.

65. Siegrist J, Starke D, Chandola T, *et al*. The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med* 2004;58(8):1483-1499.

66. Lu Y, Hu XM, Huang XL, *et al*. The relationship between job satisfaction, work stress, work-family conflict, and turnover intention among physicians in Guangdong, China: a cross-sectional study. *BMJ Open* 2017;7(5):e014894.

FIGURE LEGEND: **Figure 1. The final model in this study. (CFI = 0.956, GFI = 0.924, IFI = 0.942, NFI=0.931, RMR = 0,050, RMSEA = 0.053, TLI = 0.926)**

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

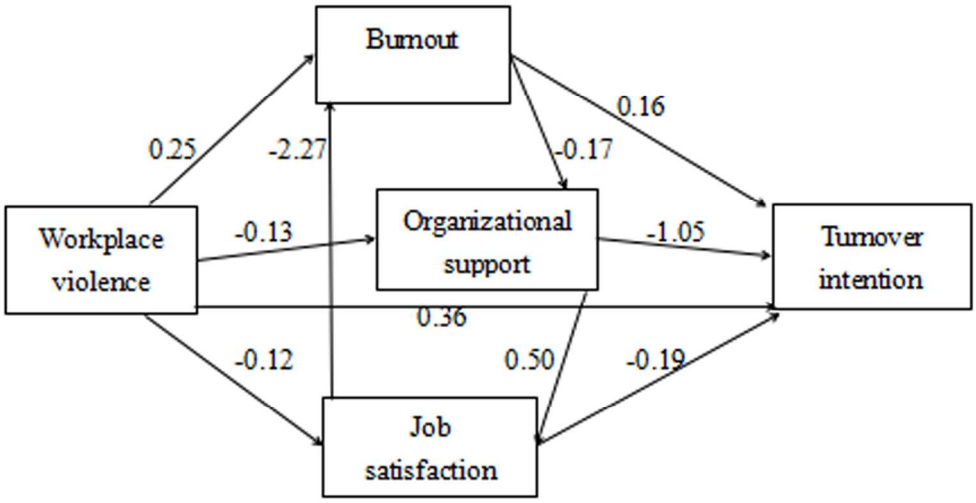

Figure 1. The final model in this study. (CFI = 0.956, GFI = 0.924, IFI = 0.942, NFI=0.931, RMR = 0,050, RMSEA = 0.053, TLI = 0.926)
Note: CFI, comparative fit index; GFI, goodness of fit index; IFI, incremental fit index; NFI, normed fit index; RMR, root mean square residual; RMSEA, root mean square error of approximation; TLI, Tucker–Lewis incremental fit.

117x61mm (300 x 300 DPI)

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Page 3, line 4-9
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	p.4, line 4-18
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	P. 5; p. 6; p. 7, line 4-49
Objectives	3	State specific objectives, including any prespecified hypotheses	P. 8, line15-33
Methods			
Study design	4	Present key elements of study design early in the paper	P. 8, line38-55;
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	P. 9, line 21-48
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	p.8, 40-56
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	P. 10, line 4-21
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	P. 10; p.11; p.12

Bias	9	Describe any efforts to address potential sources of bias	P.13, line13-18
Study size	10	Explain how the study size was arrived at	P. 9, line 48-56
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	p. 13, line24-26
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	P. 13, line13-55
		(*b*) Describe any methods used to examine subgroups and interactions	P. 13, line 16-19
		(*c*) Explain how missing data were addressed	P. 13, line 19-35
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	P. 13, line 4-16
		(*e*) Describe any sensitivity analyses	P. 13, line 36-40
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	P. 9,line 22-48;
		(b) Give reasons for non-participation at each stage	P. 9, line 39-48
		(c) Consider use of a flow diagram	No
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	P. 14,line 37-57; P. 15,line 2-36
		(b) Indicate number of participants with missing data for each variable of interest	P.9, line 36
Outcome data	15*	Report numbers of outcome events or summary measures	P. 15; P. 16; P. 17; P. 18;P. 19

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	P. 17, ;P. 18
		(*b*) Report category boundaries when continuous variables were categorized	P. 15, line 2-35
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	P. 19, p.21
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	P. 20, line 4-27;
Discussion			
Key results	18	Summarise key results with reference to study objectives	P. 21; p. 22; P. 23; p24; p25
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	P. 26, Line 36-53
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	P. 19, line 33-57; p.21; p. 22; P. 24, line4-22
Generalisability	21	Discuss the generalisability (external validity) of the study results	P. 23, line 29-42; P. 25, line 3-57;
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	P. 27, line 40-45

*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.

BMJ Open

Workplace violence, job satisfaction, burnout, perceived organizational support and their effects on turnover intention among Chinese nurses in tertiary hospitals: a cross-sectional study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-019525.R2
Article Type:	Research
Date Submitted by the Author:	05-Feb-2018
Complete List of Authors:	Liu, Wenhui; Harbin Medical University School of Public Health, Department of Health Management Zhao, Shihong; The Second Affiliated Hospital of Harbin Medical University, Department of Neurosurgery Shi, Lei; School of Public Health, Harbin Medical University, Department of Health Management Zhang, Zhong; School of Public Health, Harbin Medical University, Department of Medical Education Liu, Xinyan; Harbin Medical University, Department of Medical Education, School of Public Health Li, Li; School of Public Health, Harbin Medical University, Department of Health Management Duan, Xiaojian; School of Public Health, Harbin Medical University, Department of Health Management Li, Guoqiang; Harbin Medical University, Department of Health Management, School of Public Health Lou, Fengge; School of Public Health, Qiqihar Medical University, Department of Public Health Research Jia, Xiaoli; Chinese Hospital Association, Department of Autonomous Protection Fan, Lihua; Harbin Medical University, Department of Health Management , School of Public Health; School of Public Health, Harbin Medical University, Department of Medical Education Sun, Tao; Harbin Medical University School of Public Health, Ni, Xin; National Center for Children's Health, Beijing Children's Hospital affiliated to Capital Medical University , Department of the Hospital Director
Primary Subject Heading:	Health policy
Secondary Subject Heading:	Health policy, Health services research, Nursing, Medical management
Keywords:	Workplace violence, job satisfaction, burnout, organizational support, turnover intention, nurses

Workplace violence, job satisfaction, burnout, perceived organizational support and their effects on turnover intention among Chinese nurses in tertiary hospitals: a cross-sectional study

Wenhui Liu,[1*] Shihong Zhao,[1, 2*] Lei Shi,[1*] Zhong Zhang,[3] Xinyan Liu,[3] Li Li,[1] Xiaojian Duan,[1] Guoqiang Li,[1] Fengge Lou,[4] Xiaoli Jia,[5] Lihua Fan,[1, 3] Tao Sun, [1, 3] Xin Ni[6]

[*] WL, SZ and LS contributed equally to this work.

Correspondence to: Lihua Fan, School of Public Health, Harbin Medical University, No.157 Baojian Road, Nangang District, Harbin 150081, China; E-mail: lihuafan@126.com; Tao Sun, School of Public Health, Harbin Medical University, No.157 Baojian Road, Nangang District, Harbin 150081, China; E-mail: hydsuntao@126.com; Xin Ni, No.56 Nanlishi Road, Xicheng District, Beijing 100045, China; E-mail: nixin@bch.com.cn

[1] Department of Health Management, School of Public Health, Harbin Medical University, Harbin, Heilongjiang, China

[2] Department of Neurosurgery, The Second Affiliated Hospital of Harbin Medical University, Harbin, Heilongjiang, China

[3] Department of Medical Education, School of Public Health, Harbin Medical University, Harbin, Heilongjiang, China

[4] Department of Public Health Research, School of Public Health, Qiqihar Medical University, Qiqihar, Heilongjiang, China

[5] Department of Autonomous Protection, Chinese Hospital Association, Beijing, China

[6]Department of the Hospital Director, National Center for Children's Health, Beijing Children's Hospital affiliated to Capital Medical University, Beijing, China

Abstract

Objective

Our aim was to assess the relationship between workplace violence, job satisfaction, burnout, organizational support, and turnover intention, and explore factors associated with turnover intention among nurses in Chinese tertiary hospitals.

Methods

The purposive sampling method was used to collect data from August 2016 through January 2017. A total of 1761 nurses from 9 public tertiary hospitals in 4 provinces (municipalities) located in eastern (Beijing), central (Heilongjiang, Anhui), and western (Shaanxi) of China completed the questionnaires (effective response rate = 85.20%). A cross-sectional study was conducted using the Workplace Violence Scale, Chinese Maslach Burnout Inventory General Survey, Minnesota Job Satisfaction Questionnaire Revised Short Version, Perceived Organizational Support–Simplified Version Scale, and Turnover Intention Scale.

Results

A total of 1216 of 1706 (69.1%) participants had high turnover intention. During the previous 12 months, the prevalence of physical violence and psychological violence toward nurses was 9.60% and 59.64%, respectively. As expected, the level of turnover intention was negatively correlated with participants' scores on job satisfaction ($r= -0.367$, $P < 0.001$) and perceived organizational support ($r= -0.379$, $P < 0.001$), respectively. Burnout was positively associated with turnover intention ($r = 0.444$, $P < 0.001$). Workplace violence was positively associated with turnover intention ($\beta = 0.035$, $P < 0.001$) in linear regression analysis. The total effect ($\beta = 0.53$) of workplace violence on turnover intention comprised its direct effect ($\beta = 0.36$), and its indirect effect ($\beta = 0.17$).

Conclusions

Perceived organizational support served as a moderator between workplace violence, job satisfaction, burnout, and turnover intention, and it had a significant negative impact on turnover intention. Therefore, nursing managers should understand the importance of the organization's support and establish a reasonable incentive system to decrease turnover intention.

Strengths and limitations of this study

▪A variety of statistical methods (descriptive analysis, Pearson correlation analysis, linear regression analysis, and structural equation model) were employed to investigate the relationship between independent variables and turnover intention.

▪The benefits of using the both linear regression and structural equation model are the ability to understand the relationship between variables more clearly and intuitively and to better master the role of organizational support in the relationship between other variables and turnover intention.

▪ The retrospective approach to collecting data using self-reports of workplace violence might have led to recall and report bias.

▪The results of purposive sampling were greatly influenced due to the preconceptions of the researchers. Therefore, the researchers need to clearly understand the basic characteristics of the population under study.

INTRODUCTION

A nursing shortage is occurring worldwide and is arousing great concern.[1] The European Commission reported that 590,000 nurses would be shortage by the end of 2020.[2] In the United States, by the end of 2020, the nursing shortage will reach 340,000 nurses.[3] In 2016, the total number of registered nurses in China reached 3.507 million. Compared with 2010, the number of registered nurses per 1,000 people increased from 1.52 to 2.54.[4] The ratio of physicians to nurses in China has increased from 1:1.16 in 2010 to 1:45 in 2016, and the inverse ratio of physician and nurse was fundamentally reversed for a long time.[4] In 2001–2002, the results of the Health Resources Report for the Western Pacific Region concerning the present situation, shortages, and future trends within the world of nursing showed that the ratio of physicians to nurses in Hongkong, Japan, Thailand, Germany, and the United Kingdom was more than 1:4, and that the ratio of physicians to nurses in Finland, Norway, and Canada was over 1:6.[5] Without a doubt, an inadequate supply of nurses has been a long-existing problem in China. The most recognized cause of nursing shortage seems to be nurses leaves the nursing profession.[6-7] Many nurses tend to leave the nursing profession, and this is regarded as a global political concern.[8]

Turnover intention is defined as the possibility that employees will leave a job within a certain period.[9] The first study on turnover used the participant determination model proposed by March and Simon in 1958.[10] Following on from that study, standardized models, for example, the decision-making process model, the employee-withdrawal behavior model, and the intermediate chain extension model, have been constructed, using the peak mutation model, the unfolding model, and the loss motivation model.[11-15] Among these theoretical models and studies, turnover intention has been considered to be one of the best factors to predict turnover behavior, and has shown significant explanatory power.[16] Therefore, turnover intention has been the focus of this study.

Workplace violence can be divided into physical violence (including hitting, shooting, kicking, slapping, pushing, biting, pinching, wounding using sharp objects, and sexual assault and rape) and psychological violence (including verbal abuse, threats and sexual harassment).[17] Job satisfaction represents the extent to which personnel's demands and desires are met within the workplace.[18] Burnout is a syndrome involving emotional exhaustion and depersonalization and one where personal accomplishments are reduced, resulting in continuous work stress that has not been effectively handled.[19] Perceived organizational support refers to the overall perception and beliefs of employees about how organizations view their contributions and care about their interests.[20]

In Kim's review, it was reported that the mean score for turnover intention among Korean nurses was between 2.40 and 3.85.[21] About 40% of the registered nurses in a teaching hospital in Malaysia were reported to have a turnover intention, and the results indicated that age, work experience, nursing education, and overall job satisfaction significantly influence an intention to leave.[22] A survey was conducted in 4 general hospitals in Seoul, and the findings showed that factors influencing turnover intention involve the organizational system, depersonalization, the physical environment, work role, and the organizational climate.[23] A review of the research literature revealed that factors related to the work environment were the most important in respect of nurses' turnover intentions.[24] A study has been conducted among nurses in 1,105 general acute care hospitals in Europe and the United States, and showed that the rates of nurse burnout ranged from 10% to 78%, with the job dissatisfaction rate ranging from 11% to 56% and the intention to leave rate ranging from 14% to 49%.[25]

However, turnover intention is usually affected through a variety of factors, for example, work stress,[9] [26] workplace violence,[27] job satisfaction,[28] burnout,[28] perceived organizational support,[29] organizational commitment,[29] among others.

Workplace violence is a widely reported phenomenon among nurses in medical settings, and it influences the turnover intention of nurses.[30] A study indicated that turnover intention was positively associated with exposure types of violence.[27] McDowell found workplace violence to be significantly related to burnout (r = 0.56, $P < 0.01$) and turnover intention (r = 0.24, $P < 0.01$) for all direct care paraprofessionals.[31] The previous results determined that a statistically significant relationship existed between turnover intention and workplace violence.[32 33] Therefore, workplace violence is one of the influential factors in turnover intention.[34 35]

Job satisfaction has been considered as a major contributory factor to intending to stay in a job, in previous studies.[24 26 36] In contrast to this viewpoint, previous studies have also shown that job satisfaction mainly affects turnover intention in respect of organizational commitment.[37 38] Furthermore, a third view has showed that two considerations, namely having demands and desires met and organizational commitment, exist simultaneously regarding job satisfaction and turnover intention.[39]

Moreover, substantial evidence has indicated that employees with high levels of burnout are more prone to turnover intention.[33 40] Some studies have reported that perceived organizational support is a predictor of turnover intention.[37 39 41 42] One study has indicated that perceived organizational support is negatively associated with turnover intention.[43]

In China, a study from Shanghai indicated that 22.5% of nurses expressed their intention to leave the emergency department within the following year.[44] The mean score for turnover intention of ICU nurses was between 1.95 and 2.92 in Shandong.[45] A survey of turnover intention among 10 tertiary hospitals' nurses in Beijing showed that 16.5% of nurses may leave the current work unit in the following year.[46] An investigation in Tianjin showed that work support had a negative influence on turnover intention.[47] Previous results reflected a significant correlation between psychological capital,

work engagement, and turnover intention among primary nurses.[48] Substantial studies have mainly investigated the relationship among job stress, job satisfaction, job engagement, organizational support and turnover intention among Chinese nurses in one province.[6 45-49] Therefore, the researchers selected nurses from tertiary hospitals in several provinces and further verified the relationship between workplace violence frequency and turnover intention in this study. The novelty of this study was the inclusion of organizational support and the use of both linear regression and the structural equation model (SEM).

Based on the above evidence, researchers proposed the present study with the following hypotheses: (1) workplace violence, job satisfaction, burnout and organizational support had different effects on turnover intention; (2) workplace violence had a significant impact on job satisfaction and burnout; (3) organizational support served as a moderator between workplace violence and turnover intention; and (4) organizational support served as a moderator between job satisfaction and burnout.

The present study aims to examine the relationship between workplace violence, job satisfaction, burnout, organizational support and turnover intention, and explore factors associated with turnover intention among nurses in Chinese tertiary hospitals.

METHODS

Participants and sampling

A cross–sectional study of nurses was conducted from August 2016 through January 2017 in eastern (Beijing), central (Heilongjiang, Anhui), and western (Shaanxi) of China. A total of nine public tertiary hospitals in four provinces (municipalities) were selected using a purposive sampling method. The total number of nurses in 9 hospitals (the hospitals were similar in size, department setting, and number of nurses) is about 18,900; a total of 2,067 samples were extracted , with these nurses accounting for

10.9% of the total nurses. On average, 225 nurses from each hospital were extracted (in the actual sampling process, the sample size of each hospital was slightly different, but it was roughly 225 people). All investigators were subject to unified training before starting the investigation and could act as investigators when qualified. Permission to conduct the study was acquired from the managers, and the medical dispute resolution and human resources departments of the hospitals concerned. An anonymous, self–administered questionnaire was used to conduct face–to–face surveys. Paper-and-pencil questionnaires were filled out by each participant. Investigators (who were not unit supervisors) conducted the surveys, and they were responsible for explaining the purpose of the study and reminding participants of the matters to pay attention to in filling out the questionnaire. The Cronbach alpha of each original scale was as follows: Workplace Violence Scale was 0.873,[50] Chinese Maslach Burnout Inventory General Survey was 0.864,[51] Minnesota Job Satisfaction Questionnaire Revised Short Version was 0.891,[52] Perceived Organizational Support–Simplified Version Scale was 0.921,[53] and Turnover Intention Scale was 0.770.[54] The two public hospitals in Harbin (the Fourth Affiliated Hospital of Harbin Medical University and the principal hospital of Harbin) were selected as the locations for our pre–study before the formal investigation (200 questionnaires were distributed and returned, and these data were excluded in the formal survey data). The investigators and hospital coordinators distributed and took back the questionnaires immediately from the participants. A total of 2,067 questionnaires were distributed to nurses, all of which were returned. However, 306 questionnaires were missing data or blank, which left 1,761 valid questionnaires (effective response rate = 85.20%). The following conditions were selected as the inclusion criteria for this study: (1) having a practicing nurse certificate; (2) having at least one year of clinical nursing experience; (3) being still engaged in clinical nursing work during the investigation; and (4) voluntary participation

without prejudice to the participants' work. The exclusion criteria for this study were rehire after retirement nurses, refresher nurses, and nurses who had not passed the probation period.

Questionnaire

Demographic characteristics

Demographic information on the nurses was collected, including sex, age, marital status, educational background, professional qualifications, employment form, department, years of experience, and daily working hours. Age was categorized as ≤ 30, 31–50, and ≥ 51 years old. Marital status was categorized as married and single/divorced/widowed. Educational background was classified as junior college or below, undergraduate, and master's degree or above. Professional qualifications were categorized as primary title, intermediate title, and senior title. Employment form was categorized as long-term employee and temporary employee. Department was classified as emergency department, internal medicine, surgery, obstetrics and gynecology, pediatrics, and other. Work experience was divided into 4 categories: ≤ 4, 5–10, 11–20, and ≥ 21 years. Daily working time was categorized as ≤ 8, 8–10, 10–12, and ≥ 12 hours.

Workplace Violence Scale

The Workplace Violence Scale developed by the International Labour Office, the International Council of Nurses, the World Health Organization, and Public Services International Joint Program on Workplace Violence in the Health Sector in 2003 was used to measure workplace violence.[50] The scale used in this study consists of 2 dimensions (physical violence and psychological violence) and has 9 items that were adopted from these scales. Each item is scored on a 4–point scale reflecting respondents' frequency of exposure to workplace violence (0 = 0 times, 1 = 1 time, 2 = 2–3 times, and 3 = ≥ 4 times). The total possible score ranges from 0 to 27, with a higher total score indicating a

higher frequency of exposure to workplace violence. In the present study, Cronbach's α for the Workplace Violence Scale was 0.860.

Burnout

Burnout was assessed using the Chinese Maslach Burnout Inventory General Survey (CMBI–GS) in the present study, with a total of 15 items, developed by Li YX, and proven to be vaild.[51 55-56] The CMBI-GS is categorized into 3 subscales reflecting job burnout: emotional exhaustion, depersonalization, and reduced personal accomplishment. The response options for each item on the CMBI–GS are rated from 0 (never) to 6 (daily), based on the frequency of occurrence of the specific work feelings of the respondent. The score of the 3 subscales is equal to the average of the sum of items for each of the subscales. The total possible score is calculated through adding the scores for 3 subscales, and it ranges from 0 to 18 points, with a higher score indicating a higher level of burnout. In terms of the average score of all items, a score less than 8.5 points indicates lower job burnout, a score of 8.5–14.2 points indicates that burnout is serious, and burnout is extremely serious when the score is greater than 14.2 points. In this study, Cronbach's α for the CMBI–GS was 0.873. The internal consistency coefficients were 0.834, 0.826, 0.806, and 0.812, for emotional exhaustion, depersonalization, and reduced personal accomplishment, respectively.

Job satisfaction

The Minnesota Job Satisfaction Questionnaire Revised Short Version (MJSQ–RSV) was used in this study to assess participants' satisfaction with their job.[52 57] The MJSQ–RSV consists of 20 items, including 12 items measuring intrinsic satisfaction and 8 items measuring extrinsic satisfaction. Each item is rated on a 5–point Likert scale (1 = strongly unsatisfied, 2 = unsatisfied, 3 = uncertain, 4 = satisfied, and 5 = strongly satisfied). Intrinsic satisfaction refers to the degree of satisfaction with the

factors involved in the job content. Extrinsic satisfaction refers to the degree of satisfaction of the individual in terms of current job rewards, promotion, and leadership style. The higher the participant's self–rating, the higher their satisfaction with the job. The present study revealed that Cronbach's α for the MJSQ–RSV was 0.882, and for the two subscales it was 0.872 (intrinsic satisfaction) and 0.896 (extrinsic satisfaction).

Perceived organizational support scale

Perceived organizational support was measured using the Perceived Organizational Support–Simplified Version Scale (POS–SVS). Previous studies have found the POS–SVS to have high reliability and validity as a measure of perceived organizational support.[37 42 53] It consists of nine self–report items, which comprise two reverse questions (even if employees try to do the best job they can, the work unit doesn not notice it; the work unit rarely cares about employees). The other 7 items mainly indicate that work unit cares about the well–being and job satisfaction of employees and pays attention to the work goals and values and employees' opinions; employees can get help when they encounter difficulties; and the unit will be proud of what employees have achieved. Each item is rated on a 5–point Likert scale, and ranged from 1 (extremely inconsistent) to 5 (extremely consistent). The total possible score is calculated through adding the scores for all items, and it ranges from 9 to 45 points, with a higher score indicating a higher organizational support. In this study, Cronbach's α for the POS–SVS was 0.890.

Turnover intention scale

The Turnover Intention Scale, which has been used to measure turnover intention among nurses was used in the present study. The turnover intention scale was developed by Lee and Lee,[54] and has been widely used in many studies.[9 46 47] This 6–item scale is divided into 3 dimensions: the possibility of an

employee quitting his/her present job, the motivation for employees to find other jobs, and the possibility of employees having access to external work. Each item is scored on a 4–point scale reflecting participants' intention to leave (1 = never, 2 = seldom, 3 = occasionally, and 4 = often). The total possible score is counted through adding the scores for all items, and it ranges from 6 to 24 points, with a higher score indicating a stronger intention to leave. The extent of turnover intention is divided into 4 levels according to the different total average score of turnover intention. A total average score ≤ 1 indicates that turnover intention is particularly low, less low when it is from 1 to 2, higher when it is from 2 to 3, and exceptionally high when it is greater than 3. In the present study, Cronbach's α for the Turnover Intention Scale was 0.862.

Data Analysis

EpiData version 3.1 was used to establish the study's database. Missing data or poor–quality questionnaires were eliminated. To ensure accuracy, two trained personnel entered the data after all the surveys were completed. IBM SPSS V.19.0 was used for the data analysis in this study. Descriptive statistics, including numbers (n), percentages (%), means, and standard deviations (SD) were calculated for the demographic variables. We used one-way analysis of variance (ANOVA) or independent sample t–tests to compare group differences concerning the measurements of the continuous variables. Pearson's correlations were used to examine correlations among the continuous variables. Linear regression analysis was used to examine the associations of the demographic variables and workplace violence, job satisfaction, burnout, perceived organizational support, and turnover intention variables. Statistics, including F values, R^2, R^2–changes (ΔR^2), standardized regression coefficients (β), and P–values for each step in the regression model were reported. All study variables were tested for multicollinearity. A P–value < 0.05 was considered statistically significant.

Path analysis was used to examine the relationship among the five variables, including workplace violence, job satisfaction, burnout, perceived organizational support, and turnover intention. A SEM for path analysis was constructed using the AMOS 17.0 program to analyze the effect of workplace violence on job satisfaction, burnout, perceived organizational support, and turnover intention. The model was considered to have a good fit when all path coefficients were significant at the level of 0.05; χ^2/df, was below 5; the standardized root mean square residual (SRMR) was below 0.08; the root mean square error of approximation (RMSEA) was below 0.08; the root mean squareresidual (RMR)was below 0.10; as well as the goodness of fit index (GFI), the normed fit index (NFI), Tacker–Lewis incremental fit (TLI) and comparative fit index (CFI) being ≥ 0.90.

STROBE Statement

The STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines are followed in this study.

Ethical Considerations

Ethical approval to conduct this study was granted by the Research Ethics Committee of Harbin Medical University, and informed consent was obtained from each hospital and the nurses involved in the investigation. All participants gave their informed consent before the survey; they were assured that their personal information would be kept confidential.

RESULTS

Demographic Characteristics of the Participants

The demographic characteristics of the respondents are shown in Table 1.

Table 1. Demographic characteristics of participants (N=1761).

Demographic variables	n	%

Gender		
Male	60	3.4
Female	1701	96.6
Age group (years)		
≤ 30	899	51.1
31-50	793	45.0
≥ 51	69	3.9
Level of education		
Below undergraduate	715	40.6
Undergraduate	1020	57.9
Master's degree or above	26	1.5
Marital status		
Married	1128	64.1
Single/ divorced/ widowed	633	35.9
Professional qualifications		
Primary title	1161	65.9
Intermediate title	528	30.0
Senior title	72	4.1
Employment form		
Long-term employee	693	39.4
Temporary employee	1068	60.6
Department		
Emergency Department	299	17.0
Internal Medicine	559	31.7
Surgery	543	30.8
Obstetrics and Gynecology	93	5.3
Pediatrics	101	5.7
ENT*	82	4.7
Other	84	4.8
Years of experience		
≤4	529	30.0
5-10	619	35.2
11-20	346	19.6
≥21	267	15.2
Daily working hours		
≤ 8	113	6.4
8-10	1485	84.3
10-12	126	7.2
≥ 12	37	2.1

* ENT stand for eyes, nose, throat.

Prevalence of Workplace Violence in the Preceding 12 Months

During the previous 12 months, the prevalence of physical violence and psychological violence toward

nurses was 9.60% (169/1761) and 59.64% (1111/1761), respectively. In the past year, respondents reported an exposure frequency of workplace violence at less than or equal to 3, accounting for 65.9% of all incidents. The respondents reported that the patients' relatives were the main perpetrators (71.2%, n = 797), followed by the patients (25.4%, n = 284).

The Difference Between Participants' Characteristics and the Multiple Variables Score

Table 2 shows the descriptive association between respondents' characteristics and the burnout, job satisfaction, organizational support, and turnover intention scores. There was a significant difference in the score of turnover intention among characteristics involving age group, educational level, different professional titles, employment form, department, years of experience and daily working hours for nurses in the tertiary hospitals.

Pearson correlations between different measurement variables

Table 3 shows the correlations among the respondents' turnover intention and scores on workplace violence, burnout, job satisfaction, and perceived organizational support. As expected, the level of turnover intention was positively correlated with respondents' scores on workplace violence ($r = 0.122$ $P < 0.001$). Burnout was positively associated with turnover intention ($r = 0.444$, $P < 0.001$). The level of turnover intention was negatively correlated with participants' scores on job satisfaction ($r= -0.367$, $P < 0.001$) and perceived organizational support ($r= -0.379$, $P < 0.001$), respectively.

Linear Regression Analysis and Path Analysis of Factors Related to Turnover Intention

The predicting factors of turnover intention are presented in Table 4. Demographic variables that were significantly related to turnover intention were used as control variables. Demographic variables alone explained less than 3% of the overall variance in turnover intention. As shown in Block 2, workplace violence was positively associated with turnover intention ($\beta = 0.034$, $P < 0.001$). It explained another 2% of the overall variance in turnover intention. In Block 3, with the addition of organizational

Table 2. Burnout, job satisfaction, perceived organizational support and turnover intention according to general characteristics.

Characteristics	Burnout	Job satisfaction	Workplace violence	Perceived organizational support	Turnover intention
	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD
Gender					
Male	6.23 ± 3.34	3.54 ± 0.55	3.15 ± 3.92	3.27 ± 0.57	2.30 ± 0.71
Female	6.53 ± 3.08	3.52 ± 0.54	2.11 ± 2.60	3.10 ± 0.64	2.40 ± 0.60
F/t	-0.757	0.256	8.931**	1.991*	-1.263
Age group (years)					
≤ 30	6.58 ± 3.03	3.54 ± 0.54	1.81 ± 2.38	3.13 ± 0.64	2.44 ± 0.61
31-50	6.53 ± 3.16	3.50 ± 0.55	2.36 ± 2.73	3.07 ± 0.65	2.39 ± 0.60
≥ 51	5.80 ± 3.07	3.55 ± 0.52	3.97 ± 4.09	3.14 ± 0.57	2.04 ± 0.56
F/t	2.040	1.672	26.537**	1.986	14.144**
Level of education					
Below undergraduate	6.62 ± 3.01	3.52 ± 0.54	1.96 ± 2.45	3.11 ± 0.61	2.38 ± 0.63
Undergraduate	6.48 ± 3.13	3.53 ± 0.55	2.26 ± 2.77	3.10 ± 0.65	2.42 ± 0.58
Master's degree or above	5.54 ± 3.40	3.58 ± 0.54	2.58 ± 3.76	3.27 ± 0.78	2.08 ± 0.61
F/t	1.737	0.202	3.161*	0.888	4.468*
Marital status					
Married	6.45 ± 3.12	3.52 ± 0.54	2.25 ± 2.69	3.10 ± 0.65	2.38 ± 0.60
Single/ divorced/ widowed	6.65 ± 3.03	3.53 ± 0.56	1.96 ± 2.61	3.12 ± 0.63	2.43 ± 0.61
F/t	-1.304	-0.203	4.789*	-0.843	-1.658
Professional title					
Primary title	6.67 ± 3.04	3.53 ± 0.54	1.90 ± 2.38	3.11 ± 0.65	2.45 ± 0.60
Intermediate title	6.42 ± 3.17	3.49 ± 0.56	2.57 ± 3.05	3.07 ± 0.62	2.31 ± 0.61
Senior title	4.87 ± 2.77	3.70 ± 0.50	2.86 ± 3.34	3.25 ± 0.68	2.17 ± 0.59
F/t	12.077**	4.781**	14.412**	2.735	15.543**

Employment form					
Long-term employee	6.71 ± 3.30	3.48 ± 0.57	2.46 ± 2.80	3.05 ± 0.65	2.32 ± 0.60
Temporary employee	6.40 ± 2.94	3.55 ± 0.52	1.93 ± 2.55	3.14 ± 0.63	2.45 ± 0.61
F/t	2.025*	-2.460*	16.717**	-2.779**	-4.377**
Department					
Emergency Department	6.51 ± 3.21	3.51 ± 0.60		3.12 ± 0.70	2.37 ± 0.63
Internal Medicine	6.40 ± 3.06	3.55 ± 0.55	1.90 ± 2.38	3.15 ± 0.64	2.38 ± 0.60
Surgery	6.73 ± 3.05	3.50 ± 0.54	2.00 ± 2.47	3.05 ± 0.63	2.45 ± 0.59
Obstetrics and Gynecology	6.19 ± 2.71	3.54 ± 0.50	2.65 ± 3.31	3.13 ± 0.58	2.44 ± 0.56
Pediatrics	7.09 ± 3.23	3.47 ± 0.51	2.40 ± 2.76	3.08 ± 0.64	2.35 ± 0,67
ENT	5.87 ± 3.20	3.56 ± 0.48	1.74 ± 2.31	3.12 ± 0.62	2.25 ± 0.54
Other	6.36 ± 3.13	3.55 ± 0.55	2.58 ± 3.29	3.11 ± 0.57	2.32 ± 0.66
F/t	1.938	0.639	3.905*	1.211	2.234*
Years of experience					
≤4	6.26 ± 2.78	3.60 ± 0.51	1.70 ± 2.56	3.21 ± 0.58	2.37 ± 0.57
5-10	6.88 ± 3.18	3.49 ± 0.55	2.22 ± 2.65	3.06 ± 0.67	2.49 ± 0.63
11-20	6.75 ± 3.10	3.45 ± 0.58	2.28 ± 2.54	3.04 ± 0.67	2.46 ± 0.59
≥21	5.94 ± 3.33	3.53 ± 0.53	2.66 ± 2.92	3.08 ± 0.65	2.18 ± 0.58
F/t	7.859**	6.249**	8.745**	6.690**	18.233**
Daily working hours					
≤ 8	6.08 ± 3.01	3.65 ± 0.51	2.20 ± 2.96	3.25 ± 0.69	2.24 ± 0.59
8-10	6.53 ± 3.09	3.52 ± 0.55	2.09 ± 2.55	3.10 ± 0.64	2.41 ± 0.60
10-12	6.73 ± 2.95	3.45 ± 0.49	2.06 ± 2.78	3.05 ± 0.57	2.42 ± 0.64
≥ 12	7.11 ± 3.71	3.49 ± 0.58	4.14 ± 4.58	3.10 ± 0.62	2.37 ± 0.68
F/t	1.415	3.096*	7.195**	2.229	2.826*

* P < 0.05, ** P<0.01

Table 3. Pearson correlations among workplace violence, burnout, job satisfaction, perceived organizational support and turnover intention.

Variables	1	2	3	4	5	6	7	8	9	10
1. Turnover intention	1									
2. Workplace violence	0.122**	1								
3. Burnout	0.444**	0.206**	1							
4. Emotional exhaustion	0.418**	0.213**	0.792**	1						
5. Depersonalization	0.460**	0.220**	0.846**	0.754**	1					
6. Reduced Personal Accomplishment	0.102**	0.025	0.545**	0.017	0.116**	1				
7. Perceived organizational support	-0.379**	-0.172**	-0.527**	-0.445**	-0.495**	-0.216**	1			
8. Job satisfaction	-0.367**	-0.188**	-0.562**	-0.478**	-0.524**	-0.231**	0.675**	1		
9. Intrinsic satisfaction	-0.330**	-0.171**	-0.532**	-0.441**	-0.493**	-0.232*	0.626**	0.946**	1	
10. Extrinsic satisfaction	-0.390**	-0.176**	-0.505**	-0.456**	-0.476**	-0.178**	0.673**	0.900**	0.795**	1

* P<0.05, ** P<0.01

Table 4. Predicting factors of turnover intention.

Variables	Block 1 (β)	Block 2 (β)	Block 3 (β)	Block 4 (β)	Block 5 (β)
Age group	-0.055	-0.076*	-0.055	-0.055	-0.051
Level of education	0.028	0.022	0.028	0.025	0.026
Professional qualifications	0.120**	0.128**	0.098**	0.095**	0.044
Employment form	0.081*	0.087*	0.108**	0.098**	0.146**
Department	0.008	0.011	0.010	0.011	0.007
Years of experience	0.034	0.038	0.014	0.006	0.001
Daily working hours	0.056	0.046	0.030	0.012	0.009
Workplace violence		0.034**	0.019**	0.016**	0.005
Organizational support			-0.039**	-0.022**	-0.012**
Intrinsic satisfaction				0.001	0.008*
Extrinsic satisfaction				-0.037**	-0.030**
Emotional exhaustion					0.051**
Depersonalization					0.113**
Reduced Personal Accomplishment					0.004
F	6.374**	10.553**	41.686**	41.863**	51.582**
R^2	0.025	0.046	0.176	0.208	0.293
ΔR^2	0.025**	0.021**	0.130**	0.032**	0.085**

* P<0.05, ** P<0.01

support to the model, the explained variance jumped to 13%, meaning that it was this factor that explained most of the variance. Extrinsic satisfaction added another 3%, while emotional exhaustion and depersonalization contributed nearly 9%. Furthermore, it should be noted that professional qualifications were significant in every step except in the final step, when burnout was added to the model. It was interesting that employment form was significant throughout.

Path analysis using the SEM was performed, which is shown in Figure 1. workplace violence had a negative effect on job satisfaction, which was mediated through perceived organizational support. The total effect (β = −0.19) of workplace violence on job satisfaction was comprised of not only its direct effect (β = −0.12), but also its indirect effect (β = −0.07 = -0.13×0.50), mediated through perceived organizational support. The total effect (β = 0.53) of workplace violence on turnover intention comprised its direct effect (β = 0.36), and its indirect effect (β = 0.17=(-0.12) × 0.19 + (-0.13)× (-1.05) + 0.25 × (-0.17) × (-1.05) + (-0.13) × 0.50 × (-0.19)). Job satisfaction was negatively

associated with burnout. On the other hand, job burnout was positively related to turnover intention. The squared multiple correlations value was 0.432, which implies that the built SEM explained 43.2% of the total variance of turnover intention.

DISCUSSION

In this cross–sectional hospital–based study of nurses, we evaluated the incidence rate of workplace violence and the mean score of overall perceptions of turnover intention. The total incidence rate of workplace violence was 63.6% (1120/1761) during the past year. This finding was close to a finding from a large sample cross-sectional survey on the prevalence of workplace violence among Chinese nurses.[17] Moreover, the incidence of Chinese nurses experiencing workplace violence is higher than that of nurses in other countries.[58-59] This may be due to cultural variations across different countries in terms of workplace violence perceptions, and the variety of assessment scales used in different studies. As far as the personal characteristics of nurses are concerned, previous studies have proved that young age, lack of life and work experience, low professional qualifications, low education levels and poor interpersonal relationships are the risk factors for workplace violence against Chinese nurses.[17] In terms of organizational characteristics, high–risk departments (emergency department, orthopedics department, and pediatrics department), poor organizational climate, lack of team spirit, heavy workload, and shortage of nurses are also frequent factors of occupational violence among nurses. In China, imperfect healthcare laws and regulations, insufficient practice in dealing with medical disputes, and negative reports from the media are also an important inducing factor. Regarding aspect of patients and their relatives, high medical service expectations, long waiting times, high medical costs, unmet requirements, and poor communication between nurses and patients also lead to

workplace violence. Therefore, we suggest that the government should supervise the media to ensure the accuracy and authenticity of media coverage. Ward management needs strengthening; for example, surveillance cameras and alarms should be installed in hospital ward corridors, lights should be sufficiently bright in work areas during the night, etc. We further advise hospitals to use the Hazard Risk Matrix to identify hospital workplaces at risk for violence,[60] to provide violence–related training for nurses and provide psychological support, to instruct all staff about the value of nurses, and to foster nurses' pride in their work and develop an excellent hospital culture. These measures are conducive to reducing the occurrence of hospital workplace violence.

Although different measurement tools for turnover intention were used in different studies, the average scores and percentages of perceived high turnover intention have been used as a reference for measuring potential turnover behavior.[61] The total mean score of overall perception of turnover intention is greater than 2 points, which means that the turnover intention of nurses is high. Based on this standard, 545 participants had a low turnover intention, but 1216 (69.1%) participants had a high turnover intention. Meanwhile, a total of 291 of the 1216 nurses (23.9%) with a higher turnover intention tended to want to leave more strongly (mean score of turnover intention > 3).The Chinese nurses intending to leave their current profession was higher than in Malaysia,[22] America,[25] Finland,[25] and Greece.[25] The reason for this phenomenon may be attributed to two aspects. On the one hand, nursing is a professional, intellectual and practical specialty. With the increase in social demand for nurses, nurses have certain advantages in obtaining employment. They can more readily find jobs, which increases the likelihood of nurses leaving their current jobs. On the other hand, the contradiction between the low social status of nurses and patient expectations is becoming a prominent problem in China's medical environment, which is leading to a crisis of confidence. It is worth noting that

historical reasons have led to low status and poor professional recognition of Chinese nurses. However, patients place high demands on the level of health services provided by nurses. This significant contrast between expectations and reality can easily lead to nurses' resignations. Based on the present study, more attention need to be paid to nurses in China to reduce their turnover intention.

In the univariate analysis, this study found that there were significant differences in self–ratings of job burnout and job satisfaction among nurses with different professional titles. Furthermore, the results also indicated that nurses with primary professional titles had higher job burnout and lower job satisfaction. This finding may be attributed to these nurses often having more direct contact with patients, a busier work schedule, and work pressure being greater than for nurses with other professional qualifications.

This study also found that burnout has a negative impact on the job satisfaction of nurses, which is consistent with previous studies.[26 31] The higher the level of burnout, the lower the job satisfaction of nurses. This may be related to the particularity of the nurses' profession, which requires nurses to have a keen sense of responsibility, high professional skills, carefulness and patience, and nurses work in stressful conditions for prolonged periods. Furthermore, a crisis of trust has emerged in China's medical environment, so nurses need to spend a lot of emotional labor in dealing with the relationship between nurses and patients. However, positive feedback is rarely received and patient mistrust often remains, resulting in a state of emotional exhaustion and reduced personal accomplishment, which then negatively affects the judgment of nurses concerning their work environment and conditions, reducing in turn the level of their job satisfaction. The SEM results clearly stated that organizational support serves as a moderator between job satisfaction and burnout. This means that organizational support (paying attention to employees' feelings and salary benefits) can relieve nurses' job burnout to some

extent and then improve their satisfaction with various systems and policies of the organization. As a reward for the organization, employees will also enhance their commitment and loyalty to the organization and will improve their efforts to work. To improve the job satisfaction of nurses, it is suggested that hospital managers provide organizational support for nurses from the following three aspects: first, strengthen communication, understand the needs of nurses, and take targeted organizational support measures so that nurses can really appreciate the hospitals' support; second, pay attention to the work of nurses, provide necessary work resources and condition support for them, pay attention to the problems faced by nurses and try their best to provide help to alleviate nurses' emotional exhaustion and reduce the degree of depersonalization; and finally, pay attention to the welfare of nurses, implement reasonable salaries and performance incentive system, pay attention to the interests of nurses in decision-making, and at the same time, pay attention to the professional development of nurses, and provide more development platforms for nurses so that they can find their own value and personal accomplishment in the process of career development.

Previous studies have mentioned a series of influencing factors regarding turnover intention in other countries or areas.[22-25] According to linear regression analysis, Block 1 showed that professional qualifications and employment form are two important demographic variables that affect nurses' turnover intention, which is different from the findings of Almalki *et al.*'s study.[62] The results of single factor analysis indicated that nurses with lower–level professional qualifications had a higher turnover intention, and full–time employed nurses had a lower turnover intention than temporarily employed nurses. This may be attributed to nurses with low professional qualifications being generally in first-line clinical work, facing a heavy workload and finding it difficult to cope with the patients or their relatives. They are confronted with an imbalance between pay and return, as well as social

ignorance of their role, which affects their work enthusiasm, and thereby increasing the possibility of leaving. In addition, the temporarily employed nurses' income is unstable and these nurses do not have a strong sense of belonging to the hospital, so a turnover intention possibility is stronger.

In the linear regression analysis, Block 2 showed that workplace violence has a significant effect on turnover intention, which was consistent with earlier findings.[31-35] Workplace violence is a particularly shocking event within our model. Workplace violence can provoke in nurses a sense of extreme insecurity and reduced self–value which may directly lead to turnover intention. SEM also stated clearly that perceived organizational support played a moderating role in the impact of workplace violence on turnover intention. Workplace violence not only causes physical and psychological harm to nurses but also aggravates nurses' stress and reluctance to work,[17] resulting in an increase in turnover intention. Hospitals can carry out a variety of amateur activities to reduce the work stress of nurses. The hospital can also set up a psychological decompression room, regularly conduct psychological counseling for nurses through a psychologist, and conduct emotional management well.[17] In brief, the more comprehensive the support provided by the organization, the less likely the nurses are to have bad emotions. Moreover, hospitals can provide diverse emotional support for nurses who have experienced different types of workplace violence so that they feel the concern of the hospital, reduce the harm to nurses.

Synthesizing the results of the linear regression analysis and SEM showed that perceived organizational support had a negative influence on turnover intention, that is, the higher the sense of organizational support, the lower the turnover intention. Organizational support explained 13% of the overall variance in turnover intention regarding the results of the linear regression. The results of the SEM also showed that organizational support has a direct or indirect effect on turnover intention. These

results suggested that organizational support makes the greatest contribution to the model of turnover intention. The psychological mechanism embodied in the perceived organizational support is the social exchange between employees and organizations.[63] From the view of social exchange, the exchange consciousness of employees concerning perceived organizational support depends entirely on the level of that organizational support. The fundamental reason employees are willing to stay in an organization is that they feel the contributions of employees to the organization are equal or fair in respect of what they receive in return from the relevant organization. As knowledge workers, nurses generally have higher achievement motivation, because they hope to achieve and get social recognition value. When a nurse thinks that hospitals and departments must pay attention to his or her contributions and are concerned about their personal interests and occupation development, this will reduce turnover intention and will lead to a higher organizational commitment and work ability. After workplace violence has occurred, hospitals need to provide care and support to nurses as far as possible to reduce the harm of violence inflicted on them, which, in turn, is likely to increase their emotional commitment to the hospital, and reduce the possibility of leaving. Therefore, the hospital should provide active support measures, including: giving respect, welfare support, and practical support; effectively conveying the support of upper management; ensuring a relationship of trust and support between employees and their immediate supervisors; emphasizing procedural justice in the organization; and creating a supportive organizational climate.[20] These measures are likely to encourage nurses to stay in their present position and improve their job satisfaction, thus reducing their turnover rate.[37 43]

The results of linear regression analysis also demonstrated that emotional exhaustion and depersonalization had a positive significant influence on turnover intention, and they explained 9% of the overall variance in turnover intention. In short, our findings showed that job burnout is positively

related to turnover intention, which is similar to previous results.[23 29 31 40] At present, there are various theories and models (for example, the conservation of resources theory,[64] the job demand-resource model,[65] and the effort-reward imbalance model[66]) which have been used to explain burnout. One aspect in common arising from these theories involves an employee's experiencing a sense of inconsistency in relation to what the job promises and what it delivers, which leads to job burnout. Clinical nurses often undertake overloaded work, and especially young nurses who have just started work, have relatively insufficient clinical technical ability and effective communication skills. When their behavior is different from the expectations of doctors/administrators/patients, the doctor/ manager's criticism and patient's dissatisfaction will reduce their work enthusiasm and easily lead to emotional exhaustion, and causing turnover intention.

Another noteworthy result of our study was that job satisfaction was found to be negatively related to turnover intention in the SEM, similar to previous results.[9 11 24 26] Therefore, hospitals should pay greater attention to the working conditions and health status of nurses and increase their job satisfaction and sense of organizational belonging to reduce their job burnout and turnover intention. A Pearson correlation analysis also showed that workplace violence was positively related to job burnout. Nurses often face shocking events, for example, workplace violence and organizational injustice, during their work, and negative attitudes, for example patient mistrust, which fosters job burnout, affecting their work enthusiasm and work quality, and increasing the possibility of leaving. [57-59]

The present study has several limitations. First, researchers collected data concerning whether nurses had experienced workplace violence in the last 12 months, so there may be recall bias in the results. Second, it was not known whether those returning incomplete questionnaires differed in any significant way from those who completed them. Third, purposive sampling results are greatly

influenced due to the preconceptions of researchers. To the extent that subjective judgment may be biased, this can readily lead to sampling bias and cannot provide complete confidence in the results of the overall investigation. Thus, the researchers involved clearly understand the basic characteristics of the population under investigation, so that the selected samples can be representative and typical.

CONCLUSIONS

Perceived organizational support served as a moderator between workplace violence, job satisfaction, burnout and turnover intention, and it has a significant negative impact on turnover intention. Therefore, nursing managers should understand the organization's support and establish a reasonable incentive system to decrease turnover intention.

Acknowledgments

The authors thank all the nurses, managers and Chinese Hospital Association for their assistance and support for this project.

Author Contributions

LF, TS and XN designed the study. WL, LS, ZZ, XL, XJ, and LL collected data. WL, SZ, LS, XD, GL, LL and FL analysed the data. WL, SZ and LS drafted the manuscript. WL, LF, TS and XN revised the manuscript.

Funding

This study was funded by the National Natural Science Foundation of China (NSFC), grant number 71473063.

Competing interests None declared.

Data sharing statement No additional data are available.

REFERENCES

1. Nardi DA, Gyurko CC. The Global Nursing Faculty Shortage: Status and Solutions for Change. *J Nurs Scholarship* 2013;45(3):317-26.
2. Sermeus W, Bruyneel L. Investing in Europe's health workforce of tomorrow: Scope for innovation and collaboration. Summary report of the three Policy Dialogues. European Observatory on Health Systems and Policies. *Effect of Growth Rate of Load on Strain Aging of Soft Soil in Marsh* 2010;1995-2001.
3. Auerbach D, Buerhaus P D. Better late than never: workforce supply implications of later entry into nursing. *Health Affairs* 2007;26(1):178-185.
4. National Health and Family Planning Commission of the People's Republic of China. National nursing development program (2016-2020). [internet] http://www.nhfpc.gov.cn/yzygj/s3593/201611/92b2e8f8cc644a899e9d0fd572aefef3. Shtml.
5. Xiaoyan W. Analysis of the situation of nursing human resources in public hospitals. *The World Clinical Medicine* 2016;10(4):247-248.
6. You LM, Ke YY, Zheng J, *et al*. The development and issues of nursing education in China: a national data analysis. *Nurse Educ Today* 2015;35(2):310-314.
7. Janiszewski GH. The nursing shortage in the United States of America: an integrative review of the literature. *J Adv Nurs* 2003;43(4):335-350.
8. Anderson DJ, Chan E, Dresner P, *et al*. Nursing and Midwifery Services Strategic Directions, 2011-2015. *World Health Organization* 2010.

9. Chao MC, Jou RC, Liao CC, *et al*. Workplace stress, job satisfaction, job performance, and turnover intention of health care workers in rural Taiwan. *Asia Pac J Public Health* 2015; 27:NP1827-NP1836.

10. March JG, Simon HA. *Organizations*. New York: Wiley, 1958.

11. Mobley WH, Griffeth RW, Hand HH, *et al*. Review and conceptual analysis of the employee turnover process. *Psychol Bull* 1979;86:493-522.

12. Bluedorn AC. A unified model of turnover from organizations. *Human Relations* 1982;35:135-53.

13. Sheridan JE, Abelson MA. Cusp catastrophe model of employee turnover. *Academy of Management Journal* 1983;26:418-36.

14. Lee TW, Mitchell TR. An alternative approach: the unfolding model of voluntary employee turnover. *Academy of Management Review* 1994;1:51-89.

15. Price JL. The development of a causal model of voluntary turnover. *Iowa State University Press: Ames* 2000.

16. Griffeth RW, Hom PW, Gaertner S. A meta-analysis of antecedents and correlates of employee turnover: update, moderator tests, and research implications for the next millennium. *Journal of Management* 2000;26(3):463-488.

17. Shi L, Zhang D, Zhou C, *et al*. A cross-sectional study on the prevalence and associated risk factors for workplace violence against Chinese nurses. *BMJ open* 2017;7(6):e013105.

18. Utriainen K, Kyngäs H. Hospital nurses' job satisfaction: a literature review. *J Nurs Manag* 2009;17:1002-1010.

19. Maslach C, Jackson SE. The measurement of experienced burnout. *Journal of Organizational*

Behavior 1981;2(2):99-113.

20. Rhoades L, Eisenberger R. Perceived organizational support: A review of the literature. *Journal of Applied Psychology* 2002;87(4):698-714.

21. Kim JK, Kim MJ. A Review of Research on Hospital Nurses' Turnover Intention. *Journal of Korean Academy of Nursing Administration* 2011;17(4):538.

22. Ramoo V, Abdullah KL, Piaw CY. The relationship between job satisfaction and intention to leave current employment among registered nurses in a teaching hospital. *J Clin Nurs* 2013; 22(21-22):3141-3152.

23. Yoon GS, Kim SY. Influences of Job Stress and Burnout on Turnover Intention of Nurses. *J Korean Acad Nurs Admin* 2010;16(4):507-516.

24. Coomber B, Barriball KL. Impact of job satisfaction components on intent to leave and turnover for hospital-based nurses:A review of the research literature. *Int J Nurs Stud* 2007;44(2):297-314.

25. Aiken LH, Sermeus W, Van den Heede K, *et al*. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ* 2012;344:e1717.

26. Li L, Hu H, Zhou H, *et al*. Work stress, work motivation and their effects on job satisfaction in community health workers: a cross-sectional survey in China. *BMJ Open* 2014;4(6):e004897.

27. Choi SH, Lee H. Workplace violence against nurses in Korea and its impact on professional quality of life and turnover intention. *J Nurs Manage* 2017;1-11.

28. Labrague LJ, Mcenro cc Etitte DM, Gloe D, *et al*. Organizational politics, nurses' stress, burnout levels, turnover intention and job satisfaction. *Int Nurs Rev* 2017;64(1):109.

29. Oyeleye O, Hanson P, O'Connor N, *et al*. Relationship of workplace incivility, stress, and

burnout on nurses' turnover intentions and psychological empowerment. *J Nurs Admin* 2013; 43(10):536-542.

30. Seo, Min S, Kim, *et al*. Effect of Workplace Bullying, Job Satisfaction and Self-Esteem on Turnover Intention in Clinical Nurses. *Journal of the Korean Society for Wellness* 2017;12(2):105-115.

31. Mcdowell SS. Client-Inflicted Workplace Violence, Burnout, Job Satisfaction, and Turnover Intention: A Comparative Analysis Between Institution-Based and Home-Based Direct Care Paraprofessionals. *Dissertations & Theses - Gradworks* 2015;208.

32. Olsen E, Bjaalid G, Mikkelsen A. Work climate and the mediating role of workplace bullying related to job performance, job satisfaction, and work ability: A study among hospital nurses. *J Adv Nurs* 2017.

33. Tarja H, Anne K, Marianna V, *et al*. The prospective effects of workplace violence on physicians' job satisfaction and turnover intentions: the buffering effect of job control. *BMC Health Serv Res* 2014;14(1):1-8.

34. Christensen MP. Relationships between workplace violence, burnout, and intent to leave in emergency department nurses. *Dissertations & Theses-Gradworks* 2014;21(21):984-90.

35. Kim JI, Kim TS. Violence episodes and turnover among clinical nurses. *Journal of Korean Academy of Nursing Administration* 2004;10(4):427-436.

36. Tnay E, Othman AEA, Siong HC, *et al*. The Influences of Job Satisfaction and Organizational Commitment on Turnover Intention. *Procedia Social and Behavioral Sciences* 2013;97(2):201-208.

37. Islam T, Latif I, Ali G. The relationship between perceived organizational support and turnover

intention: mediating role of affective commitment and job satisfaction. *Research Journal of Applied Sciences Engineering & Technology* 2014;8(24):2422-2425.

38. Samad S, Yasmin S, Yusuf M. The Role of Organizational Commitment in Mediating the Relationship between Job Satisfaction and Turnover Intention. *European Journal of Social Sciences* 2012;30(2):135-137.

39. Yücel I. Examining the Relationships among Job Satisfaction, Organizational Commitment, and Turnover Intention: An Empirical Study. *International Journal of Business & Management* 2012;7(20):1-15.

40. Shimizu T, Feng Q, Nagata S. Relationship between turnover and burnout among Japanese hospital nurses. *J Occup Health* 2005;47(4):334.

41. Abou Hashish E A. Relationship between ethical work climate and nurses' perception of organizational support, commitment, job satisfaction and turnover intent. *Nurs Ethics* 2015;1-16.

42. Dawley D, Houghton JD, Bucklew NS. Perceived organizational support and turnover intention: the mediating effects of personal sacrifice and job fit. *Journal of Social Psychology* 2010;150(3): 238-257.

43. Tumwesigye G. The relationship between perceived organizational support and turnover intentions in a developing country: The mediating role of organizational commitment. *African Journal of Business Management* 2010;4(6):942-952.

44. Zhang Y, Wu J, Fang Z, *et al*. Newly graduated nurses' intention to leave in their first year of practice in Shanghai: A longitudinal study. *Nurs Outlook* 2017;65(2):202-209.

45. Sun FF, Xu CP. Job stress and its relationship with quality of life and turnover intention of ICU nurses in general hospital. *Shandong University* 2016.

46. Lei W, Hong S, Xin G, *et al*. Correlation research between nurses' status of career planning and job satisfaction, turnover intention. *Chin J Mod Nurs* 2015;21(31):3721-3723.

47. Zhang HF, Liu YH, Yang Y, *et al*. The influencing factors of nurses' turnover tendency. *Chinese Journal of Nursing* 2015;50(2):155-160.

48. Hongmei YI, Lanxian YU, Tang J, *et al*. Relationship between psychological capital, work engagement and turnover intention among primary nurses in Traditional Chinese Medicine hospitals. *Chinese Nursing Management* 2015.

49. Li L, Ai H, Gao L, *et al*. Moderating effects of coping on work stress and job performance for nurses in tertiary hospitals: a cross-sectional survey in China. *BMC Health Serv Res* 2017; 17(1):401.

50. ILO/ICN/WHO/PSI. Framework Guidelines for Addressing Workplace Violence in the Health Sector. Geneva: ILO/ICN/WHO/PSI Joint Programme on Workplace Violence in the Health Sector; 2002.

51. Richardsen AM, Martinussen M. Factorial validity and consistency of the MBI-GS across occupational groups in Norway. *International Journal of Stress Management* 2005; 12(3):289-297.

52. Lin Y, Jing-Xiang MA, Chen WQ, *et al*. Relationship between Perception of Job Characteristics and Job Satisfaction of Pediatric Nurses. *Journal of Nursing* 2013.

53. Chen ZX, Aryee S, Lee C. Test of a mediation model of perceived organizational support. *Journal of Vocational Behavior* 2005;66(3):457-470.

54. Lee G, Lee D. A study on the relationships among role conflict, organizational commitment and intent to quit matrix organizational structure: using employees from industrial technology research institute as example. *Graduate School of management, National Chiao Tung University* 2000.

55. Li YX, Zhang K, Zhao GX. Confirmatory factor analysis of job burnout. *Psychological Exploration (in China)* 2005;4:70-74.

56. Li CP, Shi K. The influence of distributive justice and procedural justice on Job Burnout. *Acta Psychologica Sinica* 2003;35(5):677-684.

57. Hirschfeld RR. Does Revising the Intrinsic and Extrinsic Subscales of the Minnesota Satisfaction Questionnaire Short Form Make a Difference? *Educational & Psychological Measurement* 2000;60(60):255-270.

58. Tiruneh BT, Bifftu BB, Tumebo AA, *et al.* Prevalence of workplace violence in Northwest Ethiopia: a multivariate analysis. *BMC Nurs* 2016;15:1-6.

59. Franz S, Zeh A, Schablon A, *et al.* Aggression and violence against health care workers in Germany-a cross sectional retrospective survey. *BMC Health Serv Res* 2010;10:51.

60. Arnetz J, Hamblin L, Ager J, *et al*. Using the Hazard Risk Matrix to identify hospital workplaces at risk for violence. *Apha Meeting and Exposition* 2014;1276-1284.

61. Gu St, Huang QM, Chen ZHQ, *et al*. Relationship between job satisfaction and turnover intention among physicians from three grade hospitals. *Chinese Journal of Hospital Administration* 2006;9:586-589.

62. Almalki MJ, Gerry FG, Michele C. The relationship between quality of work life and turnover intention of primary health care nurses in Saudi Arabia. *BMC Health Serv Res* 2012;12(1):314.

63. Settoon RP, Bennett N, Liden RC. Social exchange in organizations: Perceived organizational support, leader-member exchange, and employee reciprocity. *Social Science Electronic Publishing* 2014;81(3):219-227.

64. Hobfoll SE. The influence of culture, community, and the nested-self in the stress process: Advancing Conservation of Resources theory. *Applied Psychology* 2001; 50(3):337-421.

65. Yom YH. Analysis of burnout and job satisfaction among nurses based on the Job Demand-Resource Model. *J Koren Acad Nurs* 2013;43(1):114-122.

66. Siegrist J, Starke D, Chandola T, *et al*. The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med* 2004;58(8):1483-1499.

FIGURE LEGEND: **Figure 1. The final model in this study. (CFI = 0.956, GFI = 0.924, IFI = 0.942, NFI=0.931, RMR = 0,050, RMSEA = 0.053, TLI = 0.926)**

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

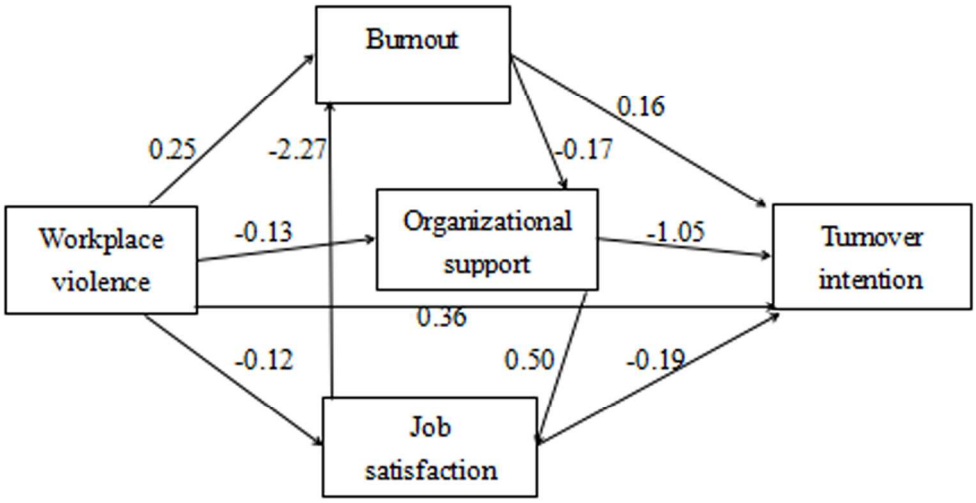

Figure 1. The final model in this study. (CFI = 0.956, GFI = 0.924, IFI = 0.942, NFI=0.931, RMR = 0,050, RMSEA = 0.053, TLI = 0.926)
Note: CFI, comparative fit index; GFI, goodness of fit index; IFI, incremental fit index; NFI, normed fit index; RMR, root mean square residual; RMSEA, root mean square error of approximation; TLI, Tucker–Lewis incremental fit.

117x61mm (300 x 300 DPI)

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Page 3, line 4-9
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	p.4, line 4-18
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	P. 5; p. 6; p. 7, line 4-49
Objectives	3	State specific objectives, including any prespecified hypotheses	P. 8, line15-33
Methods			
Study design	4	Present key elements of study design early in the paper	P. 8, line38-55;
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	P. 9, line 21-48
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	p.8, 40-56
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	P. 10, line 4-21
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	P. 10; p.11; p.12

Bias	9	Describe any efforts to address potential sources of bias	P.13, line13-18
Study size	10	Explain how the study size was arrived at	P. 9, line 48-56
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	p. 13, line24-26
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	P. 13, line13-55
		(*b*) Describe any methods used to examine subgroups and interactions	P. 13, line 16-19
		(*c*) Explain how missing data were addressed	P. 13, line 19-35
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	P. 13, line 4-16
		(*e*) Describe any sensitivity analyses	P. 13, line 36-40
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	P. 9,line 22-48;
		(b) Give reasons for non-participation at each stage	P. 9, line 39-48
		(c) Consider use of a flow diagram	No
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	P. 14,line 37-57; P. 15,line 2-36
		(b) Indicate number of participants with missing data for each variable of interest	P.9, line 36
Outcome data	15*	Report numbers of outcome events or summary measures	P. 15; P. 16; P. 17; P. 18;P. 19

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	P. 17, ;P. 18
		(*b*) Report category boundaries when continuous variables were categorized	P. 15, line 2-35
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	P. 19, p.21
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	P. 20, line 4-27;
Discussion			
Key results	18	Summarise key results with reference to study objectives	P. 21; p. 22; P. 23; p24; p25
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	P. 26, Line 36-53
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	P. 19, line 33-57; p.21; p. 22; P. 24, line4-22
Generalisability	21	Discuss the generalisability (external validity) of the study results	P. 23, line 29-42; P. 25, line 3-57;
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	P. 27, line 40-45

*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.

BMJ Open

Workplace violence, job satisfaction, burnout, perceived organizational support and their effects on turnover intention among Chinese nurses in tertiary hospitals: a cross-sectional study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-019525.R3
Article Type:	Research
Date Submitted by the Author:	13-Mar-2018
Complete List of Authors:	Liu, Wenhui; Harbin Medical University School of Public Health, Department of Health Management Zhao, Shihong; The Second Affiliated Hospital of Harbin Medical University, Department of Neurosurgery Shi, Lei; School of Public Health, Harbin Medical University, Department of Health Management Zhang, Zhong; School of Public Health, Harbin Medical University, Department of Medical Education Liu, Xinyan; Harbin Medical University, Department of Medical Education, School of Public Health Li, Li; School of Public Health, Harbin Medical University, Department of Health Management Duan, Xiaojian; School of Public Health, Harbin Medical University, Department of Health Management Li, Guoqiang; Harbin Medical University, Department of Health Management, School of Public Health Lou, Fengge; School of Public Health, Qiqihar Medical University, Department of Public Health Research Jia, Xiaoli; Chinese Hospital Association, Department of Autonomous Protection Fan, Lihua; Harbin Medical University, Department of Health Management , School of Public Health; School of Public Health, Harbin Medical University, Department of Medical Education Sun, Tao; Harbin Medical University School of Public Health, Ni, Xin; National Center for Children's Health, Beijing Children's Hospital affiliated to Capital Medical University , Department of the Hospital Director
Primary Subject Heading:	Health policy
Secondary Subject Heading:	Health policy, Health services research, Nursing, Medical management
Keywords:	Workplace violence, job satisfaction, burnout, organizational support, turnover intention, nurses

Workplace violence, job satisfaction, burnout, perceived organizational support and their effects on turnover intention among Chinese nurses in tertiary hospitals: a cross-sectional study

Wenhui Liu,[1*] Shihong Zhao,[1, 2*] Lei Shi,[1*] Zhong Zhang,[3] Xinyan Liu,[3] Li Li,[1] Xiaojian Duan,[1] Guoqiang Li,[1] Fengge Lou,[4] Xiaoli Jia,[5] Lihua Fan,[1, 3] Tao Sun, [1, 3] Xin Ni[6]

[*] WL, SZ and LS contributed equally to this work.

Correspondence to: Lihua Fan, School of Public Health, Harbin Medical University, No.157 Baojian Road, Nangang District, Harbin 150081, China; E-mail: lihuafan@126.com; Tao Sun, School of Public Health, Harbin Medical University, No.157 Baojian Road, Nangang District, Harbin 150081, China; E-mail: hydsuntao@126.com; Xin Ni, No.56 Nanlishi Road, Xicheng District, Beijing 100045, China; E-mail: nixin@bch.com.cn

[1] Department of Health Management, School of Public Health, Harbin Medical University, Harbin, Heilongjiang, China

[2] Department of Neurosurgery, The Second Affiliated Hospital of Harbin Medical University, Harbin, Heilongjiang, China

[3] Department of Medical Education, School of Public Health, Harbin Medical University, Harbin, Heilongjiang, China

[4] Department of Public Health Research, School of Public Health, Qiqihar Medical University, Qiqihar, Heilongjiang, China

[5] Department of Autonomous Protection, Chinese Hospital Association, Beijing, China

[6]Department of the Hospital Director, National Center for Children's Health, Beijing Children's Hospital affiliated to Capital Medical University, Beijing, China

Abstract

Objective

Our aim was to assess the relationship between workplace violence, job satisfaction, burnout, organizational support, and turnover intention, and explore factors associated with turnover intention among nurses in Chinese tertiary hospitals.

Methods

The purposive sampling method was used to collect data from August 2016 through January 2017. A total of 1761 nurses from 9 public tertiary hospitals in 4 provinces (municipalities) located in eastern (Beijing), central (Heilongjiang, Anhui), and western (Shaanxi) of China completed the questionnaires (effective response rate = 85.20%). A cross-sectional study was conducted using the Workplace Violence Scale, Chinese Maslach Burnout Inventory General Survey, Minnesota Job Satisfaction Questionnaire Revised Short Version, Perceived Organizational Support–Simplified Version Scale, and Turnover Intention Scale.

Results

A total of 1216 of 1706 (69.1%) participants had high turnover intention. During the previous 12 months, the prevalence of physical violence and psychological violence toward nurses was 9.60% and 59.64%, respectively. As expected, the level of turnover intention was negatively correlated with participants' scores on job satisfaction ($r= -0.367$, $P < 0.001$) and perceived organizational support ($r= -0.379$, $P < 0.001$), respectively. Burnout was positively associated with turnover intention ($r = 0.444$, $P < 0.001$). Workplace violence was positively associated with turnover intention ($\beta = 0.035$, $P < 0.001$) in linear regression analysis. The total effect ($\beta = 0.53$) of workplace violence on turnover intention comprised its direct effect ($\beta = 0.36$), and its indirect effect ($\beta = 0.17$).

Conclusions

Perceived organizational support served as a mediator between workplace violence, job satisfaction, burnout, and turnover intention, and it had a significant negative impact on turnover intention. Therefore, nursing managers should understand the importance of the organization's support and establish a reasonable incentive system to decrease turnover intention.

Strengths and limitations of this study

▪A variety of statistical methods (descriptive analysis, Pearson correlation analysis, linear regression analysis, and structural equation model) were employed to investigate the relationship between independent variables and turnover intention.

▪The benefits of using the both linear regression and structural equation model are the ability to understand the relationship between variables more clearly and intuitively and to better master the role of organizational support in the relationship between other variables and turnover intention.

▪ The retrospective approach to collecting data using self-reports of workplace violence might have led to recall and report bias.

▪The results of purposive sampling were greatly influenced due to the preconceptions of the researchers. Therefore, the researchers need to clearly understand the basic characteristics of the population under study.

INTRODUCTION

A nursing shortage is occurring worldwide and is arousing great concern.[1] The European Commission reported that 590,000 nurses would be shortage by the end of 2020.[2] In the United States, by the end of 2020, the nursing shortage will reach 340,000 nurses.[3] In 2001–2002, the results of the Health Resources Report for the Western Pacific Region concerning the present situation, shortages, and future trends within the world of nursing showed that the ratio of physicians to nurses in Hongkong, Japan, Thailand, Germany, and the United Kingdom was more than 1:4, and that the ratio of physicians to nurses in Finland, Norway, and Canada was over 1:6.[4] Without a doubt, an inadequate supply of nurses has been a long-existing problem in China. The most recognized cause of nursing shortage seems to be nurses leaves the nursing profession.[5-6] Many nurses tend to leave the nursing profession, and this is regarded as a global political concern.[7]

Turnover intention is defined as the possibility that employees will leave a job within a certain period.[8] The first study on turnover used the participant determination model proposed by March and Simon in 1958.[9] Following on from that study, standardized models, for example, the decision-making process model, the employee-withdrawal behavior model, and the intermediate chain extension model, have been constructed, using the peak mutation model, the unfolding model, and the loss motivation model.[10-14] Among these theoretical models and studies, turnover intention has been considered to be one of the best factors to predict turnover behavior, and has shown significant explanatory power.[15] Therefore, turnover intention has been the focus of this study.

Workplace violence can be divided into physical violence (including hitting, shooting, kicking, slapping, pushing, biting, pinching, wounding using sharp objects, and sexual assault and rape) and psychological violence (including verbal abuse, threats and sexual harassment).[16] Job satisfaction

represents the extent to which personnel's demands and desires are met within the workplace.[17] Burnout is a syndrome involving emotional exhaustion and depersonalization and one where personal accomplishments are reduced, resulting in continuous work stress that has not been effectively handled.[18] Perceived organizational support refers to the overall perception and beliefs of employees about how organizations view their contributions and care about their interests.[19]

In Kim's review, it was reported that the mean score for turnover intention among Korean nurses was between 2.40 and 3.85.[20] About 40% of the registered nurses in a teaching hospital in Malaysia were reported to have a turnover intention, and the results indicated that age, work experience, nursing education, and overall job satisfaction significantly influence an intention to leave.[21] A survey was conducted in 4 general hospitals in Seoul, and the findings showed that factors influencing turnover intention involve the organizational system, depersonalization, the physical environment, work role, and the organizational climate.[22] A review of the research literature revealed that factors related to the work environment were the most important in respect of nurses' turnover intentions.[23] A study has been conducted among nurses in 1,105 general acute care hospitals in Europe and the United States, and showed that the rates of nurse burnout ranged from 10% to 78%, with the job dissatisfaction rate ranging from 11% to 56% and the intention to leave rate ranging from 14% to 49%.[24]

However, turnover intention is usually affected through a variety of factors, for example, work stress,[8 25] workplace violence,[26] job satisfaction,[27] burnout,[27] perceived organizational support,[28] organizational commitment,[28] among others.

Workplace violence is a widely reported phenomenon among nurses in medical settings, and it influences the turnover intention of nurses.[29] A study indicated that turnover intention was positively associated with exposure types of violence.[26] McDowell found workplace violence to be significantly

related to burnout (r = 0.56, $P < 0.01$) and turnover intention (r = 0.24, $P < 0.01$) for all direct care paraprofessionals.[30] The previous results determined that a statistically significant relationship existed between turnover intention and workplace violence.[31 32] Therefore, workplace violence is one of the influential factors in turnover intention.[33 34]

Job satisfaction has been considered as a major contributory factor to intending to stay in a job, in previous studies.[23 25 35] In contrast to this viewpoint, previous studies have also shown that job satisfaction mainly affects turnover intention in respect of organizational commitment.[36 37] Furthermore, a third view has showed that two considerations, namely having demands and desires met and organizational commitment, exist simultaneously regarding job satisfaction and turnover intention.[38]

Moreover, substantial evidence has indicated that employees with high levels of burnout are more prone to turnover intention.[32 39] Some studies have reported that perceived organizational support is a predictor of turnover intention.[36 38 40 41] One study has indicated that perceived organizational support is negatively associated with turnover intention.[42]

In China, a study from Shanghai indicated that 22.5% of nurses expressed their intention to leave the emergency department within the following year.[43] The mean score for turnover intention of ICU nurses was between 1.95 and 2.92 in Shandong.[44] A survey of turnover intention among 10 tertiary hospitals' nurses in Beijing showed that 16.5% of nurses may leave the current work unit in the following year.[45] An investigation in Tianjin showed that work support had a negative influence on turnover intention.[46] Previous results reflected a significant correlation between psychological capital, work engagement, and turnover intention among primary nurses.[47] Substantial studies have mainly investigated the relationship among job stress, job satisfaction, job engagement, organizational support and turnover intention among Chinese nurses in one province.[5 44-48] Therefore, the researchers selected

nurses from tertiary hospitals in several provinces and further verified the relationship between workplace violence frequency and turnover intention in this study. The novelty of this study was the inclusion of organizational support and the use of both linear regression and the structural equation model (SEM).

Based on the above evidence, researchers proposed the present study with the following hypotheses: (1) workplace violence, job satisfaction, burnout and organizational support had different effects on turnover intention; (2) workplace violence had a significant impact on job satisfaction and burnout; (3) organizational support served as a moderator between workplace violence and turnover intention; and (4) organizational support served as a moderator between job satisfaction and burnout.

The present study aims to examine the relationship between workplace violence, job satisfaction, burnout, organizational support and turnover intention, and explore factors associated with turnover intention among nurses in Chinese tertiary hospitals.

METHODS

Participants and sampling

A cross–sectional study of nurses was conducted from August 2016 through January 2017 in eastern (Beijing), central (Heilongjiang, Anhui), and western (Shaanxi) of China. A total of nine public tertiary hospitals in four provinces (municipalities) were selected using a purposive sampling method. The total number of nurses in 9 hospitals (the hospitals were similar in size, department setting, and number of nurses) is about 18,900; a total of 2,067 samples were extracted , with these nurses accounting for 10.9% of the total nurses. On average, 225 nurses from each hospital were extracted (in the actual sampling process, the sample size of each hospital was slightly different, but it was roughly 225

people). All investigators were subject to unified training before starting the investigation and could act as investigators when qualified. Permission to conduct the study was acquired from the managers, and the medical dispute resolution and human resources departments of the hospitals concerned. An anonymous, self–administered questionnaire was used to conduct face–to–face surveys. Paper-and-pencil questionnaires were filled out by each participant. Investigators (who were not unit supervisors) conducted the surveys, and they were responsible for explaining the purpose of the study and reminding participants of the matters to pay attention to in filling out the questionnaire. The two public hospitals in Harbin (the Fourth Affiliated Hospital of Harbin Medical University and the principal hospital of Harbin) were selected as the locations for our pre–study before the formal investigation (200 questionnaires were distributed and returned, and these data were excluded in the formal survey data). The investigators and hospital coordinators distributed and took back the questionnaires immediately from the participants. A total of 2,067 questionnaires were distributed to nurses, all of which were returned. However, 306 questionnaires were missing data or blank, which left 1,761 valid questionnaires (effective response rate = 85.20%). The following conditions were selected as the inclusion criteria for this study: (1) having a practicing nurse certificate; (2) having at least one year of clinical nursing experience; (3) being still engaged in clinical nursing work during the investigation; and (4) voluntary participation without prejudice to the participants' work. The exclusion criteria for this study were rehire after retirement nurses, refresher nurses, and nurses who had not passed the probation period.

Questionnaire

Demographic characteristics

Demographic information on the nurses was collected, including sex, age, marital status, educational

background, professional qualifications, employment form, department, years of experience, and daily working hours. Age was categorized as ≤ 30, 31–50, and ≥ 51 years old. Marital status was categorized as married and single/divorced/widowed. Educational background was classified as junior college or below, undergraduate, and master's degree or above. Professional qualifications were categorized as primary title, intermediate title, and senior title. Employment form was categorized as long-term employee and temporary employee. Department was classified as emergency department, internal medicine, surgery, obstetrics and gynecology, pediatrics, and other. Work experience was divided into 4 categories: ≤ 4, 5–10, 11–20, and ≥ 21 years. Daily working time was categorized as ≤ 8, 8–10, 10–12, and ≥ 12 hours.

Workplace Violence Scale

The Workplace Violence Scale developed by the International Labour Office, the International Council of Nurses, the World Health Organization, and Public Services International Joint Program on Workplace Violence in the Health Sector in 2003 was used to measure workplace violence.[49] The scale used in this study consists of 2 dimensions (physical violence and psychological violence) and has 9 items that were adopted from these scales. Each item is scored on a 4–point scale reflecting respondents' frequency of exposure to workplace violence (0 = 0 times, 1 = 1 time, 2 = 2–3 times, and 3 = ≥ 4 times). The total possible score ranges from 0 to 27, with a higher total score indicating a higher frequency of exposure to workplace violence. In the present study, Cronbach's α for the Workplace Violence Scale was 0.860.

Burnout

Burnout was assessed using the Chinese Maslach Burnout Inventory General Survey (CMBI–GS) in the present study, with a total of 15 items, developed by Li YX, and proven to be vaild.[50-52] The

CMBI-GS is categorized into 3 subscales reflecting job burnout: emotional exhaustion, depersonalization, and reduced personal accomplishment. The response options for each item on the CMBI–GS are rated from 0 (never) to 6 (daily), based on the frequency of occurrence of the specific work feelings of the respondent. The score of the 3 subscales is equal to the average of the sum of items for each of the subscales. The total possible score is calculated through adding the scores for 3 subscales, and it ranges from 0 to 18 points, with a higher score indicating a higher level of burnout. In terms of the average score of all items, a score less than 8.5 points indicates lower job burnout, a score of 8.5–14.2 points indicates that burnout is serious, and burnout is extremely serious when the score is greater than 14.2 points. In this study, Cronbach's α for the CMBI–GS was 0.873. The internal consistency coefficients were 0.834, 0.826, 0.806, and 0.812, for emotional exhaustion, depersonalization, and reduced personal accomplishment, respectively.

Job satisfaction

The Minnesota Job Satisfaction Questionnaire Revised Short Version (MJSQ–RSV) was used in this study to assess participants' satisfaction with their job.[53 54] The MJSQ–RSV consists of 20 items, including 12 items measuring intrinsic satisfaction and 8 items measuring extrinsic satisfaction. Each item is rated on a 5–point Likert scale (1 = strongly unsatisfied, 2 = unsatisfied, 3 = uncertain, 4 = satisfied, and 5 = strongly satisfied). Intrinsic satisfaction refers to the degree of satisfaction with the factors involved in the job content. Extrinsic satisfaction refers to the degree of satisfaction of the individual in terms of current job rewards, promotion, and leadership style. The higher the participant's self–rating, the higher their satisfaction with the job. The present study revealed that Cronbach's α for the MJSQ–RSV was 0.882, and for the two subscales it was 0.872 (intrinsic satisfaction) and 0.896 (extrinsic satisfaction).

Perceived organizational support scale

Perceived organizational support was measured using the Perceived Organizational Support–Simplified Version Scale (POS–SVS). Previous studies have found the POS–SVS to have high reliability and validity as a measure of perceived organizational support.[36 41 55] It consists of nine self–report items, which comprise two reverse questions (even if employees try to do the best job they can, the work unit doesn not notice it; the work unit rarely cares about employees). The other 7 items mainly indicate that work unit cares about the well–being and job satisfaction of employees and pays attention to the work goals and values and employees' opinions; employees can get help when they encounter difficulties; and the unit will be proud of what employees have achieved. Each item is rated on a 5–point Likert scale, and ranged from 1 (extremely inconsistent) to 5 (extremely consistent). The total possible score is calculated through adding the scores for all items, and it ranges from 9 to 45 points, with a higher score indicating a higher organizational support. In this study, Cronbach's α for the POS–SVS was 0.890.

Turnover intention scale

The Turnover Intention Scale, which has been used to measure turnover intention among nurses was used in the present study. The turnover intention scale was developed by Lee and Lee,[56] and has been widely used in many studies.[8 45 46] This 6–item scale is divided into 3 dimensions: the possibility of an employee quitting his/her present job, the motivation for employees to find other jobs, and the possibility of employees having access to external work. Each item is scored on a 4–point scale reflecting participants' intention to leave (1 = never, 2 = seldom, 3 = occasionally, and 4 = often). The total possible score is counted through adding the scores for all items, and it ranges from 6 to 24 points, with a higher score indicating a stronger intention to leave. The extent of turnover intention is divided

into 4 levels according to the different total average score of turnover intention. A total average score ≤ 1 indicates that turnover intention is particularly low, less low when it is from 1 to 2, higher when it is from 2 to 3, and exceptionally high when it is greater than 3. In the present study, Cronbach's α for the Turnover Intention Scale was 0.862.

Data Analysis

EpiData version 3.1 was used to establish the study's database. Missing data or poor–quality questionnaires were eliminated. To ensure accuracy, two trained personnel entered the data after all the surveys were completed. IBM SPSS V.19.0 was used for the data analysis in this study. Descriptive statistics, including numbers (n), percentages (%), means, and standard deviations (SD) were calculated for the demographic variables. We used one-way analysis of variance (ANOVA) or independent sample t–tests to compare group differences concerning the measurements of the continuous variables. Pearson's correlations were used to examine correlations among the continuous variables. Linear regression analysis was used to examine the associations of the demographic variables and workplace violence, job satisfaction, burnout, perceived organizational support, and turnover intention variables. Statistics, including F values, R^2, R^2–changes (ΔR^2), standardized regression coefficients (β), and P–values for each step in the regression model were reported. All study variables were tested for multicollinearity. A P–value < 0.05 was considered statistically significant.

Path analysis was used to examine the relationship among the five variables, including workplace violence, job satisfaction, burnout, perceived organizational support, and turnover intention. A SEM for path analysis was constructed using the AMOS 17.0 program to analyze the effect of workplace violence on job satisfaction, burnout, perceived organizational support, and turnover intention. The model was considered to have a good fit when all path coefficients were significant at the level of 0.05;

χ^2/df, was below 5; the standardized root mean square residual (SRMR) was below 0.08; the root mean square error of approximation (RMSEA) was below 0.08; the root mean squareresidual (RMR)was below 0.10; as well as the goodness of fit index (GFI), the normed fit index (NFI), Tacker–Lewis incremental fit (TLI) and comparative fit index (CFI) being ≥ 0.90.

STROBE Statement

The STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines are followed in this study.

Patient and Public Involvement Statement

There are no patients or public participation in this study.

Ethical Considerations

Ethical approval to conduct this study was granted by the Research Ethics Committee of Harbin Medical University, and informed consent was obtained from each hospital and the nurses involved in the investigation. All participants gave their informed consent before the survey; they were assured that their personal information would be kept confidential.

RESULTS

Demographic Characteristics of the Participants

The demographic characteristics of the respondents are shown in Table 1.

Table 1. Demographic characteristics of participants (N=1761).

Demographic variables	n	%
Gender		
Male	60	3.4
Female	1701	96.6
Age group (years)		
≤ 30	899	51.1
31-50	793	45.0

≥ 51	69	3.9
Level of education		
Below undergraduate	715	40.6
Undergraduate	1020	57.9
Master's degree or above	26	1.5
Marital status		
Married	1128	64.1
Single/ divorced/ widowed	633	35.9
Professional qualifications		
Primary title	1161	65.9
Intermediate title	528	30.0
Senior title	72	4.1
Employment form		
Long-term employee	693	39.4
Temporary employee	1068	60.6
Department		
Emergency Department	299	17.0
Internal Medicine	559	31.7
Surgery	543	30.8
Obstetrics and Gynecology	93	5.3
Pediatrics	101	5.7
ENT*	82	4.7
Other	84	4.8
Years of experience		
≤4	529	30.0
5-10	619	35.2
11-20	346	19.6
≥21	267	15.2
Daily working hours		
≤ 8	113	6.4
8-10	1485	84.3
10-12	126	7.2
≥ 12	37	2.1

* ENT stand for eyes, nose, throat.

Prevalence of Workplace Violence in the Preceding 12 Months

During the previous 12 months, the prevalence of physical violence and psychological violence toward nurses was 9.60% (169/1761) and 59.64% (1111/1761), respectively. In the past year, respondents reported an exposure frequency of workplace violence at less than or equal to 3, accounting for 65.9% of all incidents. The respondents reported that the patients' relatives were the main perpetrators (71.2%,

n = 797), followed by the patients (25.4%, n = 284).

The Difference Between Participants' Characteristics and the Multiple Variables Score

Table 2 shows the descriptive association between respondents' characteristics and the burnout, job satisfaction, workplace violence, perceived organizational support, and turnover intention scores. There was a significant difference in the score of turnover intention among characteristics involving age group, educational level, different professional titles, employment form, department, years of experience and daily working hours for nurses in the tertiary hospitals.

Pearson correlations between different measurement variables

Table 3 shows the correlations among the respondents' turnover intention and scores on workplace violence, burnout, job satisfaction, and perceived organizational support. As expected, the level of turnover intention was positively correlated with respondents' scores on workplace violence ($r = 0.122$ $P < 0.001$). Burnout was positively associated with turnover intention ($r = 0.444$, $P < 0.001$). The level of turnover intention was negatively correlated with participants' scores on job satisfaction ($r= -0.367$, $P < 0.001$) and perceived organizational support ($r= -0.379$, $P < 0.001$), respectively.

Linear Regression Analysis and Path Analysis of Factors Related to Turnover Intention

The predicting factors of turnover intention are presented in Table 4. Demographic variables that were significantly related to turnover intention were used as control variables. Demographic variables alone explained less than 3% of the overall variance in turnover intention. As shown in Block 2, workplace violence was positively associated with turnover intention ($\beta = 0.034$, $P < 0.001$). It explained another 2% of the overall variance in turnover intention. In Block 3, with the addition of organizational support to the model, the explained variance jumped to 13%, meaning that it was this factor that explained most of the variance. Extrinsic satisfaction added another 3%, while emotional exhaustion and

Table 2. Burnout, job satisfaction, workplace violence, perceived organizational support and turnover intention according to general characteristics.

Characteristics	Burnout	Job satisfaction	Workplace violence	Perceived organizational support	Turnover intention
	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD
Gender					
Male	6.23 ± 3.34	3.54 ± 0.55	3.15 ± 3.92	3.27 ± 0.57	2.30 ± 0.71
Female	6.53 ± 3.08	3.52 ± 0.54	2.11 ± 2.60	3.10 ± 0.64	2.40 ± 0.60
F/t	-0.757	0.256	8.931**	1.991*	-1.263
Age group (years)					
≤ 30	6.58 ± 3.03	3.54 ± 0.54	1.81 ± 2.38	3.13 ± 0.64	2.44 ± 0.61
31-50	6.53 ± 3.16	3.50 ± 0.55	2.36 ± 2.73	3.07 ± 0.65	2.39 ± 0.60
≥ 51	5.80 ± 3.07	3.55 ± 0.52	3.97 ± 4.09	3.14 ± 0.57	2.04 ± 0.56
F/t	2.040	1.672	26.537**	1.986	14.144**
Level of education					
Below undergraduate	6.62 ± 3.01	3.52 ± 0.54	1.96 ± 2.45	3.11 ± 0.61	2.38 ± 0.63
Undergraduate	6.48 ± 3.13	3.53 ± 0.55	2.26 ± 2.77	3.10 ± 0.65	2.42 ± 0.58
Master's degree or above	5.54 ± 3.40	3.58 ± 0.54	2.58 ± 3.76	3.27 ± 0.78	2.08 ± 0.61
F/t	1.737	0.202	3.161*	0.888	4.468*
Marital status					
Married	6.45 ± 3.12	3.52 ± 0.54	2.25 ± 2.69	3.10 ± 0.65	2.38 ± 0.60
Single/ divorced/ widowed	6.65 ± 3.03	3.53 ± 0.56	1.96 ± 2.61	3.12 ± 0.63	2.43 ± 0.61
F/t	-1.304	-0.203	4.789*	-0.843	-1.658
Professional title					
Primary title	6.67 ± 3.04	3.53 ± 0.54	1.90 ± 2.38	3.11 ± 0.65	2.45 ± 0.60
Intermediate title	6.42 ± 3.17	3.49 ± 0.56	2.57 ± 3.05	3.07 ± 0.62	2.31 ± 0.61
Senior title	4.87 ± 2.77	3.70 ± 0.50	2.86 ± 3.34	3.25 ± 0.68	2.17 ± 0.59
F/t	12.077**	4.781**	14.412**	2.735	15.543**

Employment form					
Long-term employee	6.71 ± 3.30	3.48 ± 0.57	2.46 ± 2.80	3.05 ± 0.65	2.32 ± 0.60
Temporary employee	6.40 ± 2.94	3.55 ± 0.52	1.93 ± 2.55	3.14 ± 0.63	2.45 ± 0.61
F/t	2.025*	-2.460*	16.717**	-2.779**	-4.377**
Department					
Emergency Department	6.51 ± 3.21	3.51 ± 0.60		3.12 ± 0.70	2.37 ± 0.63
Internal Medicine	6.40 ± 3.06	3.55 ± 0.55	1.90 ± 2.38	3.15 ± 0.64	2.38 ± 0.60
Surgery	6.73 ± 3.05	3.50 ± 0.54	2.00 ± 2.47	3.05 ± 0.63	2.45 ± 0.59
Obstetrics and Gynecology	6.19 ± 2.71	3.54 ± 0.50	2.65 ± 3.31	3.13 ± 0.58	2.44 ± 0.56
Pediatrics	7.09 ± 3.23	3.47 ± 0.51	2.40 ± 2.76	3.08 ± 0.64	2.35 ± 0,67
ENT	5.87 ± 3.20	3.56 ± 0.48	1.74 ± 2.31	3.12 ± 0.62	2.25 ± 0.54
Other	6.36 ± 3.13	3.55 ± 0.55	2.58 ± 3.29	3.11 ± 0.57	2.32 ± 0.66
F/t	1.938	0.639	3.905*	1.211	2.234*
Years of experience					
≤4	6.26 ± 2.78	3.60 ± 0.51	1.70 ± 2.56	3.21 ± 0.58	2.37 ± 0.57
5-10	6.88 ± 3.18	3.49 ± 0.55	2.22 ± 2.65	3.06 ± 0.67	2.49 ± 0.63
11-20	6.75 ± 3.10	3.45 ± 0.58	2.28 ± 2.54	3.04 ± 0.67	2.46 ± 0.59
≥21	5.94 ± 3.33	3.53 ± 0.53	2.66 ± 2.92	3.08 ± 0.65	2.18 ± 0.58
F/t	7.859**	6.249**	8.745**	6.690**	18.233**
Daily working hours					
≤ 8	6.08 ± 3.01	3.65 ± 0.51	2.20 ± 2.96	3.25 ± 0.69	2.24 ± 0.59
8-10	6.53 ± 3.09	3.52 ± 0.55	2.09 ± 2.55	3.10 ± 0.64	2.41 ± 0.60
10-12	6.73 ± 2.95	3.45 ± 0.49	2.06 ± 2.78	3.05 ± 0.57	2.42 ± 0.64
≥ 12	7.11 ± 3.71	3.49 ± 0.58	4.14 ± 4.58	3.10 ± 0.62	2.37 ± 0.68
F/t	1.415	3.096*	7.195**	2.229	2.826*

* P < 0.05, ** P<0.01

Table 3. Pearson correlations among workplace violence, burnout, job satisfaction, perceived organizational support and turnover intention.

Variables	1	2	3	4	5	6	7	8	9	10
1. Turnover intention	1									
2. Workplace violence	0.122**	1								
3. Burnout	0.444**	0.206**	1							
4. Emotional exhaustion	0.418**	0.213**	0.792**	1						
5. Depersonalization	0.460**	0.220**	0.846**	0.754**	1					
6. Reduced Personal Accomplishment	0.102**	0.025	0.545**	0.017	0.116**	1				
7. Perceived organizational support	-0.379**	-0.172**	-0.527**	-0.445**	-0.495**	-0.216**	1			
8. Job satisfaction	-0.367**	-0.188**	-0.562**	-0.478**	-0.524**	-0.231**	0.675**	1		
9. Intrinsic satisfaction	-0.330**	-0.171**	-0.532**	-0.441**	-0.493**	-0.232*	0.626**	0.946**	1	
10. Extrinsic satisfaction	-0.390**	-0.176**	-0.505**	-0.456**	-0.476**	-0.178**	0.673**	0.900**	0.795**	1

* P<0.05, ** P<0.01

Table 4. Predicting factors of turnover intention.

Variables	Block 1 (β)	Block 2 (β)	Block 3 (β)	Block 4 (β)	Block 5 (β)
Age group	-0.055	-0.076*	-0.055	-0.055	-0.051
Level of education	0.028	0.022	0.028	0.025	0.026
Professional qualifications	0.120**	0.128**	0.098**	0.095**	0.044
Employment form	0.081*	0.087*	0.108**	0.098**	0.146**
Department	0.008	0.011	0.010	0.011	0.007
Years of experience	0.034	0.038	0.014	0.006	0.001
Daily working hours	0.056	0.046	0.030	0.012	0.009
Workplace violence		0.034**	0.019**	0.016**	0.005
Organizational support			-0.039**	-0.022**	-0.012**
Intrinsic satisfaction				0.001	0.008*
Extrinsic satisfaction				-0.037**	-0.030**
Emotional exhaustion					0.051**
Depersonalization					0.113**
Reduced Personal Accomplishment					0.004
F	6.374**	10.553**	41.686**	41.863**	51.582**
R^2	0.025	0.046	0.176	0.208	0.293
ΔR^2	0.025**	0.021**	0.130**	0.032**	0.085**

* P<0.05, ** P<0.01

depersonalization contributed nearly 9%. Furthermore, it should be noted that professional qualifications were significant in every step except in the final step, when burnout was added to the model. It was interesting that employment form was significant throughout.

Path analysis using the SEM was performed, which is shown in Figure 1. workplace violence had a negative effect on job satisfaction, which was mediated through perceived organizational support. The total effect (β = −0.19) of workplace violence on job satisfaction was comprised of not only its direct effect (β = −0.12), but also its indirect effect (β = −0.07 = -0.13×0.50), mediated through perceived organizational support. The total effect (β = 0.53) of workplace violence on turnover intention comprised its direct effect (β = 0.36), and its indirect effect (β = 0.17=(-0.12) × 0.19 + (-0.13)× (-1.05) + 0.25 × (-0.17) × (-1.05) + (-0.13) × 0.50 × (-0.19)). Job satisfaction was negatively associated with burnout. On the other hand, job burnout was positively related to turnover intention.

The squared multiple correlations value was 0.432, which implies that the built SEM explained 43.2% of the total variance of turnover intention.

DISCUSSION

Although different measurement tools for turnover intention were used in different studies, the average scores and percentages of perceived high turnover intention have been used as a reference for measuring potential turnover behavior.[57] The total mean score of overall perception of turnover intention is greater than 2 points, which means that the turnover intention of nurses is high. Based on this standard, 545 participants had a low turnover intention, but 1216 (69.1%) participants had a high turnover intention. Meanwhile, a total of 291 of the 1216 nurses (23.9%) with a higher turnover intention tended to want to leave more strongly (mean score of turnover intention > 3). The Chinese nurses intending to leave their current profession was higher than in Malaysia,[21] America,[24] Finland,[24] and Greece.[24] The reason for this phenomenon may be attributed to two aspects. On the one hand, nursing is a professional, intellectual and practical specialty. With the increase in social demand for nurses, nurses have certain advantages in obtaining employment. They can more readily find jobs, which increases the likelihood of nurses leaving their current jobs. On the other hand, the contradiction between the low social status of nurses and patient expectations is becoming a prominent problem in China's medical environment, which is leading to a crisis of confidence. It is worth noting that historical reasons have led to low status and poor professional recognition of Chinese nurses. However, patients place high demands on the level of health services provided by nurses. This significant contrast between expectations and reality can easily lead to nurses' resignations. Based on the present study, more attention need to be paid to nurses in China to reduce their turnover intention.

According to linear regression analysis, Block 1 showed that professional qualifications and employment form are two important demographic variables that affect nurses' turnover intention, which is different from the findings of Almalki *et al.*'s study.[58] The results of single factor analysis indicated that nurses with lower–level professional qualifications had a higher turnover intention, and full–time employed nurses had a lower turnover intention than temporarily employed nurses. This may be attributed to nurses with low professional qualifications being generally in first-line clinical work, facing a heavy workload and finding it difficult to cope with the patients or their relatives. They are confronted with an imbalance between pay and return, as well as social ignorance of their role, which affects their work enthusiasm, and thereby increasing the possibility of leaving. In addition, the temporarily employed nurses' income is unstable and these nurses do not have a strong sense of belonging to the hospital, so a turnover intention possibility is stronger.

In the linear regression analysis, Block 2 showed that workplace violence is one of the significant predictors of turnover intention, which was consistent with earlier findings.[30-34] Workplace violence is a particularly shocking event within our model. Workplace violence not only causes physical and psychological harm to nurses[59] but also aggravates nurses' stress and reluctance to work,[16] resulting in an increase in turnover intention. Meanwhile, workplace violence can provoke in nurses a sense of extreme insecurity and reduced self–value which may directly lead to turnover intention. The results of linear regression analysis also demonstrated that emotional exhaustion and depersonalization had a positive significant influence on turnover intention, and they explained 9% of the overall variance in turnover intention. In short, our findings showed that job burnout is positively related to turnover intention, which is similar to previous results.[21 27 29 38] Clinical nurses often undertake overloaded work, and especially young nurses who have just started work, have relatively insufficient clinical technical

ability and effective communication skills. When their behavior is different from the expectations of doctors/administrators/patients, the doctor/ manager's criticism and patient's dissatisfaction will reduce their work enthusiasm and easily lead to emotional exhaustion, and causing turnover intention. Another noteworthy result of our study was that job satisfaction was found to be negatively related to turnover intention in the SEM and Pearson correlation analysis, similar to previous results.[8 10 23 25] Therefore, hospitals should pay greater attention to the working conditions and health status of nurses and increase their job satisfaction and sense of organizational belonging to reduce their turnover intention.

Organizational support explained 13% of the overall variance in turnover intention regarding the results of the linear regression, and it was the most significant predictor of turnover intention. The results of the SEM also showed that organizational support has a direct or indirect effect on turnover intention. These results suggested that organizational support makes the greatest contribution to the model of turnover intention, which were similar to previous findings.[36 37] The psychological mechanism embodied in the perceived organizational support is the social exchange between employees and organizations.[60] From the view of social exchange, the exchange consciousness of employees concerning perceived organizational support depends entirely on the level of that organizational support. The fundamental reason employees are willing to stay in an organization is that they feel the contributions of employees to the organization are equal or fair in respect of what they receive in return from the relevant organization. As knowledge workers, nurses generally have higher achievement motivation, because they hope to achieve and get social recognition value. When a nurse thinks that hospitals and departments must pay attention to his or her contributions and are concerned about their personal interests and occupation development, this will reduce turnover intention and will lead to a higher organizational commitment and work ability.

Synthesizing the results of the linear regression analysis and SEM showed that perceived organizational support played a mediating role in the relationships between workplace violence, burnout, and job satisfaction on turnover intention. This result is a flash point in our study. After workplace violence has occurred, hospitals need to provide care and support to nurses as far as possible to reduce the harm of violence inflicted on them, which, in turn, is likely to increase their emotional commitment to the hospital, and reduce the possibility of leaving. The hospital can set up a psychological decompression room, regularly conduct psychological counseling for nurses through a psychologist, and conduct emotional management well.[16] Hospitals can also provide a series of organizational support to reduce effect of low job satisfaction and high burnout of nurses on the turnover intention. First, strengthen communication, understand the needs of nurses, and take targeted organizational support measures so that nurses can really appreciate the hospitals' support; second, pay attention to the work of nurses, provide necessary work resources and condition support for them, pay attention to the problems faced by nurses and try their best to provide help to alleviate nurses' emotional exhaustion and reduce the degree of depersonalization; and finally, pay attention to the welfare of nurses, implement reasonable salaries and performance incentive system, pay attention to the interests of nurses in decision-making, and at the same time, pay attention to the professional development of nurses, and provide more development platforms for nurses so that they can find their own value and personal accomplishment in the process of career development. In brief, the more comprehensive the support provided by the organization, the less likely the nurses are to have bad emotions.

In conclusion, the hospital should provide active support measures, including: giving respect, welfare support, and practical support; effectively conveying the support of upper management;

ensuring a relationship of trust and support between employees and their immediate supervisors; emphasizing procedural justice in the organization; and creating a supportive organizational climate.[19] These measures are likely to encourage nurses to stay in their present position, and improve their job satisfaction and reduce their job burnout, thus reducing their turnover rate.[36 42]

The SEM results also clearly stated that organizational support serves as a mediator between job satisfaction and burnout. This means that organizational support (paying attention to nurses' feelings and salary benefits) can relieve nurses' job burnout to some extent and then improve their satisfaction with various systems and policies of the organization. As a reward for the organization, nurses will also enhance their commitment and loyalty to the organization and will improve their efforts to work.

The present study has several limitations. First, researchers collected data concerning whether nurses had experienced workplace violence in the last 12 months, so there may be recall bias in the results. Second, it was not known whether those returning incomplete questionnaires differed in any significant way from those who completed them. Third, purposive sampling results are greatly influenced due to the preconceptions of researchers. To the extent that subjective judgment may be biased, this can readily lead to sampling bias and cannot provide complete confidence in the results of the overall investigation. Thus, the researchers involved clearly understand the basic characteristics of the population under investigation, so that the selected samples can be representative and typical.

CONCLUSIONS

Perceived organizational support served as a mediator between workplace violence, job satisfaction, burnout and turnover intention, and it has a significant negative impact on turnover intention. Therefore, nursing managers should understand the organization's support and establish a reasonable incentive

system to decrease turnover intention.

Acknowledgments

The authors thank all the nurses, managers and Chinese Hospital Association for their assistance and support for this project.

Author Contributions

LF, TS and XN designed the study. WL, LS, ZZ, XL, XJ, and LL collected data. WL, SZ, LS, XD, GL, LL and FL analysed the data. WL, SZ and LS drafted the manuscript. WL, LF, TS and XN revised the manuscript.

Funding

This study was funded by the National Natural Science Foundation of China (NSFC), grant number 71473063.

Competing interests None declared.

Data sharing statement No additional data are available.

REFERENCES

1. Nardi DA, Gyurko CC. The Global Nursing Faculty Shortage: Status and Solutions for Change. *J Nurs Scholarship* 2013;45(3):317-26.
2. Sermeus W, Bruyneel L. Investing in Europe's health workforce of tomorrow: Scope for innovation and collaboration. Summary report of the three Policy Dialogues. European Observatory on Health Systems and Policies. *Effect of Growth Rate of Load on Strain Aging of Soft Soil in Marsh* 2010;1995-2001.

3. Auerbach D, Buerhaus P D. Better late than never: workforce supply implications of later entry into nursing. *Health Affairs* 2007;26(1):178-185.

4. Xiaoyan W. Analysis of the situation of nursing human resources in public hospitals. *The World Clinical Medicine* 2016;10(4):247-248.

5. You LM, Ke YY, Zheng J, *et al*. The development and issues of nursing education in China: a national data analysis. *Nurse Educ Today* 2015;35(2):310-314.

6. Janiszewski GH. The nursing shortage in the United States of America: an integrative review of the literature. *J Adv Nurs* 2003;43(4):335-350.

7. Anderson DJ, Chan E, Dresner P, *et al*. Nursing and Midwifery Services Strategic Directions, 2011-2015. *World Health Organization* 2010.

8. Chao MC, Jou RC, Liao CC, *et al*. Workplace stress, job satisfaction, job performance, and turnover intention of health care workers in rural Taiwan. *Asia Pac J Public Health* 2015; 27:NP1827-NP1836.

9. March JG, Simon HA. *Organizations*. New York: Wiley, 1958.

10. Mobley WH, Griffeth RW, Hand HH, *et al*. Review and conceptual analysis of the employee turnover process. *Psychol Bull* 1979;86:493-522.

11. Bluedorn AC. A unified model of turnover from organizations. *Human Relations* 1982;35:135-53.

12. Sheridan JE, Abelson MA. Cusp catastrophe model of employee turnover. *Academy of Management Journal* 1983;26:418-36.

13. Lee TW, Mitchell TR. An alternative approach: the unfolding model of voluntary employee turnover. *Academy of Management Review* 1994;1:51-89.

14. Price JL. The development of a causal model of voluntary turnover. *Iowa State University Press: Ames* 2000.

15. Griffeth RW, Hom PW, Gaertner S. A meta-analysis of antecedents and correlates of employee turnover: update, moderator tests, and research implications for the next millennium. *Journal of Management* 2000;26(3):463-488.

16. Shi L, Zhang D, Zhou C, *et al*. A cross-sectional study on the prevalence and associated risk factors for workplace violence against Chinese nurses. *BMJ open* 2017;7(6):e013105.

17. Utriainen K, Kyngäs H. Hospital nurses' job satisfaction: a literature review. *J Nurs Manag* 2009;17:1002-1010.

18. Maslach C, Jackson SE. The measurement of experienced burnout. *Journal of Organizational Behavior* 1981;2(2):99-113.

19. Rhoades L, Eisenberger R. Perceived organizational support: A review of the literature. *Journal of Applied Psychology* 2002;87(4):698-714.

20. Kim JK, Kim MJ. A Review of Research on Hospital Nurses' Turnover Intention. *Journal of Korean Academy of Nursing Administration* 2011;17(4):538.

21. Ramoo V, Abdullah KL, Piaw CY. The relationship between job satisfaction and intention to leave current employment among registered nurses in a teaching hospital. *J Clin Nurs* 2013; 22(21-22):3141-3152.

22. Yoon GS, Kim SY. Influences of Job Stress and Burnout on Turnover Intention of Nurses. *J Korean Acad Nurs Admin* 2010;16(4):507-516.

23. Coomber B, Barriball KL. Impact of job satisfaction components on intent to leave and turnover for hospital-based nurses:A review of the research literature. *Int J Nurs Stud* 2007;44(2):297-314.

24. Aiken LH, Sermeus W, Van den Heede K, *et al*. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ* 2012;344:e1717.

25. Li L, Hu H, Zhou H, *et al*. Work stress, work motivation and their effects on job satisfaction in community health workers: a cross-sectional survey in China. *BMJ Open* 2014;4(6):e004897.

26. Choi SH, Lee H. Workplace violence against nurses in Korea and its impact on professional quality of life and turnover intention. *J Nurs Manage* 2017;1-11.

27. Labrague LJ, Mcenro cc Etitte DM, Gloe D, *et al*. Organizational politics, nurses' stress, burnout levels, turnover intention and job satisfaction. *Int Nurs Rev* 2017;64(1):109.

28. Oyeleye O, Hanson P, O'Connor N, *et al*. Relationship of workplace incivility, stress, and burnout on nurses' turnover intentions and psychological empowerment. *J Nurs Admin* 2013; 43(10):536-542.

29. Seo, Min S, Kim, *et al*. Effect of Workplace Bullying, Job Satisfaction and Self-Esteem on Turnover Intention in Clinical Nurses. *Journal of the Korean Society for Wellness* 2017;12(2):105-115.

30. Mcdowell SS. Client-Inflicted Workplace Violence, Burnout, Job Satisfaction, and Turnover Intention: A Comparative Analysis Between Institution-Based and Home-Based Direct Care Paraprofessionals. *Dissertations & Theses - Gradworks* 2015;208.

31. Olsen E, Bjaalid G, Mikkelsen A. Work climate and the mediating role of workplace bullying related to job performance, job satisfaction, and work ability: A study among hospital nurses. *J Adv Nurs* 2017.

32. Tarja H, Anne K, Marianna V, *et al*. The prospective effects of workplace violence on physicians'

job satisfaction and turnover intentions: the buffering effect of job control. *BMC Health Serv Res* 2014;14(1):1-8.

33. Christensen MP. Relationships between workplace violence, burnout, and intent to leave in emergency department nurses. *Dissertations & Theses-Gradworks* 2014;21(21):984-90.

34. Kim JI, Kim TS. Violence episodes and turnover among clinical nurses. *Journal of Korean Academy of Nursing Administration* 2004;10(4):427-436.

35. Tnay E, Othman AEA, Siong HC, *et al*. The Influences of Job Satisfaction and Organizational Commitment on Turnover Intention. *Procedia Social and Behavioral Sciences* 2013;97(2):201-208.

36. Islam T, Latif I, Ali G. The relationship between perceived organizational support and turnover intention: mediating role of affective commitment and job satisfaction. *Research Journal of Applied Sciences Engineering & Technology* 2014;8(24):2422-2425.

37. Samad S, Yasmin S, Yusuf M. The Role of Organizational Commitment in Mediating the Relationship between Job Satisfaction and Turnover Intention. *European Journal of Social Sciences* 2012;30(2):135-137.

38. Yücel I. Examining the Relationships among Job Satisfaction, Organizational Commitment, and Turnover Intention: An Empirical Study. *International Journal of Business & Management* 2012;7(20):1-15.

39. Shimizu T, Feng Q, Nagata S. Relationship between turnover and burnout among Japanese hospital nurses. *J Occup Health* 2005;47(4):334.

40. Abou Hashish E A. Relationship between ethical work climate and nurses' perception of

organizational support, commitment, job satisfaction and turnover intent. *Nurs Ethics* 2015;1-16.

41. Dawley D, Houghton JD, Bucklew NS. Perceived organizational support and turnover intention: the mediating effects of personal sacrifice and job fit. *Journal of Social Psychology* 2010;150(3): 238-257.

42. Tumwesigye G. The relationship between perceived organizational support and turnover intentions in a developing country: The mediating role of organizational commitment. *African Journal of Business Management* 2010;4(6):942-952.

43. Zhang Y, Wu J, Fang Z, *et al*. Newly graduated nurses' intention to leave in their first year of practice in Shanghai: A longitudinal study. *Nurs Outlook* 2017;65(2):202-209.

44. Sun FF, Xu CP. Job stress and its relationship with quality of life and turnover intention of ICU nurses in general hospital. *Shandong University* 2016.

45. Lei W, Hong S, Xin G, *et al*. Correlation research between nurses' status of career planning and job satisfaction, turnover intention. *Chin J Mod Nurs* 2015;21(31):3721-3723.

46. Zhang HF, Liu YH, Yang Y, *et al*. The influencing factors of nurses' turnover tendency. *Chinese Journal of Nursing* 2015;50(2):155-160.

47. Hongmei YI, Lanxian YU, Tang J, *et al*. Relationship between psychological capital, work engagement and turnover intention among primary nurses in Traditional Chinese Medicine hospitals. *Chinese Nursing Management* 2015.

48. Li L, Ai H, Gao L, *et al*. Moderating effects of coping on work stress and job performance for nurses in tertiary hospitals: a cross-sectional survey in China. *BMC Health Serv Res* 2017; 17(1):401.

49. ILO/ICN/WHO/PSI. Framework Guidelines for Addressing Workplace Violence in the Health Sector. Geneva: ILO/ICN/WHO/PSI Joint Programme on Workplace Violence in the Health Sector; 2002.

50. Richardsen AM, Martinussen M. Factorial validity and consistency of the MBI-GS across occupational groups in Norway. *International Journal of Stress Management* 2005; 12(3):289-297.

51. Li YX, Zhang K, Zhao GX. Confirmatory factor analysis of job burnout. *Psychological Exploration (in China)* 2005;4:70-74.

52. Li CP, Shi K. The influence of distributive justice and procedural justice on Job Burnout. *Acta Psychologica Sinica* 2003;35(5):677-684.

53. Lin Y, Jing-Xiang MA, Chen WQ, *et al*. Relationship between Perception of Job Characteristics and Job Satisfaction of Pediatric Nurses. *Journal of Nursing* 2013.

54. Hirschfeld RR. Does Revising the Intrinsic and Extrinsic Subscales of the Minnesota Satisfaction Questionnaire Short Form Make a Difference? *Educational & Psychological Measurement* 2000;60(60):255-270.

55. Chen ZX, Aryee S, Lee C. Test of a mediation model of perceived organizational support. *Journal of Vocational Behavior* 2005;66(3):457-470.

56. Lee G, Lee D. A study on the relationships among role conflict, organizational commitment and intent to quit matrix organizational structure: using employees from industrial technology research institute as example. *Graduate School of management, National Chiao Tung University* 2000.

57. Gu St, Huang QM, Chen ZHQ, *et al*. Relationship between job satisfaction and turnover

intention among physicians from three grade hospitals. *Chinese Journal of Hospital Administration* 2006;9:586-589.

58. Almalki MJ, Gerry FG, Michele C. The relationship between quality of work life and turnover intention of primary health care nurses in Saudi Arabia. *BMC Health Serv Res* 2012;12(1):314.

59. Shi L, Wang L, Jia X, *et al*. Prevalence and correlates of symptoms of post-traumatic stress disorder among Chinese healthcare workers exposed to physical violence: a cross-sectional study. *BMJ Open* 2017; 7(7):e016810.

60. Settoon RP, Bennett N, Liden RC. Social exchange in organizations: Perceived organizational support, leader-member exchange, and employee reciprocity. *Social Science Electronic Publishing* 2014;81(3):219-227.

FIGURE LEGEND: **Figure 1. The final model in this study. (CFI = 0.956, GFI = 0.924, IFI = 0.942, NFI=0.931, RMR = 0,050, RMSEA = 0.053, TLI = 0.926)**

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

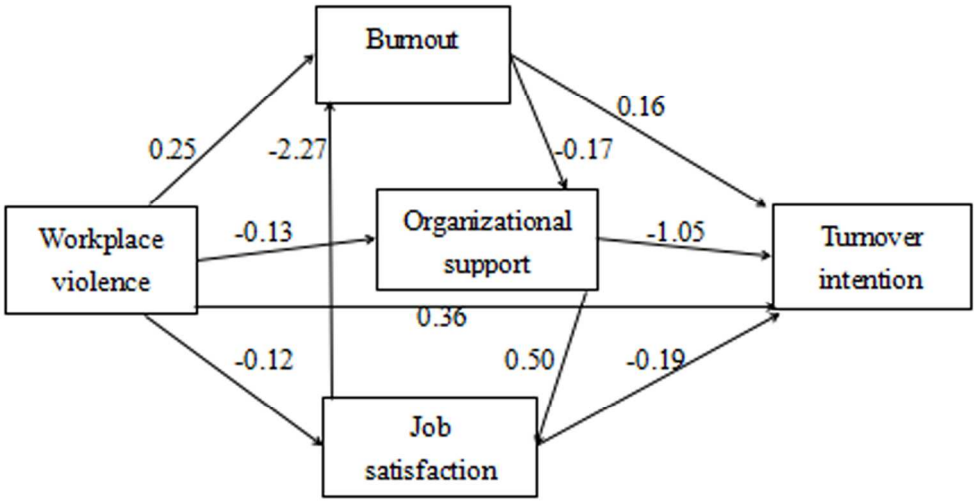

Figure 1. The final model in this study. (CFI = 0.956, GFI = 0.924, IFI = 0.942, NFI=0.931, RMR = 0,050, RMSEA = 0.053, TLI = 0.926)
Note: CFI, comparative fit index; GFI, goodness of fit index; IFI, incremental fit index; NFI, normed fit index; RMR, root mean square residual; RMSEA, root mean square error of approximation; TLI, Tucker–Lewis incremental fit.

117x61mm (300 x 300 DPI)

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Page 3, line 4-9
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	p.4, line 4-18
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	P. 5; p. 6; p. 7, line 4-49
Objectives	3	State specific objectives, including any prespecified hypotheses	P. 8, line15-33
Methods			
Study design	4	Present key elements of study design early in the paper	P. 8, line38-55;
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	P. 9, line 21-48
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	p.8, 40-56
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	P. 10, line 4-21
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	P. 10; p.11; p.12

Bias	9	Describe any efforts to address potential sources of bias	P.13, line13-18
Study size	10	Explain how the study size was arrived at	P. 9, line 48-56
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	p. 13, line24-26
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	P. 13, line13-55
		(*b*) Describe any methods used to examine subgroups and interactions	P. 13, line 16-19
		(*c*) Explain how missing data were addressed	P. 13, line 19-35
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	P. 13, line 4-16
		(*e*) Describe any sensitivity analyses	P. 13, line 36-40
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	P. 9,line 22-48;
		(b) Give reasons for non-participation at each stage	P. 9, line 39-48
		(c) Consider use of a flow diagram	No
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	P. 14,line 37-57; P. 15,line 2-36
		(b) Indicate number of participants with missing data for each variable of interest	P.9, line 36
Outcome data	15*	Report numbers of outcome events or summary measures	P. 15; P. 16; P. 17; P. 18;P. 19

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	P. 17, ;P. 18
		(*b*) Report category boundaries when continuous variables were categorized	P. 15, line 2-35
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	P. 19
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	P. 19, line 4-27;
Discussion			
Key results	18	Summarise key results with reference to study objectives	P. 20; p. 21; P.22; P.23; p24
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	P. 24, Line 18-36
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	p.20; p. 21;p.22;p.23 P. 24, line4-16
Generalisability	21	Discuss the generalisability (external validity) of the study results	P. 23, line 45-56;
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	P. 25, line16-21

*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.