

**ORIGINAL RESEARCH:
EMPIRICAL RESEARCH—QUANTITATIVE**

From job stress to intention to leave among hospital nurses: A structural equation modelling approach

Wen-Yen Lo¹ | Li-Yin Chien² | Fang-Ming Hwang³ | Nicole Huang⁴ | Shu-Ti Chiou^{5,6} ¹Department of Nursing, Taipei City Hospital, Taipei, Taiwan²Institute of Community Health Care, National Yang-Ming University, Taipei, Taiwan³Department of Education, National Chiayi University, Chiayi, Taiwan⁴Institute of Hospital and Health Care Administration, National Yang-Ming University, Taipei, Taiwan⁵School of Medicine, National Yang-Ming University, Taipei, Taiwan⁶Cheng Hsin General Hospital, Taipei, Taiwan**Correspondence**Shu-Ti Chiou, School of Medicine, National Yang-Ming University, Taipei, Taiwan.
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Abstract**Aims:** The aim of this study was to examine the structural relationships linking job stress to leaving intentions through job satisfaction, depressed mood and stress adaptation among hospital nurses.**Background:** High turnover among nurses is a global concern. Structural relationships linking job stress to leaving intentions have not been thoroughly examined.**Design:** Two nationwide cross-sectional surveys of full-time hospital staff in 2011 and 2014.**Methods:** The study participants were 26,945 and 19,386 full-time clinical nurses in 2011 and 2014 respectively. Structural equation modelling was used to examine the interrelationships among the study variables based on the hypothesized model. We used cross-validation procedures to ensure the stability and validity of the model in the two samples.**Results:** There were five main paths from job stress to intention to leave the hospital. In addition to the direct path, job stress directly affected job satisfaction and depressed mood, which in turn affected intention to leave the hospital. Stress adaptation mitigated the effects of job stress on job satisfaction and depressed mood, which led to intention to leave the hospital. Intention to leave the hospital preceded intention to leave the profession. Those variables explained about 55% of the variance in intention to leave the profession in both years.**Conclusion:** The model fit was good for both samples, suggesting validity of the model. Strategies to decrease turnover intentions among nurses could focus on creating a less stressful work environment, increasing job satisfaction and stress adaptation and decreasing depressed mood. Hospitals should cooperate in this issue to decrease nurse turnover.**KEYWORDS**

depressive symptom, intention to leave, job satisfaction, job stress, nurses

1 | INTRODUCTION

The shortage of nurses has been a problem for a long time in many countries and has become a global concern (Heinen et al., 2013; World Health Organization 2016a). Based on needs-based estimates, there was a shortage of more than 9 million nurses/midwives globally in 2013 (World Health Organization 2016b). Nearly half of the WHO member states reported fewer than three nurses/midwives

per 1,000 population (World Health Organization 2017). Projections show the number of nurses cannot meet the present and future challenges of an ageing population and the increasing number of patients with multiple chronic conditions (Rowe, Fulmer, & Fried, 2016; World Health Organization 2016b). In line with this trend, Taiwan, a high-income south-eastern Asian country with a life expectancy of 80.2 years and the world's fastest growing ageing population, also faces nursing shortages (Ministry of the Interior

2015). Although the number of nurses increased at a rate of 2%–4% per year in Taiwan from 2012–2016 (Taiwan Union of Nurses Association 2016), the shortage in the nursing workforce persisted in many hospitals (Teng, 2014).

The retention of hospital staff nurses has been identified as a key factor to counteract the shortage (Baumann, 2010; International Council of Nurses 2014; Shacklock & Brunetto, 2012). Empirical studies have highlighted the significant effect of job stress on retention and turnover intention among nurses (Wu, Fox, Stokes, & Adam, 2012; Yang, Lv, Zhou, Liu, & Mi, 2017; Zhang, Wu, Fang, Zhang, & Wong, 2017). As the pressure on the healthcare system is rapidly increasing with population ageing, evidence concerning the job stress to turnover pathway is urgently needed to develop effective interventions. However, structural relationships linking job stress to leaving intentions have not been examined thoroughly. More studies are needed to increase our understanding of the interrelationships linking job stress to leaving intention among nurses, so that strategies can be developed to decrease nurse turnover.

1.1 | Background

Occupational stress is common in the nursing profession and this stress is associated with negative outcomes at both an individual and organizational level (Allan et al., 2009; Trybou et al., 2014). Previous studies have shown that clinical nurses frequently experience many stressors such as heavy workload, impact of patient deaths and lack of support (Suresh, Matthews, & Coyne, 2013). Empirical results support the association between job stress, stress adaptation, job satisfaction, depressed mood and leaving intentions (Chiang & Chang, 2012; Kuo, Lin, & Li, 2014; Teo, Pick, Newton, Yeung, & Chang, 2013; Wu, Ge, Sun, Wang, & Wang, 2011), but the structural relationships among these variables have not been integrated into a model. Therefore, we conducted a literature search to shed light on forming such a structural model.

Theorists indicate that job stress is caused by poor person-environment fit at work (Edwards & Cooper, 1990; Eulberg, Weekley, & Bhagat, 1988). Job stress occurs when environmental demands are not matched to individual ability, or environmental opportunities do not measure up to an individual's needs and expectations (Chan, 2007). Job satisfaction is an attitudinal measure, which indicates the extent to which people are satisfied or dissatisfied with their jobs (Lu, Barriball, Zhang, & While, 2012), whereas depressed mood is an indicator for emotional well-being (Krieger et al., 2014). In Danna and Griffin's (1999) synthesis, they asserted that antecedents such as job stress and job characteristics influence well-being in the workplace, which then leads to deleterious consequences, such as absenteeism. In other words, job stress affects the attitudes and emotional well-being of the workers (Chiang & Chang, 2012; Danna & Griffin, 1999; Kuo et al., 2014), which leads to negative outcomes (Chan, 2007). On the basis of these findings, we hypothesized that job stress could influence leaving intentions through job satisfaction and depressed mood.

Why is this research needed?

- High turnover among nurses is a global concern. More studies are needed to increase our understanding of leaving intentions so that strategies can be developed to decrease nurse turnover.
- As the pressure on healthcare systems is rapidly increasing with population ageing, evidence concerning the turnover pathway is urgently needed to develop effective interventions.
- This study is one among very few studies that explore the structural relationships between job stress and intention to leave the job and it used two national surveys with large sample sizes.

What are the key findings?

- Job stress directly affected intention to leave the hospital and then intention to leave the profession.
- Job stress indirectly affected intention to leave the hospital through job satisfaction and depressed mood, which subsequently affected intention to leave the profession.
- Stress adaptation mitigated the effects of job stress on job satisfaction and depressed mood, which led to intention to leave the hospital.

How should the findings be used to influence policy/practice/research/education?

- Strategies for decreasing leaving intentions should focus on creating a less stressful work environment, promoting job satisfaction, supporting stress adaptation and detecting and caring for staff with depressed mood.
- Since intention to leave the hospital precedes intention to leave the profession, hospitals should cooperate in this issue to decrease nurse turnover.
- In future research, the effectiveness of interventions to reduce job stress in reducing intention to leave and the actual turnover rate should be studied.

For clinical nurses' practice environments, job characteristics could include high workload, time pressure, high physical demands and low skill discretion; these features could induce nurses' occupational stress (Mark & Smith, 2012; Pisanti, van der Doef, Maes, Lazzari, & Bertini, 2011; Suresh et al., 2013). Too much job stress (or distress) has an impact on job dissatisfaction and depressed mood (Adams, 2014; Flinkman & Salanterä, 2015; Lu et al., 2012; McEwen & Gianaros, 2010) and leaving intentions could develop gradually as a result (Chiang & Chang, 2012; Flinkman & Salanterä, 2015; Kuo et al., 2014).

In addition to the above relationships, the premise of the general adaptation syndrome model indicates that stressors may initiate coping behaviour and thereby influence psychological health (Selye,

1951). Psychological coping mechanisms commonly play an important role in buffering the influence of job stress on mental well-being (Mark & Smith, 2012). Empirical studies have indicated that effective coping strategies and positive coping behaviours (such as problem-focused coping) could increase job satisfaction and decrease depressed mood (Mark & Smith, 2012; Teo et al., 2013). However, if the stressors persist for a long time, the individual will be exhausted, which results in poor stress adaptation (Selye, 1951). Therefore, we hypothesized that job stress could influence stress adaptation and that stress adaptation may mediate the effect of job stress on job satisfaction and depressed mood.

Leaving intentions could mean leaving the hospital and/or the profession (Chan, Tam, Lung, Wong, & Chau, 2013). Researchers have found a strong positive correlation between intention to leave the hospital and intention to leave the profession (Lee, Dai, & McCreary, 2015). A longitudinal study further indicated that many nurses decided to leave the hospital prior to leaving the profession (Krausz, Koslowsky, Shalom, & Elyakim, 1995) and that leaving intentions could be seen as an early indicator of actual turnover among nurses (Chenevert, Jourdain, & Vandenbergh, 2016).

Based on the literature we developed a hypothesized model, which is presented in Figure 1. We hypothesized that, in addition to the direct effect of job stress on intention to leave, job stress directly affects job satisfaction and depressed mood, which in turn affects intention to leave the hospital and then intention to leave the profession. In addition, job stress indirectly affects job satisfaction and depressed mood through stress adaptation.

2 | THE STUDY

2.1 | Aim

The objective of the study was to examine the effects of job stress on leaving intentions among full-time bedside clinical nurses based on the hypothesized model (Figure 1) using structural equation modelling (SEM).

2.2 | Data source

This secondary analysis of existing data used two cross-sectional national surveys of full-time staff working in healthcare settings commissioned by the Health Promotion Administration (HPA) in 2011 and 2014. The surveys broadly examined workplace safety, physical and mental health needs, work hours, stress and expectations of organizations among staff of medical institutions. The study protocol was approved by institutional review boards (Bureau of Health Promotion investigation number 0990800708 and HPA investigation number EC1030308-F-W).

Before the data were collected in 2011 and 2014, the contents of the questionnaires were reviewed and revised by expert committees. Thereafter the questionnaires were pilot tested with 10 healthcare workers to ensure semantic clarity and readability. Questionnaires were distributed to 100 and 113 healthcare settings across Taiwan from May–July 2011 and July–September 2014 respectively. Participants were invited to fill out an anonymous, self-

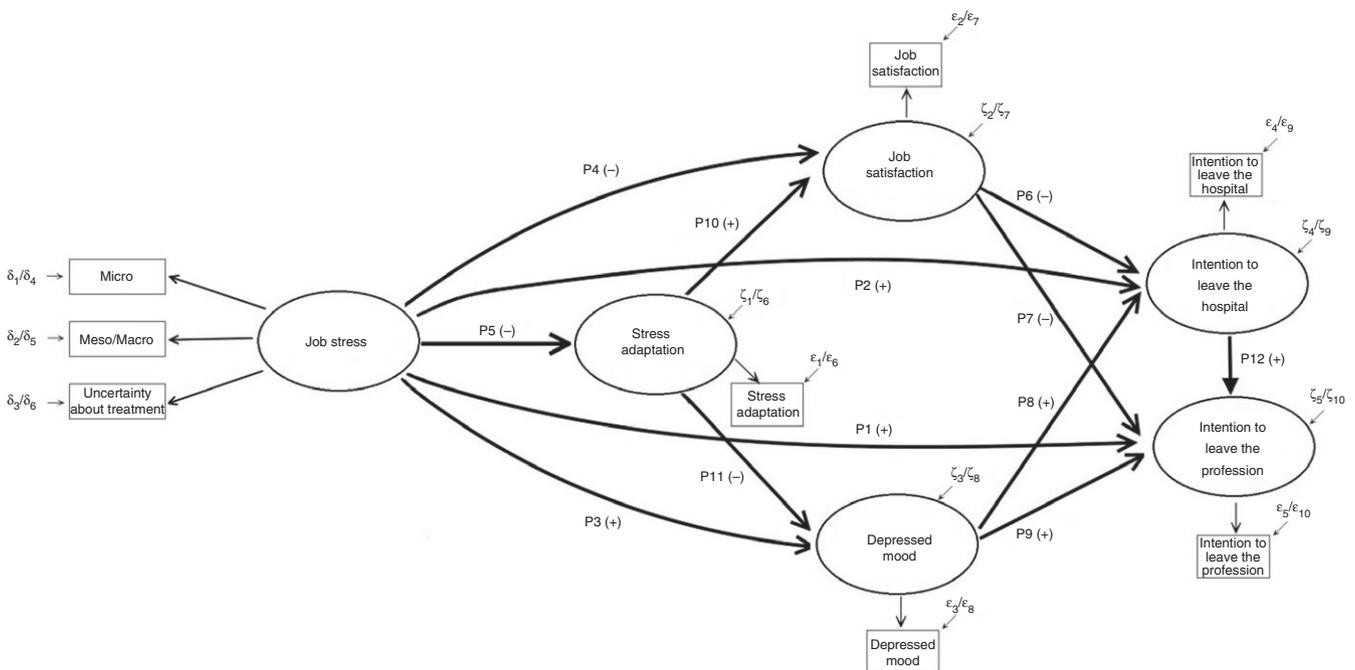


FIGURE 1 Hypothesized model. P1–P12 are hypothesized paths. The predicted directions are positive (+) and negative (–). Rectangles are measured variables. Ovals are latent variables. The symbols ϵ_1 through ϵ_{10} (fixed to 0) and δ_1 through δ_6 are measurement errors, and ζ_1 through ζ_{10} are structural errors (2011/2014)

administered structured questionnaire voluntarily. A total of 98,817 questionnaires were distributed and 73,391 (74.3%) questionnaires were returned in 2011. A total of 111,110 questionnaires were distributed and 89,014 (80.1%) questionnaires were returned in 2014. Details of the study design are presented elsewhere (Chiou, Chiang, Huang, Wu, & Chien, 2013; Lo, Chiou, Huang, & Chien, 2016).

2.3 | Participants

To focus on bedside clinical and non-manager nurses, this analysis included 26,945 and 19,386 full-time bedside clinical nurses working in the general wards, emergency room (ER)/intensive care unit (ICU), operating room (OR)/delivery room (DR), or outpatient department (OPD) in both 2011 and 2014.

2.4 | Measures

The study variables included sociodemographics (sex, marital status, educational level and age), work characteristics (years of practice at the hospital, work unit and accredited hospital level), job stress, job satisfaction, depressed mood, stress adaptation, intention to leave the hospital and intention to leave the profession.

Job stress was defined as the perceived stress level from the work environment and was measured using a 19-item five-point Likert scale. A previous study supported the reliability and validity of the scale (Su et al., 2016). Factor analysis demonstrated the three-factor structure of the scale, including micro-level stressors (e.g. lack of support, job demands, promotion and colleagues), meso- and macro-level stressors (e.g. external policy/demands and colleagues not in the same department) and uncertainty about treatment (e.g. job risks, patients and impact of patient death). The three factors explained 62.1% of the variances (28%, 20.9% & 13.2%, respectively; Su et al., 2016). The internal consistency as assessed by Cronbach's alpha was 0.91, 0.88, 0.83 and 0.93 for the three subscales and the overall scale respectively. An overall score for job stress was obtained by summing the item scores, with total scores ranging from 19 (not at all stressful)—95 (extremely stressful).

Job satisfaction was measured with the question "How would you rate your satisfaction with your current job?", with answers ranging from 1 (very dissatisfied)—5 (very satisfied). Depressed mood was measured with the question "Did you feel depressed during the past week?", with answers ranging from 1 (not at all depressed)—5 (very depressed). Stress adaptation was measured with the question "How well do you feel about your stress adaptation?", with answers ranging from 1 (very bad)—5 (very good). Intention to leave was measured with two questions "Do you intend to leave the hospital?" and "Do you intend to leave the profession?", with answers ranging from 1 (not at all)—5 (very strong).

2.5 | Data analysis

The study variables are described using percentages, means and standard deviations (SD). Bivariate correlations were assessed using

Pearson's correlation. Interrelationships among the variables were examined with SEM (Heck & Thomas, 2015). Full information maximum likelihood was used to estimate parameters when there were missing data (Dong & Peng, 2013). Sociodemographics and work characteristics were adjusted for in the SEM model.

For the latent construct of job stress, each of the three observed variables had measurement errors (labelled δ_1 through δ_3 and δ_4 through δ_6 in 2011 and 2014 respectively; Figure 1; Bowen & Guo, 2012). For the latent variable job stress, factor loadings ≥ 0.5 and average variance extracted (AVE) $\geq 50\%$ would support the validity of the measure (Hair, Anderson, Black, & Babin, 2010). As for the single-indicator latent variables (job satisfaction, stress adaptation, depressed mood and leaving intentions) in the SEM model (Figure 1), the measurement error for each observed variable was fixed to 0 (labelled ε_1 through ε_5 and ε_6 through ε_{10} in 2011 and 2014, respectively) because the reliability cannot be estimated. Each latent (dependent) variable contained a structural error (labelled ζ_1 through ζ_5 and ζ_6 through ζ_{10} in 2011 and 2014 respectively; Bowen & Guo, 2012).

Because the large sample size increased the likelihood of large and significant χ^2 values, other fit indices were used in the study (Hu & Bentler, 1998). The overall model fit was assessed using the root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), comparative fit index (CFI) and Tucker Lewis index (TLI). An RMSEA < 0.05 , SRMR < 0.08 , CFI > 0.95 and TLI > 0.9 indicated an adequate model fit (Ding, Velicer, & Harlow, 1995; Heck & Thomas, 2015; Hu & Bentler, 1999). We used the change value of CFI (Δ CFI) to evaluate the measurement and structural invariance across the two samples. Each invariance analysis was compared with a less restricted model and Δ CFI < 0.01 indicated that the two models were invariant (Cheung & Rensvold, 2002).

Cross-validation procedures were used to examine the stability and validity of the hypothesized model across the 2011 and 2014 samples (Schumacker & Lomax, 2012; Wang & Wang, 2012). First, we estimated the measurement model for each sample separately. If the model fit was good for both samples, we examined whether the measurement model had measurement invariance (configural, metric and scalar invariance) across the two samples. Once the measurement invariance had been established across the two samples, we proceeded to examine the structural invariance. Second, we estimated the structural model (hypothesized model) using the 2011 and 2014 samples separately. If the model fit was good for both samples, we examined the structural invariance across the two samples. The unconstrained model was used to test whether the hypothesized structure was equal across the two samples. If the hypothesized structure was invariant, we added the constraint of equal factor loadings and the constraint of equal factor loadings and equal regression paths across the two samples.

The hypothesized models had multiple mediators. The proportion mediated was used to measure the effect size of the mediated effects (Fairchild, Mackinnon, Taborga, & Taylor, 2009). The significance of indirect effects (as evidence of mediation) was examined using a bias-corrected bootstrap 95% confidence interval (CI;

MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2008). In this study, the estimates were based on 1,000 bootstrap samples. Statistical analyses were performed using Mplus 7.0 software (Muthén & Muthén, 1998-2015). In all analyses, a significance level of .05 was maintained.

3 | RESULTS

The characteristics of the study participants in the 2011 and 2014 surveys are summarized in Table 1. The majority was female (98.2% in 2011; 97.8% in 2014). In both years, about 58% of the nurses were unmarried. About 55% of the nurses in 2011 and 62% in 2014 had an educational level of university or higher. The nurses had a mean age of 31.61 (*SD* 7.08) years in 2011 and 31.41 (*SD* 7.29) years in 2014. The mean number of years of practice at the hospital was 7.22 (*SD* 7.04) and 10.65 (*SD* 10.07) in 2011 and 2014 respectively. Over half worked in regional hospitals (65.1% in 2011 and 51.6% in 2014). In the 2011 survey, about two-fifths of the nurses worked in general wards (43.9%), followed by the ER/ICU (25.4%), OPD (14.8%), OR/DR (11.8%) and multiple units (more than one of the listed units; 4.1%). In the 2014 survey, about two-fifths of the nurses worked in general wards (37.3%), followed by multiple units (21.2%), the ER/ICU (20.6%), OR/DR (10.8%) and OPD (10.1%).

There were significant correlations ($p < .001$) between all key variables in the bivariate analysis as shown in Table 2. The mean scores indicated a medium intention to leave the profession (mean = 3, *SD* 1.17 in 2011 and mean = 2.6, *SD* 1.19 in 2014) and intention to leave the hospital (mean = 2.97, *SD* 1.13 in 2011 and mean = 2.69, *SD* 1.26 in 2014), poor to moderate stress adaptation (mean = 2.51, *SD* 0.77 in 2011 and mean = 2.61, *SD* 0.79 in 2014) and job satisfaction (mean = 2.48, *SD* 0.72 in 2011 and mean = 2.85, *SD* 0.92 in 2014), a mild to medium depressed mood (mean = 2.81, *SD* 0.99 in 2011 and mean = 2.59, *SD* 1 in 2014) and medium to high job stress (mean = 58.32, *SD* 13.47 in 2011 and mean = 55.79, *SD* 12.9 in 2014). Most of the bivariate correlations were between 0.25–0.55 (absolute values). There was a positive and high correlation between intention to leave the hospital and intention to leave the profession ($r = .73$ in 2011 and $.55$ in 2014). The correlations between stress adaptation and intention to leave the profession ($r = -.15$) and stress adaptation and job satisfaction ($r = .12$) were smaller than for other variables in the 2014 survey.

The fit indices for the hypothesized model and measurement and structural invariance across the 2011 and 2014 samples are presented in Table 3. The measurement model and structural model (hypothesized model) revealed adequate fit to the data using the 2011 and 2014 samples. Cross-validation showed that the measurement model was invariant across the two samples. The structural model (hypothesized model) showed structural, factorial and regression invariance across the two samples (each Δ CFI between the comparison models was <0.01).

The results of the structural model using the 2011 and 2014 samples are shown in Table 4 and Figure 2. In the 2011 and 2014

TABLE 1 Characteristics of the study nurses

Variables	2011 (N = 26,945), N (%)	2014 (N = 19,386), N (%)
Sex		
Male	475 (1.8)	377 (2.2)
Female	26,375 (98.2)	17,096 (97.8)
Marital status		
Married	10,543 (39.3)	6,783 (38.2)
Unmarried	15,703 (58.5)	10,231 (57.6)
Divorced/Separated/Widowed	606 (2.2)	755 (4.2)
Educational level		
University or higher	14,810 (55.2)	11,105 (62.1)
Vocational school or less	12,045 (44.8)	6,784 (37.9)
Age		
≥35	7,085 (26.9)	4,716 (29.3)
30–34	7,369 (27.9)	3,822 (23.7)
25–29	8,443 (32.1)	4,610 (28.7)
<25	3,447 (13.1)	2,940 (18.3)
Years of practice		
≥15	3,156 (12.9)	6,413 (37.4)
10–14	3,649 (14.9)	2,309 (13.5)
5–9	6,465 (26.4)	283 (1.7)
<5	11,202 (45.8)	8,137 (47.4)
Work unit		
OPD	3,985 (14.8)	1,949 (10.1)
ER/ICU	6,839 (25.4)	3,993 (20.6)
General ward	11,824 (43.9)	7,238 (37.3)
OR/DR	3,176 (11.8)	2,095 (10.8)
Multiple units	1,121 (4.1)	4,111 (21.2)
Accredited hospital level		
Medical center	7,238 (26.8)	7,122 (36.7)
Regional hospital	17,533 (65.1)	9,998 (51.6)
District hospital	2,174 (8.1)	2,266 (11.7)

OR = operating room, DR = delivery room, ER = emergency room, ICU = intensive care unit, OPD = outpatient clinic. Multiple units: worked in more than one of the listed units.

The total number of each variable may not equal 26,945 or 19,386 due to missing values. Percentages were calculated based on total number of non-missing cases.

samples, all of the hypothesized paths (P1–P12, Figure 1) were significant ($p < .001$) and in the predicted direction. The job stress scale revealed acceptable convergent validity (all factor loadings ≥ 0.6 , R^2 values between 40–82% and AVE values at around 60% in both years). The R^2 values (2011 and 2014) for the dependent variables were similar (10.8% and 10.1% for stress adaptation, 22.1% and 19.4% for job satisfaction, 29.7% and 27.7% for depressed mood, 41.2% and 36.1% for intention to leave the hospital and 54.6% and 57.1% for intention to leave the profession). Intention to leave the hospital had a large effect on intention to leave the profession ($\beta = 0.605$ in 2011 and $\beta = 0.667$ in 2014), while job

TABLE 2 Means, standard deviations (SD) and correlations among six key variables

Variables	Mean (2011/2014)	SD (2011/2014)	Correlations (2011/2014)				
			1	2	3	4	5
1. Intention to leave the profession	3/2.6	1.17/1.19					
2. Intention to leave the hospital	2.97/2.69	1.13/1.26	0.73/0.55				
3. Stress adaptation	2.51/2.61	0.77/0.79	-0.25/-0.15	-0.28/-0.26			
4. Depressed mood	2.81/2.59	0.99/1	0.42/0.36	0.47/0.25	-0.39/-0.27		
5. Job satisfaction	2.48/2.85	0.72/0.92	-0.46/-0.46	-0.55/-0.23	0.3/0.12	-0.35/-0.27	
6. Job stress	58.32/55.79	13.47/12.9	0.39/0.36	0.4/0.38	-0.29/-0.27	0.42/0.41	-0.38/-0.35

All correlations were significant ($p < .001$). Variables 1–5 were rated on a 5-point Likert scale and variable 6 was obtained by summing 19 items (scores ranging from 19 to 95). A higher score indicates stronger intention to leave, better stress adaptation, more depressed mood, more satisfied with job, and more job stress.

TABLE 3 Fit indices for the hypothesized model and measurement and structural invariance across the 2011 and 2014 samples

Models	χ^2	df	p value	RMSEA	SRMR	CFI	TLI	Δ CFI
Hypothesized measurement model								
2011 sample	432.9	10	<.05	0.04	0.014	0.995	0.985	
2014 sample	344.9	10	<.05	0.042	0.016	0.991	0.975	
Measurement invariance								
1. Configural invariance	777.8	20	<.05	0.04	0.015	0.994	0.982	
2. Metric invariance	786.5	22	<.05	0.039	0.015	0.994	0.984	<0.01 (1 vs. 2)
3. Scalar invariance	907.5	24	<.05	0.04	0.016	0.993	0.983	<0.01 (2 vs. 3)
Hypothesized structural model								
2011 sample	2,164.4	57	<.05	0.039	0.016	0.972	0.943	
2014 sample	1,465.3	57	<.05	0.044	0.021	0.962	0.923	
Structural invariance								
4. Unconstrained equal	3,622.3	114	<.05	0.041	0.018	0.969	0.937	
5. Constrained factor loadings equal	3,634.1	116	<.05	0.04	0.018	0.969	0.938	<0.01 (4 vs. 5)
6. Constrained factor loadings and regression paths equal	3,684	128	<.05	0.039	0.018	0.968	0.943	<0.01 (5 vs. 6)

df = degrees of freedom, RMSEA = root mean square error of approximation, SRMR = standardized root mean square residual, CFI = comparative fit index, TLI = Tucker Lewis index. Δ CFI = changes in values of CFI between the comparison models. Sociodemographics and work characteristics were adjusted for in the structural model.

stress (P1), job satisfaction (P7) and depressed mood (P9) had small effects on intention to leave the profession (all $\beta < 0.1$) in both years. The direct effects of job stress on job satisfaction, depressed mood and stress adaptation were relatively larger (absolute values of β ranged from 0.31 to 0.38) than that on intention to leave the hospital (β about 0.16). Job satisfaction (absolute value of β 0.39) had a larger direct effect than depressed mood on intention to leave the hospital ($\beta = 0.241$ in 2011 and $\beta = 0.206$ in 2014). Stress adaptation had a larger direct effect on depressed mood (absolute value of β about 0.26) than on job satisfaction ($\beta = 0.17$).

The results of the mediated effects for the structural model are shown in Table 5. All the indirect effects of job stress on intention to leave the profession and intention to leave the hospital were significant (all $p < .001$). From job stress to intention to leave the hospital in the 2011 and 2014 samples, the total effects were $\beta = 0.434$ and $\beta = 0.419$, with a direct effect of $\beta = 0.154$ and $\beta = 0.167$ (proportion mediated: 35.5% and 39.9%) and the total indirect effect was

$\beta = 0.28$ and $\beta = 0.252$ (proportion mediated: 64.5% and 60.1%) respectively. Analysis of those indirect effects (proportions mediated) showed that 33.4% and 32.2% of the effects was mediated by job satisfaction, followed by depressed mood (21.2% and 18.9%). Other mediating paths had a proportion mediated of <6%.

From job stress to intention to leave the profession in the 2011 and 2014 samples, the total effects were $\beta = 0.411$ and $\beta = 0.397$, with a direct effect of $\beta = 0.094$ and $\beta = 0.081$ (proportion mediated: 22.9% and 20.4%) and the total indirect effect was $\beta = 0.317$ and $\beta = 0.316$ (proportion mediated: 77.1% and 79.6%) respectively. Analysis of those indirect effects (proportion mediated) showed that 22.6% and 28.2% of the effect was mediated by intention to leave the hospital, followed by job satisfaction which affected intention to leave the hospital (21.4% and 22.7%) and depressed mood which also affected intention to leave the hospital (13.6% and 13.4%). Other mediating paths had a proportion mediated of <6%.

TABLE 4 Results of hypothesized paths for the structural model

Paths (direct effect)	Unstandardized β	
	2011	2014
P1: Job stress → Intention to leave the profession	0.016	0.015
P2: Job stress → Intention to leave the hospital	0.025	0.029
P3: Job stress → Depressed mood	0.056	0.055
P4: Job stress → Job satisfaction	-0.039	-0.039
P5: Job stress → Stress adaptation	-0.036	-0.034
P6: Job satisfaction → Intention to leave the hospital	-0.611	-0.606
P7: Job satisfaction → Intention to leave the profession	-0.102	-0.073
P8: Depressed mood → Intention to leave the hospital	0.273	0.251
P9: Depressed mood → Intention to leave the profession	0.07	0.047
P10: Stress adaptation → Job satisfaction	0.16	0.18
P11: Stress adaptation → Depressed mood	-0.354	-0.334
P12: Intention to leave the hospital → Intention to leave the profession	0.63	0.687

All of the hypothesized paths are significant ($p < .001$). Full information maximum likelihood was used to deal with missing data in the models. Sociodemographics and work characteristics were adjusted for in the structural model.

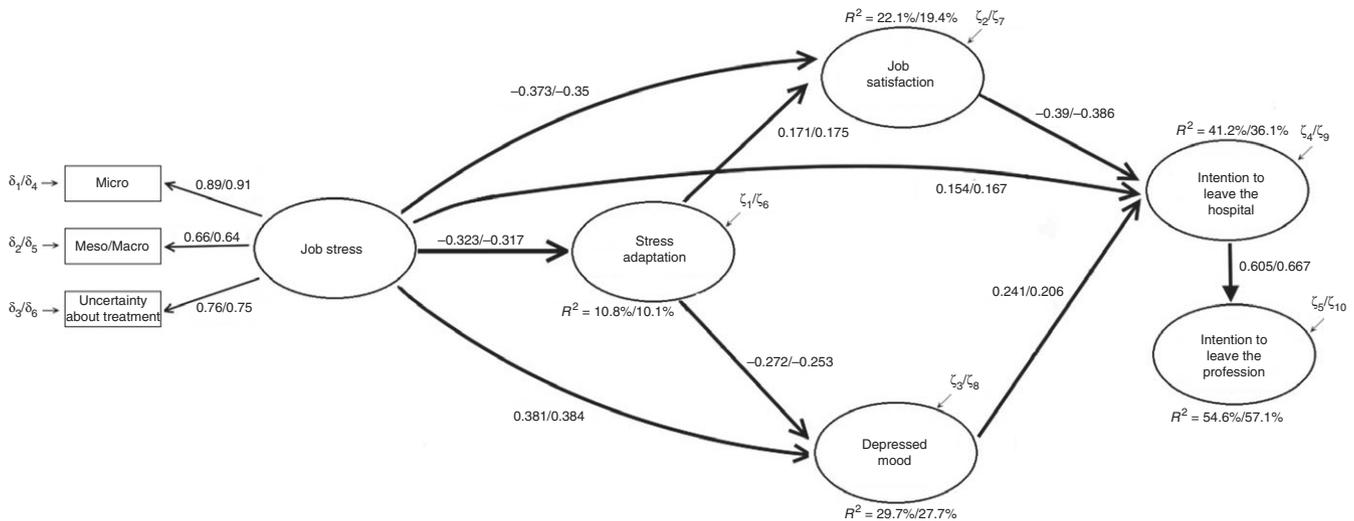


FIGURE 2 Structural equation modeling results (2011/2014). The structural model has adequate fit to the data. All the hypothesized paths are significant ($p < .001$). Model parameters reported represent completely standardized solutions. Each single observed variable and the standardized coefficients <0.1 (P1, P7, and P9) are not displayed

4 | DISCUSSION

Our results revealed that there were five paths from job stress to intention to leave the hospital/profession among clinical nurses. In addition to the direct path linking job stress to intention to leave the hospital/profession, job stress exerted its effects on intention to leave through job satisfaction and depressed mood. Job stress also influenced individual feelings of stress adaptation and then mediated the effect of job stress on job satisfaction and depressed mood. The proportion mediated showed that the mediated effects, from high to low, were job satisfaction, depressed mood and stress adaptation. Altogether these variables explained about 55% of the variance in intention to leave the nursing profession. Since multiple

paths were significant, we suggest that strategies for decreasing leaving intentions should focus on creating a less stressful work environment, promoting job satisfaction, supporting stress adaptation and detecting and caring for staff with depressed mood.

Hospital managers could act to create a less stressful work environment in their organization. Previous studies have suggested that strategies to decrease job stress for nurses could include identifying and decreasing stressors in the work environment (Happell et al., 2013; Teo et al., 2013). As measured in this study, stressors included job risks, impact of patient care, inadequate preparation for job demands, lack of support, interpersonal relationships and hospital policy/demands. Possible strategies to decrease these job-related stressors included provision of training to prepare nurses

TABLE 5 Results of mediated effects for the structural model

Paths	Standardized β (2011/2014)	Proportion mediated (2011/2014)
Job stress → Intention to leave the hospital		
Job stress → Job satisfaction → Intention to leave the hospital	0.145/0.135	33.4/32.2
Job stress → Depressed mood → Intention to leave the hospital	0.092/0.079	21.2/18.9
Job stress → Stress adaptation → Job satisfaction → Intention to leave the hospital	0.022/0.021	5.1/5
Job stress → Stress adaptation → Depressed mood → Intention to leave the hospital	0.021/0.017	4.8/4.1
Total indirect effect	0.28/0.252	64.5/60.1
Direct effect	0.154/0.167	35.5/39.9
Job stress → Intention to leave the profession		
Job stress → Intention to leave the hospital → Intention to leave the profession	0.093/0.112	22.6/28.2
Job stress → Job satisfaction → Intention to leave the hospital → Intention to leave the profession	0.088/0.09	21.4/22.7
Job stress → Depressed mood → Intention to leave the hospital → Intention to leave the profession	0.056/0.053	13.6/13.4
Job stress → Job satisfaction → Intention to leave the profession	0.023/0.016	5.6/4
Job stress → Depressed mood → Intention to leave the profession	0.023/0.014	5.6/3.5
Job stress → Stress adaptation → Job satisfaction → Intention to leave the hospital → Intention to leave the profession	0.013/0.014	3.2/3.5
Job stress → Stress adaptation → Depressed mood → Intention to leave the hospital → Intention to leave the profession	0.013/0.011	3.2/2.8
Job stress → Stress adaptation → Depressed mood → Intention to leave the profession	0.005/0.003	1.2/0.8
Job stress → Stress adaptation → Job satisfaction → Intention to leave the profession	0.003/0.003	0.7/0.8
Total indirect effect	0.317/0.316	77.1/79.6
Direct effect	0.094/0.081	22.9/20.4

Standardized β is the completely standardized solution. All of the indirect effects were significant ($p < .001$) and examined using a bias-corrected bootstrap 95% confidence interval. Proportion mediated (effect size of mediated effects; indirect effect divided by total effect); total indirect effect is the sum of indirect effects; total effect is the sum of direct and indirect effects. Sociodemographics and work characteristics were adjusted for in the structural model.

for job demands (Mosadeghrad, 2013), use of information systems or technology to increase job efficiency (Buntin, Burke, Hoaglin, & Blumenthal, 2011), increasing autonomy in developing nursing skills/knowledge and decision making in nursing care (Papathanasoglou et al., 2012) and promoting positive nurse-physician collaboration through mutual respect, open and affective communication and interprofessional simulation training (Galletta, Portoghese, Carta, D'Aloja, & Campagna, 2016; Liaw, Siau, Zhou, & Lau, 2014). These changes could benefit both individuals and the organization (Allan et al., 2009; Happell et al., 2013; Trybou et al., 2014). In summary, creating a less stressful work environment for nurses may be fundamental in decreasing leaving intentions.

Our structural model had good stability, good external validity, acceptable fit indices and good explanatory power for intention to leave the hospital (about 40%) and intention to leave the profession (about 55%). To the best of our knowledge, this study is the first to integrate the structural relationships among job stress, psychological states, stress adaptation and motivational outcomes (intention to leave). The three main mediators (job satisfaction, depressed mood and stress adaptation) were significant in influencing the relationship between job stress and leaving intentions among nurses. The mediating paths were consistent with findings from previous studies (Kuo et al., 2014; Teo et al., 2013; Wu et al., 2011).

Our samples revealed that a medium or higher level of job stress and leaving intentions persisted among Taiwanese hospital nurses in 2011 and 2014. From 2009 to 2012, increasing percentages of practice nurses in Taiwan left the hospital (10.4%, 11.6%, 12.6% and 13.1% each year respectively; Ministry of Health and Welfare 2013). About 41% of licensed nurses do not want to practice nursing (Teng, 2014). A review of longitudinal studies has indicated that higher workload, which was a common stressor for hospital nurses in Taiwan, significantly increased the odds of actual turnover (Chen, Chu, Wang, & Lin, 2008). In addition, working in an environment with high patient-to-nurse ratios, inadequate staffing and excessive workloads lead to job stress, job dissatisfaction and leaving intentions (Happell et al., 2013; Rudman, Gustavsson, & Hultell, 2013; Van Bogaert et al., 2014). Decreasing the workload of clinical nurses may be the key to a less stressful work environment and retention of the nursing workforce in Taiwan.

This study found that the intention to leave the hospital preceded the intention to leave the profession. To increase nurse retention and decrease intention to leave, hospital managers could enhance job satisfaction through building positive psychological capital and improving the work environment (Brunetto, Rodwell, Shacklock, Farr-Wharton, & Demir, 2016; Chan et al., 2013). Hospital managers could reduce emotional exhaustion by increasing

organizational trust and support (Bobbio & Manganelli, 2015), promote well-being through creating less stressful work environments for nurses (Karimi, Leggat, Donohue, Farrell, & Couper, 2014) and avoid abusive leadership behaviour through training of nursing leaders in transformational and supportive leadership styles (Lavoie-Tremblay, Fernet, Lavigne, & Austin, 2016; Liang, Tang, Wang, Lin, & Yu, 2016). If the nurse turnover persists, workloads and job stress among working nurses could increase, which may result in an escalating nursing shortage. Government policy is needed to enforce adequate nurse-to-patient ratios and work hours/schedules for nurses. Nursing education may consider including whole-person career development education and stress management strategies for job stress.

4.1 | Limitations

This study was limited by the use of a cross-sectional design and temporal relationships among the study variables could not be determined. Because of the use of anonymous questionnaire surveys, we could not examine individual changes over time. Job stress, job satisfaction, depressed mood, stress adaptation, intention to leave the hospital and intention to leave the profession were measured by questions designed specifically for this study, rather than standard instruments, which may limit comparability with other studies. Since the measurement errors of the single item measures (job satisfaction, depressed mood, stress adaptation, intention to leave the hospital and intention to leave the profession) were fixed to 0, precision of the parameter estimates may be a concern (Wang & Wang, 2012). In addition, those variables were self-reported without a clearly defined time frame and without discerning state from trait measures. Future studies should apply more subtle measures of those variables to further validate our results. Since this study was a secondary data analysis and the variables available were limited, we decided to focus on examining the hypothesized model. We cannot rule out the possibility of alternative models. Reasons for intention to leave the hospital and profession were not available. Childcare, family responsibilities and work-family conflicts could increase leaving intentions (Yamaguchi, Inoue, Harada, & Oike, 2016). Future studies could take those variables into consideration.

5 | CONCLUSIONS

Many nurses in Taiwan intend to leave not only their current hospital but also the profession. Job stress has significant direct and indirect effects on intention to leave the hospital and intention to leave the profession. In addition to its direct effect on intention to leave, job stress mainly exerts its effects indirectly on intention to leave through job satisfaction, depressed mood and stress adaptation. Intention to leave the hospital usually precedes intention to leave the profession. Strategies to decrease turnover intentions among nurses could focus on creating a less stressful work environment, increasing job satisfaction and stress adaptation and decreasing

depressed mood simultaneously. Nonetheless, longitudinal studies and intervention studies are needed to further validate the proposed structural models.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria [recommended by the ICMJE (<http://www.icmje.org/recommendations/>)]:

1. substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;
2. drafting the article or revising it critically for important intellectual content.

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CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

ORCID

Shu-Ti Chiou  <http://orcid.org/0000-0002-6994-1891>

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