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Research Article

Work Climate and Nurse Job Satisfaction of a Large Medical Center in Taiwan

Thomas T.H. Wan[1]*, Shu-Feng Chien[2]

[1]Department of Health Management and Informatics, University of Central Florida, USA

[2]Technical Staff of Department of Medical Affairs and Planning, Veterans General Hospital- Taipei, Taiwan, Republic of China

*Corresponding author: Thomas T.H. Wan, Department of Health Management and Informatics, College of Community Innovation and Education, University of Central Florida, USA. Tel: +14078233678; Fax: +14078230822; Email: Thomas.Wan@ucf.edu

Abstract

The two-fold purpose of this research is:

1) To identify measurement indicators of two theoretical or latent constructs (work climate and job satisfaction) of professional nurses and

2) To determine the relationship between work climate and nurse job satisfaction in a large, tertiary care center in Taiwan. Four research questions were formulated to guide the investigation.

The respondents of a survey (N= 3,462) were professional and registered nurses from all nursing units. Work climate, a latent exogenous construct, was measured by three indicators serving as predictors of nurse job satisfaction, a latent endogenous variable, measured by five related indicators. Confirmatory factor analysis was performed for each of the two measurement models. The structural relationship between work climate and job satisfaction was examined by covariance structure analysis.

The construct validity of work-climate and job-satisfaction measurement models was demonstrated independently. The structural equation model revealed that work climate indicators were associated with nurses' job satisfaction. Safety culture, the strongest indicator of work climate, accounted for a majority of variance in nurses' job satisfaction. Hospital and nursing executives should pay greater attention to enhance better safety culture. Thus, optimal retention of professional nurses could be achieved by implementing and practicing safety culture activities.

Introduction

Higher productivity is associated with job satisfaction of employees. Thus, healthcare managers and executives are interested in identifying organizational mechanisms for increasing employees' job satisfaction. The purpose of this empirical study is to examine the relative importance of personal and work climate factors affecting the variability in job satisfaction of professional nurses in a complex and large medical center located in Taiwan whereby a single payer or national health insurance is operative. Based on the organizational literature on the relationship between work climate and job satisfaction, this study has raised specific four research questions as follows:

1. Is nurse job satisfaction measurable by self-reported indicators?

2. To what extend the safety culture, work pressure and collaboration in a large complex medical center can measure the construct of work-climate perceptions?

3. Does job satisfaction vary by the rank of nursing staff?

4. What is the relative contribution of each of work climate variables and personal factors in explaining the variation in nurse job satisfaction?

Related Research

In conducting a systematic review of factors contributing to nurse job satisfaction, Bronwyn, Bonner and Pryor [1] found that both inter- and intra-hospital characteristics were important to understand the variability in job satisfaction. Avery, Smillie, & Fife-Schaw, argue that "job satisfaction is typically conceptualized as a multidimensional construct encompassing satisfaction with one's manager, peers, pay, promotional opportunities, job security and company policy" [2]. This does not come as a surprise if one accepts that people have different views on goal attainments and preferences. Some researchers argue that job or work satisfaction is related to organizational culture [3], safety climate [4], work environment [5], ethical climate [6], work stress or strain [7], collaboration in nurse professional practices [8], and safety culture [9] within hospitals.

Blegen [10] performed meta-analysis of 48 studies that addressed job satisfaction among nurses. There were a total of 15,048 subjects. She found the strongest perceptual correlates to job satisfaction were stress, communication with supervisor, and communication with peers. By contrast, age and professionalization had low correlations. Krueger et al., [11] examined staff perception of organizational factors that impact job satisfaction. They administered a survey to 1,819 employees at six independent health care organizations in Canada and tested for 40 possible predictors of job satisfaction. They identified best predictors, such as communication, keeping employees employed, teamwork, good supervisor, social support, infrequent excessive work, enough time to get work done, job classification and pay level. They concluded that job satisfaction is a "multidimensional construct and is a product of the global evaluation of one's work place and context" [11].

This study builds on Avery, Smillie, & Fife-Schaw [2] conceptualization of job satisfaction but it also examines whether there are differences in job satisfaction with respect of the staff rank. Chien, Wan and Chen [12] conducted a path analysis of predictors of teamwork and collaboration among professional nurses in Taiwan. They found that work related indicators are important predictors of the variability in teamwork and collaboration among nurses.

Materials and Methods

Study Design

A cross-sectional survey was conducted within a single medical center with more than 4,000 professional (registered) nurses.

Sample

The data for this study were collected in 2008 by a structured survey questionnaire. There was a total of 3,462 professional nurse respondents.

Measurement of the Study Variables

The survey instrument included 40 questions pertaining to teamwork, safety culture, work pressure, management integrity, collaborations, and job satisfaction. All of these constructs were scored from 1 (strongly disagree) to 5 (strongly agree) in a Likert scale. In addition, demographic information such as gender, staff position (rank), age, educational level, fulltime status, and years of employment was also collected and coded for each respondent. The measurement indicators and operational definitions are presented in Appendix 1.

Variable	Description	Measurement Indicators or Questionnaire Items (I)
Latent Endogenous Variable (Job Satisfaction)	Satisfaction with current job	I15: I like my job. I16: Working here is like being a part of a large family; I17. This is a good place to work; I18: I am proud to work in this place; I19: Morale here is very high;
Latent Exogenous Variables (Work Climate)		
Safety Culture	Perception of the safety of the work environment	I7: I would feel safe being taken care of in my work area; I8: Errors or mistakes are handled appropriately in the work area; I9: I know the proper channels to direct questions regarding problems encountered at work; I10: I receive appropriate feedback about my performance; I11: It is very difficult errors or mistakes at work; I12: I am encouraged by my colleagues to report any concerns I may have; I13: The culture here makes it easy to learn from the errors of others; I14: My suggestion about safety issues would be acted upon if I expressed them to management.

Work Pressure	Perception of pressure experienced at work	I20: When my workload becomes excessive, my performance is impaired; I21" I am less effective at work when fatigues; I22: I am more likely to make errors in tense or hostile situations; I23: Fatigue impairs my performance during emergency situations.
Collaboration	Perception of collaborative relationships with other staff	I38: I experience good collaboration with other workers; I39: I experience good collaboration with my colleagues; I40: I experience good collaboration with other professionals.
Other Exogenous Variables (Personal Factors)		
Age	Age group	1: >20; 2: 21-30; 3: 31-40; 4: 41-50; 5: 51-60; 6: 61>.
Rank	Rank as manager or staff nurse	1: supervisors; 2: staff.
Years Served	Years of employment	1: >6 months; 2: 6-11 months; 3: 1-2 years; 4: 3-4 years; 5: 5-10 years; 6: 11-20 years; 7: 21>.

Appendix 1: The Description of Study Variables and Measurements.

Analytical Approach

In order to provide answer to the four research questions, this study utilize confirmatory factor analysis (CFA) to validate the construct validity of selected indicators for work climate and for job satisfaction, and structural equation modeling (SEM) to determine the structural relationships of personal and organizational factors to nurse job satisfaction.

Prior to conducting multivariate analysis, the dataset was cleaned. Descriptive and correlations analyses of the data were performed. The use confirmatory factor analysis is suitable for validation of the measurement models of the endogenous construct of job satisfaction, and the exogenous construct of work-related perceptions as CFA explains the variation and covariation in a set of observed variables in terms of a set of theoretical, unobserved factors [13]. After the two measurement models were validated and further tested by multiple group analysis for supervisors and staff nurses, structural equation modeling was performed. SEM is useful for this analysis as it allows to theoretically specify complex relationships and then to test whether these relationships are present in the sample data [14]. Another advantage of the use of SEM is that it allows for testing the structural relationships among multiple constructs relevant to work climate at a large and complex medical center. The statistical software (i.e., IBM's SPSS-AMOS) was used.

Results

Descriptive Statistics

Prior to the validation of the measurement models and the covariance structural model, we screened for missing values. The descriptive analysis showed that a number of variables had missing values. In particular, the variables age, years of employment, educational attainment, fulltime status and rank had between 88 and 219 missing data points. Bearing in mind that the goal of this analysis is to validate the proposed theoretical model, all missing data points were deleted list wise. This means that if a data point was missing in one variable, the entire case was deleted. After the deletion of respondents with missing values, the final data set contained a total of 2,969 nurse observations. Notwithstanding that a large number of data points were lost, the sample is still sufficiently large enough to perform multivariate analysis. (Table 1)

	I_15	I_16	I_17	I_18	I_19	Group
Mean	3.73	3.82	3.73	3.93	3.53	1.232
Median	4	4	4	4	4	1
Mode	4	4	4	4	4	1
Std. Deviation	1.059	1.022	1.055	0.949	1.067	0.4224
Skewness	-0.541	-0.668	-0.538	-0.55	-0.389	1.268
Std. Error of Skewness	0.045	0.045	0.045	0.045	0.045	0.045

Kurtosis	-0.316	-0.061	-0.381	-0.296	-0.429	-0.393
Std. Error of Kurtosis	0.09	0.09	0.09	0.09	0.09	0.09
Minimum	1	1	1	1	1	1
Maximum	5	5	5	5	5	2
Notes: * Indicator (I) is defined as follows: I15 (like my job), I16 (like work with the family), I17 (a good place to work), I18 (proud to work at this hospital), and I19 (morale is high here). Group includes staff nurse (coded 1) and supervisory nurse (coded 2).						

Table 1: Descriptive statistics of the study variables* (N=2,969).

The descriptive statistics showed median of all questions with a value of 4 and the mean values between 3.53 and 3.93. The skewness of the distribution is -12.022 (-0.541/0.045) and the kurtosis is -3.511(-0.316/0.090). However, the distribution is relatively normal sufficing for multivariate analysis.

Prior to the validation of the measurement model, we examined the multi-collinearity among the measurement variables or indicators. This is aligned with the fact that the measurement model should be built on the theoretical specification and highly correlated indicators should not be used in the measurement model (Wan, 2002). Bearing in mind that this study aims to examine if there is a difference in job satisfaction between staff nurse (coded 1) and nursing supervisors (coded 2), two correlation matrices were presented. The first correlation matrix presented in Table 2 is for group 1 (staff) and the second correlation matrix presented in Table 3 is the correlation matrix for group 2 (supervisors).

	I_15	I_16	I_17	I_18	I_19
I_15	1				
I_16	.646**	1			
I_17	.694**	.752**	1		
I_18	.689**	.718**	.788**	1	
I_19	.555**	.673**	.717**	.664**	1
Note: ** Correlation coefficient is statistically significant at the 0.01 level (2-tailed).					

Table 2: Correlations matrix for group 1(staff nurses) (N=2,279).

	I_15	I_16	I_17	I_18	I_19
I_15	1				
I_16	.628**	1			
I_17	.669**	.702**	1		
I_18	.658**	.683**	.735**	1	
I_19	.533**	.649**	.624**	.610**	1
Note: ** Correlation coefficient is statistically significant at the 0.01 level (2-tailed).					

Table 3: Correlations matrix for group 2 (Supervisors) (N=690).

Tables 2 and 3 shows that there is a statistically significant correlation at 0.01 level among all variables, irrespective of staff rank. No serious multi-collinearity issue was observed among the variables. The highest correlation is 0.788, between the indicators I17 (this a good place to work) and I18 (I am proud to work in this place). However, as no correlation between the variables is above 0.80, there is no need to exclude any variables from the measurement model of job satisfaction.

Confirmatory Factor Analysis (the Measurement Model of Job Satisfaction)

Initially, the measurement model of job satisfaction with the total sample was performed. The five selected indicators used in the specification of the measurement model of job satisfaction were theoretically grounded on the literature. The endogenous construct of job satisfaction includes five indicators I15 - I19. The questions referred to whether the person likes his/her job (I15), if the work is like a family (I16), whether the hospital is a good place to work (I17), if he/she is proud to work at that place (I18) and whether the morale is high there (I19). The 5-indicators measurement model of the endogenous construct of job satisfaction was validated by confirmatory factor analysis using SPSS-AMOS.

The measurement model of the endogenous construct of job satisfaction is pictorially represented in Figure 1. All of the five factor loadings of the indicator variables were statistically significant at 0.05 level. The goodness of fit statistics in Table 4 shows that the model is reasonably fitted with the data when correlated measurement errors are not considered.
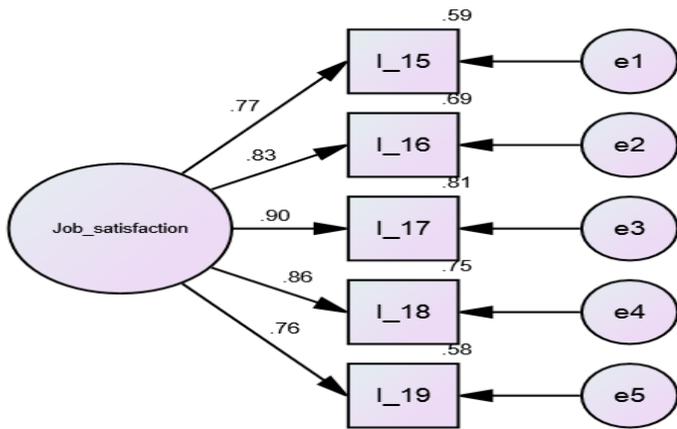
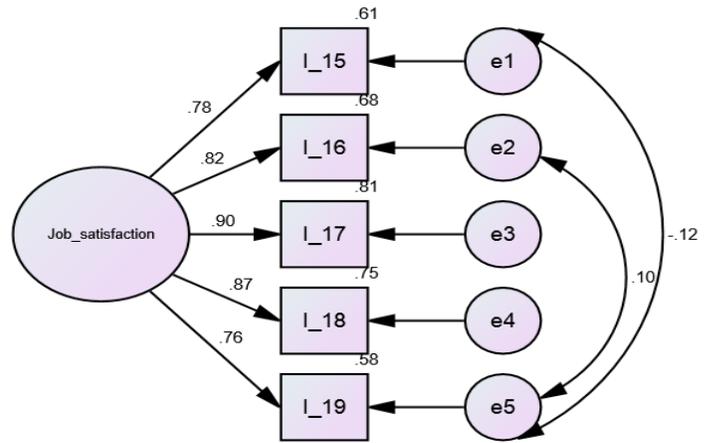**Figure 1:** Measurement model of job satisfaction for the total sample.

Index	Criterion	Results
Chi-square (X²)	Low	73.978
Degrees of Freedom (df)	≥.0	5
Likelihood Ratio (X²/df)	<4	14.796
Goodness of Fit Index (GFI)	>.90	0.99
Adjusted GFI (AGFI)	>.90	0.97
Root Mean Square Error of Approximation (RMSEA)	≤.05	0.068

Table 4: Goodness of fit statistic for the measurement model of job satisfaction.

When the revised/nested measurement model with two correlated measurement errors for the indicators was examined, an improvement of the model fit to the data was achieved. This revised and nested model is presented in Figure 2. (Table 5)

Figure 2: A revised/nested measurement model of job satisfaction with correlated errors.

Index	Criterion	Results
Chi-square (X²)	Low	11.553
Degrees of Freedom (df)	≥.0	3
Likelihood Ratio (X²/df)	<4	3.851
Goodness of Fit Index (GFI)	>.90	0.998
Adjusted GFI (AGFI)	>.90	0.992
Root Mean Square Error of Approximation (RMSEA)	≤.05	0.031

Table 5: Goodness of fit for revised measurement model of job satisfaction.

The goodness of fit statistics for the revised measurement model of job satisfaction indicates that the model has an excellent fit to the data. Therefore, there is no need for further improvements of the model. In addition, this answers the first research question

that job satisfaction can be validly measured by these five observed variables (I15-I19). Importantly, the indicator I17 (a good place to work with a factor loading of 0.90) is the most dominant variable for measuring job satisfaction.

Multiple Group Analysis of Job Satisfaction by Staff Position

In order to provide answer to the second research question on the relationship between the five indicators I15-I19 and job satisfaction, irrespective of the rank, confirmatory factor analysis was conducted using multiple group analysis. Comparison was made between Group 1 (nurse staff) and Group 2 (nursing supervisors). The measurement models for both groups with the same specifications had comparable factor loadings; therefore, only Group 1 is presented.
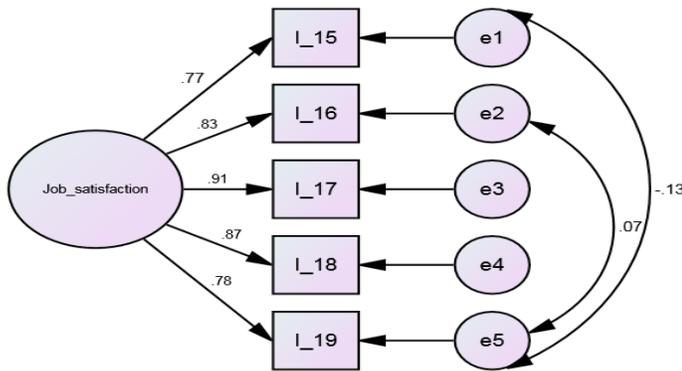

Figure 3: Measurement model of job satisfaction (Group 1).

First, the factor loadings examined for all of the observed indicators showed statistically significant at 0.05 level. The goodness of fit statistics indicates that the measurement model for job satisfaction has a very good fit to the data, irrespective of staff rank or position in the nursing department. (Table 6)

Index	Criterion	Results
Chi-square (X^2)	Low	17.932
Degrees of Freedom (df)	$\geq.0$	10
Likelihood Ratio (X^2/df)	<4	1.793
Goodness of Fit Index (GFI)	>.90	0.998
Adjusted GFI (AGFI)	>.90	0.993
Root Mean Square Error of Approximation (RMSEA)	$\leq.05$	0.016

Table 6: Goodness of fit statistic for multiple-group measurement model of job satisfaction.

Notwithstanding the fact that the model has good fit to the data, there is a relatively small difference in standardized regression weights (factor loadings) between the two groups. The factor loadings for both groups are presented below.

Job Satisfaction Indicators	Group 1 (Staff)		Group 2 (Supervisors)	
	Standardized factor loadings	Unstandardized factor loadings	Standardized factor loadings	Unstandardized factor loadings
I15	0.774	1	0.783	1
I16	0.832	1.03	0.792	1.03
I17	0.906	1.16	0.871	1.16
I18	0.868	1.003	0.849	1.003
I19	0.782	1.001	0.708	1.001

Table 7: Factor loadings for the measurement model of job satisfaction for nursing groups.

Table 7 illustrates that although the standardized estimates are not exactly same for the two groups, the indicator I17 (good place to work) has a factor loading of .906 for group 1 (staff) and 0.871 for group 2 (supervisor) as it is the most reliable indicator in the measurement model of job satisfaction for both nursing groups. As this a good model fit, it answers the second research question that the five observed variables are good indicators for measuring job satisfaction, irrespective of the rank (or position) of professional nurse employees.

Work Climate

The measurement model of work-related perceptions is conceptualized as measured by safety culture, work pressure and collaboration. Appendix 1 presents the definitions and operational measures. Safety culture is measured by observed variables I7-I15 variables, work pressure by I20-I23 and collaborations is measured with I38-I40. The generic measurement model of the exogenous construct of work related perceptions is illustrated in Figure 4. All of the observed variables in the measurement model have critical values larger than 1.96 which means that they are statistically significant at 0.05 level. However, the goodness of fit statistics indicates that the model is not perfectly fitted to the data. (Table 8)
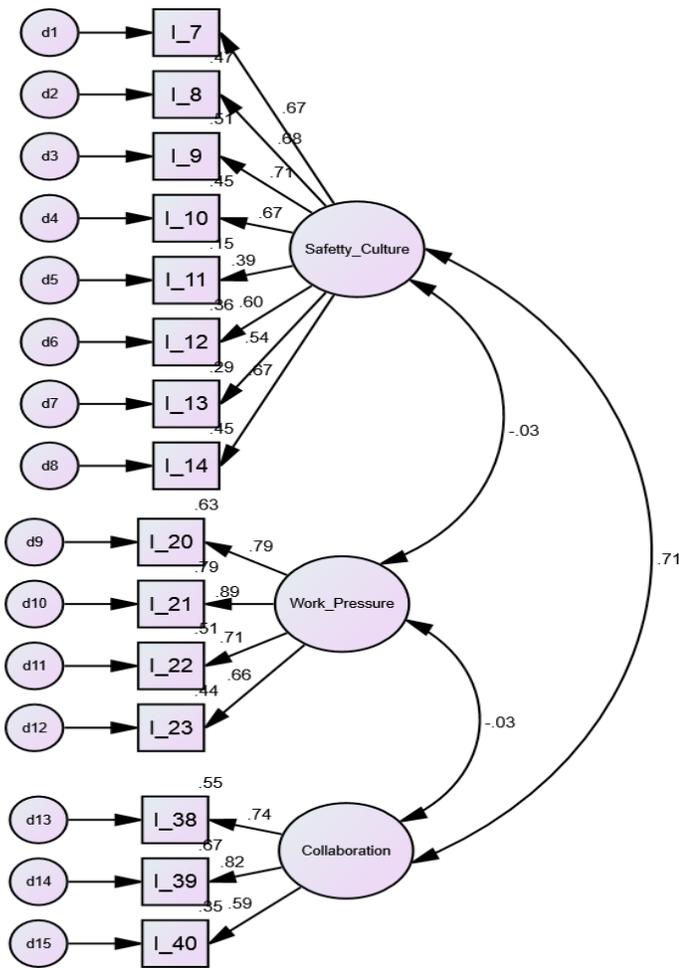
Figure 4: The measurement model of work climate with three sub-latent constructs (Safety culture, work pressure, and collaboration).

Index	Criterion	Results
Chi-square (X²)	Low	1048.52
Degrees of Freedom (df)	≥.0	87
Likelihood Ratio (X²/df)	<4	12.052
Goodness of Fit Index (GFI)	>.90	0.953
Adjusted GFI (AGFI)	>.90	0.935
Root Mean Square Error of Approximation (RMSEA)	≤.05	0.061

Table 8: Goodness of fit statistic of the measurement model of perceived work climate.

The above statistics indicate that the model can be further revised and improved. Therefore, modification indices were examined and the model was revised. The revised model is presented in Figure 5.
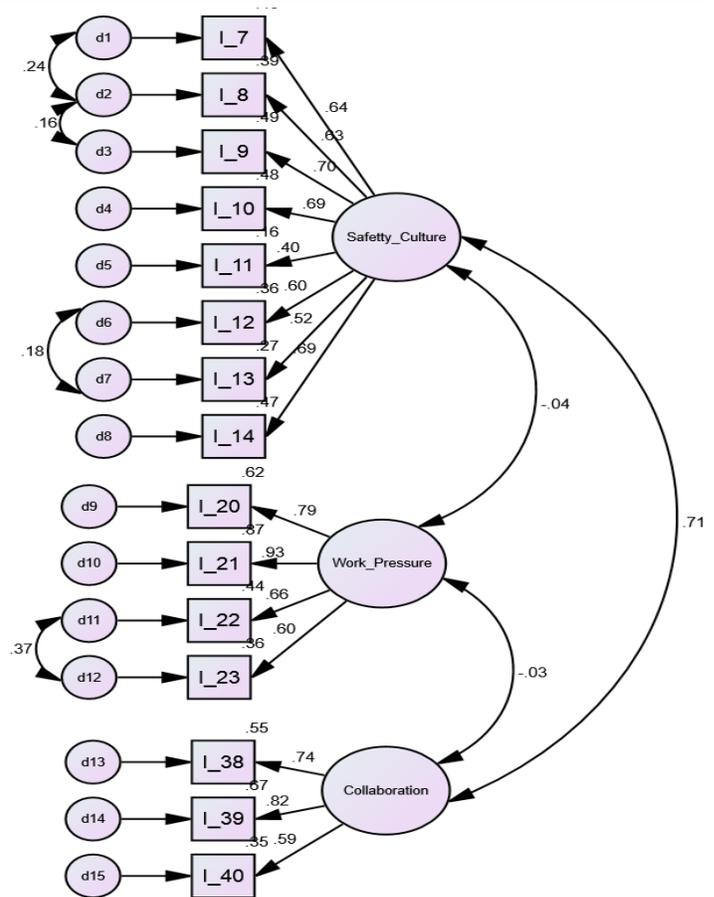

Figure 5: A revised/nested measurement model of perceived work climate with Correlated Errors.

In this measurement model, all factor loadings were statistically significant at 0.05 level. The goodness of fit of the revised model with correlated error measures indicates that the measurement model fits the data reasonably well and no additional changes should be makes (Table 9). This provides answer to the third research question and indicates that the perceptions of work climate are shared in common with three indicators such as safety culture, work pressure and collaboration.

Index	Criterion	Results
Chi-square (X²)	Low	420.873
Degrees of Freedom (df)	≥.0	83
Likelihood Ratio (X²/df)	<4	5.071
Goodness of Fit Index (GFI)	>.90	0.981
Adjusted GFI (AGFI)	>.90	0.973
Root Mean Square Error of Approximation (RMSEA)	≤.05	0.037

Table 9: Goodness of fit statistics of the measurement model of perceived work climate (revised model).

Covariance Structure Model

After validating the measurement models, we combined the exogenous (predictor) and endogenous (response) variables in a structural equation model to determine the relative effect of each of the predictors on job satisfaction. The covariance structural model is presented below.

In order to evaluate the structural model, the factor loadings were examined. This revealed that the variables rank and educational attainment were not statistically significant at 0.05 level. In particular, the critical value of the factor loading of education is 1.129 and the critical value of staff rank is 1.283. As there were not statistically significant, we removed them from the revised predictive model. A final model is presented in Figure 6.
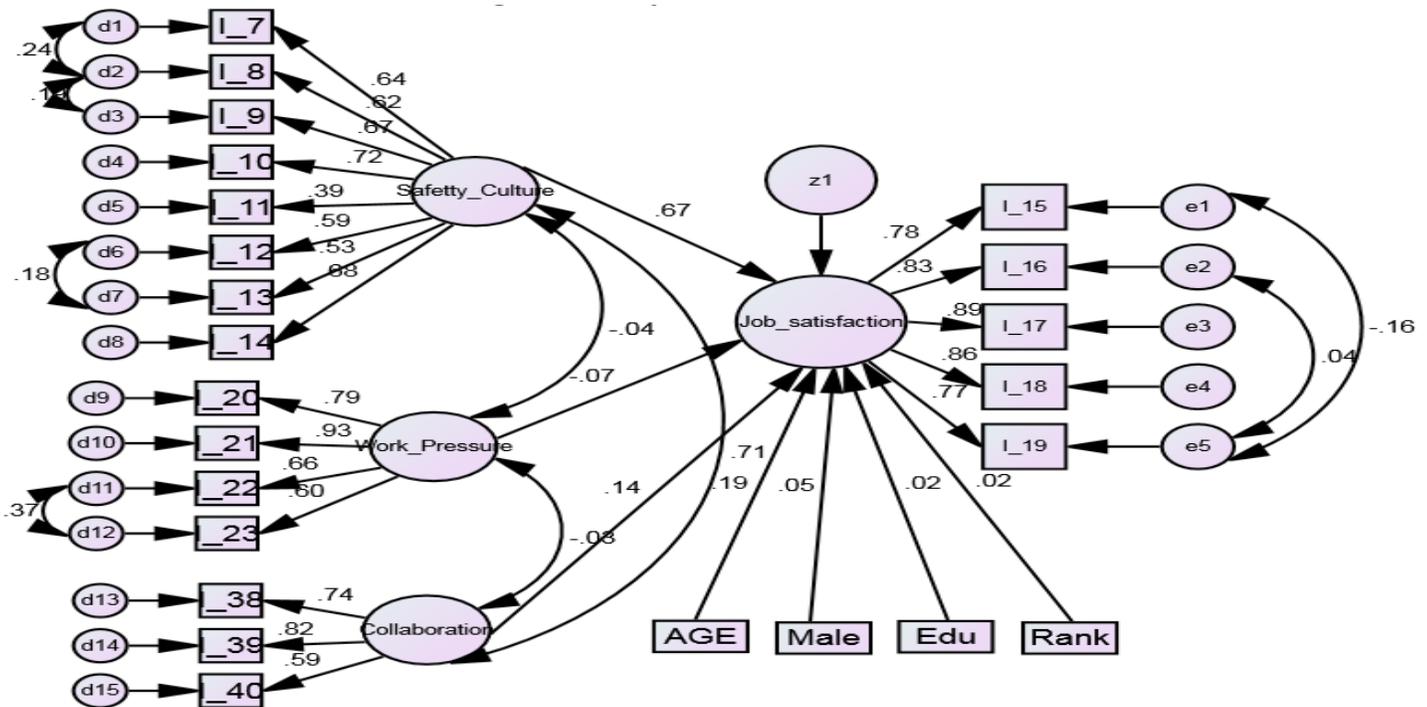

Figure 6: Generic model of Predictors of Job Satisfaction.

All of the factor loadings in the revised model are statistically significant. In addition, the goodness of fit statistics indicates that the model is a reasonable fit to the data. (Table 10)

Index	Criterion	Results
Chi-square (X^2)	Low	1366.208
Degrees of Freedom (df)	≥ 0	196
Likelihood Ratio (X^2/df)	<4	6.97
Goodness of Fit Index (GFI)	>.90	0.958
Adjusted GFI (AGFI)	>.90	0.946
Root Mean Square Error of Approximation (RMSEA)	$\leq .05$	0.045

Table 10: Goodness of Fit Statistics for revised Covariance Structure Model of Job Satisfaction.

The goodness of fit statistic reveals that the model has a good fit to the data. In an absence of new theoretical or empirical information, the model was not further improved. With regards to the relative importance of the exogenous indicators or predictors in explaining the variation in nurse job satisfaction, most important predictor is safety culture with a standardized regression coefficient of 0.675. Importantly, this study also demonstrates that work pressure has a negative impact on job satisfaction (standardized regression coefficient of -0.072). Older and male professional nurses were more satisfied with their work at the medical center than younger and female nurses.

Endogenous Variable		Predictors	Standardized Regression weight	Unstandardized Regression weigh	S.E.	C.R.
Job_satisfaction	<---	Safetty_Culture	0.674	0.836	0.038	22.00*
Job_satisfaction	<---	Work_Pressure	-0.072	-0.087	0.018	-4.92*
Job_satisfaction	<---	Collaboration	0.122	0.181	0.038	4.741*
Job_satisfaction	<---	Age	0.204	0.15	0.011	13.47*
Job_satisfaction	<---	Male (coded 1)	0.053	0.11	0.028	3.938*
*Statistically significance at 0.05 or lower level						

Table 11: Regression weights of predictors of job satisfaction.

Discussion

Implications

This study provides relevant answers to four research questions. For the first research question, we demonstrated the validity of nurse job satisfaction measured by five indicators (I15-I19). The literature suggests that additional indicators such as salary level, compensation, mobility and flexibility of the work schedule could be further considered. With regards to the second research question, the five observed variables are shown to be good indicators for measuring job satisfaction, irrespective of nursing position (rank). Thus, these indicators can be effectively used as the measurement variables for nurse job satisfaction without concern about the rank of a nursing position. With regards to the third research question, work climate can be adequately reflected by safety culture, work pressure and collaboration. However, there is an unexplained common variance not accounted for by the three work climate constructs. The organizational culture, as an additional work climate related construct, should be included in the future construction of a better measurement instrument of work climate. The literature also suggests that additional sub-constructs such as empowerment, autonomy, communication, and fulfillment could be included in the measurement model. With regards to the fourth research question, the covariance structure model of perceived work climate and job satisfaction of nurses offers evidence in support of the relative contribution of each predictor variable of work climate and personal characteristics for explaining the variability in job satisfaction. Safety culture is one of the most influential predictors of job satisfaction of nurses.

Limitations

This cross-sectional study has two limitations. First, the sample of professional nurses drawn from a single medical center in Taiwan is relatively large. However, it might not necessarily represent nursing employees in other large hospitals. Future research needs to select a diverse sample of nurses from multiple hospitals. Second, job satisfaction of nurses may be influenced by nursing unit characteristics such as the quality of administrative and technical support, the type of nursing systems, specialties in nursing practice, and unit-level size. Future research on nurse job satisfaction should employ a two-level design in collecting data at the nurse and nursing unit levels. Thus, the relative effects of personal and work climate factors on job satisfaction of nurses can be ascertained in multi-hospital studies.

Conclusion

Job satisfaction could affect turnover [7,15,16]. Consequently, hospitals would be sage to pay attention to the determinants of job satisfaction. While compensation may be an important contributing factor to staff turnover, other perceptual aspects of work environment may also influence job satisfaction. Thus, job satisfaction is a multi-dimensional construct influenced by a complex set of personal and organizational factors. This study confirms the fact that safety culture is an important factor influencing nurse job satisfaction. Furthermore, nurse job satisfaction does not vary by their ranks.

This study revealed how work climate indicators such as safety culture, work pressure and collaboration were associated with job satisfaction of registered nurses in Taiwan. Safety culture, the strongest indicator of work climate, accounted for a majority of variance in job satisfaction of nurses. Hospital and nursing executives should pay greater attention to enhance better safety culture. Thus, hospitals can achieve optimal retention of professional nurses by implementing and practicing safety culture activities.

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