

Predictors of Nurse Turnover: Model Development and Testing

Richard Redman¹ · Sung-Hyun Cho² · Shake Ketefian³ · Oi Saeng Hong⁴

Abstract

Background: The phenomenon of nursing turnover has been explained by organizational commitment, job satisfaction, or intent to stay in previous studies; yet the combined contribution of these factors to nurse turnover has not been examined.

Objectives: The purpose of this study was to develop and test a turnover model which included professionalism, job-related variables, job satisfaction, organizational commitment, and intent to stay.

Method: A total of 424 registered nurses in a university hospital completed a self-administered questionnaire including Professionalism Scale, Job Diagnostic Survey, Nurse Assessment Survey, and intention to stay. Nurses were classified as to whether they remained in or had left the organization 18 months after the survey. Multiple regression and logistic regression analyses were conducted to test the model.

Results: Overall job satisfaction and intent to stay were the most important determinants of nursing turnover. Organizational commitment positively affected intent to stay and indirectly decreased turnover through intent to stay. Satisfaction with coworkers and supervisor were the most important factors in explaining overall job satisfaction. Satisfaction with pay, autonomy, and feedback from job also positively affected overall job satisfaction.

Conclusion: Using the results of the tested model nurse managers and administrators could predict turnover by monitoring its determinants, and ultimately reduce the turnover rate through early intervention.

Key words : *Nursing turnover, Job satisfaction, Intent to stay*

Introduction

The market for registered nurses (RNs) has shifted dramatically during the past fifteen years,

especially in the acute care sector. The 1980's presented a market shortage of RNs with many hospitals offering a variety of incentives to recruit and retain nurses. By the early 1990's,

1. Associate Dean for Academic Affairs, University of Colorado Health Sciences Center, School of Nursing

2. Doctoral Student, University of Michigan, School of Nursing

3. Professor, University of Michigan, School of Nursing

4. Postdoctoral Fellow, University of Michigan, School of Nursing

Received 25 April 2000; Accepted 26 November 2000.

many hospitals were downsizing their staff and RNs frequently faced difficulty in finding employment of their choice in their local market. In the late 1990's the signs of another major nursing shortage have appeared in various regions throughout the U.S. Hospital employers are beginning to offer incentive packages to recruit and retain nurses, especially for positions in critical care units and the operation room. Throughout these cycles, the retention of qualified RN staff has continued to be a major challenge for nurse managers and their organizations.

Voluntary turnover of employees has been a management issue of long standing interest across all types of organizations. Significant organizational costs and potential erosion of quality are associated with the loss of experienced employees and the subsequent recruitment and orientation of their replacements. This is especially true in nursing where long orientation periods are common, particularly in critical care areas, before an employee can function independently and productively.

The purpose of this research was to develop and test a model which would enhance knowledge about voluntary nurse turnover and the factors that explain and contribute to the phenomenon of turnover.

The Turnover Model

The model developed for this study was constructed based on critical variables from previous research which have shown a relationship to voluntary turnover or to factors in the work environment which have been empirically demonstrated as being meaningful to nurses in the practice setting.

Empirical research suggests that nurses' job satisfaction affects nurse turnover directly and indirectly. A high level of professionalism is thought to lead to high job satisfaction through the professional growth and recognition implied (Hinshaw, Smeltzer, & Atwood, 1987), while task routinization has been found to be a negative determinant (Agho, 1993; Blegen & Mueller, 1987; Curry, Wakefield, Price, Mueller, & McCloskey, 1985; Gurney, Mueller & Price, 1997; Price &

Mueller, 1981). Climates conducive to autonomous nursing practice were found to increase job satisfaction (Hinshaw et al., 1987; Pierce, Hazel, & Mion, 1996; Price & Mueller, 1981). Conversely, centralization of decision making was associated with lower job satisfaction (Curry et al., 1985).

Bloom, Alexander, and Nuchols (1992) have reported that organizational characteristics were stronger predictors of turnover than economic factors such as pay, although fairness of rewards positively affected job satisfaction (Blegen & Mueller, 1987; Curry et al., 1985).

In the model developed and tested in this research, satisfaction with co-workers was expected to increase job satisfaction. Units where nurses perceived higher levels of group cohesion have been associated with higher job satisfaction among the staff (Gurney et al., 1997; Leveck & Jones, 1996). Satisfaction with supervisor is an important part of job satisfaction. Leveck and Jones (1996) found that a participative management style indirectly increased job satisfaction through group cohesion.

Feedback from job and agents were expected to increase job satisfaction. Instrumental communication, defined as the degree to which information about the job is transmitted by the organization to the employee, positively affected job satisfaction (Agho, 1993; Price & Mueller, 1981).

Job satisfaction is found to have a strong positive relationship with intent to stay (Bruffey, 1997; Curry et al., 1985; Hinshaw et al., 1987; Irvine & Evans, 1995; Parasuraman, 1989; Price & Mueller, 1981), although Bruffey (1997) has suggested that organizational effects such as work excitement, social climate, and work frustration are important considerations as well.

Organizational commitment correlates positively with intent to stay and ultimately negatively affects turnover (Curry et al., 1985; Parasuraman, 1989). Gurney, Mueller and Price (1997) investigated a causal model of organizational attachment (commitment and intent to leave) for nurses holding doctoral degrees. In their study intent to leave was directly reduced by greater organizational commitment. In addition, growth need strength was found to contribute to a lower intent to stay.

Intent to stay (or leave) has been shown to be the most important determinant of nursing turnover (Curry, et al., 1985; Irvine & Evans, 1995; Parasuraman, 1989; Price & Mueller, 1981; Taunton, Boyle, Woods, Hansen & Bott, 1997). While intent to leave had a strong direct effect on turnover, job satisfaction had an indirect effect on turnover through intent to leave (Curry et al., 1985). This suggests that intent to stay mediates the job satisfaction-turnover relationship (Lucas, Atwood, & Hagaman, 1993; Price & Mueller, 1981).

Based on literature review, the proposed turnover model incorporated selected variables including professionalism values, job characteristics, affective variables (job satisfaction, satisfaction with pay, co-workers and supervisors, organizational commitment), and behavioral intentions. The selected variables stress the importance of the behaviorally oriented models, which focus on psychological constructs. This approach addresses variables in the working

environment which are under the control of management and the organization and appear to be directly or indirectly related to voluntary turnover.

Definitions of the model components are provided in Table 1. The hypothesized relationships among study variables are depicted in Figure 1. As shown in Figure 1, professionalism (belief in service, belief in self regulation, sense of calling, feeling of autonomy), objective job characteristics (skill variety, autonomy, feedback from job and agents) and affective responses to the job (satisfaction with pay, social aspects/co-workers, and supervisors) are antecedent variables posited to be associated directly with overall job satisfaction. Professionalism values, overall job satisfaction, organizational commitment, and the strength of individual growth need strength are hypothesized to be related to intent to stay. Overall job satisfaction and intent to stay are first- and second-level outcomes, respectively. These two

Table 1. Definitions of the Model Components

Variable	Definition
Turnover	Voluntary separation of the employee from the organization
Intent to stay	The likelihood perceived by the individual of continued participation in the organization
Organizational commitment	The acceptance of loyalty to the organization and a sense of pride and ownership in the organization
Professionalism	Attitudes and ideologies that are valued by an occupational group
Belief in service	
Belief in self-regulation	
Sense of calling	
Feeling of autonomy	
Context satisfaction	
with pay	Satisfaction with the amount and fairness of pay and fringe benefits
with social aspect	Satisfaction with the degree to which the employee is satisfied with co-worker
with supervision	Satisfaction with the amount and quality of supervisor's support and guidance
Overall satisfaction	The degree to which the employee is satisfied and happy in his/her work
Growth need strength	The degree to which the employee has desire to obtain growth satisfactions from his/her work
Skill variety	The degree to which a job requires a variety of different activities in carrying out the work
Autonomy	The degree to which the job provides substantial freedom, independence, and discretion to the employee
Feedback from agents	The degree to which the employee receives information about his/her performance effectiveness from supervisors or from co-workers
Feedback from job	The degree to which carrying out the work activities required by the job results in the employee obtaining information about the effectiveness of his/her performance

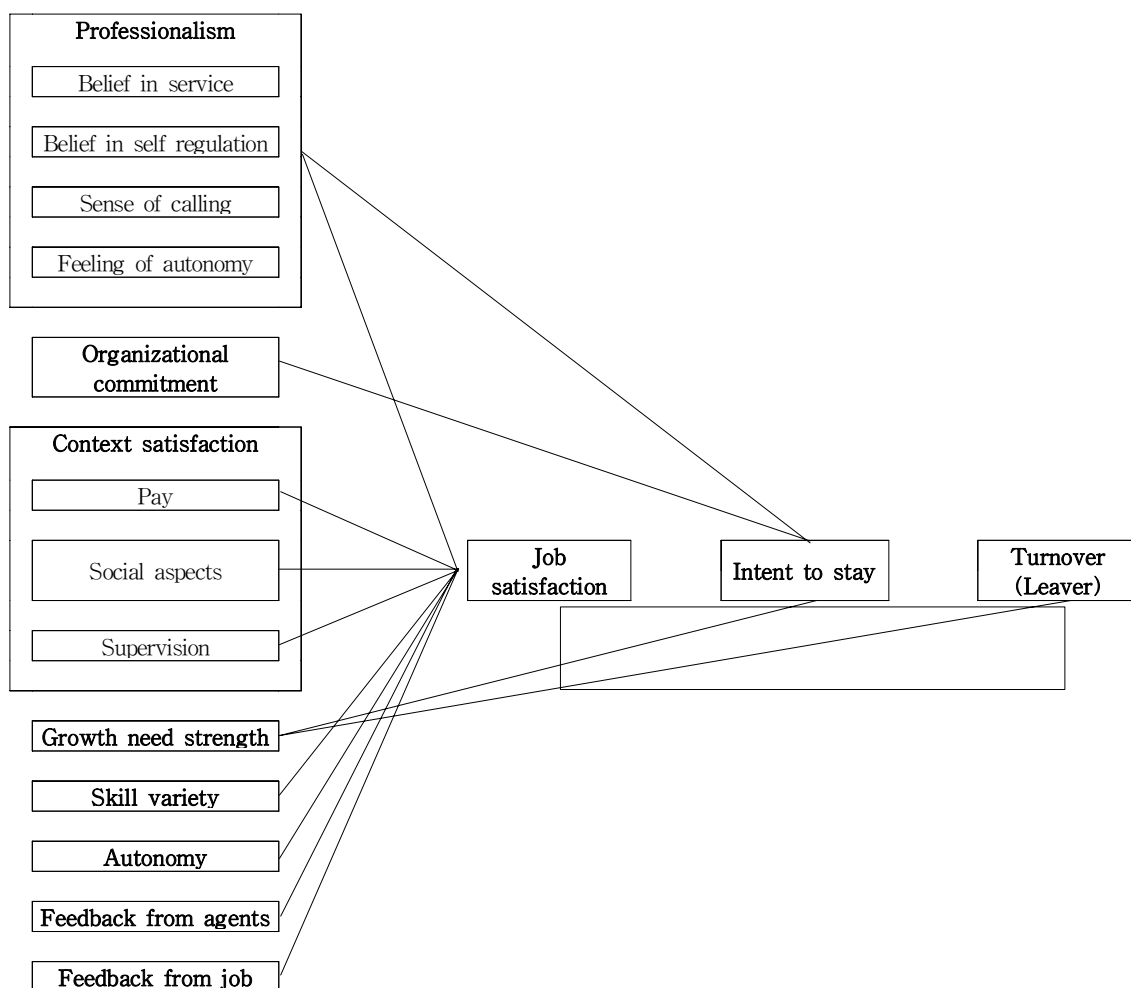


Figure 1. The proposed model of turnover

primary outcome variables and the strength of individual growth need are posited to have direct effects on nurses' turnover.

Methods

Sample

A convenience sample of RNs working in a tertiary medical center in a Midwestern state was recruited. Nurses from all areas of practice and shifts were invited to participate. All full-time and regular part-time, unit-based nurses were eligible if they had been employed for a minimum

of six months within the institution. A total of 424 nurses were included in the analysis. The average age was 41 (SD=8.0), ranging from 24 to 61 years. The sample was predominantly female (92%) and white (91%). The mean length of professional experience was 16 years (SD=8.2). About 56% and 19% of the sample completed baccalaureate and graduate degrees, respectively. Sixty-two percent and 59% were full-time and on day shift, respectively. The most commonly reported positions were clinical II (35%) and clinical I (31%). Others were clinical leaders (14%), and clinical III (12%), and managers (8%).

Instruments and Measures

The constructs included in the study, instruments used to measure them, mean scores, and Alpha reliability coefficients for the study sample are reported in Table 2. Except for professionalism, skill variety and satisfaction with co-workers, all scales had reliabilities of at least .70 for this sample. Except for turnover (leaver) and intent to stay, study variables were measured using three instruments: Job Diagnostic Survey (JDS), Professionalism Scale, and Nurse Assessment Survey (NAS). Each instrument is described below.

Job Diagnostic Survey (JDS)

Several study variables were measured by the JDS (see Table 2). The JDS was developed by Hackman and Oldham (1980) to diagnose jobs. It is an objective, self-administered tool which measures key elements of the job: job characteristics, psychological aspects of the job such as employees' satisfaction with job and the work context, and the growth need strength of employees. Job characteristics involve five core components (skill variety, task identity, task significance, autonomy, feedback from the job) as well as feedback from agents and dealing with others. The items in the JDS were scored on a 7-point Likert-type scales ranging from 1 (extreme negative) to 7 (extreme positive). Respondents indicate their level of agreement with the item. The validity and internal consistency reliabilities for all scales of the JDS were reported by Hackman and Oldham (1975).

Professionalism Scale

The idea of professionalism incorporates a number of important values. These include use of scientific knowledge in practice, continuing development, commitment to values of the profession and service to client, accountability, participation in professional organizations to improve the practice environment and contribute to the health of the wider public beyond specific patients, and autonomous practice in order to practice according to dictates of conscience, among others. Several instruments have been developed to measure various dimensions of

professionalism. Among the most widely used is the Hall Professionalism Scale as revised by Snizek (1972), addressing five components; these are: use of the professional organization as a referent (note included in this study), belief in public service, belief in autonomy, belief in self-regulation, and sense of calling to the profession. Each of these scales is comprised of five items, with responses scored on a 5-point Likert-type scale ranging from strongly agree to strongly disagree. Eleven of the items are worded negatively, so that the scoring is reversed to obtain a consistent score; the higher the scale score, the higher the degree of professionalism on that scale. Regoli and Poole (1980) report reliability coefficients on the overall scale as revised by Snizek in the range of .84 to .92; the same authors also report a factor analysis confirming the predicted five-factor structure solution according to the five scales in the instrument, with reliability coefficients ranging from .37 to .69 for the scales (see Table 2).

Nurse Assessment Survey (NAS)

The NAS was utilized as a measure of organizational commitment. The NAS was developed as a modification of SPECTRUMTM (Braskamp & Maehr, 1985) to adapt it for assessing nursing practice environments. The tool has a number of scales, including that of organizational commitment, with 8 items. The reliability of SPECTRUM was tested from responses of 750 adults from various occupations and a Cronbach's alpha of .88 was reported for organizational commitment. In the present study the alpha coefficient for organizational commitment was .85.

Intent to Stay

Intent to stay is defined as the likelihood that the individual will continue in the organization. It was measured by two questions on a 5-point Likert scale; the questions pertained to the person's feelings about her/his future in the hospital (1 = definitely will not leave, 5 = definitely will leave), and their expectation about leaving the hospital in the near future (1 =

Table 2. Model Components, Scales, and Reliabilities

Variable	Scale	Number of Items	Mean	Standard Deviation	Range	Alpha Reliability
Professionalism						
Belief in Service	Professionalism Scale (PS)	5	17.7	3.1	6-25	.58
Belief in Self-regulation	PS	5	18.4	2.4	10-25	.51
Sense of calling	PS	5	16.2	3.1	7-24	.69
Feeling of Autonomy	PS	5	15.9	2.6	8-25	.37
Skill variety	Job Diagnostic Survey (JDS)	3	5.8	0.9	2-7	.63
Autonomy	JDS	3	5.3	1.1	1.7-7.0	.76
Feedback from agents	JDS	3	3.9	1.5	1-7	.83
Context Satisfaction						
with pay	JDS	2	3.6	0.9	.7-4.7	.87
with social aspect	JDS	3	5.7	0.8	2.3-7	.62
with supervision	JDS	3	4.7	1.5	1-7	.90
Feedback from Job	JDS	3	5.2	1.1	1-7	.74
Growth need strength	JDS	6	9.1	1.0	5.8-10	.88
Organizational Commitment	Nurse Assessment Survey (NAS)	8	46.3	10.4	13-68	.85
Overall Satisfaction	JDS	3	5.3	1.2	1-7	.76
Intent to Stay		2	7.2	1.9	2-10	.88
Turnover	0 = stayer 1 = leaver	1				Not Applicable

definitely will leave, 5 = definitely will not leave). One of these was reversed to achieve consistency of interpretation. The individual's scores on the two questions were then summed up, ranging from 1 to 10. Cronbach's alpha was .88 in the present study.

Turnover

Turnover was defined as the voluntary separation of employees from the organization (Price & Mueller, 1981). For this study two categories were identified from within the organization, the stayers and the leavers. This was different from the approach typically utilized in the literature, which addresses rate of employee separation over a period of a year on a given unit. Turnover data were obtained from the

personnel records of the hospital for a period of 18 months after the survey. The assignment of the individuals to the two categories occurred as follows: Respondents to the last wave (wave 3) data collection were identified, and tracked over time; they were matched manually over an 18-month period; if they were still within the organization, they were labeled as stayers, if they were not employed any longer, they were labeled as leavers. A determination was further made with the personnel office that during this period there were no separations of staff nurses that were involuntary. Therefore, this approach met the criterion of separation on a voluntary basis. For the purpose of analyses stayers were coded as 0, and leavers as 1.

Data Collection Procedures

All eligible nurses received data collection packets, including a cover letter and the self-administered questionnaires. Subjects were assured that participation was voluntary and data would be reported in the aggregate and that individual responses would not be identified. Collection sites were established throughout the institution for the return of the completed questionnaires. Non-respondents received second and third follow-up letters in an effort to improve the response rate.

Institutional review board approval was obtained for each wave of data collection. Voluntary completion of the questionnaire implied consent for participation.

Results

Descriptive statistics (mean, standard deviation, and range) of the study variables are provided in Table 2. Since all independent variables were conceptually related, multicollinearity was investigated by examining the zero-order correlations among the independent variables. None of the correlations among the study variables approaches the .80 criterion for multicollinearity to pose a threat to the interpretation of regression results (Asher, 1983). Hence all variables were retained. Correlations of three dependent variables with other dependent or independent variables were carefully examined. Overall job satisfaction was most strongly related with organizational commitment ($r=.51$) followed by context satisfaction (satisfaction with pay, coworkers, and supervisor, $r=.32$ to $.50$). Intent to stay was most strongly associated with both organizational commitment and overall satisfaction ($r=.43$ for both). Nurses' turnover (leaver) was negatively related with both overall satisfaction ($r=-.10$) and intent to stay ($r=-.15$), indicating that nurses with lower scores on both overall job satisfaction and intent to stay were more likely to leave the organization. All correlations were in the expected direction.

Model Testing

The proposed model was tested for each of

three outcome variables with sets of regression equations. Prior to data analysis, residuals were checked and found to meet the assumptions of the multiple regression procedure (Schroeder, 1990; Tabachnick & Fidell, 1989; Verran & Ferketich, 1984).

Model testing involved 3 steps for the estimation of a series of regression equations for each of the outcome variables. In step 1 and step 2, intent to stay and overall satisfaction were used as separate outcome variables, respectively. For each of these two primary outcome variables, linear multiple regression was used to examine the direction and strength of relationships between the predictors and outcome variable in the model. The standardized regression coefficients (β s) were used to determine the direct effect of each independent variable on dependent variables. An alpha level of .05 was set for statistical significance.

In step 3, turnover (leaver) was used as the outcome variable. Logistic multiple regression was used to assess the associations of this dichotomous dependent variable with the selected predictors. Finally, logistic regression was run for the final outcome variable once more to explore its relationships with all of the proceeding variables. For this purpose, all study variables were allowed to have direct relationship with turnover.' In logistic regression, odds ratios were used to describe the degree of relationship between predictors and the outcome variable. To assess the significance of the odds ratios, 95% confidence intervals were calculated around the estimates. Results of theoretical model testing are presented below for the outcome variable at each step.

Step 1: Test of Predictors for Overall Job Satisfaction

The eleven variables were entered as predictors to overall job satisfaction in multiple regression (see Figure 1). The result of the regression analysis for overall job satisfaction is given in Table 3. Except for two professionalism variables (belief in service, feeling of autonomy) and two job characteristics (skill variety, feedback from agents), all the independent

Table 3. Summary of Multiple Regression Analysis for Variables Predicting Overall Job Satisfaction Among Nurses (n=424)

Variables	B ^a	SE B ^b	β	t	P-value
Belief in service	.02	.02	.06	1.32	ns ^c
Belief in self-regulation	-.06	.02	-.13	-2.73	.0067
Sense of calling to profession	.07	.02	.17	3.58	.0004
Feeling of autonomy	-.01	.02	-.03	-.661	ns
Skill variety	.04	.06	.03	.74	ns
Autonomy & independence	.13	.06	.12	2.34	.0197
Feedback from agents	.02	.04	.02	.38	ns
Satisfaction with pay	.20	.06	.15	3.40	.0008
Satisfaction with social aspects	.35	.08	.22	4.63	.0000
Satisfaction with supervisor	.18	.05	.22	3.815	.0002
Feedback from Job itself	.18	.05	.16	3.46	.0006

Note. $R^2 = .42$ (adjusted $R^2 = .40$) $F(11, 367) = 21.47, P < .001$

^a B = Regression Coefficient

^b SE B = Standard Error

^c ns = Nonsignificant

variables were statistically significant in the regression ($p < .05$). Overall job satisfaction increased with increased level of autonomy and independence, feedback from job and agents, and context satisfaction (satisfaction with pay, coworkers, and supervisor, and a professionalism value (sense of calling to profession). A professionalism value (belief in self-regulation) showed a negative relationship with overall job satisfaction. Based on the standardized regression coefficients, two of the context satisfaction variables (satisfaction with coworker and supervisor) were the most important contributors to overall job satisfaction. With the exception of the negative effect of self-regulation, all of these effects were expected. A combination of all

independent variables tested explained about 42% of the variance observed in overall job satisfaction, $R^2 = .42, F(11, 367) = 21.47, p < .001$.

Step 2: Test of Predictors for Intent to Stay

Intent to stay was regressed on the seven antecedent variables (4 professionalism variables, growth need strength, organizational commitment, and overall job satisfaction). The multiple regression result for intent to stay is reported in Table 4. Only organizational commitment and overall job satisfaction had significant relationships with intent to stay. As expected, both variables were positively associated with intent to stay. Nurses with higher overall satisfaction and

Table 4. Summary of Multiple Regression Analysis for Variables Predicting Intent to Stay Among Nurses (n=424)

Variables	B ^a	SE B ^b	β	t	P-value
Belief in service	-.04	.03	-.06	-1.22	ns ^c
Belief in self-regulation	-.02	.04	-.02	-.40	ns
Sense of calling to profession	.04	.03	.07	1.25	ns
Feeling of autonomy	-.02	.04	-.03	-.61	ns
Organizational commitment	.05	.01	.29	5.20	.0000
Growth need strength	-.05	.09	-.03	-.58	ns
Overall job satisfaction	.42	.08	.29	5.05	.0000

Note. $R^2 = .25$ (adjusted $R^2 = .24$) $F(7, 363) = 47.55, P < .001$

^a B = Regression Coefficient

^b SE B = Standard Error

^c ns = Nonsignificant

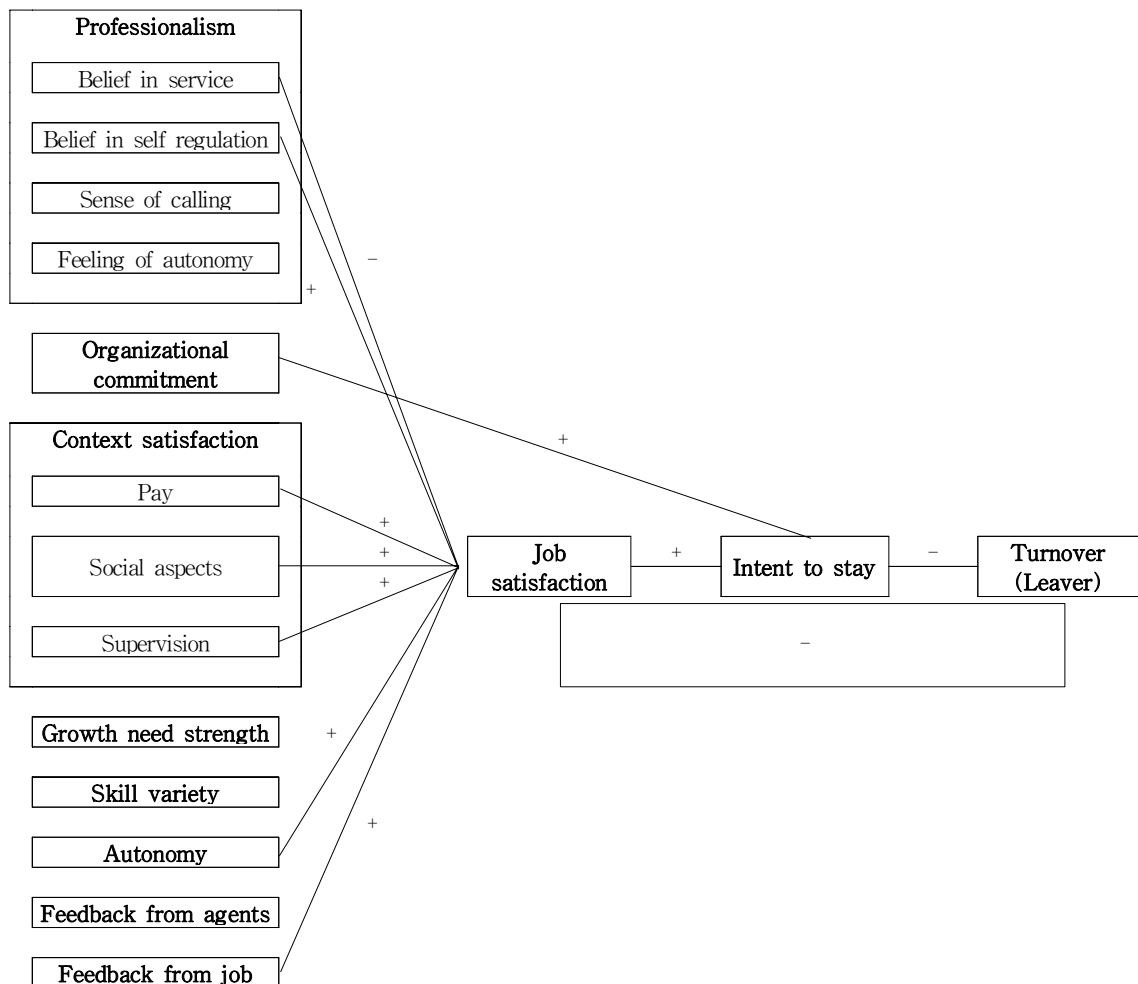


Figure 2. The revised model of turnover

organizational commitment tended to have greater intention to stay in the organization. The regression model explained 25% of the variance in nurses' intention to stay, $R^2=.25$, $F(7, 363)=47.55$, $p<.001$.

Step 3: Test of Predictors for Turnover (leaver)

Dichotomized turnover scores (leaver = 1, stayer = 0) were regressed onto the three independent variables using logistic regression. Logistic regression is appropriate when the dependent variable is binary or dichotomous and there are multiple explanatory variables (Cleary &

Angel, 1984; Hosmer & Lemeshow, 1989). The analysis and interpretation is quite similar to the procedure of multiple regression (Cox, 1970).

Beta (β) in multiple logistic regression is interpreted by exponentiating it (e^β), a measure of association is produced that is equivalent to the odds ratio. The odds ratio indicates the likelihood of change in turnover (leaver), given a change in one unit for a predictor variable. An odds ratio greater than 1 indicates higher turnover (leaver).

Based on the model estimates in the form of odds ratios, and 95% confidence intervals, intent to stay was the only variable significantly associated with the likelihood of turnover (leaver),

with an odds ratio of .846 (95% CI=.736-.973). Nurses with stronger intention to stay were less likely to voluntarily leave the organization.

Next, for the purpose of exploring all possible direct relationships between turnover and all study variables, all the preceding variables were entered and allowed to have association with nurses' turnover (leaver). Only intent to stay and overall job satisfaction were significantly associated with the probability of nurses' turnover (leaver), with odds ratios of .812 (95% CI = .693-.951) and .672 (95% CI = .501-.902), respectively. In general, the proposed theoretical model was well supported by the present data. The final, empirical model depicting the variables and significant relationships that emerged from this testing is provided in Figure 2.

Discussion

The model tested in the present study has shown that overall job satisfaction and intent to stay are the most important determinants of nursing turnover, which is consistent with previous studies. Organizational commitment positively affected intent to stay and indirectly decreased turnover through intent to stay. Satisfaction with co-workers (social aspects) and supervisors were the most important factors of overall job satisfaction. Satisfaction with pay, autonomy, and feedback from job also positively affected overall job satisfaction.

Some variables did not contribute significantly to the model although they are often viewed as important variables in nursing practice. For example, skill variety is often thought to be an important contributor to job satisfaction. In this model, however, it did not demonstrate a significant relationship. The various dimensions of professionalism are also frequently thought to relate to job satisfaction and intent to stay. With the exception of belief in self-regulation and sense of calling, there were no significant relationships among professionalism and other variables in the model. While professionalism may be central to many aspects of nursing practice, this analysis suggests that other variables are more important contributors to job satisfaction

and staying in the organization.

The tested turnover model was distinct from previous studies and further expanded those works for three reasons. First, the turnover model was developed based on behaviorally oriented models rather than market-oriented models. Lee and Mitchell (1994) defined behaviorally oriented turnover models as focusing on psychological constructs such as perceptions and job attitudes, while market-oriented models examine supply and demand in the context of the marketplace. The behaviorally oriented model should be more useful than the market-oriented model in providing prudent managers in organizations with knowledge and strategies to reduce nursing turnover.

The emphasis on psychological factors led to the use of individuals as the unit of analysis, whereas many studies have used units or hospitals as the unit of analysis in nursing turnover studies. In this study the results of individuals' psychological factors were not aggregated into the unit level but linked to their individual turnover status, instead of using the turnover rate of the units. This approach is regarded to be more appropriate for the behaviorally oriented turnover models.

Third, the revised model integrated the determinants of job satisfaction, intent to stay, and turnover, while many studies have focused on one or two of these variables. The expanded model is expected to help nurse managers and administrators understand nursing turnover within a broader perspective and link these variables.

The results of the revised model should be useful to nurse managers and administrators. Should they desire, they could predict turnover by monitoring its determinants in the tested model and ultimately reduce the turnover rate through early intervention. For example, a nurse manager in a unit would develop and implement strategies for empowerment and leadership in order to improve staff nurses' satisfaction with co-worker and supervisor, which were found to be the most important contributors to overall job satisfaction. These strategies could reduce the turnover rate of the unit through increasing overall job satisfaction and intention to stay.

This study has several limitations that should

be remembered in interpreting the results. First, convenience sampling with volunteer participants could cause selection bias, which could be one of the threats to internal validity of the study. Nurses who voluntarily participated in the study may have been more satisfied with their job and committed to the organization than nurses who did not participate. Another concern is that of limited generalizability (external validity). The sample was selected from a large tertiary university hospital. Thus, the nurses who participated may have characteristics that differ from the general nurse population. For instance, the high proportion of white and baccalaureate-prepared nurses in this study may have different nursing turnover from nurses in other clinical settings and with different characteristics.

Reference

- Agho, A.O. (1993). The moderating effects of dispositional affectivity on relationships between job characteristics and nurses' job satisfaction. *Research in Nursing & Health*, 16, 451-458.
- Asher, H.B. (1983). *Causal modeling*. Beverly Hills, CA: Sage.
- Blegen, M.A., & Mueller, C.W. (1987). Nurses' job satisfaction: A longitudinal analysis. *Research in Nursing & Health*, 10, 227-237.
- Bloom, J.R., Alexander, J.A., & Nuchols, B.A. (1992). The effect of the social organization of work on the voluntary turnover rate of hospital nurses in the United States. *Social Science & Medicine*, 34(12), 1413-1424.
- Braskamp, L.A., & Maehr, M.L. (1985). *Spectrum: An organizational development tool*. Champaign, IL: MetriTech, Inc.
- Bruffey, N.G. (1997). Job satisfaction and work excitement: Organizational considerations. *Seminars for Nurse Managers*, 5(4), 202-208.
- Cleary, P., & Angel, R. (1984). The analysis of relationships involving dichotomous dependent variables. *Journal of Health and Social Behavior*, 25, 334-348.
- Cox, D.R. (1970). *The analysis of binary data*. London: Methuen.
- Curry, J.P., Wakefield, D.S., Price, J.L., Mueller, C.W., & McCloskey, J.C. (1985). Determinants of turnover among nursing department employees. *Research in Nursing & Health*, 8, 397-411.
- Gurney, C.A., Mueller, C.W., & Price, J.L. (1997). Job satisfaction and organizational attachment of nurses holding doctoral degrees. *Nursing Research*, 46(3), 163-171.
- Hackman, J.R., & Oldham, G.R. (1975). Development of the Job Diagnostic Survey. *Journal of Applied Psychology*, 60(2), 159-170.
- Hackman, J.R., & Oldham, G.R. (1980). *Work redesign*. Reading, MA: Addison-Wesley.
- Hinshaw, A.S., Smeltzer, C.H., & Atwood, J.R. (1987). Innovative retention strategies for nursing staff. *Journal of Nursing Administration*, 17(6), 8-16.
- Hosmer, D.W., & Lemeshow, S. (1989). *Applied logistic regression*. New York: Wiley.
- Irvine, D.M., Evans, M.G. (1995). Job satisfaction and turnover among nurses: Integrating research findings across studies. *Nursing Research*, 44(4), 246-253.
- Lee, T.W., & Mitchell, T.R. (1994). An alternative approach: The unfolding model of voluntary employee turnover. *Academy of Management Review*, 19(1), 51-89.
- Leveck, M.L., & Jones, C.B. (1996). The nursing practice environment, staff retention, and quality of care. *Research in Nursing & Health*, 19, 331-343.
- Lucas, M.D., Atwood, J.R., & Hagaman, R. (1993). Replication and validation of anticipated turnover model for urban registered nurses. *Nursing Research*, 42(1), 29-35.
- Parasuraman, S. (1989). Nursing turnover: An integrated model. *Research in Nursing & Health*, 12, 267-277.
- Pierce, L.L., Hazel, C.M., & Mion, L.C. (1996). Effect of a professional practice model on autonomy, job satisfaction and turnover. *Nursing Management*, 27(2), 48M-48T.
- Price, J.L., & Mueller, C.W. (1981). *Professional turnover: The case of nurses*. New York: Spectrum.
- Regoli, R.M., & Poole, E.D. (1980). Police professionalism and role conflict: A comparison of rural and urban departments.

- Human Relations, 33(4), 241-252.
- Schroeder, M.A. (1990). Diagnosing and dealing with multicollinearity. Western Journal of Nursing Research, 12, 175-187.
- Snizek, W.E. (1972). Hall's Professionalism Scale: An empirical assessment. American Sociological Review, 37, 109-114.
- Tabachnick, B.G., & Fidell, L.S. (1989). Using multivariate statistics. New York: Harper & Row.
- Taunton, R.L., Boyle, D.K., Woods, C.Q., Hansen, H.E., & Bott, M.J. (1997). Manager leadership and retention of hospital staff nurses. Western Journal of Nursing Research, 19(2), 205-226.
- Verran, J., & Ferketich, S. (1984). Residual analysis for statistical assumptions of regression equations. Western Journal of Nursing Research, 6, 27-40.