

A Predictive Model for Turnover Intentions of Emergency Room Nurses Using Structural Equation Modeling

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Abstract: It is extremely important in the emergency room(ER) to secure the manpower with highly trained skills and specialized knowledge and to maintain the optimal number of nurses working. Hence this study aims to present the direction for establishing an efficient human resources management plan by exploring the direct/indirect paths to the turnover intention of ER nurses, and also constructing a structural model. This study were collected using a structured questionnaire from nurses working for ER departments of 13 general hospitals located in 8 provinces in Korea from August 2nd to September 20th, 2013. Two hundred fifty-five participants were recruited by convenient sampling and 236 were collected. Data was analyzed through the structural equation model. The direct factor that had a direct effect on ER nurses' intention of turnover was job satisfaction and the hardiness proven by parameter appeared to have a positive effect on job satisfaction and quality of life of professionals. The only variable directly influencing turnover intention on ER nurses is job satisfaction, and hardiness and professional self-concept significantly affect job satisfaction. Hardiness and professional self-concept would reduce actual turnover of ER nurses through job satisfaction. Also various interventions increasing job satisfaction need to be developed based on the special context of ER.

Keywords: Turnover Intention, Job Satisfaction, Structural Equation Model, Emergency Nurses

1. Introduction

As the role of medical personnel is being expanded due to diverse and complex aspects of disease and rapid changes of medical environment, nurses who provide direct service is getting bigger and becoming important[1]. The special departments such as emergency room(ER), intensive care unit, and operation room require nurses with special knowledge and highly trained skills, therefore securement of manpower is necessary[2][3].

When looking into nurses' current situation of turnover in Korea, it is increasing every year with an average of 16.9% in 2013 and it was reported that 70-80% of nurses had the intention of turnover[4]. The problem of nurses' turnover is becoming severe not just domestically but also internationally. According to the Hospital Nurses Association, the turnover rate of has been increasing since 2013 until 2022 for each type of medical institution, and hospital-level is the highest at 25%. Now that the number of new nurses has significantly increased from 31.2% in 2013 to 51.8% in 2022, stable manpower securement of nurses becomes an international issue[5][6].

Especially in ER, immediate treatment and care must be provided for the patients who are exposed to extreme stress such as life-threatening emergency, critical injury disease, abuse, or rape, therefore the capability of precise assessment and high-quality nursing care are needed even more[3][7]. Domestically, the visiting ratio of non-emergency patients with symptoms such as simple stomachache as compared

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to chronic diseases is rapidly increasing and duration of stay in ER is increasing due to the lack of rooms for admission in wards[7]. With this reason, the nursing workload increases and congestion in a limited space of ER leads to more complaints from patients and family, which causes higher stress than general ward and even leads to the cause of resignation or transfer of department[8]. This result leads to the increase of workload and stress to other colleagues and becomes the factor of resignation or turnover of nurses with ER experience; hence the method of minimizing such result needs to be considered[9]. As the nurses have important impact on treatment process and result, securement of optimal number of manpower and maintaining the nurses with many experiences on emergency patients are very important[2][3].

Analyzing the factors that influence ER nurses' intention of turnover, frequent experience of violence from guardian or visitors were known to be the reasons of turnover[10][11]. Also, due to the visiting of serious trauma or death patients from shocking accidents such as intoxication, death leap, suicide by strangulation or ordrowning increase, ER nurses who need to provide preliminary care are being negatively influenced not only in personal relationship, but also in physical and psychological ways [3][12].

Recently, working environment and professional self-concept are also reported as relating factors to turnover intention. In order to provide quick treatment and nursing care for emergency patients, cooperation with various health care personnel needs to be built up. Therefore, creating an ER work environment that is supporting nursing activity[3][9], and enhancing solid and positive professional self-concept are being reported as the ways of decreasing the turnovers[13].

Job satisfaction and professional quality of life also have been reported as direct and indirect on turnover intention of ER nurses. In previous studies, both are consistently reported as mediating variables of turnover intention[3][14][15].

Also, hardiness is known to be a good coping method of overcoming various crisis situations and stress to continuously readapt[10][16]. Many emergency nurses are exposed to verbal and/or physical violence while they are working in ER. They are also confronted with stressful experiences such as serious trauma, death leap, or suicide by strangulation. In this case, the hardship they feel is related to turnover intention and job satisfaction[17][18].

Like this, turnover intention, a leading variable of action that has the intention of leaving voluntarily, is a useful variable to explain the turnover and also a strong predictor that can prevent turnover[19]. Turnover is leaving the organization voluntarily or involuntarily[20], therefore it is not the same with the concept of intention of turnover. However, to prevent the turnover, finding the variables, which influence the turnover intention, and controlling them can be the basis of turnover prevention for ER nurses.

In this study, based on previous research, the turnover intention of ER nurses and direct/indirect relationship among the relative factors were explored. Furthermore, setting this as the base, structural equation modeling(SEM) that explains turnover intention was proposed. This is intended to set the direction of effective mediating method for the decrease in turnover of ER nurses. Therefore this study aims to present the direction for establishing an efficient human resources management plan by exploring the direct/indirect paths to the turnover intention of ER nurses.

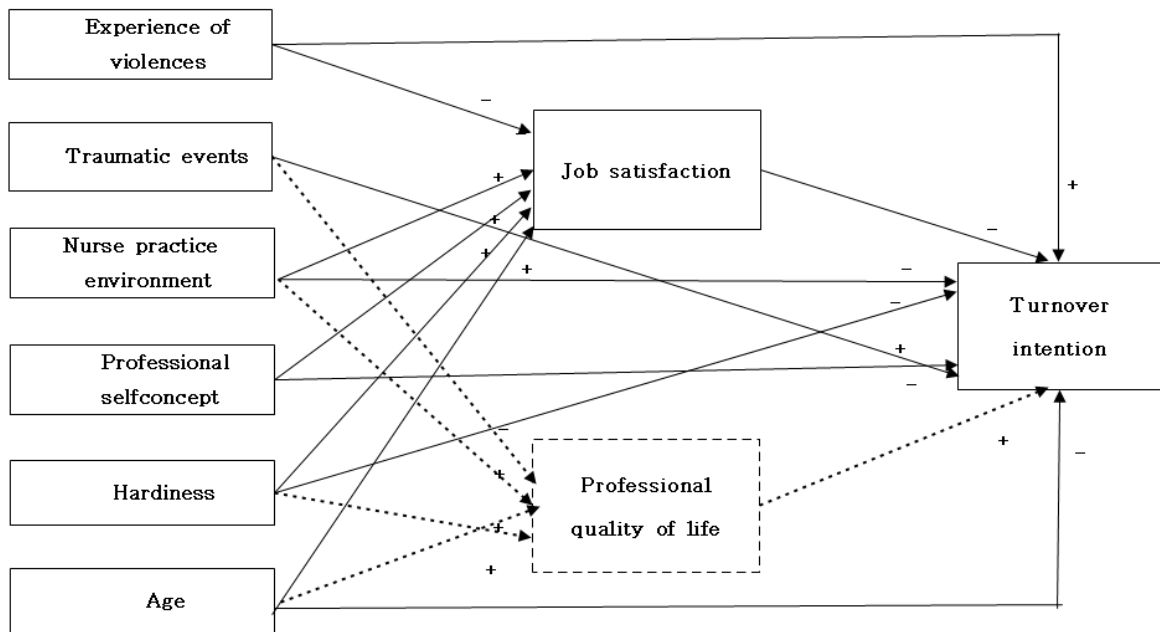
2. Conceptual Framework

The conceptual framework of this research was established based on influencing factors and mediating factors from the results of literature review and the hypothetical model which is called as the causal model of turnover for nurses by Price and Mueller[21]. This causal model of turnoversets the direction of predicting turnover and consists of determinant factors, job satisfaction, intent to stay, and turnover. Determinants factors including environmental, personal, and structural factors directly and

indirectly influence turnover. Job satisfaction turns to mediating the effect of determinants factors to intent to stay. Intent to stay could consequently affect turnover of nurses but has limitations to predict turnover and control turnover, hence the investigators adopt turnover intention instead of intent to stay.

ER violence is related to alcohol drinking and used to happen at midnight[3][10][11]. It is very important to create a safe working environment due to serious ER violence[3][9]. Traumatic event is a real and threatening death or serious injury because it threatens the physical well-being the physical well-being of an individual[18]. Also, professional self-concept refers to one's feelings and views on one's work[22]. Hardiness is a concept that can explain personal differences in the response of adaptation to these stressful experiences[17][18]. Job satisfaction refers to the emotional state obtained by an individual through job evaluation or experience[23]. Professional quality of life means that a person with a professional job who helps others subjectively evaluates the quality of life in relation to job[24]. Lastly, turnover intention is a leading variable in the act of wanting to leave voluntarily[19][20].

As shown in [Fig. 1], six exogenous variables were experience of violence, traumatic event, nursing practice environment, professional self-concept, and hardiness in this study. Age of nurse was also included as it is an important relating variable among the demographic factors[3][10][15][20][21]. These variables have influences on professional quality of life, job satisfaction, and turnover intention which are endogenous variables. Job satisfaction and professional quality of life turned out to be the mediating the effect of exogenous variables to the intention of turnover[3][10][14-17].



[Fig. 1] Conceptual Framework

3. Methods

3.1 Study Design

The design of this study is quantitative research. SEM was used to fit a path model from experience of violence, traumatic events, nurse practice environment, professional self-concept, hardiness, and age to turnover intention through intermediate effect on job satisfaction and professional quality of life using cross-sectional data.

3.2 Study Subjects

Subjects for this study were emergency nurses from 13 general hospitals located in eight different provinces in Korea. The inclusion criteria were as follows: (1) nurses who had been working for at least three months in the ER and (2) informed consent, willing to cooperate. The exclusion criteria were as follows: nurses with less than three months of ER experience. The sample size that is needed to test structure equation model using the Maximum Likelihood Estimation(MLE) must satisfy the minimum number of 200[25]. In this study, the data of 255 nurses who are currently working in the ER were collected.

3.3 Measurements

3.3.1 Experience of Violence

The device used to measure experience of violence consists a total of 16 questions, with 4 questions on verbal violence, 5 questions on physical threat, and 7 questions on physical violence. Subjects were asked to check the frequency of violence personally experienced within the recent one year for each item. In this device, as the score is higher, it indicates that the degree of experience of violence is higher. The overall Cronbach's alpha was .88 in Yun's[26] study which was the same in this research. The range of alpha values were from .78 to .85 in subdomains.

3.3.2 Traumatic Events

Traumatic events consisted of 13 questions and the experience frequency according to the types of traumatic events over the last month was to be answered. In the scale of 1-5, the higher score indicates that there is a more frequent experience of traumatic events[18]. Cronbach's alpha value was .99 in the previous study[18] and Cronbach's alpha was .89 in this study.

3.3.3 Nursing Practice Environment

Nursing practice environment was measured using Revised Nursing Work Index(NWI-RVL) developed by Van Bogaert and colleagues[27]. It has a total of 11 questions, which consist of three questions which consist of 3 questions regarding the relationship between the nurse and doctor, 4 questions regarding nurse management by nursing unit, and 4 questions regarding hospital management and organization support. In the 5-points Likert scale, a higher score indicates that it indicates that the practice environment is being perceived more positively. Cronbach's alpha was .75 in the previous study and in this study, Cronbach's alpha was .85 and .68-.92 in the subdomains.

3.3.4 Professional Self-concept

Professional Self Concept of Nurses Instrument(PSCNI) developed by Arthur, adapted and revised by Min[22] was used to measure the professional self-concept. There are 27 questions in total, which consist of 15 questions on professional practice, 8 questions on satisfaction, and 4 questions on communication. In the 4-points, a high score indicates that the professional self-concept is higher. Cronbach's alpha value was .85 and Cronbach's alpha was .88 in this study, and .68-.88 in the subdomains.

3.3.5 Hardiness

Dispositional Resilience Scale(DRS-15) developed by Bartone, translated by Cho and colleagues[10] was used to measure the hardiness. There are 15 questions in total, which consist of 5 questions on control, 5 questions on commitment, 5 questions on challenge. In the 4-points Likert

scale, higher the score, it indicates that the hardness level is higher. Cronbach's alpha in Cho's version was .72, .81 in this study, and .68-.80 in the subdomains.

3.3.6 Job Satisfaction

Minnesota Satisfaction Questionnaire(MSQ), developed by Weiss[23] was used to measure job satisfaction. The instrument consisted of 5 questions on intrinsic satisfaction and 5 questions on extrinsic satisfaction. In the 5 points Likert scale, higher the score, it indicates that the level of job satisfaction is higher. Cronbach's alpha was .87, .83 in this study.

3.3.7 Professional Quality of Life

ProQOL Version 5 (Professional Quality of Life Scale; Compassion Satisfaction/Fatigue Subscale-Version 5) developed by Stamm[24], translated by Kim and Choi[18] was used to measure the professional quality of life. There were 30 questions, which consisted of 10 questions on compassion satisfaction, 10 questions on compassion fatigue, and 10 questions on burnout. In the 5 points scale, higher the score, it indicates that compassion satisfaction, compassion fatigue, and burnout are higher. In this study, the professional quality of life was not analyzed by subscale, instead, total score was used for analysis. Compassion satisfaction was inverse coded to compassion dissatisfaction to be used in the analysis. In Stamm's research, Cronbach's alpha for compassion satisfaction was .88, .81 for compassion fatigue, and .75 for burnout. In Kim and Choi's research[18], alpha coefficients were .88, .74, .75 respectively, and in this study, they were .91, .74, .74 respectively.

3.3.8 Turnover Intention

In order to measure the turnover intention, the tool developed by Cheon[28] was used. There were 5 questions in total and higher the score, it indicates that the turnover intention is higher. Cronbach's alpha in Cheon's device was .84 and .72 in this study.

3.4 Data Collection

Data collection was conducted from August 22nd to September 20th, 2013 and the questionnaire was distributed to 255 ER nurses from 13 university hospitals and general hospitals located in eight provinces of Korea. Before the survey instrument was administered, the researcher personally visited the nursing department and ER to gain approval to collect data. Overall, 255 questionnaires were distributed and 236 surveys were used to analyze excluding 19 surveys that were negligently answered.

3.5 Statistical Analysis

PASW (version 18.0) and AMOS (version 18.0) (IBM SPSS Statistics, Chicago, IL, USA) were used to analyze the collected data. Descriptive statistics was used for the subjects' general characteristics and measured variables. Cronbach's alpha was used for the reliability of measuring instruments. To test the normality of the sample using PASW and AMOS, mean, deviation, skewness, and kurtosis were calculated. The hypothesized model of turnover intention ER nurses was analyzed using SEM techniques. For SEM test, maximum likelihood(ML) was used and forfit test of the model, χ^2 test, goodness-of-fit index(GFI), adjusted goodness of fit index(AGFI), root-mean-square error of the approximation(RMSEA), comparative-fit index(CFI), standardized root-mean-square residual(SRMR) were used. Bootstrap method was used to analyze to test statistical significance of indirect effect and total effect.

3.6 Ethical Consideration

The current study(Academic13-081) was received from Institutional Review Board of Inha University. Prior to collecting the data, each emergency nurse received the information on this study including the purpose of study, potential risks and benefits of the study, procedure, anonymity, confidentiality, rights of participant. The informed consent were then obtained from the participants. The collected questionnaires will be shredded after the thesis is published.

4. Results

4.1 Subject Characteristics

General characteristics of the participants is shown in [Table 1]. Mean age of the targets was 29.0 ± 6.0 years and mostly female(62.7%). In the marital status, mostly were single(72.9%). For the religion, 49.6% declared of not having religion, while 50.4% had religion. Less than half(47.5%) of the subjects graduated from 3-year college and 44.9% graduated from 4-year college. The clinical career experience was 2.92 ± 1.11 years with over 5 years the most(45.3%), and it showed 27.1% in the category of over 1 year to less than 3 years. The mean experience of the ER department was 2.53 ± 1.10 years and over 1 year to less than 3 years was the most with 36.9% and 29.2% in the over 5 years category. Staff nurses took the most part in the position category with 85.2%. Monthly night duty shift was 6.6 days in average. Desired working period in ER 3.6 ± 4.0 months in average. Only 68.6 percent out of overall subjects received safety education.

[Table 1] Characteristics of Participants ($N = 236$)

| Variable | Category | <i>n</i> (%) |
|--------------------------------|------------------|--------------|
| Age (years) | 20-29 | 148 (62.7) |
| | 30-39 | 72 (30.5) |
| | 40-49 | 14 (5.9) |
| | 50-59 | 2 (0.9) |
| Gender | Male | 17 (7.2) |
| | Female | 219 (92.8) |
| Marital status | Single | 172 (72.9) |
| | Married | 64 (27.1) |
| Religion | Yes | 117 (49.6) |
| | No | 119 (50.4) |
| Education | 3 year program | 112 (47.5) |
| | 4 year program | 106 (44.9) |
| | Graduate program | 18 (7.6) |
| Clinical careers (years) | <1 | 30 (12.7) |
| | 1-<3 | 64 (27.1) |
| | 3-<5 | 35 (14.8) |
| | ≥ 5 | 107 (45.4) |
| Emergency room careers (years) | <1 | 46 (19.5) |
| | 1-<3 | 87 (36.9) |
| | 3-<5 | 34 (14.4) |
| | ≥ 5 | 69 (29.2) |

| | | |
|---|--------------|------------|
| Position | Staff Nurse | 201 (85.2) |
| | Charge Nurse | 27 (11.4) |
| | Head Nurse | 8 (3.4) |
| Unit rotation | Yes | 69 (29.2) |
| | No | 167 (70.8) |
| Transfer from other hospital | Yes | 73 (30.9) |
| | No | 163 (69.1) |
| Wanted period of stay in emergency room (month) | <3 | 161 (68.2) |
| | 3-<6 | 41 (17.4) |
| | 6-<12 | 30 (12.7) |
| | ≥12 | 4 (1.7) |
| Safety education | Yes | 74 (31.4) |
| | No | 162 (68.6) |

4.2 Descriptive Statistics of Variables

The descriptive statistics of variables used in this research is shown in [Table 2]. Also, Pearson correlation coefficient was used to test multicollinearity among measured variables. If the correlation coefficient(r) among measured variables is over .70, the deletion of the variable has to be considered as it is showing a very strong relationship among the variables[25]. The correlation coefficient values are .002-.681, therefore it appears that there is no problem of multicollinearity. In general, it is problematic when the skewness of normal distribution of sample is larger than 2, or if multivariate kurtosis is larger than 7 in multivariate normal probability by AMOS[22]. In this study, skewness was less than ± 2 , kurtosis was less than ± 7 for all variables, which satisfied the normality assumption of samples.

[Table 2] Descriptive Statistics of Observed Variables ($N = 236$)

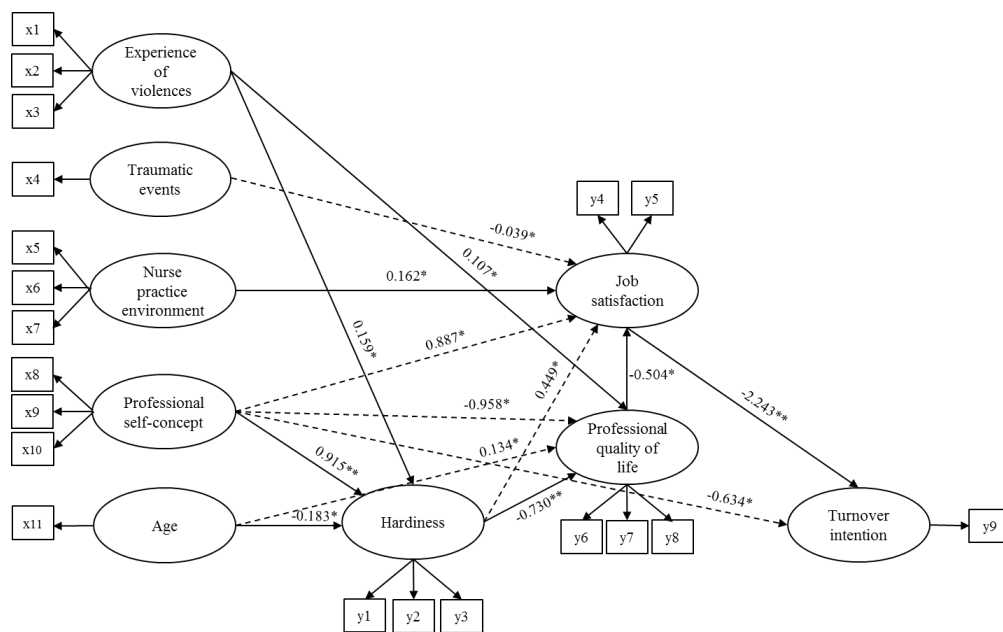
| Constructs | Items | Mean \pm SD | Skewness | Kurtosis |
|---------------------------------------|---------|-----------------|----------|----------|
| Violence (VIO) | VIO1 | 3.50 \pm 1.08 | -.243 | -.899 |
| | VIO2 | 2.77 \pm 1.04 | .280 | -.684 |
| | VIO3 | 1.49 \pm 0.63 | 1.076 | 5.391 |
| Traumatic event | | 2.97 \pm 0.89 | -.319 | -.042 |
| Nursing practice environment (NPE) | NPE1 | 3.10 \pm 0.75 | .216 | 1.803 |
| | NPE2 | 3.56 \pm 0.56 | .222 | -.261 |
| | NPE3 | 2.63 \pm 0.73 | .277 | .062 |
| Professional self-concept (PSC) | PSC1 | 2.75 \pm 0.36 | .213 | 1.076 |
| | PSC2 | 2.39 \pm 0.36 | -.057 | -1.857 |
| | PSC3 | 2.44 \pm 0.59 | -.072 | .529 |
| Hardiness (HD) | HD1 | 2.48 \pm 0.60 | .087 | .012 |
| | HD2 | 3.15 \pm 0.46 | .148 | -.357 |
| | HD3 | 2.72 \pm 0.60 | -.126 | -.077 |
| Age | | 29.0 \pm 6.0 | 1.173 | 1.552 |
| Professional quality of life (ProQOL) | ProQOL1 | 3.29 \pm 0.62 | .258 | .732 |
| | ProQOL2 | 2.69 \pm 0.59 | -.067 | .075 |
| | ProQOL3 | 2.68 \pm 0.77 | .116 | -.141 |

| | | | | |
|--------------------|-----|-----------|-------|-------|
| Job satisfaction | JS1 | 3.29±0.62 | .023 | .049 |
| (JS) | JS2 | 2.44±0.77 | -.092 | -.399 |
| Turnover intention | | 3.28±0.89 | -.176 | -.311 |

VIO = Verbal violence; NPE = Nursing practice environment; PSC = Professional self-concept; HD = Hardiness; ProQOL = Professional quality of life; JS = Job satisfaction

4.3 Fit of the Modified Model

The initial analysis of the hypothesized model revealed fit indices did not reach recommended level, then the modified model is suggested. The model fit indices reveal that the modified model is a better fit for the data. As a result of the structure’s goodness of fit test, it showed $\chi^2(72)=196.69$, $\chi^2 / df=1.38$, which showed good accordance with the data of the structure. With RMSEA=.04[90% confidence interval(CI)=0.08–0.10], GFI=.92, AGFI=.88, CFI=.91, SRMR=.07, fit index satisfied the recommended level in general. With the standardized path coefficient centralized, the final structural model was established by exploring turnover intention of ER nurses and is shown in [fig. 2].



[Fig. 2] Results of SEM Analysis

x1 = Verbal violence; x2 = Physical threats; x3 = Physical violence; x4 = Traumatic events; x5 = Nurse-physician relationship; x6 = Nurse management at the unit level; x7 = Hospital management and organizational support; x8 = Professional practice; x9 = Satisfaction; x10 = Communication; x11 = Age; y1 = Commitment; y2 = Control; y3 = Challenge; y4 = Intrinsic satisfaction; y5 = Extrinsic satisfaction; y6 = Compassion satisfaction; y7 = Compassion fatigue; y8 = Burnout; y9 = Turnover intention
 ** p<.01, * p<.05

4.4 Effect of Predictor Variables in the SEM

The result of analyzing direct, indirect, total effects on turnover intention of ER nurses is as follows;

First, the result of analyzing the effects of factors that have influence on hardiness, experience of violence($\beta=.159$, $p<.05$), professional self-concept($\beta=.915$, $p<.01$), age($\beta=-.183$, $p<.05$) all had statistical significance on direct and total effects. However, experience of traumatic events did not have statistical significance.

Second, when looking into job satisfaction, nursing practice environment($\beta=.162$, $p<.05$) and professional quality of life($\beta=-.504$, $p<.05$) had statistical significance on direct and total effects. Traumatic event experience($\beta=-.039$, $p<.05$) and professional self concept showed statistical significance with indirect effect($\beta=.557$, $p<.05$) and total effect($\beta=.887$, $p<.05$), hardiness had statistical significance with indirect effect($\beta=.368$, $p<.05$) and total effect($\beta=.449$, $p<.05$). Age and experience of violence did not show statistical significance.

Third, in professional quality of life, experience of violence had direct effect($\beta=.107$, $p<.05$) and indirect effect($\beta=-.116$, $p<.05$), professional self-concept had indirect effect($\beta=-.668$, $p<.05$) and total effect($\beta=-.958$, $p<.05$). Hardiness($\beta=-.730$, $p<.01$) had statistical significance with direct and total effect, experience of traumatic events did not have any statistical significance. Age($\beta=.134$, $p<.05$) had statistical significance with indirect and total effect.

Lastly, in the turnover intention, professional self concept($\beta=-.634$, $p<.05$) had indirect and total effect, job satisfaction($\beta=-2.243$, $p<.01$) had direct and total effect. However, there were no statistical significance in experience of violence, traumatic events, nursing practice environment, age, hardiness and professional quality of life.

5. Conclusion

This research explored direct/indirect causal relationships on the turnover intention of ER nurses and confirmed the paths among the factors to establish a structure model and tested the validity of the model.

After the research, the only variable that has an influence on turnover intention on ER nurses appeared to be interventions to improve job satisfaction must be considered. Job satisfaction is a strong influencing factor on the recruitment of nurse manpower, and it can influence the organization of hospitals extensively[6]. Nurses having satisfaction in their job can minimize the turnover and increase the capability of nursing performance. It can also secure experienced nurses and excellent manpower. Therefore to enhance the job satisfaction, the hospital policy and strategy reflecting unique characteristics of the ER department must be explored.

Especially, as hardiness has been confirmed as a main variable that mediates the turnover intention, through hardiness evaluation and training for ER nurses, it can reduce the turnover by positively influencing job satisfaction and professional quality of life. Therefore, it would be necessary to evaluate the hardiness of ER nurses and apply a hardiness-strengthening programs such as sensitivity coaching programs to the lower group. Also, when assigning departments, consideration of manpower arrangement based on hardiness evaluation can be thought of as one of the methods to prevent ER nurses' transfer due to maladjustment.

There were no direct effects of professional self-concept, experience of traumatic events, and age on job satisfaction and turnover intention, however as the factors that have influence, professional self-concept turned out to have the most influence. The task of ER nurses requires more expertise and responsibilities than the nurses from other departments. Emergency patients' severity classification, setting priorities, and multidisciplinary treatment requiring cooperation with other departments are required[2]. In the performing process of roles requiring expertise and responsibilities, the level of dignity and independence of the nurses may increase, but nurses may experience more stress and conflict. In order to enhance the expertise and increase the confidence of ER nurses, counseling and psychological therapy to relieve stress needs to be provided and a clear compensation system must be established. Specialized education for professional job performance could provide the opportunity for systematic capability of providing the nursing practice at the highest quality level for ER nurses. It also reduces the ratio of turnover, which will lead to a strategy to bring achievement and development to the organization.

Lastly, for serious problems of ER such as experience of violence, strong punishment and alternatives at the institutional level need to be found and be intervened actively.

Based on the above results, the limitations of the study are as follows. First, there is a possibility that the used tool may not sufficiently reflect the properties of the tool to be measured because a large number of questions were deleted during the analysis process. Therefore, it is re-analyzed using a reduced tool with sufficient reliability and validity. Second, most of the experience of violence and trauma events can affect the results of this study, given the results of previous studies that occur in general nurses. Third, there will be some limitations in applying the results of this study at this point. However, nurse turnover is increasing, and violence in ER is still a serious problem. The variable in the prediction model of the turnover intention of ER nurses is a strong variable that has already been revealed in previous studies. Therefore, the results of this study are considered being of sufficient value at this point. Therefore, confirmation is required through re-verification of related variables through follow-up studies. Lastly, since this study was conducted on some ER nurses, there is a limit to generalization.

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