



Identifying Critical Dimensions of the Patient Safety Culture Affecting Nurses' Turnover

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Abstract:

Background: A lack of understanding of the causes of turnover among nurses is the main threat to patients, as it directly affects the care that staff provide based on the patient safety culture (PSC). Therefore, it is necessary to identify critical dimensions affecting nurses' turnover.

Methodology: This study uses the internal data sets of the Chinese version of the safety attitudes questionnaire of a regional teaching hospital in Taiwan from 2015 to 2018 focusing on the turnover of nursing staff who left their jobs in the next coming year (from 2016 to 2019) by employing linear regression with forward selection.

Results: Perceptions of management are the first critical variable to be identified followed by safety climate and teamwork climate. These three dimensions positively influence the overall satisfaction of the PSC from the viewpoints of nurses' turnover. In contrast, this study concludes that working conditions and job satisfaction might be the dimensions to influence nurses' leave in this case hospital.

Conclusion: Improving working conditions and job satisfaction to result in a higher overall satisfaction of the PSC might be an approach to reduce nurses' turnover.

Keywords: Nurses' turnover, Patient safety culture, Regional teaching hospital, Safety attitudes questionnaire, Linear regression, Climate.

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1. INTRODUCTION

Patient safety has become an important health concern because a large number of injuries and deaths are related to healthcare in hospitals. Safety culture in each organization is a basic determinant in developing medical services and patient safety. Most importantly, a medical organization that has a more open culture and reflective attitude toward patient safety can not only help staff learn from failures but also reduce patients' harmful

consequences [1]. A positive safety culture can predict potential threats to guide medical staff's behaviors and also provide hospital strategies for medical care and patient safety [2, 3]. Therefore, the concept of enhancing the patient safety culture (PSC) is essential to relentlessly improve the quality of medical services in healthcare organizations worldwide [4].

Nurses are the frontline to contact patients and deliver medical services and are the core personnel to reduce

medical errors [5, 6]. Badr *et al.* [7] stated that nurses would have better perceptions of patient safety because they interact with patients directly, and this is regarded as an important factor in studying the PSC. In contrast, an increased workload of nursing staff may lead to more medical errors [8]. At present, the shortage of nursing staff and a high rate of turnover intention have become a concern for healthcare organizations worldwide as well as in Taiwan [9, 10]. Chang *et al.* [11] argued that nurses' turnover appears to lead to increased job dissatisfaction, poor organizational commitment, and higher patient dissatisfaction. Besides, a relationship between negative job satisfaction and turnover intention has been found, and negative job satisfaction can predict nurse turnover intention [12-14].

Many studies have provided evidence of the benefits of establishing the PSC by using the safety attitudes questionnaire (SAQ), most of which focused on the perceptions of patient safety-centered care among medical staff [1, 15] and their potential turnover intention [11, 16]. Based on our knowledge, studies identifying the critical factors influencing the nurses' leave by investigating the SAQ have not been found. A lack of understanding of the causes of nurses' turnover is the main threat to patients, as it directly affects the care that staff provide. With that in mind, this study intends to find critical dimensions to influence nurses' turnover by using the Chinese version of the safety attitudes questionnaire (CSAQ) currently used in Taiwan to assess the PSC in hospitals.

2. LITERATURE REVIEW ON PATIENT SAFETY CULTURE AND NURSING TURNOVER

2.1. Patient Safety Culture and Safety Attitudes Questionnaire

Safety culture is a collective output of the values, abilities, attitudes, and behavior patterns of individuals and groups that determine the commitment to safety, safety plan, and proficiency in implementation in an organization [2]. Patient safety is the behavior of hospitals to avoid, prevent, or correct adverse events and injuries during the treatment [17], and the PSC is an essential factor in determining the treatment and reduction of adverse events in hospitals [18]. If medical staff have a good attitude toward patient safety, the relationship between members can be harmonious, which is helpful in reducing medical malpractice and high compensation cost [19-21]. Potential safety threats to patients may be increased if the PSC is not concerned and properly evaluated [22]. In other words, the establishment of the PSC not only is the responsibility of the management of medical organizations but also includes all medical staff to mutually maintain medical quality in order to reduce the occurrence of medical errors [23]. When hospital management has a commitment to patient safety, physicians and nurses might be more likely to satisfy their jobs [24].

The SAQ containing six dimensions including teamwork climate, safety climate, perceptions of management, job

satisfaction, stress recognition, and working conditions were developed by Sexton *et al.* [25] and has been validated cross-culturally and translated by many languages such as English, Turkish, Swedish, Norwegian, and Chinese with high internal consistency and reliability (*e.g.* Deilkås and Hofoss [26]; Huang *et al.* [5]; Ulrich and Kear [27-31]). In 2007, the SAQ was translated forward and backward and verified by the Joint Commission of Taiwan to become the CSAQ with six dimensions and 30 questions [31-33]. To further reflect medical staff's perceptions toward the PSC better in Taiwan, the JCT borrowed three dimensions, including hospital management support for patient safety, teamwork across hospital units, and hospital handoffs and transitions, from the survey designed by the Agency for Healthcare Research and Quality (AHRQ) in the United States [34-36]. This version has nine dimensions and 41 questions. However, the second version of the CSQ did not explicitly discuss the medical staff's emotional conditions during the medical settings. As a matter of fact, medical staff suffering from emotional distress are linked to adverse events. Ample research has highlighted the threats of medical staff burnout in Taiwan, leading to negative outcomes including medical mistakes, higher medical staff turnover, absenteeism, shortage of nursing staff, accidents, and failure to meet patient needs [5, 9, 19, 37]. Therefore, three hospital level aspects of safety culture from the AHRQ were removed in 2014 and emotional exhaustion and work-life balance have been added to form the third edition of the CSAQ with eight dimensions and 46 questions, as presented in Table 1 [33].

The initial SAQ and CSAQ both use questions and dimensions to assess the PSC in healthcare organizations. However, few studies have explicitly assessed the overall perception (namely satisfaction) of the PSC. Spreng *et al.* [38] emphasized that using the overall experience to replace individual attributes is a better approach to evaluate the overall assessment. In addition, Oliver [39] suggested a similar philosophy by using a summative evaluation of the experience of all products and services rather than using a single feature. As a result, the item of the overall satisfaction with the PSC to measure the overall view of the PSC is added to the CSAQ in the current study. Therefore, the final questionnaire has 47 questions.

2.2. Nurses' Turnover

The nursing staff's turnover rate in recent years has remained high threatening the medical care system and the quality of patient care [40]. Though turnover intention does not necessarily mean the employees' actual turnover, it is found that turnover intention is a powerful indicator to predict their future behaviors [41, 42]. Takase [43] defined turnover intention as an employee who wants to leave the current workplace. Numerous factors might increase the possibility of nursing staff turnover, such as heavy workload, high pressure, and low job satisfaction [16, 44]. The nursing staff's departure leads to a shortage that impacts the quality of care and patient safety

negatively and increases the additional cost of new personnel training [45, 46]. Trivellas *et al.* [47] showed that when a nurse has greater job pressure and lower job satisfaction; the nurses' turnover rate would be higher. Moreover, job satisfaction and organizational commitment have important causal relationships with turnover intention [42]. When medical staff have excessive work

pressure and low job satisfaction, the quality of care for patients would be affected negatively and the medical staff's turnover intention would be increased [48].

To effectively reduce the turnover rate, healthcare organizations need to reduce the employees' turnover intention [49]. Mobley *et al.* [50] stated that satisfaction is the essential psychological variable related to turnover at

Table 1. The Chinese version of the SAQ developed in 2014.

Teamwork climate	(1) Nurse input is well received in this clinical area
	(2) In this clinical area, it is difficult to speak up if I perceive a problem with patient care*
	(3) Disagreements in this clinical area are resolved appropriately (<i>i.e.</i> not who is right, but what is best for the patient)
	(4) I have the support I need from other personnel to care for patients
	(5) It is easy for personnel here to ask questions when there is something that they do not understand
	(6) The physicians and nurses here work together as a well-coordinated team
Safety climate	(7) I would feel safe being treated here as a patient
	(8) Medical errors are handled appropriately in this clinical area
	(9) I know the proper channels to direct questions regarding patient safety in this clinical area
	(10) I receive appropriate feedback about my performance
	(11) In this clinical area, it is difficult to discuss errors*
	(12) I am encouraged by my colleagues to report any patient safety concerns I may have
Job satisfaction	(13) The culture in this clinical area makes it easy to learn from the errors of others
	(14) I like my job
	(15) Working here is like being part of a large family
	(16) This is a good place to work
	(17) I am proud to work in this clinical area
	(18) Morale in this clinical area is high
Stress recognition	(19) When my workload becomes excessive, my performance is impaired
	(20) I am less effective at work when fatigued
	(21) I am more likely to make errors in tense or hostile situations (<i>e.g.</i> emergency resuscitation, seizure)
	(22) Fatigue impairs my performance during emergency situations
Perceptions of management	(23) Managers support my daily efforts
	(24) Managers do not knowingly compromise patient safety
	(25) I get adequate, timely information about events that might affect my work
	(26) The levels of staffing in this clinical area are sufficient to handle the number of patients
Working conditions	(27) Problem personnel are dealt with constructively
	(28) This hospital does a good job of training new personnel
	(29) All the necessary information for diagnostic and therapeutic decisions is routinely available to me
	(30) Trainees in my discipline are adequately supervised
Emotional exhaustion	(31) I feel like I'm at the end of my rope*
	(32) I feel burned out from my work*
	(33) I feel frustrated by my job*
	(34) I feel I'm working too hard on my job*
	(35) I feel emotionally drained from my work*
	(36) I feel used up at the end of the workday*
	(37) I feel fatigued when I get up in the morning and have to face another day on the job*
(38) Working with people all day is really a strain for me*	
Work-life balance	(39) Working with people directly puts too much stress on me*
	(40) Missed meals
	(41) A hasty meal
	(42) All-day work without any rest
	(43) Individual or family plan change due to work factors
	(44) Poor sleep
	(45) Less than five-hour sleep at night
(46) Work overtime	

Note: * Indicates the question item is worded negatively.

the individual level. To sum up, previous studies mainly focused on either the nursing staff's turnover intention or how to retain nursing staff. No further investigation using the SAQ results filled out by the nursing staff who later resigned was found.

3. RESEARCH METHOD

A regional teaching hospital in this study evaluates its PSC by the CSAQ in October-November annually. The purpose of this study is to observe critical dimensions affecting nurses' turnover such that the subject of this study is the nurses who filled up the CSAQ in the previous year and left their jobs in the next coming year. That is, the internal data sets of the CSAQ from 2015 to 2018

focusing on the turnover of nursing staff who left their jobs in the next year, *i.e.*, from 2016 to 2019 are used from this case hospital in Taiwan. The effective numbers of the questionnaires for inclusions focusing on nurses' turnover from 2015 to 2018 are 36, 47, 68, and 45, respectively. Detailed information about the nursing staff's turnover in this hospital from 2016 to 2019 is provided in Table 2. There are eleven negative-wording questions such that the numerical score for each question from each respondent is reversed. The overall score for each dimension is to sum the scores from the individual questions under that particular dimension. Moreover, this hospital has one additional question to evaluate the overall satisfaction of the PSC.

Table 2. Demographic variables of nurses' turnover.

Demographic variable	Frequency	Percentage
Gender	-	-
Male	12	6.1
Female	184	93.9
Age	-	-
Less than 20 years old	9	4.6
21-30 years old	139	70.9
31-40 years old	33	16.8
41-50 years old	13	6.6
51-60 years old	2	1
61 years old and above	0	0
Supervisor/Manager	-	-
Yes	11	5.6
No	185	94.4
Respondents reporting events in the past 12 months	-	-
No	120	61.2
1-5	68	34.7
6-10	6	3.1
11-15	2	1
More than 16	0	0
Job status	-	-
Full Time	138	70.4
Contract	11	5.6
Part Time	11	5.6
Agency	36	18.4
Experience in organization	-	-
Less than 6 months	38	19.4
6 to 11 months	16	8.2
1 to 2 years	78	39.8
3 to 4 years	29	14.8
5 to 10 years	22	11.2
11 to 20 years	11	5.6
21 years or more	2	1
Experience in position	-	-
Less than 6 months	42	21.4
6 to 11 months	18	9.2
1 to 2 years	81	41.3
3 to 4 years	27	13.8
5 to 10 years	23	11.7
11 to 20 years	5	2.6
21 years or more	0	0

(Table 4) contd....

Demographic variable	Frequency	Percentage
Education	-	-
Junior High School and below	0	0
Senior High School	0	0
College/University	191	97.4
Graduate School and above	5	2.6
Direct patient contact	-	-
No	5	2.6
Rare	13	6.6
Very Often	178	90.8
Year of resignation	-	-
2016	36	18.4
2017	47	24
2018	68	34.7
2019	45	23

Table 3. Coefficients of the third model.

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Standard error	Beta		
(Constant)	0.159	0.217	-	0.733	0.464
Perceptions of management	0.109	0.020	0.401	5.346	<0.001
Safety climate	0.036	0.016	0.224	2.265	0.025
Teamwork climate	0.037	0.018	0.190	2.007	0.046

Linear regression with forward selection is used to find essential dimension(s) that impact the overall satisfaction of the PSC from viewpoints of the nursing staff’s turnover. The forward selection enables the decision maker to figure out which dimension has a significant influence directly on the overall satisfaction [51, 52]. The independent variables are eight dimensions, while the dependent variable is the overall satisfaction of the PSC. The probability of F to enter (F test) less than 0.050 is the criterion to add variable(s) into a linear regression model.

4. RESULTS

The number of nurses’ turnover from 2016 to 2019 included in this study is 196 by summing the numbers from these four years (36, 47, 68, and 45) as shown in Table 1. Among them, female nurses are the majority (93.9%) with 21-30 years (70.9%) and most of them are not supervisors or managers with 94.4%. More than 60% of nurses do not report any event in the past 12 months, and 70.4% of nurses are full-time. Both nurses’ experience in organization and experience in position fall in 1 to 2 years with 39.8% and 41.3%, respectively. Most of the nurses have a college or university degree (97.4%) and directly contact patients very often (90.8%).

To check the severity of the multicollinearity of input variables, variance inflation factor (VIF) is employed, and the multicollinearity is relatively low with the VIF values less than 10 [53]. The presence of autocorrelation in the residuals of variables can be evaluated by the Durbin-Watson statistic. The statistics value is close to 2, i.e., 2.011, showing residuals are not correlated [54]. Three models are found with $\alpha = 0.05$, and the respective

adjusted R square values are 0.505, 0.559, and 0.568. That is, Model 3 is the best. From Table 3, the standardized coefficients of perceptions of management, safety climate, and teamwork climate are 0.401, 0.224, and 0.190, indicating that these three dimensions influence the overall satisfaction of the PSC positively. In addition, the larger the standardized coefficients are, the greater the impact the dimension has. The results in Table 3 show that perceptions of management are the first critical variable to be selected followed by safety climate and teamwork climate. Based on the viewpoints of the nursing staff’s turnover, perceptions of management positively impact the overall satisfaction of the PSC. Safety culture and teamwork climate also have positive influences on the overall satisfaction of the PSC.

5. DISCUSSION

No studies were found to focus on the nurses’ turnover based on the CSAQ. Thus, it is a pioneer study to explore how the nurses’ turnover reacts to the PSC. Perceptions of management are the most essential dimension to positively affect the overall satisfaction of the PSC from the viewpoints of nurses’ turnover followed by safety climate and teamwork climate. The study conducted by Cheng *et al.* [51] who used the same hospital to analyze nurses’ overall satisfaction with the PSC in 2015 and 2016 can be the benchmark to know if nurses’ turnover might have different perceptions.

Cheng *et al.* [51] summarized that working conditions were the most critical dimension in 2015 followed by job satisfaction. Both dimensions positively influence the overall satisfaction from nurses’ viewpoints. In 2016, three

dimensions are essentially important to affect overall satisfaction positively, *i.e.*, working conditions, safety climate, and perceptions of management. That is, working conditions might be the major dimension to affect the overall satisfaction of the entire nurses. It is worth noting that this study focuses on the perceptions of nurses' turnover, whereas Cheng *et al.* [51] used the perceptions of the overall nurses including nurses who left their jobs in the coming years. Obviously, the viewpoints of the overall satisfaction between the nurses' turnover and the entire nurses are somewhat different as shown in Table 4. Specifically, the numbers of participating nurses in Cheng *et al.* [51] are 358 and 404 in 2015 and 2016, respectively. In our study, the numbers of nurses' turnover are 36 and 47 in 2016 and 2017, respectively. The percentages of nurses' turnover in this case hospital are roughly 10.0% and 11.6%, respectively. That is, the overall satisfaction affecting the PSC evaluated by Cheng *et al.* [51] was from the majority of nurses who still work in this hospital for the coming years. That is, the dimensions summarized in Table 4 and found by Cheng *et al.* [51] could be the references that nurses are willing to work in this regional teaching hospital later. Therefore, the significant differences in terms of dimensions between nurses' turnover and the entire nurses are working conditions and job satisfaction. That is, working conditions and job satisfaction might be the most important dimensions to result in a higher nurse turnover rate since these two dimensions were not found from the viewpoints of nurses' turnover as shown in Table 4.

Table 4. Critical dimensions to influence the overall satisfaction between two studies.

-	Our findings	Cheng <i>et al.</i> [51]
Critical dimensions	Perceptions of management safety climate teamwork climate	Working conditions (2015, 2016) Job satisfaction (2016) Safety climate (2016) Perceptions of management (2016)

Working conditions consist of the following four questions as shown in Table 1 including "Problem personnel are dealt with constructively by our unit", "This hospital does a good job of training new personnel", "All the necessary information for diagnostic and therapeutic decisions is routinely available to me" and "Trainees in my discipline are adequately supervised". That is, the relationship between the overall satisfaction and working conditions is not strong enough for the viewpoints of nurses' turnover. Hospital management can pay attention to these questions to reduce nurses' turnover by improving nurses' working conditions. On the other hand, the findings from Yahya Muabbar and Zayyan Alsharqi [13] and Ahanchian and Ganji [12] summarized that there is a direct relationship between job satisfaction and turnover intention. Chen *et al.* [14] further emphasized that job satisfaction could predict nurses' turnover intention negatively. That is, our findings might indicate that nurses' job satisfaction could be an indicator to result

in not only their turnover intention but also their departure in the later stage.

CONCLUSION

This study focuses on the perceptions of nurses' turnover from a regional teaching hospital in Taiwan to find critical dimensions influencing the overall satisfaction of the PSC based on the CSAQ. Perceptions of management, safety climate, and teamwork climate are found to positively affect the overall satisfaction of the PSC from the viewpoints of nurses' turnover. In contrast, Cheng *et al.* [51] found that working conditions and job satisfaction were the two critical dimensions influencing the overall satisfaction of the PSC positively from the nurses. That is, nurses' turnover might lack of working conditions and job satisfaction for the overall satisfaction of the PSC in this regional teaching hospital. Working conditions and job satisfaction could be two essential dimensions to affect nurses' turnover. Therefore, monitoring working conditions and job satisfaction relentlessly might be an approach to reduce nurses' turnover in this hospital.

AUTHORS' CONTRIBUTION

It is hereby acknowledged that all authors have accepted responsibility for the manuscript's content and consented to its submission. They have meticulously reviewed all results and unanimously approved the final version of the manuscript.

LIST OF ABBREVIATIONS

PSC = Patient Safety Culture
SAQ = Safety Attitudes Questionnaire
CSAQ = Chinese Version of the Safety Attitudes Questionnaire

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by Cheng Ching General Hospital in Taichung City, Taiwan with protocol number HP190028 on June 20, 2019.

HUMAN AND ANIMAL RIGHTS

All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committees and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

The data of current study are available from author, [H-H.W.], on a reasonable request.

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CONFLICT OF INTEREST

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