

## **Nurses' perception regarding patient safety climate and quality of healthcare in general hospitals in Japan**

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## **Nurses' perception regarding patient safety climate and quality of healthcare in general hospitals in Japan**

### **Abstract**

**Aim:** To clarify perceptions of nurses towards patient safety climate and quality of health care in Japan. **Background:** Nurses' perceptions of patient safety climate and quality of healthcare services are not well-known. **Method:** The survey was conducted at general hospitals with 200 beds or more using the Patient Safety Climate Scale and the Modified multiple-item scale for consumer perceptions of healthcare service quality. **Results:**

Significant positive correlations were found among nurses' perception towards patient safety and healthcare service quality. The experience of nurses as members of the committee on patient safety and their employment position did not show any significant difference in the perception towards patient safety and healthcare services quality. Perceptions of healthcare service quality were lower among those with 6 -10 year experience than with over 21 years.

**Conclusion:** In the perception of nurses and nurse managers' continuous improvement perceptions towards patient safety were related to reliability, assurance, responsiveness, and empathy in healthcare service quality. **Implications for Nursing Management:** Generalist nurses with 21 years or more experiences in multiple departments showed high perception towards healthcare service quality. Experienced nurses' perceptions of activities to improve

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patient safety and quality of healthcare services are important.

**Keywords:** Nurse, Perceptions, Patient safety climate, Healthcare service quality

### **Introduction**

Healthcare institutions need to create safe healthcare systems with high-quality healthcare for patients (Betancourt & Tan-McGrory, 2014). As medical care and healthcare become more sophisticated (Sultan, 2015), patients are starting to recognize health-related service industries (Kitapci et al., 2014). Healthcare safety is now a major global concern and delivering safer care becomes a challenge in healthcare settings (WHO, 2017).

Safety is a core element to improve patient safety and care quality (Weaver et al., 2013).

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Patient safety climate is often used interchangeably with patient safety culture (Weaver et al., 2013) and refers to perceptions about policies, norms, and procedures related to patient safety among members of a group, such as care teams, units, departments, or institutions (Singer & Vogus, 2013). Patient safety climate is a critical factor in preventing harmful events in healthcare institutions. This climate is influenced by worker perceptions and organizational factors (Matsubara et al., 2008).

The length of professional experience at the institution is an important indicator of patient safety, representing the professional turnover inside the institution, since a fast turnover would prevent effective maintenance of effective patient care (Barbosa et al., 2016). Organizational behavior and the retention of a qualified and committed nurse workforce might be a promising area to improve hospital care safety and quality, both nationally and internationally (Aiken et al., 2012). Differences by management level depend on the discipline: senior managers versus frontline workers, in which discrepancies are less pronounced for physicians than for nurses or for other disciplines. Patterns of variation by management level differed by professional discipline. Continuing efforts to improve patient safety should address perceptual differences, both among and within groups by management level (Singer et al., 2008).

### **Patient Safety**

Safety perceptions were found to be higher in older age healthcare provider groups suggesting that they know their job very well and may also hold enhanced safety perceptions (Brasaitte et al., 2016). In a study that explored the safety climate perceptions of a multicultural nursing workforce, a significant difference was found between the age groups, years of nursing experience, and their perceptions of the safety climate (Almutairi et al., 2013). However, little is known about relations among *length of experience* as registered nurse and *nurses' perceptions on patient safety climate* and *healthcare service quality*. It was reported that the level of patient safety culture was

positively correlated with the rate of error reporting and that the level of the patient safety culture at both organizational and departmental levels predicted the error reporting rate (Kagan & Barnoy, 2013).

### **Quality of Healthcare**

Quality of healthcare service is defined as fulfilling the needs of the patients consistently through effective and efficient healthcare service based on the most recent clinical guideline and standard that meets patients' needs and satisfies providers (Mosadeghrad, 2013). Importantly, one of the characteristics of healthcare service quality is satisfying customer expectations and needs, including safety (Mosadeghrad, 2013).

McFadden et al. (2015) have observed that current continuous quality improvement implementation in hospitals may be done more in the interest of improving business processes and quality results rather than in the interest of patient safety. Quality and safety are not the same and may work against each other. This may be because quality and safety focus on different objectives. However, empirical research on patient safety and patient safety climate in medical settings still lags far behind the theoretical literature on these topics (Zaheer et al., 2015). A previous study explored the disparities between the perceptions of patients and health care workers on the quality and safety culture, and the relationship between patient perceptions and engagement in, and satisfaction with their care and treatments (Kagan et al., 2019). It is essential to continuously improve health care quality through the implementation of patient safety culture. Commitment to quality care as an outcome will be associated with patient safety (Mahrous, 2018).

Nevertheless, nurses' perceptions of patient safety climate and quality of healthcare services are not well-known. Therefore, it is significant to examine the nurses' perceptions and attributes that influence the patient safety climate and quality of health care to consider measures that will lead to further development of the medical safety climate and improvement of the perceptions of healthcare service quality.

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## **Purpose**

The purpose of this study was to clarify nurses' perceptions regarding patient safety climate and healthcare service quality in general hospitals in Japan.

## **Methods**

### **Research Design**

The design of this study was cross-sectional web-based questionnaire survey.

**Survey Monkey**© platform (SurveyMonkey, n.d.) was used for this survey. The researcher provided the Letter of Invitation to participate, and information about the study with the Survey Monkey URL to the Nurse Managers who agreed to distribute the document containing the URL in order for participants to be able to access the survey instrument.

### **Setting**

Eleven general hospitals in Chugoku-Shikoku district, Japan, with 200 or more in-patient beds.

### **Survey population**

The questionnaire survey request was distributed to 1,000 nurses. The data were collected using a stratified sampling method of which 20% was allocated to each group who were within the age range of 20 to 60 years old.

The total number of Japanese registered nurses in 2018 was 1,218,606. The number of persons per age range (20-30, 31-40, 41-50, and 50+) was between 250,000 to 350,000. Therefore, we set the number of samples on the average which is about 300,000 persons. Consideration was for a response rate (most prone to error) of "50%".

As a result, the number of required samples were calculated as follows: (1) When the acceptable error range is 5%, a response rate of 50%, and the reliability at 90%, the required number of samples is 269 persons; (2) The required number of samples, with an acceptable error range of 10%, a response rate of 50%, and a reliability of 95% is 96

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persons; and (3) The required number of samples with an acceptable error range of 10%, a response rate of 50%, and a reliability of 90% is 67 persons.

Selection of participants was based on the following inclusion criteria: a) were currently employed as nurses; b) were practicing mainly in a private or public healthcare system (or both); c) were qualified and registered to practice nursing; and d) agreed to take part in the survey. Exclusion criteria sorted those professionals who were not eligible to participate in the survey, such as nurses who decided to quit the study at any stage and for any other reason.

### **Survey period**

It was conducted during the months of October to December 2019.

### **Survey items related to characteristics**

The questionnaire collected data on the survey respondent's age, employment position, length of experience as registered nurse, educational background, experience of nurses as members of committee on patient safety, and experience in submitting incident reports.

### **Instruments**

The following instruments were used for data collection.

(1) **PSCS** (Patient safety climate scale) (Matsubara et al., 2008) has eight dimensions measuring health care worker perceptions (free communication flow, continuous improvement, reporting/rules compliance and patient/family involvement) and organizational factors (supervisors' safety leadership, allied professionals' safety leadership, patient safety committee leadership and rules/equipment availability). The internal consistency (measured by Cronbach's alpha) and repeatability (measured by intra-class correlation) were more than 0.70 for all subscales. The reliability and validity of this scale have been confirmed. The items were accompanied by a 5-point response scale (1 = disagree, 3 = neither agree nor disagree, 5 = agree).

(2) **M-SERVQUAL** (Modified multiple-item scale for measuring consumer perceptions of

healthcare service quality; Modified SERVQUAL): Parasuraman et al (1985, 1991) revealed that the criteria used by consumers in assessing service quality comprise ten potentially overlapping dimensions. These dimensions were tangibles, reliability, responsiveness, communication, credibility, security, competence, courtesy, understanding/knowing the customer, and access. These dimensions and their descriptions served as the basic structure of the service-quality domain from which items were derived for the SERVQUAL. The original SERVQUAL (Parasuraman et al., 1988) consists of 22 items with a 7-point Likert scale that measure perceived service quality across five dimensions. These five dimensions are tangibles, reliability, responsiveness, assurance and empathy. The SERVQUAL is a multidimensional research instrument, designed to measure service quality by capturing respondents' expectations and perceptions along the five dimensions of service quality. Its component and the perceptions component of the questionnaire consist of a total of 22 items, comprising 4 items to capture tangibles, 5 items to capture reliability, 4 items for responsiveness, 4 items for assurance and 5 items to capture empathy. The tangibles dimension measures the effects of the appearance of the physical facilities, equipment, personnel, and communication materials on the client's perception of service quality. Reliability addresses the ability to perform the promised service dependably and accurately. Responsiveness is defined as the willingness to help clients and provide prompt service. Assurance measures the knowledge and courtesy of employees and their ability to convey trust and confidence. Empathy is the caring and individualized attention provided to clients.

(3) A Japanese service quality evaluation scale for nurses has been developed (Tada & Ebe, 2001). This Japanese version of the SERVQUAL scale for nursing (SERVQUAL-N) is a measure of the quality of Japanese nursing services as perceived by patients. With the permission of SERVQUAL's author, A. Parasuraman, the authors translated the scale into Japanese and modified it to measure Japanese nurses' perceptions of healthcare service quality at their place of employment. Although the validity and reliability of SERVQUAL in

English have already been demonstrated, re-testing was conducted to establish the reliability of this new scale, called the Modified Multiple-Item Scale for Measuring Consumer Perceptions of Healthcare Service Quality (M-SERVQUAL), using factor analysis and Cronbach's  $\alpha$ . The reliability of the scale was confirmed during the study, using the same sample. Factor analysis identified the same dimensions as for the SERVQUAL, but with assurance and responsiveness combined into a single dimension, a total of four component factors were established in the M-SERVQUAL. The reliability of the overall scale was high, with a Cronbach's  $\alpha$  of 0.93. For the component factors Cronbach's  $\alpha$  coefficients were, from highest to lowest: Reliability (Factor 1: F1) 0.90, Assurance & Responsiveness (Factor 2: F2) 0.89, Empathy (Factor 3: F3) 0.93, and Tangibles (Factor 4: F4) 0.65. For each of the factors, respondents rated their expectations for and their perceptions of the quality of a particular healthcare service using a 7-point Likert scale from 1 "strongly disagree" to 7 "strongly agree." Higher scores for a particular service indicated that the respondent perceived the service to be relatively more important.

### **Analysis method**

The statistical analysis was performed using the following tests: Descriptive statistics was used to describe age, employment position, length of experience as registered nurse, educational background, experience of committee members on patient safety, and experience in submitting the incident reports. Total score and mean for each subscale of Patient Safety Climate Scale and Modified SERVQUAL were calculated: Welch's t-test was used to determine the differences between two samples; Welch's analysis of variance (ANOVA) with the Games-Howell post-hoc tests was also used to conduct analysis among five samples. Pearson's correlation coefficient with Kolmogorov-Smirnov test was used to analyze relationships between the total points and mean factor scores of Patient Safety Climate Scale and Modified SERVQUAL.

Statistical analyses were conducted using IBM SPSS Version 24 (IBM Institute,

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Chicago, USA) and R (version 3.6.2, R Foundation for Statistical Computing, Vienna, Austria). The level of statistical significance was set at  $p < 0.001$ . For sample size estimation, the researcher performed a statistical power analysis. The effect size in this study is considered to be extremely large using Cohen's (1988) criteria. With an alpha = .05 and power = 0.80, the projected sample size needed with effect sizes (G\*Power 3.1.9.7, Franz, Universität Kiel, Germany) (Faul et al., 2007) were the *t*-test (N=128), the one-way analysis of variance (N=200), and correlation coefficient (N=82). Thus, the proposed sample size was adequate for the main objective of this study.

### **Ethical Consideration**

Ethical approval was obtained from the Ethics Committee of a University Hospital in Japan. When survey respondents accessed the web link, information was made available about the study. This information included their agreement or permission to participate and for collecting personal data. This permission was obtained prior to the data collection stage. Participation was voluntary; the respondents incurred no penalty if they decided to quit the study at any time. To assure the confidentiality, participants' personal information which could identify them were not collected, such as birthdates, instead age was used. Contact information such as email addresses were not collected as well. To assure that participants only respond once, the survey monkey link was set so that participants can only respond once. Consent form was provided through the link prior to the survey questions that will only be accessed if the participants "agreed to participate." If they do not agree, they only need to close the information page.

Personal information was kept confidential by securing access only when using a password. All personal data were secured in the researcher's computer that was also accessible only through a password that is known only by the main researcher.

Participants were presented with a reward of 300 Japanese yen after completion of the survey as approved by the Ethics Review Board.

## Results

Retrieved completed questionnaire copies totaled 422 (response rate = 42.2 %), and only 421 responses were considered valid for analysis and interpretation (Ratio of valid responses: 42.1%). The demographic data are presented in **Table 1**. All the participants were registered nurses; 325 (77.2%) for staff nurse and 96 (22.8%) for nurse managers. In terms of education level, advanced diploma was the most common at 315 (74.9%), followed by university at 67 (15.9%). The number of participants who had an experience of being committee members on patient safety was 127 (30.2%), and for experience in submitting incident reports, it was 417 (99.0%).

(Please insert table 1 about here)

### **Table 1.** *Demographic Data*

There was no significant difference in the average of the total score differences in the Patient Safety Climate Scale and Modified SERVQUAL by the employment position, and experience of committee members on patient safety.

(Please insert table 2 about here)

### **Table 2.** *Welch`s Test Results for Patient Safety Climate Scale and Modified SERVQUAL Scores*

**Table 3** shows the results of the differences in the length of experience as registered nurse in the Patient Safety Climate Scale and Modified SERVQUAL.

No significant difference was found in the comparison based on the total Patient Safety Climate Scale score. For the factor Patient Safety Climate Scale of Patient/family involvement (F4), the score was significantly lower in the groups with over 21 years' and 11-15 years' experience than in the group with only 1-5 years' experience ( $p < 0.001$ , respectively). However, there was no significant difference for Patient Safety Climate Scale

of Organizational factors.

The overall score of Modified SERVQUAL, among those with 6-10 years' experience showed significantly lower scores than those who had 21 years or more of experience ( $p < 0.001$ ). In the comparison of scores for each factor of Modified SERVQUAL, in Reliability (F1), the group with more than 21 years of experience showed a significantly higher score compared with the 6-10 years' experience group ( $p < 0.001$ ). For Assurance and Responsiveness (F2), the score was significantly lower in the 6-10 years' experience group than in the 1- 5 years group; and showed a significantly lower score in the 6-10 years' experience group than over 21 years' experience group ( $p < 0.001$ , respectively). However, there were no significant differences for the factors Empathy (F3) and Tangible (F4) of M-SERVQUAL.

(Please insert table 3 about here)

**Table 3.** *Welch`s Analysis of Variance Results for Modified SERVQUAL and Patient Safety Climate Scale Scores*

As shown in the explanation part of **Table 4** the correlation coefficient between the total scores of Patient Safety Climate Scale and Modified SERVQUAL was  $r=0.34$  ( $p < 0.001$ ). Significant positive correlations ( $r \geq 0.3$ ) were found among the following factors of Patient Safety Climate Scale and Modified SERVQUAL: Continuous improvement (F2) of the Patient Safety Climate Scale with Reliability (F1), Assurance & Responsiveness (F2), Empathy (F3) of the Modified SERVQUAL; and Patient safety committee leadership (F7) showed Reliability (F1) of the Modified SERVQUAL ( $p < 0.001$ , respectively).

(Please insert table 4 about here)

**Table 4.** *Correlation between Factors of Modified SERVQUAL and Patient Safety Climate Scale Scores*

## Discussion

## Characteristics of survey subjects

Retrieved completed questionnaire copies totaled 422 (response rate = 42.2 %), and only 421 responses were considered valid for analysis and interpretation (Rate of valid responses is 42.1%). The required number of samples with an acceptable error range of 10%, a response rate of 50%, and a reliability of 95% is 96 persons. As shown in Table 1, there were more than 96 respondents in each age group. Therefore, the required number of samples was obtained, the sample size was found representative of the population.

Of the nurses in the sample, 96 (22.8%) were nurse managers and 315 (74.9%) were vocational school graduates. Many were extremely experienced, with 169 (40.1%) having practiced nursing for 21 years or more. The nurses' age distribution was similar to that shown in the 2018 Report on Public Health Administration and Services (Practicing Health Professionals) by the Ministry of Health, Labor and Welfare (2018). By age group, 21.2% were aged 29 and under, 24.4% were 30–39, 28.2% were 40–49, and 26.3% were 50 or older (Ministry of Health, Labor, & Welfare, 2018).

In addition, 127 (30.2%) had been members of committees related to either patient or staff safety, and 417 (99%) had experience in filing an incident report. Almost all the nurses indicated that they had filed an incident report, suggesting that this group may have strongly recognized the importance of patient safety. Almost all had experienced an incident where they had written a report to look back on the incident and reflect on ways to improve patient safety with nurse managers and ward staff.

If culture of safety is negative which means that it involves punitive actions and blames, then nurses are less likely to speak up in the team (Nacioglu, 2016). However, increased numbers of reported incidents were not perceived as a deterioration of patient safety but on the contrary, as indicating improved readiness to report incidents that were already present (Verbakel et al., 2015).

## Differences in the Modified SERVQUAL and Patient Safety Climate Scale by the

## **employment position, and experience of committee members on patient safety**

As shown in Table 2, no significant differences were found between mean Patient Safety Climate Scale scores or Modified SERVQUAL scores by employment position or safety-related committee member experience. These factors may not have contributed to change in the quality of care or patient safety climate because the sharing and exchange of information and knowledge regarding patient safety and patient care services are always taking place among staff and between organizational units (Sendlhofer et al., 2015).

## **Differences by the length of experience as registered nurse in the Patient Safety Climate Scale and M-SERVQUAL**

For the factor Patient Safety Climate Scale of Patient/family involvement (F4), the group with 1-5 years of experience obtained significantly higher perception scores that were greater than those with experience of 11-15 years and more than 21 years.

A previous study reported that the factor that affected patient safety management activities the most was total working experience at the present hospital. Especially, nurses with more than 15 years of experience conducted more management activities than nurses with less than 2 years of experience (Jang et al., 2017). Because the group with 1-5 years of experience not have much experience, they are unable to make independent or intuitive decisions in a wide variety of nursing situations confronted by lack of experiential knowledge, and this group tends to depend on other people. Thus, it was considered that inexperienced nurses tended to involve their patients and families to prevent medical accidents, and to invite them in their medical process.

By contrast, the overall score of Modified SERVQUAL, among those with 6-10 years' experience showed significantly lower scores than those who had 21 years or more of experience. It was suggested that a group of nurses over 21 years has more

perceptions of the quality of healthcare services.

In this present study, no statistically significant differences were observed between the nurses with 11-15 years of experience and those with 16-20 years of experience; however, results should be interpreted with caution due to the small sample size. Furthermore, 47.9% of the group with over 21 years of experience were nursing managers, so they may be more concerned about managing the quality of healthcare service. Nevertheless, it is considered important to involve such experienced nurses in activities to improve patient safety and quality of healthcare services.

In Modified SERVQUAL, scores for Reliability (F1) and Assurance and Responsiveness (F2) were significantly higher in the group with 21 years or more clinical experience than in the group with 6-10 years. According to Parasuraman et al. (1988), *Reliability* means the ability to perform the promised service dependably and accurately; *Assurance* means the knowledge and courtesy of employees and their ability to convey trust and confidence; and *Responsiveness* means the willingness to help customers and to provide prompt service. Therefore, we believe that nurses with over 21 years of experience provide appropriate and reliable care with a strong sense of responsibility. In contrast, 6-10 years of experience covers a period where conflict arises in role perception for mid-level nurses. Because of this conflict and stress related to nursing care, this group had a lower perception of healthcare service compared to the group with over 21 years of experience.

Experiential knowledge is characterized by skillful execution of nursing procedures as well as the ability to perform complex, multidisciplinary assessments and to recognize early signs of deterioration in the condition of a patient. Nurses who are both well-educated and experienced are in the position to give the highest quality of care (Hill, 2010). A previous study reported that the relationships between the levels of nursing competence and the length of clinical experience were illustrated by a rapid increase in competence levels at the early stage of the nursing career (Takase, 2013). Therefore, medical institutions need to understand

that the nurses' perception for high quality care may vary depending on the length of nursing experience. In addition, these institutions need to consider maintenance of practical nursing ability, support for improvement, as well as timing and methods for in-service education.

### **Correlation between Patient Safety Climate Scale and Modified SERVQUAL**

There was a significant positive correlation between nurses' perceptions measured by Patient Safety Climate Scale and M-SERVQUAL. It was considered that the higher perception scores towards patient safety, and higher perception scores for healthcare services quality. Especially, items of correlation coefficient of  $r=0.3$  or more were Patient Safety Climate Scale (Worker Attitude), Continuous improvement between Reliability, Assurance & Responsiveness and Empathy of Modified SERVQUAL; Patient Safety Climate Scale (Organizational factor) Patient safety committee leadership and Reliability of Modified SERVQUAL.

It is important to realize that 'reliability' ranked the highest degree of the healthcare service quality (Weng et al., 2016). In particular, the nurses' idea of continuous improvement involves selecting healthcare service based on the patient's situation, understanding the patient's wishes and demands, and ensuring that the service required by the patient is being provided. We believe that patients can only be truly understood when they are included in the planning. Furthermore, it is important to develop qualities, such as observance of rules and refusal to cover up mistakes, which lead to reliability and assurance.

Empathy of the Modified SERVQUAL means the provision of caring, individualized attention to customers. We believe that the current emphasis is on initiatives for continuous improvement that are geared towards actively ensuring the patient's safety and providing reliable healthcare service while placing individualized

attention on the other party—as the recipient of services—and viewing things from their perspective. In this study, 99% of the subjects have experience in filing incident reports. As one of the initiatives of the organization to prevent future accidents, this study suggested that nurses recognize these reports as the nucleus of continuous improvement for patient's safety.

On the other hand, no significant correlation was found among the following factors of Patient safety climate scale and Modified SERVQUAL: (1) Modified SERVQUAL of Reliability (F1) between Patient Safety Climate Scale of Patient/family involvement (F4) and Allied professionals' safety leadership (F6); (2) Modified SERVQUAL Assurance & Responsiveness (F2) and Patient Safety Climate Scale of Reporting/rules compliance (F3), Patient/family involvement (F4), Allied professionals' safety leadership (F6); (3) Modified SERVQUAL Empathy (F3) and Patient Safety Climate Scale of Reporting/rules compliance (F3); and (4) Modified SERVQUAL Tangibles (F4) between Patient Safety Climate Scale of factors 3 to 8.

In particular, Tangibles (F4) of Modified SERVQUAL did not show a significant correlation with Patient Safety Climate Scale of F3-8. 'Tangibles' refers to the items on the appearance of physical facilities, equipment, personnel, and communication materials. In addition, no correlation was observed with Patient Safety Climate Scale of F8 rules/equipment availability because there were several intangibles, such as the assessment of rules and manuals and sufficiency of items. The F3 to F7 are related to human management and environmental aspects, such as staff attitudes and committee activities, so it was expected that no correlation would be observed.

To guarantee the quality of healthcare service, first, it is important to place the patient's safety as the foundation and then adjust the treatment environment and medical system to suit the patient's situation.

### **Limitations**

This study identified relationships between Patient Safety Climate Scale and Modified SERVQUAL scores in a sample of nurses working at Japanese general hospitals. As such, the results are significant for Japanese nurses in their roles as providers of patient safety and healthcare service quality. However, since the data were collected from a limited sample of hospitals, caution would be advised when generalizing these findings. Another limitation is that the study did not look at factors related to the nurses' characteristics, their subjective perceptions, and their organizations, which would have also contributed to the hospital's patient safety culture and perceptions of healthcare service quality. Existing research does not yet include conclusive studies on the impact of healthcare quality, nursing experience, incident report filing, and serving on patient safety committees on the healthcare quality of nurses' perceptions. Therefore, in the future, large-scale studies are needed to investigate such factors and explore factors contributing to better hospitals' patient safety cultures and superior quality healthcare. Finally, the results may have had limitations related to the fact that, in this study, serving on a safety-related committee included both committees related to patient safety and staff safety. However, the Patient Safety Climate Scale focuses on assessing the climate related to patient safety only.

### **Conclusions**

This study revealed that significant positive correlation between nurses' perceptions measured by Patient Safety Climate Scale and Modified SERVQUAL among those who have the higher perception towards patient safety, and higher perception for healthcare services quality. More particularly, regarding the perception of nurses and nurse managers' patient safety climate and healthcare safety, the following factors were revealed: continuous improvement of the Patient Safety Climate Scale related to the reliability, assurance and responsiveness, and empathy of the M-SERVQUAL. For perception of the patient safety committee leadership, the Patient

Safety Climate Scale influenced the reliability of the Modified SERVQUAL. For Patient Safety Climate Scale of Patient/family involvement, the score was significantly lower in the group that had over 21 years and from 11-15 years' experience than in the group that had only 1-5 years' experience. It was considered that inexperienced nurses let their patients and families participate to prevent medical accidents, and to invite them in their healthcare process. The overall score of Modified SERVQUAL showed that among those with 21 years or more experience exhibited significantly higher scores than those who had less than 6-10 years of experience. However, the experience of nurses as members of the committee on patient safety and their employment position did not show any significant difference in the perception towards patient safety and healthcare services quality.

### **Implications for Nursing Management**

Nurses with over 21 years of experience or more and who are generalists possessing experience in multiple departments, have accumulated a lot of experiences, and have high perception towards healthcare service quality. It is important to involve these experienced nurses in activities to improve patient safety and quality of healthcare services.

This study provided findings that implied nursing service quality and educational priorities of nurses in practice, emphasizing the value of continuing education among nurses who have years of experience. The educational topics seemed to be more appreciated as focused on patient safety and enhancing quality healthcare. Furthermore, it informs nurse managers to be conscious about the educational needs of experienced nurses implying more emphasis on non-formal education contents (about patient centered care and other practice-focused topics) rather than formal education such as graduate education studies.

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**Table 1. Demographic Data**

Demographics (N=421)	n	(%)
Age		
20-30	105	(24.9)
31-40	96	(22.8)
41-50	108	(25.7)
51+	112	(26.6)
Employment position		
Registered nurse	325	(77.2)
Nurse manager	96	(22.8)
Length of experience as registered nurse (Years)		
1-5	60	(14.3)
5-10	82	(19.5)
10-15	67	(15.9)
15-20	43	(10.2)
21+	169	(40.1)
Educational background		
Master of Science in Nursing	3	(0.7)
Bachelor of Science in Nursing	67	(15.9)
Associate degree	36	(8.6)
Advanced diploma	315	(74.9)
Experience of committee members on patient safety		
Yes	127	(30.2)
No	294	(69.8)
Experience in submitting incident reports		
Yes	417	(99.0)
No	4	(1.0)

**Table 2.** Welch`s Test Results for PSCS and M-SERVQUAL Scores

Variables	PSCS			M-SERVQUAL		
	Mean (SD)	<i>t</i>	<i>p</i>	Mean (SD)	<i>t</i>	<i>p</i>
Employment position						
Registered nurse (N=325)	3.54 (0.62)	1.70	NS	5.56 (0.88)	2.20	NS
Nurse manager (N=96)	3.64 (0.50)			5.74 (0.63)		
Experience of committee members on patient safety						
Yes (N=127)	3.55 (0.66)	0.18	NS	5.72 (0.70)	-2.12	NS
No (N=294)	3.57 (0.57)			5.55 (0.88)		

Welch's t-test, Abbreviations: PSCS; Patient safety climate scale, M-SERVQUAL; Modified multiple-item scale for measuring consumer perceptions of medical service quality, SD; standard deviation, NS; not significant.

**Table 3.** *Welch's Analysis of Variance Results for M-SERVQUAL and PSCS Scores*

Length of experience as registered nurse (Years)	a: 1-5 yrs (n = 60)	b: 6-10yrs (n = 82)	c: 11-15yrs (n = 67)	d: 16-20yrs (n = 43)	e: 21yrs+ (n = 169)	F	p	Post hoc Significant Differences
<b>PSCS Total score</b>	123.70±18.41	114.62±20.74	113.48±19.90	113.47±15.90	119.46±19.72	3.84	NS	NS
<b>Factors</b>								
<b>Worker attitude</b>								
F1 Free communication flow	19.00±3.55	17.89±3.98	18.28±3.70	18.23±3.10	18.79±4.05	1.12	NS	NS
F2 Continuous improvement	19.20±3.48	17.44±4.12	17.22±4.38	17.26±4.05	18.90±3.62	4.70	NS	NS
F3 Reporting/rules compliance	16.10±4.14	15.55±3.98	15.37±3.71	15.95±3.63	16.34±3.37	1.18	NS	NS
F4 Patient/family involvement	11.13±2.13	10.01±2.44	9.46±2.55	9.53±2.68	9.70±2.29	5.89	§	a vs c §, e §.
<b>Organizational factors</b>								
F5 Supervisors` safety leaderships	15.23±3.54	14.28±3.67	14.39±3.37	14.12±3.49	15.13±3.64	1.60	NS	NS
F6 Allied professionals` safety leadership	12.70±3.76	10.91±3.82	10.48±3.92	10.21±4.09	11.31±3.41	3.69	NS	NS
F7 Patient safety committee leadership	15.10±3.09	14.39±3.38	14.54±3.27	14.40±2.60	14.92±2.86	0.83	NS	NS
F8 Rules/equipment availability	15.23±3.06	14.15±3.16	13.73±3.36	13.77±2.30	14.36±3.05	2.47	NS	NS
<b>M-SERVQUAL Total score</b>	118.13±20.80	116.00±20.18	124.67±18.57	121.53±16.31	128.49±14.84	8.33	§	b vs e §.
<b>Factors</b>								
F1 Reliability	40.65±8.06	40.80±6.80	43.09±5.81	42.88±5.68	44.98±4.64	9.37	§	b vs e §.
F2 Assurance & Responsiveness	42.32±8.63	41.52±8.81	44.66±7.92	43.98±7.03	47.32±6.47	10.03	§	a vs e §, b vs e §.

F3 Empathy	19.40±4.51	18.65±5.00	20.58±4.60	19.72±4.48	20.07±4.40	1.83	NS	NS
F4 Tangible	15.77±3.35	15.02±2.95	16.34±3.26	14.95±3.07	16.11±3.49	2.92	NS	NS

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Welch's analysis of variance (ANOVA) with the Games-Howell post-hoc tests, Abbreviations: F, Factor; PSCS, Patient safety climate scale; M-SERVQUAL, modified multiple-item scale for measuring consumer perceptions of medical service quality, SD, standard deviation, §, p<0.001, NS, not significant.

**Table 4.** Correlation between factors of PSCS and M-SERVQUAL Scores

PSCS (N=421)	M-SERVQUAL (N=421)			
	F1 Reliability	F2 Assurance & Responsiveness	F3 Empathy	F4 Tangible
<b>Worker attitude</b>				
F1 Free communication flow	0.20§	0.20§	0.23§	0.20§
F2 Continuous improvement	0.36§	0.31§	0.30§	0.22§
F3 Reporting/rules compliance	0.17§	0.09	0.02	0.06
F4 Patient/family involvement	0.12	0.15	0.25§	0.12
<b>Organizational factors</b>				
F5 Supervisors' safety leaderships	0.27§	0.22§	0.19§	0.10
F6 Allied professionals` safety leadership	0.12	0.15	0.19§	0.08
F7 Patient safety committee leadership	0.31§	0.25§	0.26§	0.14
F8 Rules/equipment availability	0.26§	0.24§	0.25§	0.15

Pearson's correlation coefficient with Kolmogorov-Smirnov test. Abbreviations: PSCS, Patient safety climate scale; M-SERVQUAL, Modified multiple-item scale for measuring consumer perceptions of medical service quality, §,  $p < 0.001$ . The correlation coefficient between the total scores of PSCS and M-SERVQUAL was  $r = 0.34$  ( $p < 0.001$ ).