Assessing the Trends of Patient Safety Culture from Viewpoints of Physicians and Nurses Based on Safety Attitudes Questionnaire of a State-Owned Regional Hospital in Taiwan

Hsin-Hung Wu
Department of Business Administration, National Changhua University of Education, Changhua, Taiwan
Email: hhwu@cc.ncue.edu.tw

Jiunn-I Shieh
Department of M-Commerce and Multimedia Applications, Asia University, Taichung City, Taiwan
Email: jishieh@asia.edu.tw

Wen-Huai Hsieh
Superintendent Office, Chang Hua Hospital, Changhua, Taiwan
Email: q0928705848@gmail.com

Hsiu-Wen Hsueh
Department of Industrial Education and Technology, National Changhua University of Education, Changhua, Taiwan
Email: pk121@cc.ncue.edu.tw

Kuan-Kai Huang
Center for Quality Management, Chang Hua Hospital, Changhua County, Taiwan
Email: hydokykk@gmail.com

***Abstract*—Regularly assessing the perceptions of physicians and nurses in patient safety culture is critically important to enhance patient safety and reduce medical errors in healthcare organizations because physicians and nurses are the core staffs in healthcare organizations. This study uses six dimensions of safety attitudes questionnaire to examine whether or not physicians and nurses perceive differently in patient safety culture in 2016 and 2017. Mann-Whitney U test for two independent samples is used to compare if the perceptions of physicians and nurses in 2016 and 2017 are different statistically. The results show that physicians and nurses do not have different perceptions in safety climate, perceptions of management, and job satisfaction. Stress recognition has been improved from 2016 to 2017. On the contrary, teamwork climate and working conditions are getting worse from 2016 to 2017. Therefore, hospital management needs to pay much attention to improve teamwork climate and working conditions for physicians and nurses in order to improve patient safety and reduce medical errors in this state-owned regional hospital.**

***Index Terms*—patient safety culture, safety attitudes questionnaire, state-owned regional hospital, Mann-Whitney U test for two independent samples**

I. Introduction

Soh et al. [1] pointed out that there is a growing trend for healthcare organizations to assess patient safety culture because safety culture can be viewed as a snapshot of an organization toward patient safety. A healthcare organization should develop a patient safety culture among its medical staffs and establish its structural interventions to enhance quality and safety for its patients [2]. Safety attitudes questionnaire (SAQ) developed by Sexton et al. [3] is one of the most frequent instruments to measure patient safety culture because SAQ has been linked to patient outcomes with good psychometric properties worldwide from medical staffs' viewpoints [4]-[7]. Through assessing the patient safety culture by SAQ, the drawbacks of the provision of patient safety can be identified and healthcare organizations can learn from errors to provide better healthcare and improve patient safety relentlessly [4], [8].

Physicians and nurses are the core staffs in each healthcare organization because they contact patients directly and have direct influences on quality of care and patient safety [5], [9], [10]. Lee et al. [11] summarized that it is essentially important to track the performance of patient safety culture on a timely basis in order for

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hospital management to gain insights by addressing the deficiencies to continuously enhance patient safety culture. In reality, the perceptions of patient safety culture might vary from time to time. Thus, it would be of interest to observe the trends of the patient safety culture in a healthcare organization.

The purpose of this study is to assess the trends of the patient safety culture based on the safety attitudes questionnaire in a state-owned regional hospital under Department of Health and Welfare in Changhua County, Taiwan from the viewpoints of physicians and nurses with the data sets in 2016 and 2017. In doing so, hospital management can observe how patient safety culture changes from 2016 to 2017. Therefore, improvement actions can be made to enhance the deficiencies in this state-owned regional hospital.

II. Safety Attitudes Questionnaire

Safety attitudes questionnaire developed by Sexton et al. [3] having six dimensions along with 30 questions has been widely used to survey the medical staffs' perceptions of patient safety culture in healthcare organizations worldwide [12], [13]. Six dimensions are teamwork climate, safety climate, perceptions of management, job satisfaction, stress recognition, and working conditions [12], [13]. The detailed information along with brief definitions of dimensions are provided in Table I.

TABLE I. Thirty Questions in Safety Attitudes Questions

Teamwork climate: perceived quality of collaboration between personnel	
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.e., 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: perceptions of a strong and proactive organizational commitment to safety	
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.
13	The culture in this clinical area makes it easy to learn from the errors of others.
Job satisfaction: positivity about the work experience	
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: acknowledgement of how performance is influenced by stressors	
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.
22	Fatigue impairs my performance during emergency situations (e.g. emergency resuscitation, seizure).
Perceptions of management: the approval of managerial actions	
23	Management supports my daily efforts.
24	Management doesn't 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: perceived quality of the work environment and logistical support such as staffing and equipment	
27	Problem personnel are dealt with constructively by our unit.
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.

Physicians and nurses are required to fill out thirty questions by a five-point Likert's scale ranging from strongly agree to strongly disagree with the respective numerical values of five to one. Two questions (No. 2 and 11) are the reversed questions such that each respondent's answer needs to be adjusted. For instance, if a respondent's answer is strongly disagree, the original numerical value of one should be replaced by the numerical value of five. In addition, the score for each dimension is to aggregate the scores of the questions in one particular dimension. For instance, there are four questions in perceptions of management. Therefore, the score of perceptions of management is to aggregate the scores from these four questions, ranging from four to twenty for each respondent. By the same token, the scores of the other five dimensions can be calculated.

III. Research Method

This study intends to compare the difference of patient safety culture perceived by physicians and nurses in 2016 and 2017 in terms of six dimensions from a state-owned regional hospital located in Changhua County, Taiwan. The internal survey results conducted in 2016 and 2017 based on thirty questions listed in Table 1 are used and compared. By removing incomplete questionnaire, the numbers of the effective questionnaire in 2016 and 2017 are 310 and 284, respectively. The demographic information of this state-owned hospital including gender, age, supervisor/manager, job position, job status, experience in organization, experience in position, education, and direct patient contact is summarized in Table II.

TABLE II. Demographic Information of the State-Owned Hospital in 2016 and 2017

Demographic Variables	Data in 2016 (n = 310)		Data in 2017 (n = 284)	
	Frequency	Percentage	Frequency	Percentage
Gender				
Male	42	13.5	36	12.7
Female	268	86.5	248	87.3

Age				
Less than 20 years old	1	0.3	2	0.7
21-30 years old	94	30.3	94	33.1
31-40 years old	154	49.7	126	44.4
41-50 years old	46	14.8	44	15.5
51-60 years old	12	3.9	14	4.9
61 years old and above	3	1.0	4	1.4
Supervisor/Manager	53	17.1	43	15.1
Yes	257	82.9	241	84.9
No				
Job Position	42	13.5	32	11.3
Physician	268	86.5	252	88.7
Nurse				
Job Status	58	18.7	44	15.5
Full Time	202	65.2	187	65.8
Contract	49	15.8	52	18.3
Part Time	1	0.3	1	0.4
Agency				
Experience in Organization				
Less than 6 months	15	4.8	16	5.6
6 to 11 months	28	9.0	24	8.5
1 to 2 years	39	12.6	42	14.8
3 to 4 years	46	14.8	37	13.0
5 to 10 years	121	39.0	89	31.3
11 to 20 years	57	18.4	74	26.1
21 years or more	4	1.3	2	0.7
Experience in Position				
Less than 6 months	21	6.8	24	8.5
6 to 11 months	33	10.6	24	8.5
1 to 2 years	51	16.5	47	16.5
3 to 4 years	59	19.0	48	16.9
5 to 10 years	104	33.5	83	29.2
11 to 20 years	39	12.6	58	20.4
21 years or more	3	1.0	0	0.0
Education				
Junior High School and below	0	0.0	0	0.0
Senior High School	4	1.3	0	0.0
College/University	285	91.9	161	56.7
Graduate School and above	21	6.8	123	43.3
Direct Patient Contact	3	1.0	3	1.1
No	14	4.5	17	6.0
Rare	293	94.5	264	93.0
Very Often				

The distribution of the total score for each dimension in both 2016 and 2017 does not follow a normal distribution, independent sample t-test cannot be applied to evaluate if the perceptions from physicians and nurses in patient safety culture are different in 2016 and 2017. In contrast, this study uses Mann-Whitney U test for two independent samples with $\alpha = 0.05$.

IV. Results

Table III lists the average value, standard deviation, and the number of questions for each dimension in 2016 and 2017 from this state-owned regional hospital. From the descriptive statistics, the average values of perceptions of management, job satisfaction, and stress recognition in 2017 are higher than those in 2016. However, the average values of teamwork climate, safety climate, and working conditions in 2017 are lower than those in 2016.

TABLE III. The Average Values and Standard Deviations of Six Dimensions in 2016 and 2017

Dimension (Number of Questions)	Data in 2016 (n = 310)		Data in 2017 (n = 284)	
	Mean	Standard Deviation	Mean	Standard Deviation
Teamwork climate (6)	22.39	4.656	21.52	4.220
Safety climate (7)	25.49	4.936	25.40	4.615
Perception of management (5)	18.06	4.343	18.71	4.502
Job satisfaction (4)	14.67	3.762	15.10	3.764
Stress recognition (4)	10.83	2.536	14.39	3.253
Working conditions (4)	16.79	4.081	14.40	3.386

Table IV summarized the detailed information when Mann-Whitney U test for two independent samples with $\alpha = 0.05$. The perceptions from physicians and nurses in safety climate, perceptions of management, and job satisfaction have no difference statistically in 2016 and 2017. In contrast, the perceptions in teamwork climate, stress recognition, and working conditions are different statistically. Specifically, physicians and nurses have better perceptions in teamwork climate and working conditions in 2016. That is, teamwork climate and working conditions are getting worse statistically. In contrast, the perception of stress recognition has been improved from 2016 to 2017 significantly. That is, physicians and nurses are less stressful in 2017 than in 2016 as a whole.

TABLE IV. Mann-Whitney U Test of Six Dimensions in 2016 and 2017

Dimension	Mann-Whitney U Test	Z Value	Exact. Sig. (2-tailed)	Post Hoc
Teamwork climate	39321.5	-2.260	.024	2016 > 2017
Safety climate	43879.0	-0.068	.946	
Perceptions of management	40450.0	-1.732	.083	
Job satisfaction	41194.5	-1.374	.170	
Stress recognition	17327.5	-12.908	< .001	2017 > 2016
Working conditions	29243.0	-7.127	< .001	2016 > 2017

V. Conclusions

Lee et al. [11] emphasized that healthcare organizations should conduct surveys regularly to assess staff's perceptions in order to enhance patient safety and reduce medical errors relentlessly. This study examines how physicians and nurses perceive the patient safety culture in 2016 and 2017 based on six dimensions of safety attitudes questionnaire from a state-owned regional hospital. This study identifies that physicians and nurses do not have different perceptions in safety climate, perceptions of management, and job satisfaction even though the numerical scores show that perceptions of

management and job satisfaction have higher scores in 2017 than in 2016 and safety climate has a lower score in 2017 than in 2016 from the descriptive statistics. Stress recognition has been improved from 2016 to 2017 showing that physicians and nurses are less stressful in 2017. In contrast, teamwork climate and working conditions are getting worse from 2016 to 2017, indicating hospital management needs to focus on improving teamwork climate and working conditions for physicians and nurses in order to relentlessly improve patient safety and reduce medical errors in this state-owned regional hospital.

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Hsin-Hung Wu is a University Distinguished Professor at National Changhua University of Education (NCUE), Changhua, Taiwan since August 2014. He is with the Department of Business Administration at NCUE since August 2004. In addition, he is an adjunct Chair Professor at Asia University, Taichung City, Taiwan since February 2017. He was elected as a Fellow of International Economics Development and Research Center (IEDRC) in March 2013 as well as a Fellow of International Association of Computer Science and Information Technology in March 2018. Dr. Wu received his Ph.D. degree in the Department of Industrial & Systems Engineering and Engineering Management at University of Alabama in Huntsville, Huntsville, AL, USA in May 1998. His research interests include service quality, patient safety, decision analysis, data mining, and applied statistics. In recent years, Dr. Wu received Outstanding Young Industrial Engineer Award from the Chinese Institute of Industrial Engineers in December 2008, Quality Award for Individuals from the Chinese Society for Quality in November 2011, and Mr. Lu Feng Zhang Memorial Medal from the Chinese Management Association in December 2012. Dr. Wu has been awarded by Ministry of Science and Technology in Taiwan with Special Outstanding Talent Award since October 2010. Moreover, he has received Outstanding Research Faculty Award three times from NCUE.

Jiunn-I Shieh graduated in Physics from National Taiwan University, Taiwan. He obtained his PhD of Mathematics from the University of Texas at Austin, USA. He is a Professor in the Department of M-Commerce and Multimedia Applications at Asia University and the Department of Dental Hygiene at China Medical University.

Wen-Huai Hsieh was born at Chiayi County of Taiwan on 15th October 1956, who finished the 7-year learning course and graduated from School of Medicine of National Yang-Ming University in Taipei, Taiwan in 1983 and received the Doctor's Degree of Medicine. Superintendent Hsieh received his Master's Degree of Management Information Systems from the Institute of Information Management of National Chung Cheng University at Chiayi County of Taiwan in 2004. Currently, he is the superintendent of Changhua hospital, Ministry of Health and Welfare since August 2014 and was the vice superintendent of Nantou hospital, Ministry of Health and Welfare from July 2012 to August 2014.

Hsiu-Wen Hsueh was born in Changhua, Taiwan in November 19, 1978. She is a doctoral student in Department of Industrial Education and Technology of National Changhua University of Education (NCUE) since September 2015. She is also administrative assistant at Business Administration Department of NCUE since 2002. She has earned the outstanding administrative staff award of NCUE in 2013.

Kuan-Kai Huang graduated in Department of Computer Science and Information Engineering, Asia University, Taiwan. He obtained his Ph.D. in Information Engineering from Asia University, Taiwan. His major research interest is service quality. He is a Senior Specialist in Center for Quality Management, Chang Hua Hospital, Department of Health and Welfare, Changhua County, Taiwan.