A Comparative Study among Three Hospitals in Taiwan by Safety Attitudes Questionnaire from Viewpoints of Physicians and Nurses

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***Abstract*—This study intends to assess the perceptions of physicians and nurses in patient safety culture based on safety attitudes questionnaire among three hospitals by using the internal survey data in 2016. The results show that physicians and nurses have different perceptions in five out of six dimensions. Physicians and nurses in regional teaching hospital have the best perception in teamwork climate, while physicians and nurses in regional hospital have the best satisfaction in working conditions. In contrast, physicians and nurses in medical center have the best perception in perceptions of management and job satisfaction. However, physicians and nurses in medical center have the highest perception in stress recognition indicating that they might have higher pressure or feel more stressful. Therefore, hospital management needs to pay much attention to reduce their stress.**

***Index Terms*—patient safety culture, safety attitudes questionnaire, Kruskal-Wallis test for three independent samples**

I. Introduction

Assessing patient safety culture among medical staff is essential to promote safety and improve the quality of patient care [1]. By assessing the existing patient safety culture, hospital management would have a clear vision to identify strengths and weaknesses of a healthcare organization [2]. Safety attitudes questionnaire (SAQ) developed by Sexton et al. [3] has been widely used to measure patient safety culture worldwide due to good psychometric properties from medical staffs' viewpoints [2], [4]-[6]. Through SAQ, the drawbacks of the provision of patient safety can be found and healthcare organizations can learn from errors and initiate actions to improve patient safety and provide better healthcare continuously [4], [7].

For each healthcare organization, physicians and nurses are the core staffs because they contact patients directly and have direct impacts on quality of care and patient safety [2], [8], [9]. In reality, different healthcare organizations have different environmental settings, working conditions, and cultures such that physicians and nurses in different healthcare organizations might have different perceptions in patient safety culture. It is of interest to observe how physicians and nurses in different hospitals perceive the patient safety culture when safety attitudes questionnaire is used as a basis for comparisons. In this study, three hospitals have been chosen for a comparison including a medical center located in Taichung City, a regional teaching hospital in Taichung City, and a regional hospital in Changhua County. The datasets of three hospitals are from the internal survey results conducted in 2016 based on safety attitudes

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questionnaire. The purpose of this study is to assess if there is any difference among three hospitals in patient safety culture from viewpoints of physicians and nurses.

II. Safety Attitudes Questionnaire

Safety attitudes questionnaire developed by Sexton et al. [3] possesses good psychometric properties and great internal consistency and has been validated in different languages to assess the patient safety culture from medical staffs' viewpoints in healthcare organizations [10], [11], [12]. There are six dimensions along with 30 questions in SAQ. Six dimensions are teamwork climate, safety climate, perceptions of management, job satisfaction, stress recognition, and working conditions [12], [13]. The detailed information is 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 who are the core staffs in each healthcare organization are required to answer thirty questions depicted in Table I. For each question, a five-point Likert's scale ranging from strongly agree to strongly disagree is applied to reflect each respondent's viewpoint. Among thirty questions, Questions 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 numerical value of five should be used instead of the original numerical value of one. In addition, each dimension consists of different question items. Thus, the score for each dimension is to aggregate the scores of the questions coming from that particular dimension. For instance, there are four questions in working conditions. Therefore, the total score in working conditions is from four to twenty for each respondent. By the same token, the scores of the other five dimensions can be calculated.

III. Research Method

The purpose of this study is to assess whether or not physicians and nurses perceive the patient safety culture differently when they are in different hospitals. To evaluate the differences among three hospitals from viewpoints of physicians and nurses, thirty questions from SAQ provided in Table I are used. The internal survey results among three hospitals were conducted in 2016. By removing incomplete questionnaires, the numbers of the effective questionnaire in regional hospital, regional teaching hospital, and medical center are 310, 432, and 923, respectively. The demographic information regarding gender, age, supervisor/manager, job position, job status, experience in organization, experience in position, education, and direct patient contact in three hospitals is summarized in Table II.

TABLE II. Demographic Information of Three Hospitals

Demographic Variables	Regional Hospital (n = 310)		Regional Teaching Hospital (n = 432)		Medical Center (n = 923)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Gender						
Male	42	13.5	54	12.5	156	16.9
Female	268	86.5	378	87.5	767	83.1
Age						
Less than 20 years old	1	0.3	11	2.5	6	0.7
21-30 years old	94	30.3	168	38.9	384	41.6
31-40 years old	154	49.7	145	33.6	313	33.9
41-50 years old	46	14.8	82	19.0	153	16.6
51-60 years old	12	3.9	24	5.6	49	5.3
61 years old and above	3	1.0	2	0.5	18	2.0
Supervisor/Manager						
Yes	53	17.1	56	13.0	111	12.0
No	257	82.9	376	87.0	812	88.0
Job Position						
Physician	42	13.5	48	11.1	181	19.6
Nurse	268	86.5	384	88.9	742	80.4
Job Status						
Full Time	58	18.7	388	89.8	886	96.0
Contract	202	65.2	17	3.9	33	3.6
Part Time	49	15.8	7	1.6	3	0.3
Agency	1	0.3	20	4.7	1	0.1

Experience in Organization						
Less than 6 months	15	4.8	54	12.5	105	11.4
6 to 11 months	28	9.0	38	8.8	23	2.5
1 to 2 years	39	12.6	71	16.4	152	16.5
3 to 4 years	46	14.8	52	12.0	133	14.4
5 to 10 years	121	39.0	100	23.1	186	20.2
11 to 20 years	57	18.4	104	24.1	260	28.2
21 years or more	4	1.3	13	3.0	64	6.9
Experience in Position						
Less than 6 months	21	6.8	65	15.0	116	12.6
6 to 11 months	33	10.6	39	9.0	39	4.2
1 to 2 years	51	16.5	77	17.8	163	17.7
3 to 4 years	59	19.0	60	13.9	146	15.8
5 to 10 years	104	33.5	108	25.0	191	20.7
11 to 20 years	39	12.6	76	17.6	220	23.8
21 years or more	3	1.0	7	1.6	48	5.2
Education						
Junior High School and below	0	0.0	0	0.0	3	0.3
Senior High School	4	1.3	3	0.7	1	0.1
College/University	285	91.9	399	92.4	772	83.6
Graduate School and above	21	6.8	30	6.9	147	15.9
Direct Patient Contact						
No	3	1.0	13	3.0	16	1.7
Rare	14	4.5	27	6.3	45	4.9
Very Often	293	94.5	392	90.7	862	93.4

In this study, the hypothesis test is as follows. H_0: Patient safety culture perceived by physicians and nurses in terms of dimensions in different hospitals is the same. H_1: Physicians and nurses in at least one hospital perceive patient safety culture differently. Kruskal-Wallis test is applied for three independent samples with $\alpha = 0.05$ because the distribution of the total score for each dimension among three hospitals does not follow a normal distribution.

IV. Results

The average values and standard deviations of six dimensions in three hospitals are provided in Table III. In addition, box plot is illustrated for six dimensions among three hospitals by showing the first quartile, medium (second quartile), third quartile, and outliers (the circles either below the minimum or above the maximum) in Fig. 1, where 1, 2, and 3 shown in X-axis represent regional hospital, regional teaching hospital, and medical center, respectively. In addition, the figures labeled by Dimensions 1, 2, 3, 4, 5, and 6 in Y-axis indicate teamwork climate, safety climate, perceptions of management, job satisfaction, stress recognition, and working conditions, respectively. From Fig. 1, medical center has the smallest interquartile range (between the first and third quartiles) in teamwork climate, safety climate, and job satisfaction. Regional hospital has the smallest interquartile range in perceptions of management

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

Dimension (Number of Questions)	Regional Hospital (n = 310)		Regional Teaching Hospital (n = 432)		Medical Center (n = 923)	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Teamwork climate (6)	22.39	4.656	23.32	4.344	22.05	3.262
Safety climate (7)	25.49	4.936	26.11	4.955	26.01	3.718
Perception of management (5)	18.06	4.343	18.54	4.042	19.04	4.384
Job satisfaction (4)	14.67	3.762	14.26	3.436	15.38	3.501
Stress recognition (4)	10.83	2.536	14.39	2.871	15.15	3.333
Working conditions (4)	16.79	4.081	14.37	2.932	15.54	3.164

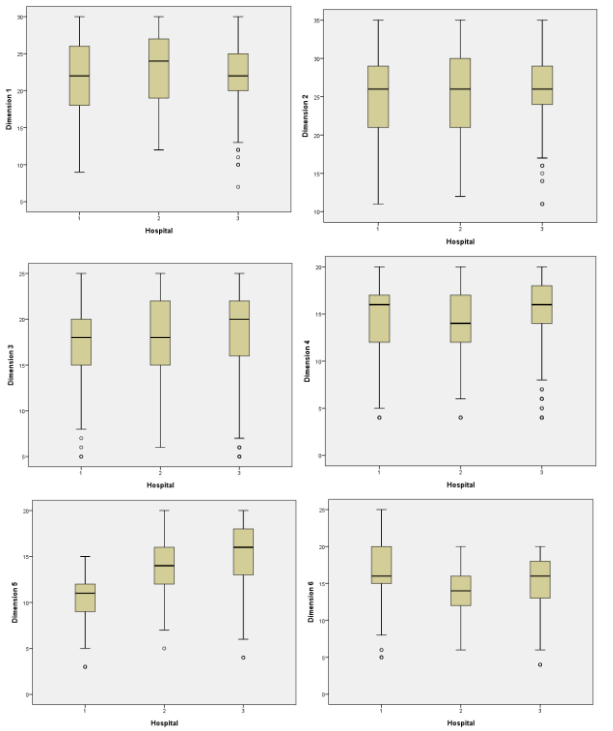

Figure 1. Box plot of six dimensions among three hospitals.

By performing Kruskal-Wallis test for three independent samples with $\alpha = 0.05$, Tables IV and V summarize the detailed information. Physicians and nurses have different perceptions statistically in five out of six dimensions except for safety climate (Dimension 2). That is, physicians and nurses in different hospitals have different perceptions in teamwork climate, perceptions of management, job satisfaction, stress recognition, and working conditions. From Table IV, regional teaching hospital has the best teamwork climate among three hospitals indicating physicians and nurses can work as teams better to accomplish their tasks. Regional hospital has the best working conditions indicating physicians and nurses in this hospital receive more training and support from hospital management. In contrast, medical center has the highest mean rank values in perceptions of management, job satisfaction, and stress recognition. Physicians and nurses in medical center have the highest satisfaction in perceptions of management and job satisfaction. On the other hand, a higher perception in stress recognition might indicate physicians and nurses in this medical center have higher pressure or feel more stressful. Hospital management needs to pay much attention to stress recognition.

TABLE IV. THE MEAN RANKS AMONG THREE HOSPITALS

Dimension	Hospital	Sample Size	Mean Rank
Teamwork climate (Dimension 1)	Regional Hospital	310	826.89
	Regional Teaching Hospital	432	930.05
	Medical Center	923	789.63
Safety climate (Dimension 2)	Regional Hospital	310	781.44
	Regional Teaching Hospital	432	838.09
	Medical Center	923	847.93
Perceptions of management (Dimension 3)	Regional Hospital	310	758.00
	Regional Teaching Hospital	432	792.24
	Medical Center	923	877.26
Job satisfaction (Dimension 4)	Regional Hospital	310	791.34
	Regional Teaching Hospital	432	723.31
	Medical Center	923	898.33
Stress recognition (Dimension 5)	Regional Hospital	310	374.64
	Regional Teaching Hospital	432	855.74
	Medical Center	923	976.30
Working conditions (Dimension 6)	Regional Hospital	310	982.62
	Regional Teaching Hospital	432	663.62
	Medical Center	923	862.03

TABLE V. TEST STATISTICS OF SIX DIMENSIONS AMONG THREE HOSPITALS

Dimension	Chi-Square	df	Asymp. Sig.
Teamwork climate	25.404	2	< .001
Safety climate	4.549	2	.103
Perceptions of management	18.790	2	< .001
Job satisfaction	42.651	2	< .001
Stress recognition	369.753	2	< .001
Working conditions	88.768	2	< .001

V. CONCLUSIONS

This study evaluates the perceptions of physicians and nurses in patient safety culture with the internal survey data in 2016 based on safety attitudes questionnaire among a regional hospital, a regional teaching hospital, and a medical center. The results show that physicians and nurses have different perceptions in five out of six dimensions except for safety climate. Specifically, physicians and nurses in regional teaching hospital have the best perception in teamwork climate. Physicians and nurses in regional hospital have the best satisfaction in working conditions. On the other hand, physicians and nurses in medical center have the best perception in perceptions of management and job satisfaction. It is worth to note that physicians and nurses in medical center have the highest perception in stress recognition indicating that they might have higher pressure or feel more stressful than the others in either regional hospital or regional teaching hospital. Therefore, hospital management needs to provide means of reducing their stress.

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