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Article

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What We Should Know about Patient Safety Culture: An Empirical Investigation of Viewpoints from Four Categories of Hospital Staffs in Taiwan

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In recent years, patient safety culture in healthcare organizations has been considered as a critical issue for improving the quality of healthcare. The current study attempts to examine the perceptions of patient safety from four different categories of hospital staffs in a case hospital by conducting the Chinese version of Safety Attitudes Questionnaire, developed from the Taiwan Joint Commission on Hospital Accreditation. Pearson correlation analysis is used to assess the strength and direction of the relationships among seven patient safety culture dimensions. For physicians and administrators, the findings highlight that safety climate is highly correlated to teamwork climate and perceptions of management. For nurses, the results reveal that safety climate is highly correlated to teamwork climate and working conditions. For technicians, job satisfaction is highly related to safety climate and working conditions. Additionally, emotional exhaustion is negatively significant to stress recognition and safety climate for all hospital staff.

Keywords: Safety attitudes questionnaire, Patient safety culture, Hospital staffs, Pearson correlation analysis

In 1995, the public health insurance only covered 60% of the population in Taiwan. In order to improve life and medical quality to all citizens, Taiwan's government implemented a new National Health Insurance (NHI). Due to the implement of NHI, the citizens receive more benefits than ever, such as high-quality medical care and convenient access to treatment (Shieh, Wu, and Huang, 2010). Nowadays, Taiwan's medical service system provides the public comprehensive health care. According to the annual report of the National Health Insurance Administration (NHIA), the NHI system now covers 99.6% of Taiwan's population

in 2016 (NHIA, 2016). With the enhancement of medical quality, patients thus expect more care about the safety medical service provided (Lee and Hsieh, 2009; Ho and Lee, 2013). Evidence reveals that hospital staffs with higher attitudes toward patient safety are more likely to compete tasks as a team and emphasize the patient safety culture for healthcare organizations (Nie et al., 2013; Göethals et al., 2013; Lee et al., 2016). For example, Lee et al. (2016) have suggested that hospital staffs with positive patient safety can help healthcare organizations to reduce medical adverse events, such as patient fall, medical errors, and work absence. Hospital employees are the core staffs with professional skills, who dedicated to service patients in healthcare organizations (Liu et al., 2012; Lee et al., 2015). However, until now most studies have focused on the improvement of patient safety culture from the viewpoints of physicians and nurses (Abdi et al., 2015; Gozlu and Kaya, 2016; Lee et al., 2017), little knowledge has clearly recognized the difference of perceptions across different occupational categories of hospital staffs. In fact, physicians and nurses are more like to directly contact with patient than technicians and administrators. These hospital staffs may face different tasks and challenges in different medical environment (e.g. divisions, operating room, pharmacy, and front desk) and their attitudes toward patient safety may vary. Therefore, the current study aims to identify the opinions and attitudes toward patient safety from the viewpoints of four hospital staffs (i.e. physicians, nurses, technicians, and administrators) in order to comprehensively develop implications for improving patient safety culture.

Following this introduction, the second section of this paper presents a review of the literature on patient safety culture; the third section illustrates details of the methods used in the empirical investigation; the research results and discussion are demonstrated in section four and five respectively; and finally, the findings are concluded.

LITERATURE REVIEW

Patient safety culture in healthcare organizations has been considered a critical issue for improving the quality of healthcare (Michell et al., 2014; Lee et al., 2017). Patient safety culture was identified by the European Network for Patient Safety (EUNetPaS) in 2006 as “An integrated pattern of individual and organizational behavior, based upon shared beliefs and values that continuously seeks to minimize patient harm, which may result from the processes of care delivery” (EUNetPaS, 2006).

Studies have suggested that more benefits can be obtained if health organizations pay more attentions on the establishment of patient safety culture. For example, both Zuniga et al. (2013) and Nie et al. (2013) suggested that fewer hospital complications, patient falls, urinary tract infections and lower mortality are highly correlated to medical staffs with a positive attitude toward patient safety. Lee et al. (2016) also demonstrated that when the higher degree of burnout hospital staffs are identified, hospital management can make implementations to reduce the potential negative performance, including patient falls, medical malpractice, and medical errors. In fact, the medical errors and adverse events could result in a cost of harm to both patients and healthcare organizations (Longo et al., 2007; Ewing, 2013; Lee et al., 2015). It is therefore important for health organizations to evaluate patient safety in a regular period to continuously improve medical quality.

The Sexton et al.'s (2006) Safety Attitudes Questionnaire (SAQ) is most widely used to assess the attitudes toward patient safety in healthcare organizations (Nguyen et al., 2015; Lee et al., 2015). The SAQ questionnaire contains 30 items, categorized into six dimensions: teamwork climate (relationships and cooperation among staff), safety climate (organizational commitment to patient safety), job satisfaction (positive about work experience), stress recognition (stress factors that link to work performance), perceptions of management (administrator approval), and working conditions (perceived work-environment quality).

In 2014, the Taiwan Joint Commission on Hospital Accreditation (TJCHA) has modified the SAQ by incorporating two dimensions derived from the Maslach burnout inventory-human services survey (MBI-HSS). Particularly, nine questions were used to measure emotional exhaustion, and seven questions were used to measure work-life balance (Lee et al., 2016). Emotional exhaustion describes a loss of passion for work, emotional exhaustion and feelings of depersonalization (Poghosyan et al., 2009) whereas work-life balance refers to balancing both work and other aspects of life (Blunsdon et al., 2006; Feldtead et al., 2002). As a result, the Chinese version of SAQ contains eight dimensions and 46 questions, as shown in Table 1 (see Appendix-I).

METHODOLOGY

-Data Collection Procedure

The aim of current study is to examine the perceptions toward patient safety across different occupational categories of hospital staffs in a case hospital. This case hospital is one of the best general and teaching hospital in Taiwan (MOHW, 2015), which contains more than 30 divisions. Therefore, there is essential to access patient safety provided by the case hospital in continuous improvement of medical service.

As suggested by Hair et al. (2006), fifty hospital members are asked to answer a pretesting survey to confirm the accuracy and potential problems of the questionnaire. An online-based survey is consequently undertaken to investigate the perceptions toward patient safety among hospital staffs (i.e. physicians, nurses, technicians, and administrators) in the case hospital in 2016.

-Measurement

The Chinese version of SAQ is used to assess the perceptions toward patient safety among four different occupational categories. As presented in Table 1, seven dimensions with thirty nine items are assessed except work-life balance because the frequency scale is used to access that dimension. Six question items (questions 1 to 6) are used to measure teamwork climate; seven question items (questions 7 to 13) are used to measure safety climate; five question items (questions 14 to 18) are used to measure job satisfaction; stress recognition is accessed using four question items (question 19, 21, 25, and 26); perceptions of management is accessed using four question items (questions 27 to 30); working conditions is measured using four question items (questions 31 to 34); emotional exhaustion is measured using nine question items (question 20, 22, 23, 24, 35, 36, 37, 38, 39); work-life balance is measured using seven question items (questions 40 to 46). Additionally, hospital staffs are required to answer different questions due to dissimilar job tasks and working situations. For example, physicians and nurses are required to fill out thirty nine questions. For technicians and administrators, question items 2, 3, 4, 6, 8, and 30 are not required, and the number of questions is thirty three. Five-point Likert scales anchored by 1 (strongly disagree) and 5 (strongly agree) are used throughout the questionnaire. Eleven reversed questions are designed to further be more accurate in wording (Vandiver et al., 2002). Thus, each respondent' s answer is adjusted. The original answer of strongly agree represents the poorest perceptions of measuring outcome.

-Analysis Methods

Item analysis test (e.g. average test, standard deviation test, skewness test, and extreme groups test) is firstly assessed to verify the structure of the data (Wu and Tu, 2005). Pearson' s correlation analysis is subsequently performed to investigate the strength and direction of the relationships among seven patient safety culture dimensions (Cohen et al., 2013).

RESULTS

-Sample Characteristics

A total of 667 questionnaires are collected, while valid questionnaires are 588, representing an 88.16% return rate. In terms of sample profile, most hospital staffs are females except physicians (16.7% for physicians, 96.4% for nurses, 78.4% for technicians, and 69.5% for administrators). The majority respondent age is from 31 to 50 years old (64.6% for physicians, 3.0% for technicians, and 67.1% for administrators) whereas nurses' age ranges 21 to 40 years olds (78.4%). The characteristics also reveal that all respondents with relevant working experiences are more than five years in the hospital (64.7% for physicians, 48.4% for nurses, 60.8% for technicians, and 45.1% for administrators).

-Item Analysis

Average test that is accepted if the average should not fall on the average of total amount that is neither higher nor lower to more than 1.5 standard deviations (Wu and Tu, 2005). For four hospital staffs, the results demonstrate that the average of total amount are 3.63, 3.53, 3.51, and 3.35, the standard deviation are 0.590, 0.502, 0.511, and 0.578, respectively. The value should be neither greater than 4.52, 4.28, 4.28, and 4.22 nor less than 2.75, 2.78, 2.74, and 2.48. As a result, all items do pass the average test.

Results also show that the standard deviation of each of items is greater than 0.5, inspection of all items has satisfied the standard deviation test. Skewness test result indicates that the absolute values of skewness coefficient of all items are less than 1, which supports the skewness test. Moreover, the p-value of extreme groups for all items are less than 0.01 after independent sample t-test of average value in the extreme groups, indicating the support of extreme groups test.

-Descriptive Statistics

For nurses, technicians, and administrators, teamwork climate has the highest average value, whereas stress recognition has the highest average value followed by teamwork climate for physicians. For administrators, perceptions of management are identified as the second highest dimension of patient safety. For all four categories of hospital staffs, emotional exhaustion has the lowest average value. Overall, physicians have the highest attitude toward patient safety (total average value is 3.63) whereas administrators have lowest one (total average value is 3.35) (see Table 2). In addition, the results demonstrate that all dimensions' Cronbach's α values exceed 0.7 which indicates measuring scales have good reliability and internal consistency (Nunnally, 1978).

	Physicians (n=48)		Nurses (n=384)		Technicians (n=74)		Administrators (n=82)	
	Mean	α	Mean	α	Mean	α	Mean	α
1. TC	3.91	0.871	3.88	0.863	3.82	0.782	3.55	0.776
2. SC	3.71	0.905	3.73	0.891	3.73	0.845	3.44	0.853
3. JS	3.88	0.932	3.52	0.939	3.62	0.929	3.52	0.955
4. SR	3.96	0.860	3.69	0.882	3.53	0.899	3.35	0.861
5. PM	3.67	0.839	3.59	0.820	3.71	0.735	3.54	0.902
6. WC	3.62	0.891	3.59	0.899	3.63	0.775	3.39	0.902
7. EE	3.09	0.912	3.02	0.878	3.13	0.898	3.06	0.918
Total	3.63	0.955	3.53	0.941	3.51	0.930	3.35	0.942

Note: TC: teamwork climate; SC: safety climate; JS: job satisfaction; SR: stress recognition; PM: perceptions of management; WC: working conditions; EE: emotional exhaustion; α : Cronbach's alpha coefficient

Table 2: Average Value and Cronbach's Alpha Coefficient for Hospital Staffs

-Correlation Analysis

The Pearson correlation analysis is conducted to determine the degree of correlation among dimensions. On the basis of perspectives from physicians, the results illustrate that safety climate is highly correlated to teamwork climate and perceptions of management. For physicians, emotional exhaustion is negatively related to stress recognition and safety climate, from Table 3. For nurses, the results reveal that safety climate is highly correlated to teamwork climate and working conditions. Similarly, emotional exhaustion is negatively related to stress recognition and safety climate, as shown in Table 4. For technicians, job satisfaction is highly related to safety climate and working conditions. The correlation between emotional exhaustion and stress recognition, and safety climate is also negative, from Table 5. For administrators,

safety climate is highly correlated to teamwork climate and perceptions of management. A negative correlation between emotional exhaustion, stress recognition and safety climate is also found (see Table 6).

	1	2	3	4	5	6
1.TC						
2.SC	.815**					
3.JS	.799**	.867**				
4.SR	.049	.092	.058			
5.PM	.687**	.807**	.732**	.022		
6.WC	.701**	.871**	.820**	.005	.882**	
7.EE	.419**	-.437**	.370**	-.352*	.538**	.527**

Note: * $p < .05$; ** $p < .01$; TC: teamwork climate; SC: safety climate; JS: job satisfaction; SR: stress recognition; PM: perceptions of management; WC: working conditions; EE: emotional exhaustion

Table 3: Pearson's Correlation Analysis for Physicians (n=48)

	1	2	3	4	5	6
1.TC						
2.SC	.814**					
3.JS	.700**	.773**				
4.SR	-.003	.042	.023			
5.PM	.660**	.764**	.719**	.043		
6.WC	.674**	.780**	.702**	.056	.824**	
7.EE	.324**	-.312**	.363**	-.507**	.290**	.272**

Note: ** $p < .01$; TC: teamwork climate; SC: safety climate; JS: job satisfaction; SR: stress recognition; PM: perceptions of management; WC: working conditions; EE: emotional exhaustion

Table 4: Pearson's Correlation Analysis for Nurses (n=384)

	1	2	3	4	5	6
1.TC						
2.SC	.662**					
3.JS	.706**	.767**				
4.SR	.200	.054	.140			
5.PM	.569**	.677**	.671**	.210		
6.WC	.627**	.733**	.741**	.030	.701**	
7.EE	.310**	-.463**	.478**	-.307**	.411**	.451**

Note: ** $p < .01$; TC: teamwork climate; SC: safety climate; JS: job satisfaction; SR: stress recognition; PM: perceptions of management; WC: working conditions; EE: emotional exhaustion

Table 5: Pearson's Correlation Analysis for Technicians (n=74)

DISCUSSION

The results of our study are consistent with the study in Alves and Guirardello (2016) who indicated that indicated that emotional exhaustion is negatively correlated with safety climate or job satisfaction. The

Spearman's correlation values between emotional exhaustion and safety climate in terms of nurse are -0.32 and -0.312 in Alves and Guirardello (2016) and our study, respectively. Based on these results, the

	1	2	3	4	5	6
1.TC						
2.SC	.767**					
3.JS	.739**	.796**				
4.SR	.085	.092	.032			
5.PM	.736**	.896**	.762**	.129		
6.WC	.694**	.751**	.715**	.046	.781**	
7.EE	.391**	-.382**	.470**	-.372**	.377**	.304**

Note: ** $p < .01$; TC: teamwork climate; SC: safety climate; JS: job satisfaction; SR: stress recognition; PM: perceptions of management; WC: working conditions; EE: emotional exhaustion

Table 6: Pearson's Correlation Analysis for Administrators (n=82)

correlation of emotional exhaustion and safety climate is almost the same for Brazilian pediatric nurses and Taiwanese nurses in regional teaching hospital. However, for physicians, technicians and administrators, our study shows the correlation values of the two variables are -0.437, -0.463 and -0.382, respectively. The results indicate that the behavior of physicians protects the behavior of nurses. For example, as a supporter of physicians during operation, nurses may not disregard rules or guidelines regarding to safety climate if physicians follow guidelines during operation. Physicians and nurses are much more likely to directly collaborate with operating than other staffs such as technicians and administrators. In other word, technicians and administrators are more independent when working. Therefore, the more the perception on safety climate increases, the more the level of burnout increases for technicians. To decline the level of emotional exhaustion, a decrease on the workload and management on absenteeism are suggested (Alves and Guirardello, 2016). To enhance nurse on commitment to safety, Dawson et al. (2014) and Feng et al. (2011) suggested that the nurse manager shall show up in the working place. Therefore, feasible arrangement on human resources may be critical for the management in this regional teaching hospital.

Second, our results illustrate that emotional exhaustion is significantly related to stress recognition and Pearson's Correlation values are -0.352, -0.507, -0.307, and -0.372 in physicians, nurses, technicians and administrators, respectively. We can identify management of workload and absenteeism as two of the most important factors in stress of personnel (Alves and Guirardello, 2016). For example, when colleague is

absent, personnel who becomes as a substitute may increase workload and feel stressfully. Also, average value on emotional exhaustion is lowest among all seven variables in the questionnaire. In other words, staff always feels like working under extreme pressure in long term. This implies that the working environment and management on human resources in the hospital is an important issue to alleviate staff's level of emotional exhaustion.

Third, job satisfaction is highly related to teamwork climate or safety climate. In other words, as the job satisfaction of staffs increases, their teamwork climate or safety climate increases. Our results are similar with the study in Buljac-Samardzic et al. (2015). Buljac-Samardzic et al. (2015) investigated the safety attitude of caregivers in terms of nursing and residential homes. The correlation values between job satisfaction and teamwork climate in terms of nurses are 0.52 and 0.70 in Buljac-Samardzic et al. (2015) and our study, respectively. For the rest of three groups, the value is not less than 0.70 in our study. Furthermore, the correlation between job satisfaction and safety climate is also high among four groups and the value is not less than 0.767. The environment in this regional hospital where staffs work in is more complex than the environment in nursing and residential home intuitively. Therefore, comparing to staffs in nursing and residential home, staffs in this regional hospital may receive more satisfaction when they finish a mission. Also, the mission or environment in this regional hospital is more complex than it in nursing and residential home. The staffs in this regional hospital is more to work together and is more to follow guidelines to accomplish a mission rather than the staffs in nursing and residential home. Therefore the working environment and the difficulty of task are moderately assigned to each personnel instead of extremely easy or difficult so that either individual personnel or team may accomplish in appropriate manners to minimize patient safety risks.

CONCLUSION

This study aims to assess patient safety culture in terms of the viewpoints of four hospital staffs. To improve patient safety culture, human resource management is one of the most important issues in this regional teaching hospital. For all categories, emotional exhaustion and safety climate are significantly correlated and the result is consistent with the study in Alves and Guirardello (2016). For more details, rather than nurses, the correlation values of emotional exhaustion and safety climate are relatively higher for the other staffs,

i.e., physicians, technicians and administrators. The managers in healthcare organizations are suggested to improve staff's working environment. Without feasible arrangement on human resources, the staff who becomes as a substitute may increase workload and feel stressfully. Patient safety is the goal of a hospital. Therefore, top managers may put more efforts on alleviating staff's level of emotional exhaustion.

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-
- (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^(r)
 (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
-
- (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^(r)
 (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
-
- (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
-
- (19) When my workload becomes excessive, my performance is impaired
 (20) I feel like I'm at the end of my rope^(r)
 (21) I am less effective at work when fatigued
 (22) I feel burned out from my work^(r)
 (23) I feel frustrated by my job^(r)
 (24) I feel I'm working too hard on my job^(r)
 (25) I am more likely to make errors in tense or hostile situations (e.g. emergency resuscitation, seizure)
 (26) Fatigue impairs my performance during emergency situations
-
- (27) Managers supports my daily efforts²⁷
 (28) Managers do not knowingly compromise patient safety²⁸
 (29) I get adequate, timely information about events that might affect my work²⁹
 (30) The levels of staffing in this clinical area are sufficient to handle the number of patients
-
- (31) Problem personnel are dealt with constructively
 (32) This hospital does a good job of training new personnel
 (33) All the necessary information for diagnostic and therapeutic decisions is routinely available to me
 (34) Trainees in my discipline are adequately supervised
-
- (33) I feel emotionally drained from my work^(r)
 (36) I feel used up at the end of the workday^(r)
 (37) I feel fatigued when I get up in the morning and have to face another day on the job^(r)
 (38) Working with people all day is really a strain for me^(r)
 (39) Working with people directly puts too much stress on me^(r)
-
- (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) Late work
-

Note: r: reversed question

Table 1: The Chinese Version of Safety Attitudes Questionnaire