World Academy of Science, Engineering and Technology
International Journal of Humanities and Social Sciences
Vol:3, No:5, 2009

A Study on the Leadership Behavior, Safety Culture, and Safety Performance of the Healthcare Industry

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***Abstract*—**Object: Review recent publications of patient safety culture to investigate the relationship between leadership behavior, safety culture, and safety performance in the healthcare industry. Method: This study is a cross-sectional study, 350 questionnaires were mailed to hospital workers with 195 valid responses obtained, and a 55.7% valid response rate. Confirmatory factor analysis (CFA) was carried out to test the factor structure and determine if the composite reliability was significant with a factor loading of >0.5, resulting in an acceptable model fit. Results: Through the analysis of One-way ANOVA, the results showed that physicians significantly have more negative patient safety culture perceptions and safety performance perceptions than non- physicians. Conclusions: The path analysis results show that leadership behavior affects safety culture and safety performance in the health care industry. Safety performance was affected and improved with contingency leadership and a positive patient safety organization culture. The study suggests improving safety performance by providing a well-managed system that includes: consideration of leadership, hospital worker training courses, and a solid safety reporting system.

***Keywords*—** Leadership Behavior, Patient Safety, Safety Culture, Safety Performance

I. Introduction

IN recent years, the issues of patient safety and healthcare error have become important topics in health policy and healthcare practice in several countries. The problem of risks and medical errors in patient safety is a critical issue facing hospitals today. There has been a lot of serious accidents within medical treatments in Taiwan since 2002.

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For example, in North City Hospital the wrong needle was typed, causing Chuog Ai Clinic to administer the wrong medicine. Thus, both governments and experts desire to promote patient safety projects as a public action in response to these errors.The first report from the Quality of Health Care in America Committee of the Institute of Medicine (IOM) concluded that it is not acceptable for patients to be harmed by the health care system that is supposed to offer healing and comfort, promising, “First, do no harm.” Helping to remedy this problem is the statement, “To Err is Human” [1]. One of the report’s main conclusions is that the majority of medical errors do not result from individual recklessness. More commonly, faulty systems, processes, and conditions that lead people to make mistakes or fail to prevent mistakes, cause errors.

The IOM Committee’s first report also indicated health care in the United States is not as safe as it should be--and can be. At least 44,000 people, and perhaps as many as 98,000 people, die in hospitals each year as a result of medical errors that could have been prevented, and 53%-58% of those medical errors were preventable. The National Health Service (NHS) in Britain published a report in 2000 indicating that at least 400 patients died or were seriously injured in adverse events involving medical devices in 1999, and that nearly 10,000 people are reported to have experienced serious adverse reactions to drugs [2]. These reports all emphasize that hospitals should reduce faulty systems and process errors that lead to people making mistakes. In 2001, the Joint Commission on Accreditation of Healthcare Organization (JCAHO) suggested hospital leaders implement a strategy for maintaining the effectiveness of the patients’ safety and ensure responsibility for developing a safety culture that emphasizes cooperation and communication to prevent medical care errors. In 2002, Health Canada advised that culture plays an important role in patient safety improvement [3]. In 2000, The Department of Health in the UK noted safety culture’s importance in indicating that it could have a positive and quantifiable impact on the performance of organization through error event learning [2].

Prior research from Zohar (1980) discussed organization culture. Since 1990, research has shown that safety climate is dependent on employees’ perception regarding safety climate in the health care industry. In recent years, many scales were developed for measuring the dimension of safety climate. For example, Voluntary Hospital of America (VHA) developed, “Strategies for Leadership: An Organizational Approach to

Patient Safety" (SLOAPS) [4], "Patient Safety Climate in Health Care Organization" (PSCHO) [5], "Safety Attitudes Questionnaire" (SAQ) [6], and "Safety Climate Survey" (SCS) [7]. Safety culture is also discussed in high-risk units in the health industry, such as DeJoy (2004) assessing safety climate by developing the Safety Attitudes Questionnaire (SAQ), which found that a positive safety climate could reduce the risk of wrong-site operations in the OR [8].

A patient safety culture survey scale was developed by the Agency for Health Research and Quality (AHRQ) to be used in research. Respondents to the survey included members of internal, surgical, and other specialized departments from four teaching hospitals in Kaohsiung. The perception of safety culture of physicians, young age staff, junior staff, and non-leader staff were lower than any other medical staff [9]. Exploring the relationship between physicians' perception of patient safety culture and reported behavior in the medical center's different specialties had significantly different perceptions of patient safety culture, behavior, and employee satisfaction [10]. PSCHO was adapted to measure patient safety climate in hospitals in Taiwan to discover the association between patient safety climate and healthcare workers' behaviors. The study found that different hospitals and departments could lead to different patient safety culture. Additionally, the individual personality and job responsibility significantly affected the perception and behavior of patient safety [11].

Most of the research references the variance between patient safety perceptions and patient safety behavior, but there has been very little discussion about the association among leadership behavior, safety culture, and safety performance in the healthcare industry. Organization leadership could lead members to achieve goals and optimal safety performance through safety culture [12]. Leadership behavior and safety culture are both important to affect safety performance, thus, neither can be ignored if safety performance is to be achieved. This has also been proven in high-reliability organizations (HRO), such as in the air-traffic industry, the nuclear power industry, and the manufacturing industry. The research quantifies the association among leadership behavior, safety culture, and safety performance in the healthcare industry and this study proposes to:

1) Explore and report on the present situation of patient safety in the health industry.
2) Discover the effect of healthcare leadership behavior on safety culture and safety performance.
3) According to research conclusions, will show that safety culture is suggested to promote and to improve safety performance in the health care industry.

II. Material and Method

A. Safety performance

Organization safety performance assessment helps organizations evaluate the effectiveness of management, but various definitions of safety performance challenge the safety performance assessment. Safety performance as global performance of an organization's safety management can be conceptualized by six factors: safety training, safety equipment, accident investigation and statistics, safety measures, safety organization, and safety management [13]. Neal and Griffin (2000) present models of safety performance that include the components of performance, the determinants of performance, and the antecedents of performance. The antecedents of performance have been identified at both the individual level and organizational level. The individual level includes ability, experience, and personality, which are tasks of performance. The organization level includes climate of an organization, individuals attribute meaning, and value to features of the work environment. There are three determinants of performance: knowledge, skill, and motivation. The components of performance describe actual behavior of individuals at work, such as safety compliance and safety participation. [14].

Employers' behavior toward the subject of safety at work is not revealed in just a safety performance measurement, it is actually divided into two parts: passive measurement and active measurement. Active measurement is the measurement of accidents happening, including performance of injuring frequency, severity of injury, and unsafe behavior and status. Passive measurement includes employees' perceived risk, the attitude of the risk, safety improvement suggestions, safety training courses, policy communication, and safety commitment [15].

Safety performance can be described as a self-reported rate of accident and occupational injuries. [16]. Huang, Smith, and Chen (2006) have studied safety in many workplaces, such as the manufacturing industry, building industry, service industry, and transport industry. They defined safety performance as employee safety control and self-reported occupational injury. [17].

Wu (2008) stated that safety performance is a global performance of safety management systems operated and measured by safety organizations, safety management, safety equipment, safety training practice, safety training evaluation, accident investigations, and measures of accident statistics [18].Safety performance can be measured as a safety process evaluation at both the individual and the organizational level. Safety performance is used for measuring safety culture and the organization's competence improvement. When organizations base rewards on people not having injuries, it can drive injury reporting underground [19]. To make this study more feasible and suitable for the health care industry, the safety performance measurement has been described as a self-reported questionnaire investigation. This study adopts three dimensions of safety performance: safety audit assessment, accident investigation management, and safety system.

B. Safety culture

The concepts of Safety climate and safety culture have been confused within the existing literature. Many articles have different concepts of safety culture and safety climate; sometimes the definition of safety culture is similar to safety

climate [20]. Safety culture is an employee's perception of organizational characteristics and environmental safety characteristics that affect safety performance. These perceptions were affected by organization policy, personality, and attitude [21]. The safety culture reflects attitudes, beliefs, perceptions, and values that employees share in relation to safety [22]. Schein (1992) stated that climate refers to the climate of the group in interaction, and climate precedes existence in group culture. The definition of organization culture, as an observed behavior, includes language, customs, traditions, group norms, formal philosophy, rules of the game, climate, habits of thinking, shared knowledge for socialization, shared meanings of the group, and metaphors or symbols. The definition from Schein's literature helps us understand that climate is part of organization culture [23]. Safety culture can be referred to as a three layers. At the center are the factors normally associated with culture, which are the basic assumptions held by the organization. These assumptions relate to the understanding of human behavior, relationships, and the nature of work. The middle layer of this model relates to what is commonly referred to as safety climate. This layer highlights the explicit values and attitudes expressed regarding safety. These attitudes and values can be seen in policies, training approaches, procedures, and formal communications. The final outer layer consists of what is referred to as artifacts, and includes such things as accidents and incidents, the use of personal protective equipment (PPE), and other safety related behavior and objects [24]. Safety culture can relate to safety performance and affect organization's staff attitude and behavior [25].

A lot of research indicates various dimensions of safety culture. Differences in industries, theories, and perception of the researcher have also generated various dimensions of safety culture. Zohar (1980) identified eight dimensions of safety climate, including dimensions such as safety training, management attitudes, and effects of safe conduct on promotion, level of risk at the workplace, pace of work, status of safety officers, effects of safe conduct on social status, and status of the safety committee [21]. O`Toole (2002) investigated the relationship between employees' perceptions of safety and organizational culture. He found the indicators to be safety management and commitment, employees' involvement and commitment, training and communication, and emergency response [26]. Neal (2000) suggests that safety culture can be assessed by studying management values, safety communication, safety practice, and employees' involvement with safety in the workplace [27]. Wu's (2000) analysis of the safety climate scale (SCS) revealed four factors: top management's commitment and action, manager's commitment and action, perceived risk, and safety practice [13]. Neal (2002) suggested management values, safety communication, safety practice, safety training, and safety equipment to be links to investigate with safety climate measures. The antecedents of safety performance include supportive leadership and conscientiousness [28]. Lin (2003) studied container terminal operators in Kaohsiung Port to determine how safety management positively influences safety performance and safety climate. He discovered three dimensions: safety management, safety attitude, and employee's perceived risk [29]. Katz-Navon, (2005) explored safety climate as predictors of treatment errors and found a relationship between safety procedures and the number of treatment errors [30]. Huang (2006) found that management commitment to safety, return-to-work policies, post-injury administration, and safety training are important dimensions of safety climate, and safety climate positively influences safety performance [31]. Stock (2007) found health care organizations that develop a safety culture have been decreasing the frequency and impact of medical errors, the study also indicated that safety culture positively influences safety performance [32].

This research focuses on safety culture which is formed from climate. Safety culture is defined as: employee perception of safety culture in organization, the perception affected through organization to safety management, safety commitment, safety communicated to affect value, and attitude and perception of the individual or group. This study adopts three dimensions of safety culture: organization management, communication, and commitment. Organization management is defined as individual perceptions of safety strategy management, core value and vision, procedure for monitoring safety, education, and report. Communication is simply the system of communicating and the communication atmosphere in the organization. Manager commitment is the perception of leaders' support and commitment to individuals.

The review of safety culture literature can be related to an employer's behavior and safety performance, which included manager's control, commitment, and value. The study's three dimensions to measure safety culture include organization system, safety communication, and manager's commitment.

C. The relationship among leadership behavior, safety culture, and safety performance

Since 1950, the theory of leadership behavior has been used to explain and predict a leader's effectiveness, but has not focused on the leader's personality.

In 1951, Ohio State University verified two dimensions of leadership behavior as initiating structure leadership and consideration leadership [33]. Initiating structure is the extent to which a leader defines the leader and the group members' roles; consideration leadership is a kind of organization's climate in which the leader exhibits concern for the welfare of the members of the group. White (1953) also distinguished three kinds of leadership styles: authoritarian, democratic, and laissez-faire. The authoritarian style is directive and their subordinates were productive, but generally only so long as the leaders were in the room or otherwise keeping close watch, and all policy is decided by the leader. Democratic leaders empowered their followers. Laissez-faire leaders were as nondirective as possible much of the time, leaving it to the followers to figure out what to do [34]. Through review of the references, this study adopts leadership behavior and behavior by Ohio State University's standard of leadership and initiating

structure leadership to measure leadership behavior. Consideration leadership is defined as individual perception of a leader's behavior in exhibiting concern for the welfare of the employee and towards interpersonal relationships, mutual trust, and friendship. Initiating structure leadership is defined as individual perception of a leader's behavior exhibited toward safety activities, how tasks are to be accomplished, a channel of safety communication to be constructed, and standard regulations.

A review of literature reveals the importance of leadership for effective safety management. Managers must be able to lead the safety management actively. Leadership can be improving safety performance by articulating an appealing vision for the future, encouraging members of their team to think for themselves, and participation in safety activities by employees. The leadership is able to affect the safety attitude and safety culture of members of their team, and therefore, determine safety performance of the team [35 12]. Wu (2007) manifests that safety leadership and safety climate are two important factors to predict a good safety performance, and that safety climate takes a mediating role in the relationship between leadership and safety performance [36].

Managers supportive of safety have been recognized as a basic element of safety culture. Participative leadership style was the best practice for developing safety culture and safety policy in organizations. Participation style leadership also led workers to accept responsibility and ownership for safety [37]. Zohar (2002) verified that managers and supervisors who are supportive of safety activities have both direct and indirect effects on organizational culture [38]. Lee (2002) found that hospital organizational culture, manager's leadership behavior, and organization's vision, are also critical factors of successful organization management [39]. Zohar (2003) showed that a leader encouraging workers participation and system implementation could enhance employees' desires to improve the safety climate. The various leadership behaviors could affect the efficiency of safety performance [40].Clarke (2006) showed that leadership style had a significant impact on relationships with safety participation, and leaders may encourage safety participation using a combination of influence tactics. The leaders play an important role in high reliability organizations [41].

Wu's (2008) results of the statistical analysis indicated that organizational leaders would do well to develop a strategy by which they improve the safety climates within their organizations, which will then have a positive effect on safety performance [18].

D.Framework and hypothesis

Based on the industry safety literature described above [18, 26, 28], the present study hypothesized that safety performance is a dependent variable, while the safety culture was treated as the intervening variable, and leadership style as an independent variable. The model relating leadership behavior, safety culture, and safety performance are shown in figure 1.

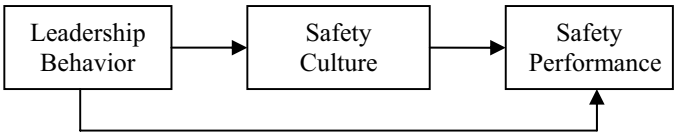

Fig. 1 The model relating leadership behavior, safety culture, and safety performance

Based on the model relating leadership behavior, safety culture, and safety performance, the following hypotheses have been put forward:

1) Consideration leadership is positively related to organization system, safety communication, and manager's commitment to safety culture.
2) Initiating structure leadership is positively related to organization system, safety communication, and manager's commitment to safety culture.
3) Organization system is positively related to safety audit assessment, accident investigation management, and safety system of safety performance.
4) Safety communication is positively related to safety audit assessment, accident investigation management, and system of safety performance.
5) Manager's commitment is positively related to safety audit assessment, accident investigation management, and system of safety performance.
6) Consideration leadership is positively related to safety audit assessment, accident investigation management, and system of safety performance.
7) Initiating structure leadership is positively related to safety audit assessment, accident investigation management, and system of safety performance.

E. Questionnaire Development

The study was performed via questionnaire investigation. The leadership behavior that was referenced by Leadership Behavior Description Questionnaire (LBDQ) represented two dimensions: consideration and initiating structure. The safety culture scale was constructed based on scales such as the SCS, PSCHO, and SAQ, with three dimensions: organization system, safety communication, and organization's commitment.

The safety performance was represented by three dimensions: safety audit assessment, accident investigation management, and safety system. The questionnaire uses a five-point Likert scale: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree. After the questionnaire was reviewed and modified by clinical and administrative experts, the final dimensions were determined. The final survey consisted of 42 items that included ten items of leadership behavior, twenty items of safety culture, and twelve items of safety performance.

The study hospital has 648 beds and 700-hospital workers. It is a regional teaching hospital located in middle Taiwan and received an excellent grade by the Taiwan Joint commission on Hospital Accreditation in 2006. Each unit in the hospital collected surveys from half of the workers from a random sampling. Mailing 350 questionnaires to the workers since

March 31st, 2008 to April 7th, 2008; 220 responses were obtained. The survey excludes the responses that answered questions that were either contradictory or incomplete. Finally, 195 valid responses were obtained setting the response rate at 55.7%.

III. Result

A. Sample

The response profile is composed of 87.5% female and 12.5% male. In relation to job position, the response is composed of 12.2% supervisors, 0.6% senior managers, and 87.2% other employees. In relation to job responsibilities, the response is composed 55.3% hospital nurses, 29.2% medical technologists, and 15.3% physicians. In relation to years on the job, 1~3 years accounted for 31.8%, 4.7% was on the job less than six months.

In leadership behavior, most of the clinical staff agreed to the item, "The manager requested staff to follow safety standard and procedure for quality assurance in my unit," with a mean value of 4.21. The lowest agreement from clinical staff was on the item, "The manager requested us to understand the external environment expectation of my hospital in my unit," with a mean value of 3.83. In safety culture, most of the clinical staff agreed to the item, "In my unit, the procedure and goal of patients' safety was emphasized to new employees" with a mean value of 4.12. However, the lowest agreement was on the item, "When I made suggestions about safety to my executive, the suggestions were adopted easily and implemented in the work place," with a mean value of 3.65. In safety performance, most clinical staff agreed to the item, "The hospital where I serve has already set up a perfect incident report system and channel," with a mean value of 4.24; the lowest agreement was with the item, "My unit will replace the equipment that is harmful for patient safety," with a mean value of 4.01.

B. Reliability and validity

The scale was constructed from reference review and experts.

TABLE I
THREE DIMENSIONS OF CONFIRMATORY FACTOR ANALYSIS

	Recommended value	Leadership pattern	Safety culture	Safety performance
χ^2/df	<3	3.994	1.72	3.46
GFI	>0.9	0.908	0.897	0.907
AGFI	>0.8	0.841	0.862	0.84
PGFI	>0.5	0.525	0.666	0.527
IFI	>0.9	0.926	0.954	0.941
RMSEA	<0.08	0.124	0.061	0.112
CFI	>0.9	0.925	0.954	0.940
TLI	>0.9	0.896	0.945	0.916
RMR	<0.05	0.029	0.042	0.031

Exploratory factor analysis was used to investigate the item's load on the same factor for increasing internal consistency by removing undesirable items. The Bartlett Sphericity test showed that the samples met the criteria for factor analysis. In leadership behavior, the 4th question was deleted and nine questions remained for explaining two dimensions: consideration leadership and initiating structure leadership. The factors explained the 71.95% of variance and Cronbach's α was 0.904. In safety culture, the survey deleted the 3rd, 9th, 16th, and 19th questions, keeping the remaining sixteen questions for explaining three dimensions: organization system, safety communication, and organization's commitment. The factors explained the 61.76% of variance and Cronbach's α value was 0.888. In safety performance, the survey deleted the 6th and 11th question and ten questions remained for explaining three dimensions: safety audit assessment, accident investigation management, and safety system of safety performance, Cronbach's α value was 0.859. After modification, thirty-five questions composed our scale and Cronbach's α value was 0.931, making the reliability moderately acceptable.

Using maximum-likelihood estimation confirmatory factor analysis to estimate model fit and CR value, factor loading was greater than 0.5, without negative observation values occurring and resulted in an acceptable model fit (see table).

C. *One-way ANOVA analysis*

Statistical analysis by one-way ANOVA showed that there was no significant difference between sample profile (age, sex, and years on the job) and each dimension. However, there was a significant difference within the job responsibilities (divided into three groups as nurses, physicians, and technologists). Through Scheffe's comparison analysis test, the study discovered the physicians have a lower perception of leadership behavior, safety culture, and safety performance than any other medical staff.

D. Path analysis

This study conducted a correlation analysis using SPSS program to test the relationship among leadership style, safety culture, and safety performance. The result showed a statistical significance among all dimensions.

The linear structure relationship model was used to test the hypothetical theory model. The model resulted in an acceptable model fit but chi-square indicates lack of a satisfactory model fit. Variance by the model reported the following results: organization system(r=.435), safety communicates(r=.074), organization's commitment(r=.115), safety audit assessment(r=.35), accident investigation management(r=.455), and safety system(r=.454). The initiating structure leadership had a higher total effect on safety culture, and organization of safety culture had a higher total effect on safety performance. The path structure model was: (GFI=0.86, AGFI=0.80, PGFI=0.64, NFI=0.86, RMSEA=0.1, CFI=0.86, RMR=0.038)

Twenty-one hypotheses were tested and thirteen hypotheses were accepted (see table). Leadership behavior significantly affects safety culture. In safety performance, consideration leadership significantly affected safety audit assessment, the total effect was 0.48. Initiating structure leadership significantly affects accident investigation management with a total effect of 0.44. The relationship between safety culture and safety performance had a higher total affect on organization

systems than all other factors. However, safety communication is not significantly affected by safety audit assessment; organization's commitment is also not significantly affected by any safety performance factors.

Hospital organizations recently discussed how to initiate and maintain safety culture, but it is rare to practice it as a part of daily work. Clinical practice is a complex industry with professionals who easily tend to have "departmental egoism". The study suggests senior executives should be involved in safety communication and initiate safety systems for promoting safety culture. The study also revealed that reporting and accident investigation systems rely on organizational system, such as a patient safety committee investigating medical incidents and reporting events independently. High-level executives should be part of the investigating committee because they play an important role in arbitrating and coordinating. The study results showed that organization's commitment did not have a significant effect on global safety performance; it may be due to employees not feeling the organization's commitment and support. One way to reverse this would be to increase cohesiveness and perception of the hospital's organization by building direct communication and providing more commitment and support to medical staff in order to initially handle medical disputes properly.

TABLE II
PATH COEFFICIENT ANALYSIS

		Direct effect	Indirect effect	Total effect	Test Result
Consideration leadership	Organization system	N.A	0.32	0.32	Accept
	Safety communicates	N.A	0.22	0.22	Accept
	commitment	N.A	0.20	0.20	Accept
	Safety audit assessment	0.21	0.27	0.48	Accept
	Accident investigation management	0.22	0.01	0.23	Reject
	safety system	0.26	-0.04	0.22	Reject
Initiating structure leadership	Organization system	N.A	0.39	0.39	Accept
	Safety communicates	N.A	0.36	0.36	Accept
	commitment	N.A	0.32	0.32	Accept
	Safety audit assessment	0.26	0.03	0.29	Reject
	Accident investigation management	0.27	0.17	0.44	Accept
	safety system	0.34	0.12	0.46	Reject
Organization system	Safety audit assessment	N.A	0.59	0.59	Accept
	Accident investigation management	N.A	0.70	0.70	Accept
	safety system	N.A	0.71	0.71	Accept
Safety communicates	Safety audit assessment	N.A	0.13	0.13	Accept
	Accident investigation management	N.A	0.04	0.04	Reject
	safety system	N.A	0.11	0.11	Accept
commitment	Safety audit assessment	N.A	-0.06	-0.06	Reject
	Accident investigation management	N.A	-0.05	-0.05	Reject
	safety system	N.A	0.06	0.06	Reject

IV. Discussion

Parts of the hypotheses in our model were true, that is leadership behavior and safety culture is related to safety performance. The model resulted in several useful conclusions for hospital organizations and government, including:

1) Organization's safety culture affects safety performance.
2) Leadership behavior affects safety culture and indirectly affects safety performance.

The study found physicians have a lower perception of safety culture and safety performance than any other medical staff. It suggests physicians could benefit from learning and sharing science related to safety in clinical practice and training courses. This conclusion corresponds to Pronovost's research [7].

In leadership behavior, the reason that initiating structure leadership had a higher affect on safety culture than consideration leadership may be that patient safety culture was later implemented in Taiwan. Many high level executives lack strategic plans and visions for initiating patient safety culture. In summary, we believe high level executives should not only provide initiating structure leadership to conduct organization management, but also through consideration leadership should help employees recognize the relationship between individual and group performance through the contingency model and safety culture. For example, communications channel construction, organization vision, and organization commitment promotion. The study found organization systems is an important factor in safety performance, including: education system, safety procedure, incident report system, establishing rewards and recognition for safety system, and continuously providing organization wide safety systems in the healthcare delivery process.

Most important is having a fair and just system to investigate an adverse event. In Taiwan, the Department of Health Executive, Yuan, emphasized sharing knowledge for improving safety from medical incidents as helpful for building safety systems and preventing adverse incidents. The Institute of Medicine (IOM) suggests creating a non-punitive culture as the first step in implementing a safety healthcare system and accident investigation system. Promoting a non-punitive culture relies on an organization system.

In Taiwan, even many health care organizations have been improving their patient safety culture; this study shows that a supportive leadership is still insufficient for patient safety systems in Taiwan. For example, nursing staff does not thoroughly understand the operation of organization systems and communication channels. Many nurses worry about reporting near-miss events to reporting systems for fear of consequences from colleagues and punishment from senior management. Hence, management can demonstrate a commitment by showing concern for medical staff and encouraging staff to participate in enhancing safety activities and communication channels in order to obey safety regulation. The more leadership displays support the more helpful it is in creating a safety culture.

This study only chose important and explicit factors of safety culture to test, there are still many indicators that affect safety performance and safety culture. In the future, studies can adopt other methods to test and follow situational variables, such as references to measure organization safety performance through accident records and frequency of injury, to focusing on measuring the process and outcomes of safety performance.

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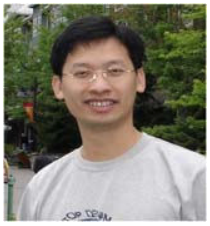

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