Hospital Safety Climate Assessment toward Attitude's Nurses Based on Sammer's Model
Case study: An academic General and A specialized Hospital in Tehran (Iran)

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ABSTRACT
Safety climate has become an important issue in organizational safety management of health systems. The aim of this applied study was assessment safety climate in general and specialized academic hospitals based on Sammer's model, to introduce a model with the specific framework to assess climate safety in Iranian hospitals, moreover, to reduce medical errors and incidents, also to increase patient safety.

This model consists of seven dimensions: leadership, teamwork, evidence-based practices, communication, learning, justice and patient-centeredness. So a descriptive –comparative study was undertaken through a methodology including 3 phases. Data were collected by a modified questionnaire based on the Hospital Survey on Patient Safety Culture (HSOPSC) from 217 nurses and an In-depth interview with 52 nurses in both hospitals.

According to the results in the general hospital, leadership, patient-centeredness and learning was recognized as the most effective factors, however, in the specialized hospital, the most important factors were patient-centeredness and justice.

Seven dimensions of Sammer's model are effective in safety climate assessment, but they are not enough to assess safety climate Iranian hospitals. Adding other factors such as safety and standardized hospital building space, the safety of equipment, physical factors in the workplace, Social and culture factors and terms and conditions governing the hospital settings can help to complete the model and provide an integrated and more consistent one to take an effective step in assessing overall hospital safety climate.

Keywords: Hospital Safety Climate, Patient Safety, Sammer's Model, Academic Hospital

1. INTRODUCTION
The issue of patient safety drew the attention of researchers and health professionals when IOM (Institute of Medicine) published a report in 1999 which referred to the prevalence of medical errors in the United States [1.2] Published reports from developed countries such as England, Canada and Australia indicate that health systems even in these countries are not safe enough [3].

1.1 Patient safety
Patient safety which is known as one of the main components of health care is defined as 'the prevention of harm and injury and adverse impacts to patients associated with healthcare [4].

These harms take place following medication errors (errors in the type or dose of medication prescription), surgical errors (wrong site, wrong techniques, postoperative complications), misdiagnoses (delay in diagnosis, failure to diagnose, misdiagnosis), failure of devices and diagnostic equipment, and others, such as nosocomial infections, patient falls, bedsores, wrong treatment [5].

Based on the available evidence in developing countries, one out of every ten patients gets injured while receiving hospital services, but there is no accurate statistics in this regard, and it seems that these statistics is contrary to actual values [6]. However, according to the IOM report, most of the medical errors are not caused by the negligence of people, but by system malfunction [7].

Lack of attention to patient safety can cause medical errors, low quality of medical services, and increased length of hospital stay [8, 9]. Despite continues efforts are associated with the human and systems factors that cause to unsafe healthcare, it is evaluated that internationally, harmful events are the third leading

cause of death in developed countries [10]. Internationally, it is assessed that 10–25% of patients experience harmful events of medical care in each year; most of them are avoidable [11]. Carson, Hibbert, Williams, *et al.* [12] have recognized in terms of reporting culture in England and Wales. They discovered that two-thirds of the reports were written without explanation about the causes and details of the medical accident. Most mistakes lead to hurt to patients and half of the total incident reports (996) cause serious damage or death. The personal and financial effects of these negative results of the hospital are significant. Such as, in Australian public hospitals, it is evaluated that 12–16% of the cost is the direct result of adverse events, with the costs of hospital-acquired complications are approximate to more than $4 billion each year [11].

 One factor, which can play an important role as a crucial issue in promoting patient safety is the presence of patient safety culture in health service management [13].

Culture is defined as a set of beliefs, attitudes and values of a group of people which are reflected in their behaviour [14]. In fact, patient safety culture represents the priority of patient safety from the perspective of the staff in their workplace [15]. Issues such as not hiding errors and accidents but revealing them, training staff regarding patient safety [16].

Presence of an error reporting system, use of data provided by the reporting system to improve processes, reduction in the number of blames, teamwork, clear communication between departments and units and their cooperation with each other to further the interests of patients and attention of the leadership to patient safety are known as defining characteristic of this culture [17].

1.2. Safety culture and safety climate

Since safety culture is a part of the corporate culture with a deeper concept than safety climate based on the core values which are hardly available/accessible, and it is associated with human resources and safety in an organization [18]. Safety climate is closely related to safety culture, however, the former emphasizes the importance of safety in the view of the personnel [19]. Understanding that patient safety initiatives follow a step-by-step process to gain a patient safety climate is important and necessary. The term safety climate often returns to the various measurable factors and components of a safety culture, for instance, safety systems, health care workers' perceptions to risk and safety, and management [20, 21].

Accordingly, safety climate is a criterion of a temporary situation of safety culture and is considered as individuals' common perception of the organization. Therefore, it is dependent on both location and time, and it refers to the perceived concept of safety in a special place and time, which is relatively unstable. Consequently, it is subject to change by environmental conditions or prevailing situations [22]. Research results by Cox and Flynn, which aimed to review safety culture, showed that safety climate is a more preferred scale to safety culture since studies of safety culture have provided a limited set of measurable variables [23].

Hence, the common perception of beliefs, norms, values, practices, and regulations relating to the safety of personnel in the workplace is technically called a safety climate [24]. Consequently, safety climate is often used to assess the safety culture of an organization, and specifically return to the employees' attitude of the safety culture of an organization at a particular point in time [25].

There are several tools to measure patient safety culture, but the most complete of which is Hospital Survey on Patient Safety Culture (HSOPSC) which was designed by the Agency for Healthcare Research and Quality in 2004 [26]. Today, in improvement countries, evaluating these factors by different tools to measure patient safety culture is of high interest for the healthcare providers to make evidence-based decision and implement appropriate plans and programs [27].

Previous study has indicated that patient safety culture among the healthcare professionals in hospitals of Iran is moderate and weak [13].

According to the importance of patient safety in health centers, implementing a system to assess the existing safety culture in hospitals, including the prevailing safety climate and the level of awareness of hospital staff, is one of the most essential measures that must be taken. Therefore, introducing a framework-specific model to assess the safety climate in Iranian hospitals seems to be necessary. In previous studies in Iran, the researchers have only examined the relationship between several safety climate factors and employee attitudes; also, the hospital safety climate was never assessed with a conceptual model with a specific framework. . In addition, to promote safety patient culture in hospital, safety climate assessment in health and medical service centers is unavoidable.

Hence, after extensive studies on factors and indicators affecting the safety climate in hospitals, and reviewing researches that have been evaluated in this field, the Sammer's model has been selected as a comprehensive model according to the experts opinions (Fig. 1).

Because, Sammer's model design was a comprehensive literature review utilizing meta-analysis to develop a typology of the patient safety culture (PSC) literature and identify key concepts. To strengthen reliability and validity, two authors agreed to the grouping of the concepts into categories from

which they generated a conceptual culture of safety framework with subcultures and properties.

A literature search was conducted using Medical Literature Analysis and Retrieval System Online [1], from the U.S. National Library of Medicine, and the Cumulative Index to Nursing and Allied Health Literature(CINAHL) database, the authoritative source of information for the professional literature of nursing, allied health, biomedicine, and health care . In addition, Key search words in Sammer's model were "hospital safety," "culture of safety," "safety culture," and "safety climate." They found a preponderance of literature addressing hospital patient safety culture and reviewed over 200 scholarly journal articles in during 10 years that met the initial criteria.

Therefore, the purpose of this study is assessment of hospital climate safety by a conceptual model, finally a model with a specific framework was introduced, to assess climate safety, to reduce injuries and increase patient safety in Iranian hospital.
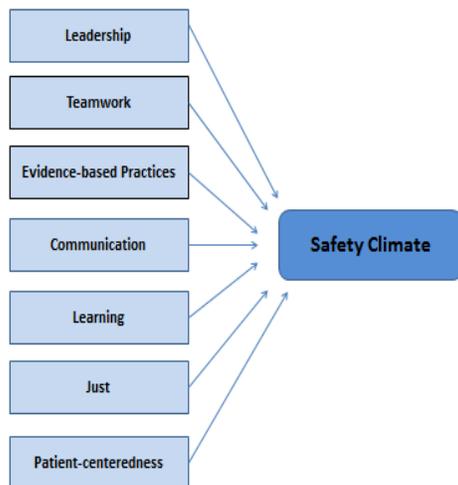
Fig. 1. Dimensions of the Sammer model

Thus hospitals safety climate analysis was conducted based on the Sammer's model in an academic General Hospital & A specific Hospital.

2. MATERIALS AND METHODS

2.1. Procedure

That study is applied research has been conducted in3 phases. First, a review of the literature was done about the safety climate in hospitals and safety climate models. Also, factors affected by safety climate were extracted and Sammer's model was selected (Fig. 2). Sammer and her colleagues performed an analysis and synthesis of all the patient safety literature from 1999 through 2007. Their analysis resulted in the generation of a framework for hospital culture of patient safety intended to be a tool to assist hospital leaders in the operationalization of the complex concept of safety climate. Safety culture properties were identified and

organized into seven subcultures: 1) leadership, 2) teamwork, 3) evidence-based practices, 4) communication, 5) learning, 6) justice, and 7) patient-centeredness. It was identified that senior leadership was one of the most significant facilitators for establishing a culture of safety, a finding consistent with the more mature organizational culture literature. The leadership subculture included perceptions that leaders recognize the high-risk nature of the healthcare environment and align vision/mission, staff competency and resources throughout the organization to reduce risk. Teamwork includes such elements as mutual respect, psychological safety, collaboration and "watching each other's backs." Evidence-based subculture refers to care practices based on evidence, standardization to reduce variation and striving for high-reliability and zero defects. Communication includes the behaviours of staff perceiving they hold a responsibility to speak openly about concerns and processes needing improvement. Hospitals with a strong Learning subculture learn from mistakes and continually improve. A Just Culture is one where individuals hold themselves accountable for their actions and investigations of care failures include the examination of systems as well as the choices of individuals. Last, a Patient-centered culture is focused on the patient and family actively participating in care decisions and plans. [28].
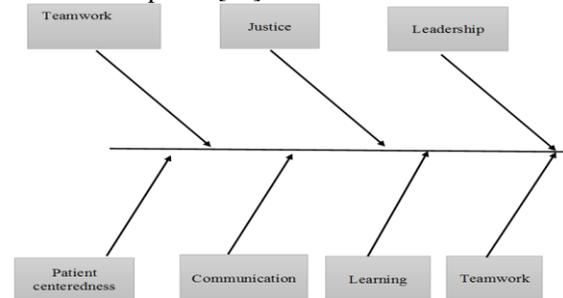

Fig.2: Sammer's model (Sammer *et al.*)

2.2. Quantitative section:

In the second phase, The measurement tool in the quantitative section of the study was a standard questionnaire to assess patient safety (Hospital Survey on Patient Safety Culture-HSOPSC) which was designed by the Agency for Healthcare Research and Quality [26]. Questionnaire (HSOPSC) was modified based on Sammer's model, therefore, the modified questionnaire consisted of seven items and 45 closed questions, which were validated (Cronbach's alpha: 0.819). Then, they were filled out in both hospitals, and collected data were analyzed by SPSS v.23.

2.2.1. Participants in the quantitative section

The current research study was conducted based on Sammer's model in 2016-2017 for nine months in two academic specialized and general hospitals. The study population consisted of nurses with a bachelor's

degree or higher in different wards of both hospitals. The total sample size was 375 subjects, which ultimately reduced to 189 based on the Cochran formula.

A total of 157 and 60 nurses in the general and specialized hospital, respectively. The modified questionnaire was filled out in both hospitals, and collected data were analyzed by SPSS v.23.

2.2.2. Statistical Analyses

Determining central indicators and dispersion by Pearson's correlation coefficient, safety climate was used to study the statistical correlation between each of the dimensions of the model (Leadership, Teamwork, Communication, Learning, Justice, Patient-centeredness and Evidence-based practices) and nurses' overall attitude. Hierarchical multiple regression model (Enter) was applied to study the coefficient of determination for each of the mentioned dimensions, and stepwise multiple regression model was used to identify the most effective factors.

2.3. Qualitative section

In the third phase, the qualitative section of the study was carried out by an In-depth and semi-structured interview. In-depth interview analysis of focus groups and individual interviews can provide insights about collective or individual perceptions, despite that such methods are resource-intensive and time-consuming. The items of the questionnaire and the common problems that they face at the hospital were discussed with head nurses of 20 wards and 20 nurses who were randomly selected as an available sample from each ward in the general hospital. Also, in the specialized hospital with 6 head nurses of six wards and 6 nurses who were randomly selected in each ward. Therefore, 52 nurses were interviewed. The purpose of the interview was to identify the viewpoints and issues which were not exactly mentioned in the questionnaire so that it could help to complete the understudy model. Finally, the results of the interview were classified by subject, and their themes and subthemes were determined following content analysis.

3. RESULTS

3.1. Results of the quantitative section

Result first phase: After a review of the literature was done about the safety climate in hospitals, Sammer's model was selected. In 2010, Sammer *et al.* conducted a study on safety culture and factors affecting hospital safety climate in the United States, which ultimately resulted in the proposal of a conceptual model with a specific framework to assess safety culture at health centres. The model is comprised of seven dimensions: Leadership, Teamwork, Evidence-based practice, high-quality intersectional Communication, Learning, Justice and Patient-centeredness. Sammer model is used in the present study to assess and analyze safety climate in the selected general and specialized hospitals, results of which may pave the way to apply the model for assessment of hospital safety climate in Iran [28].

The result from the second phase's 217 nurses filled out the questionnaire in both hospitals, whose demographic information is provided in Table 1.

Table 1: Demographic information's nurses

Variable		Specialized hospital (n=60)		General hospital(n=157)	
		Number of nurses	Percent of the total (%)	Number of nurses	Percent of the total (%)
Age group	21-30	15	25	58	36.9
	31-40	30	50	68	43.3
	41-50	11	18.3	31	19.7
	50<	4	6.7	-	-
Sex	Female	57	95	131	83.4
	Male	3	5	26	16.6
Marital Status	Married	44	73.3	88	56.1
	Single	16	26.7	69	43.9
Education	Bachelor	57	95	151	96.2
	Master	3	5	6	3.8
Work experience	5>	8	13.3	41	26.1
	5-10	18	30	40	25.5
(year)	10-15	13	21.7	42	26.8
	15-20	9	15	16	10.2
	20-25	5	8.3	16	10.2
	25-30	7	11.7	2	1.3
Salary	1200000>	-	-	7	4.5
(IRR)	1200000-2000000	40	66.7	89	56.7
	2000000-2500000	10	16.7	38	24.2
	2500000-3000000	9	15	19	12.1
	3000000<	1	1.7	4	2.5
Preferred to working in other wards	Yes	20	33.3	30	19.1
	No	40	66.7	127	80.9

Note: The number of nurses in Specialized hospital (n=60) and in General hospital (n=157)

3.1.1. Pearson's correlation coefficient

The relationship between seven factors of the study and nurses' overall attitude towards safety climate was examined by Pearson's correlation coefficient. Results are shown in Table 2.

Table 2: Pearson's correlation coefficient

Factors	General hospital				specialized hospital			
	Pearson	P-value	Mean	SD	Pearson	P-value	Mean	SD
Leadership	0.39^{**}	0.000	3.221	0.53	0.363^{**}	0.002	3.08	0.46
Teamwork	0.185^{*}	0.010	3.870	0.68	0.358^{**}	0.002	3.97	0.67
Evidence based practice	0.131^{*}	0.05	3.067	0.46	-0.186	0.07	3.15	0.41
Communication	0.340^{**}	0.000	2.781	0.54	0.280^{*}	0.015	3.81	0.57
Learning	0.354^{**}	0.000	3.694	0.51	0.153	0.121	3.68	0.49
Justice	0.190^{**}	0.008	2.736	0.72	0.458^{**}	0.000	2.65	0.81
Patient centeredness	0.222^{**}	0.003	3.203	0.60	0.622^{**}	0.000	3.23	0.71

Note: **. Correlation is significant at the 0.01 level (2-tailed), and *. Correlation is significant at the 0.05 level (2-tailed).

3.1.2. Hierarchical multiple regression

The coefficient of determination was calculated for each of the factors by Hierarchical multiple regression method (Enter model). Results in both hospitals are illustrated in Table 3 and Table 3. As it is seen in R Square Change column of Table 3, by adding new factors from the fifth row, no significant change is observed in the coefficient of determination. This is indicative of a minimal effect of factors such as Teamwork and Evidence-based practices in the general hospital.

Table 2: Hierarchical multiple regression method (Enter model) in the general hospital

	Regression (R)	R square	Adjusted R Square	Standard error	R square change
Leadership	0.390	0.152	0.147	0.458	0.152
Leadership, Patient centeredness	0.442	0.192	0.185	0.448	0.043
Leadership, Patient centeredness, learning	0.472	0.223	0.207	0.442	0.027
Leadership, Patient centeredness, Learning, Communication	0.485	0.235	0.215	0.440	0.013
Leadership, Patient centeredness, Learning, Communication, Justice	0.487	0.237	0.212	0.441	0.02
Leadership, Patient centeredness, Learning, Communication, Justice, Team work	0.487	0.237	0.207	0.442	0.000
Leadership, Patient centeredness, Learning, Communication, Justice, Teamwork, Evidence-based Practice	0.487	0.237	0.202	0.443	0.000

Table 3: Hierarchical multiple regression method (Enter model) in the specialized hospital

	Regression ®	R square	Adjusted R Square	Standard error	R square change
Patient centeredness	0.622	0.386	0.376	0.425	0.386
Patient centeredness, Justice	0.664	0.441	0.422	0.409	0.055
Patient centeredness, Justice, Leadership	0.685	0.469	0.440	0.402	0.028
Patient centeredness, Justice, Leadership, Teamwork	0.707	0.499	0.463	0.394	0.030
Patient centeredness, Justice, Leadership, Teamwork, Communication	0.720	0.518	0.473	0.390	0.019

According to the Hierarchical multiple regression method, in the general hospital, it can be said that about 15% variance in nurses' overall attitude towards safety climate was predictable by the Leadership factor. Nearly 19% variance in nurses' overall attitude towards safety climate was predictable by the variables of Leadership and Patient-centeredness. Also, 22% variance in nurses' overall attitude towards safety climate was predictable by the variables of Leadership, Patient-centeredness and Learning. About 24% variance in nurses' overall attitude towards safety climate was predictable by Leadership, Patient-centeredness, Learning, Communication, Justice, Teamwork, and Evidence-based practice.

In the specialized hospital: safety climate was predictable by Leadership, Patient-centeredness, Learning, Communication and Justice. Coefficient of determination in the specialized hospital showed that about 38% variance in nurses' overall attitude towards safety climate was predictable by Patient-centeredness, and 44% by patient-centeredness and justice. Also, 46% variance in nurses' overall attitude towards safety climate was predictable by Patient-centeredness, Justice and Leadership, and 51% by Patient-centeredness, Justice, Leadership, Teamwork and Communication.

3.1.3. Stepwise multiple regression

The standardized coefficient of the most effective and the most important study factors was determined by

Stepwise multiple regression method. Results are shown in Table 5.

Table 4: Results of Stepwise multiple regression method

Model General hospital		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.212	.225	-	9.825	9.825
	Leadership	.367	.069	.394	5.322	5.322
2	(Constant)	1.681	.286	-	5.878	5.878
	Leadership	.360	.067	.386	5.340	5.340
	Patient Centeredness	.173	.060	.210	2.904	2.904
3	(Constant)	1.323	.321	-	4.117	4.117
	Leadership	.270	.077	.291	3.525	3.525
	Patient Centeredness	.161	.059	.196	2.736	2.736
	Learning	.185	.079	.193	2.328	2.328
Model Specialized hospital		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	1.775	.258		6.872	.000
	Patient Centeredness	.471	.078	.622	6.045	.000
2	(Constant)	1.574	.263		5.992	.000
	Patient Centeredness	.396	.081	.523	4.863	.000
	Justice	.167	.071	.254	2.363	.022

Note: Dependent Variable: Safety Climate

This Table was shown the weights of Leadership, Patient-centeredness and Learning on the attitude towards safety climate in the general hospital; also in the second block, the specialized hospital was showed the weights of Patient-centeredness and Justice (standardized coefficient, Beta)

3.2. Results of **the** *qualitative section*:
Results third phase which was obtained by content analysis of in-depth interview and was shown in Table 6.

Table 5: Results of the interview with nurses

Theme	Subtheme	Details
Safety and standardization of the hospital building space	Location of wards	Locating pediatric and physically disabled patients wards on upper floors regardless of their special requirements in critical situations for emergency evacuation
	Room space	Room space is not proportional to the number of beds, which makes it difficult to carry medical equipment to the room when necessary.
	door frames	Inappropriate width of entrances and exits leads to vigorous shaking of patients in transfers to other wards, while it has been strictly forbidden by medical considerations.
	Absence of handholds	Patients need to use handholds in bathrooms and corridors.
	Number of beds per ward	Patients are forced to be admitted to other wards due to the insufficient number of beds in each ward so that the course of treatment is prolonged, and medication, nutritional and clinical errors are highly probable to occur.
Safety of Equipment	lack of safe beds	Lack of safe beds without suitable protecting bars, which causes the patient to fall from the bed.
	Equipment inspection	Nurses are responsible for inspecting types of capsules and electronic equipment available in the ward. They do not have the necessary information regarding equipment safety, which can put patient safety at risk.
Physical adverse factors	Noise	Noise inwards not only disturbs patients but also it makes nurses exhausted and distracts them while providing patients with appropriate care.
	ventilation	Infection and colonoscopy wards should not be located on -2 or lower floors due to poor ventilation, as it may threaten patients and personnel's health.
	lighting	Poor lighting in rooms may threaten patient safety, especially when nurses are changing open wound dressing.

Terms and Conditions governing the hospital settings	5S or Discipline	In some cases, nursing stations are cramped, and there are lots of forms and sheets on desks, which increase the risk of error.
	Nurses' duties and responsibilities	Nurses' duties are not compatible with their job description. So they pay a great deal of attention to anything else other than clinical care. This can be a serious threat to patient safety.
	Number of nurses	Inadequate number of nurses per patient
	Forms to be filled out by nurses	Nurses must fill out a large number (multiplicity and diversity) of forms routinely. This can waste the time, which nurses should allocate to clinical care, and frequent changes in forms can cause many errors too.
	Developing treatment plans	Health Sector Evolution Plan (HSEP) has had some problems and deficiencies besides its benefits for patients. In a single speciality hospital, sometimes consultation with other specialists such as a cardiologist is necessary when patients need surgery. When they have to be transferred to another hospital for pre-surgery consultation, it should be on the list of hospitals covered by Health Sector Evolution Plan (HSEP), and patients have to be transferred by ambulance. The limited number of hospitals under the coverage of this new plan and as well as insufficient ambulances have made such arrangements time consuming and difficult for nurses.
	Training skills academic	According to the view of the majority of nurses, without experience work, ones lack professional skills at the beginning of their clinical practice.
	Legal consultancy centres and Counseling units	Patients and their families are unaware of their legal rights due to the absence of a legal consultancy centre, and counselling units in hospitals are open only during working hours.
	Motivation and job satisfaction among nurses	Late payments, lack of respect from physicians, absence of a reward and punishment system, compulsory work shifts, which may jeopardize nurses' private life, are some of those important factors, which result in lack of motivation and job satisfaction among nurses.
Social and cultural factors	The intervention of caregivers (patients' families)	The intervention of caregivers (patients' family), such as giving unsuitable food to the patient, is another important issue in the course of treatment which causes some difficulties for nurses and threatens patient safety.
	Patient addiction	Addition among patients, particularly to new drugs, has significantly increased. In some cases, addicted patients have been seen offering drugs to those who are not addicted but suffer from severe pain.

4. DISCUSSIONS

Results of this study showed that all of the understudy factors (leadership, patient-centeredness, learning, communication, justice, teamwork and evidence-based practices) have a statistically direct and significant relationship with nurses' overall attitude towards safety climate in the general hospital (P-value <0.05). However, results were different in the specialized hospital; evidence-based practices and learning did not show a statistically significant relationship with nurses' overall attitude towards safety climate (P-value >0.05). In addition, the most important factors in the general hospital were leadership, patient-centeredness and learning according to stepwise multiple regression model and determination of the effect and importance of each factor, whereas patient-centeredness and justice were identified as the most important ones in a specialized hospital.

Importance of these seven factors and their effects on safety climate have been examined and significantly emphasized in other studies too. To mention but a few, Dalton and Goodman referred to the paramount importance of leadership and the influential role of health policymakers to develop policies to support patient safety culture. They also refer to managers as those who are seriously responsible for patient safety [29]. Alzahrani *et al.* declared that there was a comparatively negative evaluation of management support. Thus, improvement of management support and engagement would lead to more positive patient safety climate attitudes among both doctors and nurses [16].

In terms of teamwork, Marshal and Manures stated that besides all advantages of working in a team, the important role of managers in organizations to provide safety climate and safety culture should not be overlooked, however, in some countries individualism is seen to be more popular than participating in team working activities which can help to reduce staff's errors [30].

Teamwork return to the flexibly collaborate to gain a common goal in different disciplines [31]. Unfortunately, the findings of previous studies indicated that working in teams with other health care wards received the lowest score [32, 33]. Therefore, Teamwork training programs should be held regularly in medical service centres [34].

Given the evidence-based practice, Dalton *et al.* showed that heavy load of compulsory work causes

fatigue and exhaustion, and ultimately leads to human errors which can put patient safety at risk [35]. Regarding intersectional communication, Kaelber and Bates referred to the importance of health information exchange which can directly affect and enhance health as it provides a clear image of patients and helps health providers to reduce human errors [36]. Yu *et al.*, revealed that patient safety culture positively affects strategies for improving patient safety and quality of healthcare, including systematic analysis to assess the efficacy of patient safety culture initiatives [20].

Having referred to learning and justice, Dalton *et al.* in their study on improvement in the safety of patient care in the united states showed that one of the important features of safety culture is that it provides staff with a blame-free workplace in which errors are easily reported, and they are used as a good source of learning [35]. Reason and Hobbs; have expressed that the three main factors of a safety culture are learning, justice, and reporting cultures. [37[Therefore, all health care staffs must realize medical errors as valuable learning opportunities to increase patient safety culture [38].

However, the results of Anbari *et al.* showed that there is punishment and blame culture, non-openness in communication channels and low reporting of events in Iran hospitals. They mentioned that, it is necessary for hospital management to design error and accident reporting system and reinforce non-punitive culture to increase error reporting [39].

To identify the errors, which occur in order to monitor the adverse effects of them by nurses, is important, so attempts to identify and report medical errors can be made by a reporting system [40]

Patient-centeredness, which is recently introduced to Sammer model, is known as customer orientation in organizations in order to promote customer satisfaction. Similarly, patients in hospitals are the most important receivers of healthcare, but the only significant difference is that the smallest error made by healthcare providers can lead to irreversible harms. However, Hwang *et al.* noted that nurses' competency in promoting Patient-centeredness involvement in medical care has the lowest rate. This result can be showed to the fact that nurses do not have enough time to raise patient participation in care owing to busy work environment.[41]

In summary, patient-centeredness refers to the importance of providing high quality healthcare, which leads to patient satisfaction. The quality of the work environment has a significant impact on how nursing care of patients[42, 43]. The work environment include of the attitudes, values, and beliefs that are part of daily life in an organization which can be effect on the psychosocial and physical health of employees [44].

In the general hospital, about 24% variance in nurses' overall attitude towards safety climate regarding leadership, teamwork, evidence-based practice, communication, learning, justice and patient-centeredness is predictable. But. In the specialized hospital, about 51% variance in nurses' overall attitude towards safety climate regarding leadership, communication, justice and patient-centeredness is predictable. Eventually, in results of hospital climate safety assessment by Sammer model indicates that approximately, 76% variance in nurses' overall attitude towards safety climate in the general hospital and 49% in specialized hospital is predictable regarding other factors, which should be identified and added to the model in order to promote hospital safety climate assessment and enhance patient safety.

The final model to assess of hospital safety climate for Iranian Hospitals showed in Fig. 3.
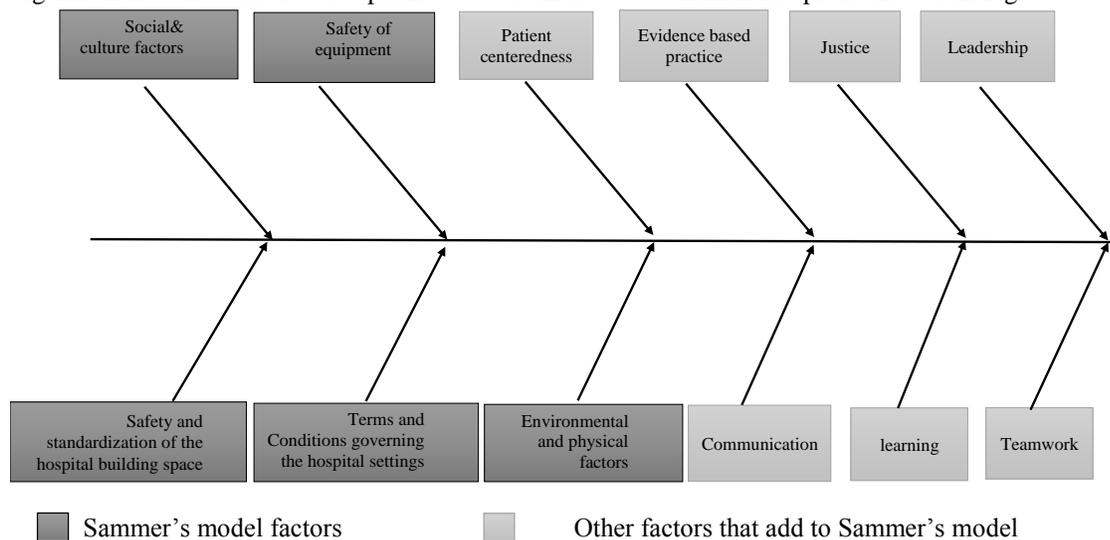
Fig.3: Final model of patient safety culture for Iranian Hospitals

According to the Fig.3 and content analysis of the results, five factors must be added to the Sammer's model as follow in Iranian hospital:

1- Safety and standardization of the hospital building space
2- Safety of equipment
3- Environmental and physical factors
4- Terms and Conditions governing the hospital settings
5- Social and cultural factors

5. CONCLUSION

Safety culture is a complex phenomenon that is still poorly understood. Safety climate is the aspect of safety culture that can be measured. A few empirical studies examine the factors that affect the registered nurse's perceptions of SC. This study had attempted to operationalize and test Sammer's conceptual model of seven safety subcultures. Safety climate measures attitudes and perceptions. Perceptions are formed through experience, knowledge and evaluative judgments accumulating within the individual's memory.

In conclusion, comparative analysis of safety climate in general and specialized academic hospitals based on Sammer's model, patient-centeredness was identified as the most important ones in both hospitals. A patient-centred climate is one that recognizes that the healthcare organization exists only to serve and meet the needs of patients and families.

Seven dimensions of Sammer model are effective in safety climate assessment, but they are not enough. Adding other factors such as safety and standardized hospital building space, the safety of equipment, physical factors in the workplace, Social and culture factors and terms and conditions governing the hospital settings can help to complete the model and provide an integrated and more consistent one to take an effective step in assessing overall hospital safety climate.

It is highly recommended to add five dimensions to Sammer model to assess hospital safety climate in Iran.

Limitations

One of the limitations of this study was the conservatism of some nurses in answering questions or ignoring the actual opinion, thus in response to a fear of negative repercussions arising out of open and honest responding. Another limitation was difficult to access to nurses due to their high workloads.

ETHICAL ISSUES

Ethics approval was received from the relevant health service and university research ethics committees.

CONFLICT OF INTEREST

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