



Workforce Perceptions of Hospital Safety Culture: Case of Iran Teaching Hospitals

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: One of the main determinants of safety and quality of care in hospitals is institutionalization of safety culture among their employees. This study aimed to assess patient safety culture in Iran teaching hospitals.

Methods: Four Iran provinces were selected purposefully, one hospital from each was entered the study randomly, and proportional with hospital size, 500 employees were selected. The data were collected using standard questionnaire of Hospital Survey on Patient Safety Culture (HSPSC) and analyzed using Excel and SPSS 22.

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Results: Patient safety dimensions with highest positive score were organizational learning and continuous improvement (77%), management support for patient safety (68%) and supervisor/manager expectations and actions promoting patient safety (61%) and dimensions with the lowest patient safety score were non-punitive response to error (20%), communication openness (28%), frequency of events reported (32%), staffing (37%), teamwork across and within hospital units (71%). Although 48% of the participants have not reported any event during 12 past months, but 64.6% scored patient safety excellent/ very good.

Conclusions: There are punishment and blame culture, non-openness in communication channels and low reporting of events in Iran hospitals. It is necessary for hospital management to design error and accident reporting system and reinforce non-punitive culture to increase error reporting.

Keywords: Patient safety culture; Teaching hospitals; Iran.

1. INTRODUCTION

Institute of Medicine has defined patient safety as “the freedom from accidental injury due to medical care or medical errors”. Human interaction and use of complicated technologies and new treatments have created unwanted damages to patients such as injuries resulting from wrong diagnosis and treatment, delay in treatment, medication errors and hospital infections. By avoiding these errors, patient security is provided and prevent from psychological pressure and financial burden on families and health system [1].

Studies in different countries have indicated that 3-16% of admitted patients in hospitals have injured from medical accidents and 30-70% of these accidents have created from medical errors. Medical errors are 8th cause of death in US and it is estimated that these errors impose \$17 billion on US health system in a year [2]. The importance of decrease in medical errors have been emphasized in the developing countries located at East Mediterranean Region Office (EMRO) of World health organization (WHO) such as Iran. So that it is estimated that 4.4 million unwanted error happen annually in the health care organizations of EMRO countries [3].

Improving patient safety culture requires understanding attitudes, beliefs and behaviors related to patient safety which organizations support and reward them [4]. So, the first step in designing hospital safety program is assessment of current hospital patient safety culture [5]. Numerous studies around the world have assessed patient safety culture in hospitals. One study in hospitals affiliated with Kerman University of Medical Sciences indicated that employees’ assessment of all 10 patient safety dimensions and 2 outcome safety culture dimensions are lower than the average [6]. Study

on Kermanshah hospitals indicated that half of hospitals have favorite situation and half other don’t have favorite situation in establishment of patient safety culture [7]. Another study on 32 hospitals in China showed that employees have positive attitude toward patient safety culture [8]. In another study on Belgium hospitals, although patient safety culture score in long term and psychiatry hospitals was higher than acute hospitals, but employees understanding from safety culture was low [9].

Healthcare Research and Quality Agency has developed a useful tool entitled Hospital Survey on Patient Safety Culture (HSOPSC) to assess patient safety culture in healthcare organizations [10]. This tool has been used in many countries health system [11-14]. So, this study using this tool assesses workforce perceptions of Iran teaching hospitals regarding hospital safety culture.

2. MATERIALS AND METHODS

2.1 Study Design and Participants

In this analytical-cross-sectional study, teaching public hospitals, because of vast coverage of services, less financial burden to the people and most refer to them, were considered as the population of the study. Purposive sampling method used for sampling, so that at the first step, 4 provinces of Kermanshah, Arak, Kerman and Mashhad selected purposefully. High number of population coverage by teaching hospitals of these cities which present a more realistic view of Iran societies and better access to these provinces by researchers were among main causes of these sampling. At the second step, one hospital from each province was entered the study, randomly. Finally, by referring to the human resource unit of these hospitals, total number of clinical and non-clinical

employees with direct contact with patients including physicians and nurses and also employees without direct contact with patients but their work had direct effect on patient care including paramedical and supportive employees, managers and supervisors were obtained. In this way, the number of the study population included 4100 persons.

By specifying total population of the study, Cochran formula used for sampling. In order to obtain the highest number of samples, we assumed that the frequency ratio of the study traits (i.e. the dimensions of organizational culture) is 0.5, and also we assumed 5% margin of error from the actual value among the employees and 95% confidence level. Accordingly, and by adding 20% for design effect and 15% for people who leave the study or present incomplete and imperfect information, the sample size estimated 500 people. Proportional classified sampling method was used to extract these 500 samples from the mentioned hospitals' job groups.

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N} \left(\frac{z^2 pq}{d^2} - 1 \right)}$$

2.2 Procedures and Variables Assessments

The data were collected using standard questionnaire of Hospital Survey on Patient Safety Culture (HSPSC) in 2016. HSOPSC questionnaire includes 42 questions which

assesses patient safety culture in 12 main dimensions and is scored based on 5 parts Likert spectrum. HSOPSC user guide used to analysis data to allow for benchmarking the results [15]. Positive responses to the questions with positive wording were: "agree/strongly agree" or "most of the time/always". Negative responses to the questions with negative wording were: "disagree/strongly disagree" or "never/rarely". So the strength point is when each question receives 75% positive response of the respondents or when 75% of them to be against reversed questions. Improvable areas were considered questions which 50% or more of the respondents responded to them using "disagree/strongly disagree" or "never/rarely" responses. The results were arranged in descending order in relation to received positive responses (Table 1).

Measurement of internal consistency of the questionnaire using Cronbach's alpha coefficients indicated that the highest value was for organizational learning-continuous improvement (0.84) and lowest value was for feedback and communication about error (0.39) (Table 1).

Content validity, experts' opinions, and literature review were used to confirm the questionnaire validity. Test-retest method was used to confirm reliability, so that 10 participants were selected and the questionnaires were presented to them. After 15 days, the questionnaires were presented to them, again. The calculated Cronbach's alpha coefficient was 74%; so, the questionnaire reliability was confirmed.

Table 1. Cronbach's α coefficient and percent mean of positive responses to the dimensions of patient safety culture

Dimensions and survey questions	Percent mean of positive responses
Teamwork within units (Cronbach's α = 0.59)	40
People support one another in this unit	42
When a lot of work needs to be done quickly, we work together as a team to get the work done	41
In this unit, people treat each other with respect	40
When one area in this unit gets really busy, others help out	39
Organizational learning—continuous improvement (Cronbach's α = 0.84)	77
We are actively doing things to improve patient safety	84
Mistakes have led to positive changes here	76
After we make changes to improve patient safety, we evaluate their effectiveness	70
Supervisor/manager expectations and actions promoting patient safety (Cronbach's α = 0.44)	61

Dimensions and survey questions	Percent mean of positive responses
Manager says a good word when he/she sees a job done according to established patient safety procedures	60
Manager seriously considers staff suggestions for improving patient safety	58
Whenever pressure builds up, my manager wants us to work faster, even if it means taking shortcuts (R)	64
My manager overlooks patient safety problems that happen over and over (R)	61
Hospital handoffs and transitions (Cronbach's $\alpha = 0.70$)	48
Things 'fall between the cracks' when transferring patients from one unit to another (R)	46
Important patient care information is often lost during shift changes (R)	60
Problems often occur in the exchange of information across hospital units (R)	35
Shift changes are problematic for patients in this hospital (R)	53
Feedback and communication about error (Cronbach's $\alpha = 0.39$)	46
We are given feedback about changes put into place based on event reports	30
We are informed about errors that happen in this unit	52
In this unit, we discuss ways to prevent errors from happening again	56
Teamwork across hospital units (Cronbach's $\alpha = 0.59$)	40
There is good cooperation among hospital units that need to work together	43
Hospital units work well together to provide the best care for patients (R)	38
Hospital units do not coordinate well with each other (R)	46
It is often unpleasant to work with staff from other hospital units	34
Overall perceptions of safety (Cronbach's $\alpha = 0.71$)	43
Patient safety is never sacrificed to get more work done	59
Our procedures and systems are good at preventing errors from happening	44
It is just by chance that more serious mistakes do not happen around here	38
We have patient safety problems in this unit	31
Staffing (Cronbach's $\alpha = 0.58$)	37
We have enough staff to handle the workload	34
Staff in this unit work longer hours than is best for patient care	46
We use more agency/temporary staff than is best for patient care	31
We work in 'crisis mode' trying to do too much, too quickly (R)	36
Hospital management support for patient safety (Cronbach's $\alpha = 0.63$)	68
Hospital management provides a work climate that promotes patient safety	69
The actions of hospital management show that patient safety is a top priority	67
Hospital management seems interested in patient safety only after an adverse event happens	68
Communication openness (Cronbach's $\alpha = 0.52$)	28
Staff will freely speak up, if they see something that may negatively affect patient care	42
Staff feel free to question the decisions or actions of those with more authority	38
Staff are afraid to ask questions when something does not seem right	24
Frequency of events reported (Cronbach's $\alpha = 0.50$)	32
When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?	32
When a mistake is made, but has no potential to harm the patient, how often is this reported?	30
When a mistake is made that could harm the patient, but does not, how often is this reported?	34
Non-punitive response to error (Cronbach's $\alpha = 0.66$)	20
Staff feel like their mistakes are held against them (R)	17
When an event is reported, it feels like the person is being written up, not the problem	24
Staff worry that mistakes they make are kept in their personnel file	20

2.3 Statistical Analysis

Descriptive statistics used to analyze participant's characteristics. Analysis of variance used to study difference in patient safety culture dimensions between different hospitals and work position of participants. Chi-square test used to assess relation between measures of patient safety outcome, selected hospital and participant's characteristics. Finally, univariate analysis of linear model used to study the effect of different hospitals and patient's characteristics on patient safety score. This model uses total patient safety score as dependent variable and work unit or place, contact with patients, professional experience and work hours in week as independent variables. Data were analyzed

using Excel and SPSS 22. $P \leq 0.05$ considered as significant value. Before collecting the data, the written permission was collected from the participants.

3. RESULTS

Most of the participants were working in medical (28.2%) and surgery (18.6%) units. Nurses/midwives were majority of the participants (63.8%). Most of the participants had more than 1-year experience working in this job (81.2%) or this hospital (95.8%) and finally most of the employees (54.8%) were working more than usual working hours in a week (40 h) and 16.6% more than 60 h in a week (Table 2).

Table 2. Participants characteristics

		Number	Percent
Hospital work unit	Medical	141	28.2
	Surgery (including operation room and anesthesia)	93	18.6
	Administration/supportive	85	17
	Diagnostic (laboratory, radiology)	60	12
	Emergency	36	7.2
	Different units	49	9.8
	Intensive care	20	4
	Pharmacy	16	3.2
Employee work position	Nurse/midwife	233	46.6
	Physician	86	17.2
	Other health professionals	64	12.8
	Management	55	11
	Support services	48	9.6
	Pharmacist	14	2.8
Interaction/contact with patients	Yes, with direct contact with patient	466	93.2
	No, without direct contact with patient	34	6.8
Experience in this job	Lower than 1 year	21	4.2
	1 to 5 years	148	29.6
	6 to 10 years	155	31
	11 to 15 years	107	21.4
	16 to 20 years	45	9
	21 years and more	24	4.8
Experience in this hospital	Lower than 1 year	94	18.8
	1 to 5 years	163	32.6
	6 to 10 years	111	22.2
	11 to 15 years	62	12.4
	16 to 20 years	41	8.2
	21 years and more	29	5.8
Work hour in a week	Lower than 20 hours	18	3.6
	20-39 hours	208	41.6
	40-59 hour	191	38.2
	60-79 hours	63	12.6
	80 hours and more	20	4

Scores of patient safety culture dimensions and comparison with 3 other countries are presented in Table 1 [16-20]. Patient safety dimensions with highest positive score were organizational learning-continuous improvement (77%), hospital management support for patient safety (68%) and supervisor/manager expectations and actions promoting patient safety (61%). Amongst these 3 dimensions, only organizational learning-continuous improvement had reached 75% threshold of positive score as strength point. The lowest scores belonged to non-punitive response to error (20%), communication openness (28%), frequency reported events (32%), staffing (37%), teamwork across hospital units (40%), teamwork within units (40%), overall perception of safety (43%), feedback and communication about error (43%) and hospital handoffs and transitions (48%).

On the basis of Table 3, 64.6% of the participants scored patient safety excellent/very good, 20.8% acceptable and 12.2% poor/failing. 48% of the participants stated that have not reported any event during past 12 months, 22.6% 1 to 2 events, 14.8% 3 to 5 and 13.8% more than 5 event. Highest number of events have reported by managers, so that only 36.4% of them have not reported an event during last 12 months. Lowest number of events have been reported by pharmacists and other health professionals, so that 57.1% and 54.7% of them don't have reported any event during past 12 months. Meanwhile, there was no significant difference between the number of reported events during past 12 months in terms of employees' experience in the hospital.

Pharmacists rated most positive score to the patient safety, so that 78.6% rated their hospital patient safety as excellent/very good and only 7.1% rated poor/failing. Physicians rated lowest positive score, so that 47.8% rated patient safety as excellent/very good and 25.6% as poor/failing ($P = 0.001$).

Regression analysis showed that participants with direct contact with patients had higher score ($B = 82.324$, $SE = 35.741$ and $P = 0.021$). All of the participants with 40 or more working hours had patient safety score higher than part-time workers (lower than 40 h) (Table 4).

Moreover, there had been higher patient safety score for participants who worked in medical ($B = 98.128$, $SE = 47.983$ and $P = 0.041$), surgery ($B = 122.188$, $SE = 51.801$ and $P = 0.019$), emergency ($B = 44.108$, $SE = 20.755$ and $P =$

0.034) and supportive/administration units ($B = 169.903$, $SE = 37.827$ and $P < 0.001$). The model explained 5.7% of the variation in the aggregate patient safety score as explained by the adjusted overall R^2 (0.057).

4. DISCUSSION

In order to study Iran place in patient safety culture, the study results were compared and assessed with other countries results. For this purpose, the countries were selected randomly from Asia, Europe and America continents (subject to availability of information). So U.S., Thailand and Netherlands were studied.

As the results indicated, the most difference between the 3 mentioned countries and this study was related to dimensions of teamwork within units and management support for patient safety. So that in these two dimensions, 3 mentioned countries had better situation, significantly ($p < 0.05$). However, Iran has a better situation in frequency of reported events than Taiwan (32% vs. 30%), management support for patient safety than Taiwan and Netherlands (68% vs. 60% and 31%, respectively), teamwork within units than Thailand (40% vs. 30%), feedback and communication about error then Thailand (46% vs. 44%), hospital handoffs and transitions than U.S., Taiwan and Netherlands (48% vs. 44%, 43% and 42%, respectively) and organizational learning and continuous improvement than U.S. and Netherlands (77% vs. 71% and 46%, respectively)(Fig. 1).

Management commitment to the patient safety, and in this regard, providing needed sources, educational programs and other sources are necessary for patient safety success [21-24]. However, in current study, management support for patient safety has no better situation than 3 studied countries which require good governance and adequate human sources. Error reporting is a very important issue for patient safety improvement in different countries [25-30]. Error reporting make learning from errors and implementing changes in system to reduce probabilities of future patient injuries [31]. Current study indicated that 48% of the participants have not reported any event in the past 12 months. This implies that errors which have potential to harm patients are reported low.

Other finding indicated that most number of hospital errors are reported by managers and then physicians. So that, during one past year, only 36% of managers and 46% of physicians

Table 3. Patient safety outcome variables by selected hospitals and respondent characteristics

		Patient safety grade						Events reported in the past 12 months							
		Excellent/ very good		Acceptable		Poor/ failing		No events		1–2 events		3–5 events		+5 events	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
Staff categories	Nurses	164	70.4	48	20.6	21	9.0	113	48.5	50	21.4	39	16.7	31	13.3
	Physicians	41	47.8	23	26.7	22	25.6	40	46.5	19	22	9	10.5	18	20.9
	Pharmacist	11	78.6	2	14.3	1	7.1	8	57.1	4	28.5	2	14.3	1	7.1
	Other health professionals	45	70.3	12	18.7	7	10.9	35	54.7	14	21.9	9	14.1	6	9.3
	Administration/management	30	54.5	19	34.5	6	10.9	20	36.4	13	23.6	9	16.4	13	23.6
	Support services	32	66.6	12	25.0	4	8.3	24	50.0	13	27.1	6	12.5	5	10.4
		Chi-square =63.141, P-value < 0.001						Chi-square =58.495, P-value < 0.001							
Experience at hospital	Less than 1 year	50	53.2	27	28.7	17	18.1	58	61.7	18	19.1	6	6.38	12	12.7
	1–5 years	95	58.3	41	25.1	27	16.5	95	58.3	37	22.7	18	11.0	13	7.8
	6–10 years	72	64.8	29	26.1	10	9.0	60	54.0	24	21.6	15	13.5	12	10.8
	11–15 years	35	56.4	17	27.4	10	16.1	24	38.7	14	22.6	9	14.5	15	11.7
	16–20 years	24	58.5	13	31.7	4	9.7	20	48.8	10	24.4	4	9.7	7	17.0
	21 years or more	20	68.9	7	24.1	2	6.9	14	48.3	5	17.2	6	20.7	4	13.8
		Chi-square =8.149, P-value = 0.614						Chi-square =21.004, P-value =0.137							

Table 4. Factors associated with patient safety culture score

	Parameter	B	Standard error	t-test	P-value
Experience in profession	Less than 1 year	Reference group			
	1–5 years	5.546	10.126	0.548	0.584
	6–10 years	9.441	39.449	0.239	0.811
	11–15 years	-32.156	26.315	-1.222	0.222
	16–20 years	62.306	50.645	1.230	0.219
Direct contact with patients	No	Reference group			
	Yes	82.324	35.741	2.303	0.021
Working hours per week	Less than 40 h	Reference group			
	40 h per week	90.904	36.099	2.518	0.012
	41–59 h	128.424	33.990	3.778	<0.001
	60–79 h	174.192	43.143	4.038	<0.001
Work area/hospital unit	80 h and more	180.153	37.517	4.802	<0.001
	Different units	Reference group			
	Medical	98.128	47.983	2.045	0.041
	Surgical	122.188	51.801	2.359	0.019
	Intensive care	36.095	22.210	1.625	0.104
Work area/hospital unit	Diagnosics (laboratory/radiology)	-14.081	34.531	-0.408	0.684
	Pharmacy	38.853	44.776	0.868	0.386
	Administrative/support	169.903	37.827	4.492	<0.001
	Emergency	44.108	20.755	2.125	0.034

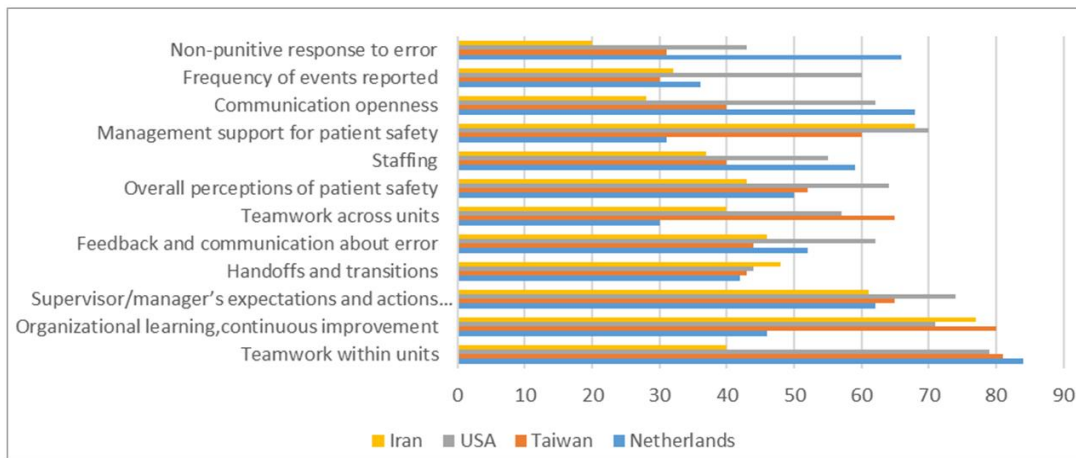


Fig. 1. Scores of patient safety dimensions and its comparison with Netherlands, Taiwan and USA study results

have not reported any event. One of the most probable reason behind this is that managers and physicians have more dominance and receive more support than other groups and have lower vulnerability to state errors.

Employee's willingness to report errors depends on non-punitive response to error and blame culture (which is 20% in current study). Employees worry about their errors to be kept in

personal records (20%) and use against them (17%) and also when happen an error, it feels like the person is being written up, not the problem (Table 1). Moreover, inadequate feedback and communication about error (46%) cause the employees don't acquire adequate information about errors and necessary feedback about administered changes and error prevention methods.

Another very important issue is staffing which its score was 37% in this study. Most of employees stated that don't have enough employee to doing work load (34%) and work in crisis mode to do more work with faster time (36%). In the studied hospitals employees work more shifts to compensate shortage of professional employees, so that during past 1 year 54.8% of employees had worked more than 40 h in a week. Long hour of working increase employees fatigue, medical errors and adverse side effects [15].

5. CONCLUSION

Administration of quality improvement strategies such as clinical governance and accreditation are completely related to patient safety. This study emphasizes that some patient safety dimensions need to be improved. It is necessary to design error and accident reporting system, reinforce non-punitive culture to increase error reporting, provide more professional human sources in hospitals to decrease other employees work hour and finally it is necessary to hospital management support for patient safety to be assured. The survey should be repeated after implementation of appropriate interventions to monitor improvements in patient safety culture in these hospitals.

CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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