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Measurement of Patient Safety Culture in Iranian hospitals: A National Baseline Study

Javad Moghri^a, Elnaz Nateghi^b, Mohammad Arab^a, Mahbobeh Moghri^c, Ali Akbari Sari^a, Habib Omranikhoo^a, Ali Vafayi Najjar^d, Farbod Ebadifard Azar^e

a: Department of Health Management and Economics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

b: Department of Immunology, Faculty of Veterinary Medicine, Ferdowsi University, Mashhad, Iran

c: Department of Health Services Administration, Shiraz university of medical science, Shiraz, Iran

d: Department of health and management, School of Public Health, Mashhad University of Medical Sciences, Mashhad, Iran

e: Hospital management Research Center, Tehran University of Medical Sciences, Tehran, Iran

Correspondence

Dr Farbod Ebadifard Azar
Hospital management Research Center
Tehran University of Medical Sciences
Tehran, Iran
Tell: +989121249139
Email: dr_febadi@yahoo.com

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Abstract

Purpose: Iran has initiated Patient Safety Friendly Hospital Initiatives (PSFHI) in 10 hospitals since 2010, and now aims to expand it to 50 more hospitals. The aim of this study was to systematically measure patient safety culture in Iranian hospitals as the first national baseline measure.

Methods: A cross-sectional study, using Farsi version of the popular "Hospital Survey on Patient Safety Culture" (HSOPSC) was done in 11 public teaching general hospitals in three major province centers in Iran. About 1000 questionnaires were randomly distributed staff across four selected strata (physicians, nurses, laboratory and radiology staff). Finally, percent positive scores were calculated.

Results: A total of 725 respondents had successfully completed the questionnaire (response rate: 75.44%). Overall patient safety culture percent positive scores was 47%. "Teamwork within units" and "organizational learning - continuous improvement", got the highest scores, while "non-punitive response to error" and "staffing" had the lowest ratings. About 58% of study participants reported not completing any event reports during the previous 12 months and only 22.5% gave their hospitals an 'excellent or very good' patient safety grade.

Conclusion: Study findings provided a good baseline data about the current status of patient safety culture in Iranian hospitals, their strengths and potentials for improvement in this field, as well as the status in each dimension of safety culture among other countries from different WHO regions.

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Introduction

Patient safety discussions in health sector have gained popularity in the past decade. The introduction of this issue was related to the Institute of medicine's 1999 report on medical errors, "to err is human: building a safer health system" [1]. This report estimates that 44000 to 98000 patients die every year because of medical error in the United States alone, and indicates that medical errors is one of the three main factors of death in this country [1]. After the report, a significant attention was paid to the patient safety, and a number of efforts and initiatives were started to address this issue. Now, the challenge of achieving significant improvements in patient safety is one of the key tasks facing healthcare at the start of the 21st century [2]. There is broad international agreement on the nature of the task faced and the importance of achieving improvements to quality in this area [1- 5]. Safety becomes a value and priority for an organization, when all personnel realize the importance

of the matter and pay deep attention to it in their tasks. At this time, safety becomes a culture which forces staff to do their works more accurately.

The concept of safety culture was introduced in the 1988 report of the "International advisory group on nuclear safety" on the nuclear power plant disaster in Chernobyl in the Soviet Union for the first time, and gradually became a famous concept in high risk industries like nuclear power and aviation [6]. Safety culture is the collection of attitudes, beliefs, perceptions, and values that employees share in relation to safety [7]. Nieva & Sorra defined patient safety culture as "the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's safety management" [8]. Evidence shows that understanding the safety culture is an essential prerequisite to improve patient safety in healthcare organizations [9].

Iran has initiated Patient Safety Friendly Hospital Initiatives (PSFHI) since 2010, which was started with a pilot phase in 10 hospitals. Recently, Ministry of Health and Medical Education decided to expand the initiative to 50 more hospitals [10]. The existing literature and anecdotal evidence showed that patient safety culture is not good in Iranian hospitals. PSC is a relatively new field in this country, and as we know, there isn't any comprehensive study published in measuring PSC in Iranian hospitals. This study was done in order to provide policy makers and related officials necessary information about the first prerequisite of patient safety in Iranian hospitals and to obtain a clear view of the patient safety aspects and also to identify the strengths and weaknesses of their safety culture [11].

Table 1. The professional characteristics of the participants

Professional features	Number	Percent
Staff position		
Physician	137	18.9
Nurse	389	53.6
Laboratory staff	132	18.2
Radiology staff	67	9.3
Work Area/Unit		
Medicine	187	25.8
Surgery	161	22.2
Intensive care unit (any type)	109	15
Emergency	72	9.9
Laboratory	127	17.5
Radiology	69	9.6
Experience in current hospital		
Less than 1 year	130	17.9
1-5	244	33.7
6-10	118	16.3
11 years or more	233	32.1
Experience in current hospital work area/unit		
Less than 1 year	173	23.9
1-5	325	44.8
6-10	133	18.3
11 years or more	94	13
Working hours per week		
Less than 20 hours	24	3.3
20-39 hours	216	29.8
40-59 hours	370	51
More than 60 hours	115	15.9
Having Direct contact with patients		
Yes	593	81.8
No	132	19.2

Methods

Study design and the study population

A cross sectional design was adopted to carry out the study. The investigation was conducted from February 2010 to October 2011. Physicians, nurses, laboratory and radiology staff were our study population. General public teaching hospitals were chosen for their important role in providing health care services to the vast majority of people in Iran.

Sampling

A multi level approach was applied for sampling. At first, three province centers were chosen out of 31 provinces centers in Iran purposefully, based on the importance of them and convenient access for the researchers (three clusters). Two of the selected cities are metropolitan and also have the greatest number of population in Iran(Tehran, Mashhad, Qazvin). At the second stage, 2-5 public teaching general hospitals were selected in each city according to the size and their manager's willingness to participate in the study (in total 11 hospitals were selected as our 11 clusters-None of them were participated in PSFHI). The next stage was stratification. Staff were stratified into four groups based on their jobs (physicians, nurses, laboratory and radiology staff). After that, about one thousand samples were allocated among strata proportionally, according

to the size of study population in them (257 physicians, 474 nurses, 151 laboratory staff and 79 radiology staff). Finally, the self administered questionnaires were hand distributed randomly in all strata.

Table 2. Overall Patient Safety Grade

	Number	Percent
Excellent	31	4.3
Very good	132	18.2
Acceptable	418	57.7
Poor	115	15.8
Failing	29	4

Table 3. Number of events reported in the past 12 month

	Number	Percent
Zero	419	57.8
1-2	208	28.7
3 or more	98	13.5

Measurement Tool

Several instruments are available to assess hospital safety culture [12]. Among them, Hospital Survey on Patient Safety Culture (HSOPSC) which was developed by the Agency for Healthcare Research and Quality (AHRQ) in 2004 were employed in this study [13]. The questionnaire was chosen because it's being used increasingly in many countries [14- 21] and is considered valid, reliable, and the most efficient tools used for patient safety culture [22, 23].

It was designed to assess hospital staff opinions about patient safety issues, medical error, and event reporting and includes 42 items that measure 12 areas or composites of patient safety culture at work area/unit and hospital levels and included questions measuring outcome variables. Seven unit-level aspects of safety culture were:

- Supervisor/Manager Expectations & Actions Promoting Safety (4 items),
- Organizational Learning—Continuous Improvement (3 items),
- Teamwork Within Units (4 items),
- Communication Openness (3 items),
- Feedback and Communication About Error (3 items),
- Non punitive Response to Error (3 items), and
- Staffing (4 items).

In addition, three hospital-level aspects of safety culture:

- Hospital Management Support for Patient Safety (3 items),
- Teamwork Across Hospital Units (4 items), and
- Hospital Handoffs and Transitions (4 items).

And finally, four outcome variables were:

- Overall Perceptions of Safety (4 items),
- Frequency of Event Reporting (3 items),
- Patient Safety Grade (of the Hospital Unit) (1 item), and
- Number of Events Reported (1 item).

Eighteen of the 42 items belonging to 12 dimensions were worded negatively. The five-level Likert scale was utilized for the responses (strongly disagree, disagree, neither, agree, or strongly agree / never, rarely, sometimes, most of the time, or always).

HSOPSC had been translated in Farsi and also had been validated for using in Iranian hospitals by one of the researchers (JM) prior to this study [24].

Exclusion criteria

The exclusion criteria applied for the present study were similar to the criteria used by the questionnaire designers and

other studies [12, 20, 25]: (1) no entire section completed; (2) fewer than half the items answered; or (3) all items answered the same.

If at least one of the mentioned situations had existed in a questionnaire, it wouldn't have entered to the analysis.

Data analysis

Data were analyzed according to the survey user's guide published by AHRQ [25]. Two methods were recommended in the report which were "Frequencies of Response" and "Composite Frequencies of Response". The second one was chosen for this study, in order to make results comparable to other studies findings. In this method, all positive responses to each positively worded item ("Strongly Agree/Agree" or "Most of the time/Always"), and also all negative responses to each reversely worded item ("Strongly Disagree/Disagree" or "Never/Rarely") in a dimension are calculated and considered as positive response. After dividing the number of positive responses to the items in a dimension by the total number of responses in them, the average percent positive score are made.

Pearson coefficient was also used to analyze the correlation between countries' Human Development Index (HDI) values and their patient safety culture percent positive scores.

Results

After up to 6 reminders, the questionnaires were collected and incomplete ones were removed according to the mentioned exclusion criteria. Finally a total of 725 respondents (137 physicians, 389 nurses, 132 laboratory staff, and 67 radiology staff) from all 11 hospitals had successfully completed the questionnaire (total response rate: 75.44%). Laboratory staff and physicians had the highest and lowest response rate respectively (87.4% VS 53.3%).

Respondents Professional Statistics

Nurses comprised more than half of the respondents (53.6%). The majority of study participants were working in the medicine and surgery units (25.8 and 22.2% respectively). 48.4% of respondents reported having more than 6 years of experience at their current hospital, while only 31.3% declared such an experience at their current unit. About 67% of respondents were working more than 40 hours a week in hospital, and the majority of the study participants had direct contact with patients in doing their tasks (81.8%) (Table 1).

Composites and Outcome

"Teamwork within units" and "Organizational learning – Continued improvement" had the highest average percent positive response (65% and 62% respectively), while dimensions scoring the lowest were "Non-punitive response to error" (23%) and "staffing" (35%) (Figure 1).

Results are also classified based on mentioned unit and hospital level aspects of patient safety culture. The unit-level aspect of patient safety culture includes items 1, 2, 3, 7, 10, 11, and 12 (Figure 1). In this aspect, "Teamwork within Units" had the highest, and "Non-punitive response to error" had the lowest positive scores. In the other aspect of PSC (hospital level) which covers items 5, 8 and 9 in the Figure 1, all items got scores less than 50%. In this aspect, "Hospital handoffs and transitions" had the highest positive response among the three dimensions. The outcome-level measurements of patient safety culture included two dimensions ("Overall perceptions of safety" and "Frequency of event reporting"), and two questions ("patient safety grade" and "total number of events reported in the past 12 month by respondents"). The average percent positive scores for the two dimensions were 53% and 46% respectively (Figure 1). Only 22.5% of respondents gave their hospital 'excellent' or a 'very good' patient safety grade (Table 2), and about 58% of survey participants reported that they had not completed any event reports in the past 12 months (Table 3).

Discussion

Patient safety culture has gained attention in the last few years in Iran. The existing literature and anecdotal evidence showed that PSC is not good in Iranian hospitals. As far as we know, the present study is the first one in Iran that investigated patient safety culture in a large scope (about 1000 samples in four job categories from 11 hospitals in 3 main center provinces-including the Capital of Iran). There are two other studies in this field, but both of them measure PSC in only one hospital and one profession, and also their sample size were lower than 250 [26, 27].



Figure 1. Composite-level average percent positive response for all participating hospitals

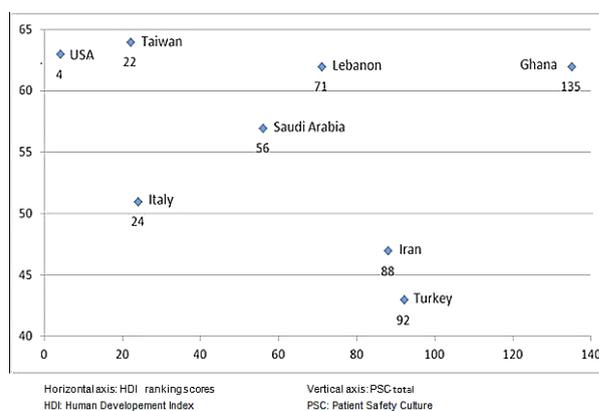


Figure 2. Countries HDI rankings VS their total PSC scores Scatter Plot

Generally, patient safety culture scores in Iranian hospitals were low. Only two dimensions gained scores above 60% ("teamwork within units" with 65%, and "organizational learning-continuous improvement" with 62%), indicating they are rather strength PSC areas in Iranian hospitals as staff perceived. Also there were two dimensions which fell below the unacceptable 40% positive score ("non punitive response to error" with 23%, and "staffing" with 35%), indicating they are areas which need considerably more attention. Non punitive response to error is defined as "the extent to which staff feel that their mistakes and event reports are not held against them and that mistakes are not kept in their personnel file" [28]. A blame and shame culture, where individuals are believed responsible for errors, is a major threat for reporting medical errors [29]. Such a culture leads to under reporting of mistakes and adverse events, which is a barrier for open communications and learning from errors. Maybe one of the reasons for under reporting in this study is the existence of such a punitive culture as respondents perceived (nearly 60% of the respondents had not completed any events report in the past 12 years). Under-staffing and high workloads also were a common complaint and a source of concern among study participants. Lack of health care personnel and specially nurses, leads to excessive working hours in Iranian hospitals. As results revealed, about 67% of respondents had been working more than 40 hours a week in their hospitals. A study in

Belgian hospitals showed that less than 29% of the study participants had such working hours [12]. Under staffing causes anxiety, stress and depression in medical personnel, which could increase the risks of catastrophic incidents [30].

Table 4 shows the patient safety culture percent positive scores in all 12 dimensions in eight studies, including the present research. Studies were selected from the East Mediterranean Region (Iran, Lebanon and Saudi Arabia), European Region (Italy, Turkey), African Region (Ghana), American Region (USA), and West Pacific Region (Taiwan) of World Health Organization (WHO). Studies were chosen based on available relevant high quality data (studies which measured patient safety culture using the AHRQ's questionnaire and had been published through valid sources), chronological similarity (all studies were published in 2010) and existence of at least one study in each WHO region (any published study in South East Asia Region (SEAR) based on these criteria were not found).

The highest total patient safety percent positive scores belonged to Taiwan (64%), while Turkey had the lowest ratings (43%). In the "frequency of event reporting" composite, Lebanon with 68%, and Turkey with 15%, got the highest and lowest positive scores respectively. In "overall perceptions of patient safety", again Lebanon with 73% took the lead, while Saudi Arabian hospitals were in the last (52%). In the third and fourth dimensions ("supervisor/manager expectations..." and

"Organizational learning..."), Taiwanese hospitals got the highest scores (83% and 84%), while Turkish counterparts had the lowest ratings (44% and 41%). In "Teamwork within hospital units" positive scores, Taiwan again was ahead of other countries (94%), while Italian hospitals were in the last(64%). In "communication openness", American and Italian respondents gave the highest scores to their hospitals (62%), while Turkish and their Saudi Arabian counterparts gave the lowest ratings (36%). In the seventh composite ("feedback and communication ..."), Lebanese hospitals with 68%, and Turkish ones with 40%, got the highest and lowest positive scores respectively. The next dimension was "non punitive response to error" which among all mentioned countries, Saudi Arabian and Iranian hospitals had the highest and lowest scores respectively (49% VS 23%). In the ninth composite -"staffing"- American hospitals got the highest scores (56%), while their Lebanese counterparts had the lowest ratings (18%). In "hospital management support for patient safety", Saudi Arabia took the lead (90%), while Italian hospitals were in the last (28%). In "Teamwork across hospital units" positive scores, Ghana was ahead of other countries (78%), while Italy was again the last one(30%). And finally, Lebanon had the highest score in the last dimension - "hospital handoffs and transition"- (77%), while Saudi Arabian hospitals had the lowest ratings (22%).

Table 4. Comparing patient safety culture scores between Iran and 7 other countries

	Taiwan	United States	Lebanon	Ghana	S. Arabia	Italy	Iran	Turkey
1-Frequency of event reporting	57	62	68	NA	61	59	46	15
2-Overall perceptions of patient safety	65	65	73	NA	52	64	53	62
3-Supervisor/manager expectations and actions promoting safety	83	75	66	80	49	69	55	44
4-Organizational learning ...	84	72	78	72	82	74	62	41
5-Teamwork within hospital units	94	80	82	76	70	64	65	70
6-Communication openness	58	62	57	49	36	62	42	36
7-Feedback and communication ...	59	63	68	55	67	60	44	40
8-Non-punitive response to error	45	44	24	39	49	35	23	24
9-Staffing	39	56	18	40	54	30	35	44
10-Hospital management support ...	62	72	78	67	90	28	43	36
11-Teamwork among hospital units	72	58	56	78	55	30	42	48
12-Hospital handoffs and transitions	48	44	77	67	22	37	48	54
OVERAL	64	63	62	62	57	51	47	43

* Not Available

Figure 2 shows the scatter plot of countries HDI rankings for 2011, and their total PSC score [31, 32]. Analysis showed that the correlation between countries HDI values and their PSC score is not statistically significant (Pearson correlation: 0.176, P. value: 0.677). It means that patient safety culture score is independent of development status of a country. For instance, Ghana that is placed at 135th rank of the HDI, had almost the same PSC score as USA, which is at the 4th place.

Excluding dimensions 9 and 12, Iranian hospitals percent positive scores in all composites were 10% or more lower than most of the mentioned studies (the highest difference was in the 10th dimension, where Saudi Arabian hospitals gained 90% positive response, while their Iranian counterparts got only 43%- a 47% difference)(Table 4). Authorities and health officials related to the patient safety and quality movement in Iran should pay a special attention at these PSC composites, in order to decrease the current unacceptable differences.

Several limitations to this work need to be acknowledged. First of all, we couldn't deny the possibility of non response bias, as 25% of the samples did not complete the questionnaires and we couldn't investigate their reason for non participation. Maybe this group had characteristics which could affect the PSC results (like being very busy, tired or so on). Secondly, as questionnaires were distributed between 8-16 o'clock every day, the results couldn't be representative of those who work at night shifts. Again maybe this group had different perceptions about the current situation of PSC in their hospitals

(selection bias).

Many countries have initiated a strong effort to improve patient safety now, and health care providers have been encouraging to assess the current state of their safety culture [19]. Patient Safety Friendly Hospital Initiatives (PSFHI) have been started in 10 Iranian hospitals since 2010. Iranian health authorities later decided to expand PSFHI to 50 more hospitals. While Iranian health system is striving to move toward patient safety, it is important to consider the current status of patient safety culture in its hospitals. Knowing their strengths and weaknesses in each of the dimensions of PSC, Iranian hospitals can move faster toward patient safety goal; because inappropriate culture could be a major barrier for improving PS. This paper revealed that patient safety culture status in Iran is not good enough and needs more attention. A total of 725 health care personnel from 11 hospitals completed the HSOPS-one of internationally common used questionnaires available to measure PSC. In general, respondents gave the lowest scores to "non punitive response to error" and "staffing". The paper also compared patient safety culture scores among eight countries from five WHO regions and found that although there is a positive relationship between the HDI value of a country and their PSC score, the correlation was not statistically significant. Moreover, the comparison revealed that Iranian hospitals in most of the patient safety culture composites, have considerably lower scores than most of the other countries in different WHO regions.

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