Effects of Implemented Initiatives on Patient Safety Culture in Fateme Al-zahra Hospital in Najafabad

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ABSTRACT

Introduction: Patient safety improvement requires ongoing culture. This cultural change is the most important challenge that managers are faced with in creation of a safe system. This study aims to show the results of initiatives to improvement in patient safety culture in Fateme Al-zahra hospital.

Method: In the quasi-experimental research, patient safety culture was measured using the Persian questionnaire on adaptation of the hospital survey on patient safety culture in 12 dimensions. The research was conducted before (January 2010) and after (September 2012) the improvement initiatives. In this study, all units were determined and no sampling method was used. Reliability of the questionnaire was tested by Alpha Chronbakh (0.83). Data were analyzed using descriptive statistics indices and Independent T-Test by SPSS Software (version 18).

Results: 350 questionnaires were distributed in each phaseand overall response rate was 58 and 56 percent, respectively. According to Independent T-test, Management expectations and actions, Organizational learning, Management support, Feedback and communication about error, Communication openness, Overall Perceptions of Safety, Non-punitive Response to Error, Frequency of Event Reporting, and Patient safety culture showed significant differences (P-value<0.05). Teamwork within hospital units, Teamwork across units, Hospital handoffs and transitions, and Staffing did not reveal any significant differences (P-value>0.05). The mean score of Patient safety culture was 2.27 (from 5) and it was increased to 2.46 after initiatives that showed a significant difference (P-value<0.05).

Conclusion: Although, improvement in patient safety culture needs teamwork and continuous attempts, the study showed that initiatives implemented in the case hospital had been effective in some dimensions. However, Teamwork within hospital units, Teamwork across units, Hospital handoffs and transitions, and Staffing dimensions were recognized for further intervention. Hospital could improve the patient safety culture with planning and measures in these dimensions.

Keywords: Patient Safety culture, Medical Errors, Hospital, Iran

Introduction

Added value in health services results in balance between good results, excellent care and suitable services with acceptable cost. One of the criteria to attain good results is preserving the patient's safety. Safety means the environment, in which the patients and other people receiving the medical care, delivers the appropriate safety regulations so that the possible risks for a surgery reduce to an acceptable level (1, 2). It seems that in current situation, many of the strategies, organizational structures and methods do not conform to patient's expected values (3). Patient safety is defined as the process that an organization does to improve the patient care safety. Safety culture is the culture in which the staff

has a stable and active awareness of the things that may happen wrongly (4). Facing with danger and errors can be reviewed from two perspectives:, individual or systematic. In individual perspective, 80 percent of the error making factors is considered by the human being. In systematic perspective, that is the accepted approach, the system is responsible for errors. As the system is not improved and error making possibility does not reach zero, errors will be made repeatedly by different people. The key to attain safety is the error management with systematic approach (5).

Cultural change is the biggest challenge in moving toward a safe health care system (6). The report by medical institute of the United States of America entitled "To Err Is Human in 2000" states the importance of considering

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the patient safety as one of the important and vital aspects of quality in health services and emphasizes the safety culture in health care organizations as one of the their main objectives (7).

Patient safety is a serious debate in public health worldwide. In 2002, members of World Health Organization reached an agreement about global solution of health in relation to safety. Surveys show that in developed countries, 1 out of 10 patients is hurt during receiving the healthcare services. In developing countries, it is more hazardous (8). Besides, introducing the clinical governance model by the Iranian Ministry of Health and Medical Education was an important endevour in this regard.

Safety culture is a group-based concept that refers to the values and opinions of the members of a group or an organization as to safety and safe behavior. Establishing safety culture in healthcare organizations reduces the medical errors and patients' injuries (9).

The characteristics of safety culture is as follows: warning the staff and people responsible about risk reduction, observing and recognizing the errors as an opportunity to improve the system safety, making a safe environment, having honest and open relations, being able to maintain the reliability of data, reporting and learning from errors through special mechanisms, paying the price of making injuries to the patients, and having commitment to values and responsibilities (10). It is obvious that change of the barriers and passing through them requires cultural change (5). Safety culture in an organization is the result of the individual and group values, attitudes, perceptions, competencies, behavioral pattern of commitment, style and efficiency of safety management in organization. An organization with positive safety culture has trustful interactions and mutual perception of the importance of safety and confidence to the efficiency of the preventive indicators (11). Proposed strategies to improve the patient safety are as follows: evidence based management, employees' competency improvement, work redesign aimed at error reduction, and finally deployment and stabilization of safety culture (12). Determination of organizational status in relation to sentinel events helps to make decisions to improve patient safety, recognize the safety culture and increase the awareness of stakeholders, assess the interventions related to patient safety, follow long time changes, internal and external benchmarking, and help to meet the legal requirements (13).

In the research done so far, different dimensions have been stated for patient safety. Sexton et al. measured work group climate, job satisfaction, management perception, safety climate, work situations, and stress recognition (14). Research and quality institutes in health care assess the culture of patient safety from the dimensions of management expectations and behaviors, organizational learning, team work between wards, openness and communication, staffing, hospital management and patient hands-off and transition (15). In designing the scale of patient safety climate in Japan, they used from criteria of free information flow, continuous improvement, error reports, cooperation of patient's family, organizational safety leadership, professional safety leadership,

patient safety committee leadership, and availability of accessories and regulations (16).

Studies about the safety culture are done in many of countries including Iran. In our country, there have been studies in the area of risk management and medical error management (17). Besides, there have been studies about the patient safety culture but so far there have been fewer systematic studies about the effects of interventions made in the patient safety culture; however, there has been research done in the area of the assessment of patient safety culture in Iran hospitals including Baghaei research in educational health center affiliated to Orumiah University of Medical Sciences in 2011 (13) and Abdi et al. in elite hospitals of Tehran University of Medical Sciences in 2011 (1).

There have been many studies about the patient safety culture worldwide including Waltson Al-Omar, AL-mutari research in 4 Arab hospitals (18) and Kim et al research about the nurses' understanding about mistakes reporting and patient safety culture in South Korea (19). All of these studies were done cross-sectionally and descriptively. In Hellings et al.'s research in 2010 in 5 Belgian hospitals, the effect of the measures taken on improvement of patient safety culture has been reviewed (20). One of the strong points in this research is its large statistical population and use of logistic regression to analyze the results, although, it's results cannot be generalized to other hospitals. The same methodology was used in our research and the above-mentioned investigations yield better comparison of results.

Because of the priority of cultural change, it is stated that instead of spending time for quality improvement systems, we should try to change the safety culture. This research aims to assess the effect of Implemented Initiatives on patient safety culture in Najafabad Fatemeh Al-Zahra Hospital in Isfahan province, Iran.

Methods

In the quasi-experimental research, patient safety culture was measured. In the review of literature, we used international and WHO documents as to patient safety culture. To determine the patient safety culture status in the field stage, we used a questionnaire of the hospital survey on patient safety culture prepared by agency for healthcare research and quality (AHRQ). The questionnaire selected for this study was based on its psychometric validation and detailed user guidelines. To recognize the current status in the field stage, we translated the questionnaire of patient safety culture in hospital affiliated to National Patient Safety Agency and then validated it. The survey was done beforeFebruary 2011 and after September 2012, using improvement approach.

The questionnaire had 7 parts. In the first to sixth part, we used 5 point Likert scale and 43 questions to assess the patient safety status from the dimensions of teamwork within units, supervisor/manager expectations and actions, organizational learning, management support on patient safety, overall perceptions of patient safety, feedback and communication about error, communication openness,

frequency of events reported, teamwork across units, staffing, handoffs and transition, and non-punitive response to error. In the 7th part, we addressed the demographic characteristics in 8 questions. The validity of the questionnaire was confirmed by 15 experts in the school of management of medical health services. Statistical population consisted of all the staff in hospital.

Due to the number of staff, no sampling was done and the questionnaire was distributed among all of the staff. In each unit, one person was chosen as the coordinator. All coordinators were informed of the benefits, application and confidentiality of the information by the researchers. Questionnaires were delivered to each coordinator for all of the personnel employed in medical sections including physicians and nurses and other employees in different work shifts and gathered after completion.

Quality improvement initiatives done after initial evaluation was as follows:

-Establishing patient safety committee with cooperation of the hospital senior managers.

-Establishing patient safety as one of the strategies in the hospital and compiling its objectives and indicators.

-Designing reporting system for medical errors, pharmaceutical errors and sentinel events

-Educating the staff in relation to patient safety (more than 680 people-hour)

-Educating thestaff in relation to blood safety system

-Holding root cause analysis workshops for senior managers

-Holding management patient safety walk-round in two periods

In this research, the reliability of the questionnaire was calculated 0.83 using alpha Kronbach statistical test in each review. We used descriptive-analytical statistics to analyze the data. Data were analyzed using descriptive statistics indices and independent t-test in SPSS software.

Results

In both periods, 350 questionnaire were distributed , from which 189 were analyzed in stage one and 178 in stage two. Response rate was 58% in the first survey and 56% in second one. From job position, most staff was nurses. Staff distribution in research is presented by work place and job position in Table 1.

Table 1. Distribution of staff workplace and job position in the case hospital

variable		first assessment		second assessment	
		Number	Percent	Number	Percent
Department	Circulation	14	7.41	5	2.81
	Internal	4	2.12	4	2.25
	Surgical	4	2.12	24	13.48
	Midwifery	22	11.64	27	15.17
	Pediatric	15	7.94	8	4.49
	Emergency	22	11.64	14	7.87
	ICU	4	2.12	10	5.62
	Physiotherapy	1	0.53	3	1.69
	Pharmacy	9	4.76	10	5.62
	Laboratory	11	5.82	16	8.99
	Radiology	9	4.76	8	4.49
	CCU	7	3.7	8	4.49
	Anesthesiology	5	2.65	5	2.81
	Operation room	9	4.76	12	6.74
	Labor	12	6.35	6	3.37
	Clinics	14	7.41	7	3.93
	Others	17	8.99	5	2.81
	Anonymous	10	5.29	6	3.37
	Total	189	100	178	100
Job Position	Komak	5	2.65	12	6.74
	Nurse assistant	13	6.88	18	10.11
	Nurse	59	31.22	65	36.52
	Housekeeping	10	5.29	5	2.81
	Physician	10	5.29	1	0.56
	Specialist	7	3.7	3	1.69
	Secretary	8	4.23	5	2.81
	Technician	29	15.34	33	18.54
	Midwives	12	6.35	13	7.3
	Others	14	7.41	6	3.37
	Anonymous	22	11.64	17	9.55
	Total	189	100	178	100

In confrontation with the patients, 79% of the respondents stated in the first evaluation that they had direct interaction with the patient and 21% had no direct contact. In the second evaluation, 88% had direct and 12 had no direct contact.

Response mean and standard deviation by safety culture dimensions are presented in Table 2. The highest score was related to supervisor/manager expectations and actions and teamwork within units for promotion of patient safety culture.

was statistically significant. Also, the mean score of the communication openness was 48% in the first evaluation that reached 52% in the second evaluation. This increase was significant in 95% confidence interval. The mean score of the frequency of events reported was 46% in the first evaluation and reached 53% in the second evaluation. This increase was statistically significant.

The mean score of the teamwork across units was 42% in the first evaluation and reached 43% in the second evaluation. This increase was significant in 95%

Table 2. Mean and standard deviation by safety culture dimensions in two assessments

Dimension	first assessment		second assessment		P Value
	Mean	SD	Mean	SD	
Teamwork within units	2.7351	0.70687	2.8626	0.65516	0.074
Manager expectations and actions	2.8296	0.71005	3.0245	0.70052	0.009
Organizational learning	2.6807	0.69748	2.8787	0.58801	0.004
Management support on patient safety	2.2352	0.90649	2.5104	0.7703	0.002
Overall perceptions of patient safety	2.3717	0.81171	2.5396	0.66696	0.032
Feedback and communication about error	2.5429	0.68965	2.8421	0.625	<0.001
Communication openness	2.4143	0.87	2.6305	0.78526	0.013
Frequency of events reported	2.3237	0.77309	2.6526	0.75865	<0.001
Teamwork across units	2.1105	0.76169	2.1553	0.73248	0.566
Staffing	1.3924	0.62543	1.5061	0.60808	0.079
Handoffs and transition	2.4188	0.679	2.3328	0.67373	0.224
non-punitive response to error	1.228	0.80507	2.3328	0.67373	<0.001
Patient Safety culture	2.2735	0.43833	2.4695	0.41914	<0.001

The percentage of scores in the first and second evaluations in dimension of teamwork within units was 54% in team work in the first and 57% in the second evaluation. Based on independent t-test results, there was no significance difference between the two periods in teamwork within units.

In the first evaluation, the percentage of scores of supervisor/manager expectations and actions was 56% and in the second evaluation, it was 60%; this shows 3.8% increase. There was no significant difference between the mentioned percentages in this part.

In the first evaluation, the percentage of the scores of organizational learning was 53% and in the second one, it was 57%; this shows 3.9% increase. There was a significant difference between the mentioned percentages in this part. Mean score of management support for patient safety increased from 34% in the first stage to 50% in the second one. In this dimension, we had 6% increase . There was a significant statistical difference in the score of management support in the second stage. Mean score of overall perceptions of patient safety obtained 47% of all scores. In the second stage, it had 3.37% increase and reached 50%. This increase was statistically significant. Mean score of feedback and communication about error related to patient safety was 50% in the first evaluation that reached 56% in the second evaluation. This increase

confidence interval. Moreover, the mean score of the staffing was 27% in the first evaluation and reached 30% in the second stage. This increase was not statistically significant. As to handoffs and transition, the mean score was 48% in the first evaluation and reached 46% in the second one. This decrease was not statistically significant. The mean score of the non-punitive response to error was 24% in the first evaluation and reached 46% in the second stage. This increase was significant in 95% confidence interval.

In the number of events reported in the first evaluation, 64% of the personnel had no report at all and it decreased to 44% in the second evaluation. In the first evaluation, 24% of the personnel reported that they had 1 to 2 times error report that decreased to 31% in the second assessment. 6% of the personnel had reports of 3 to 5 times, 2% with 6 to 10 times, 1% with 11 to 20 times and 1% more than 20 times. These scores were increased respectively 13, 6, 2 and 2 in the second evaluation. In Figure 1, the number of events reported in both evaluations is presented. Totally, the mean score of patient safety culture in the first evaluation was 45% that reached 49% in the second evaluation. It showed statistically significant differences between two assessments.

Figure 1. Number of errors reported by employees in two assessments
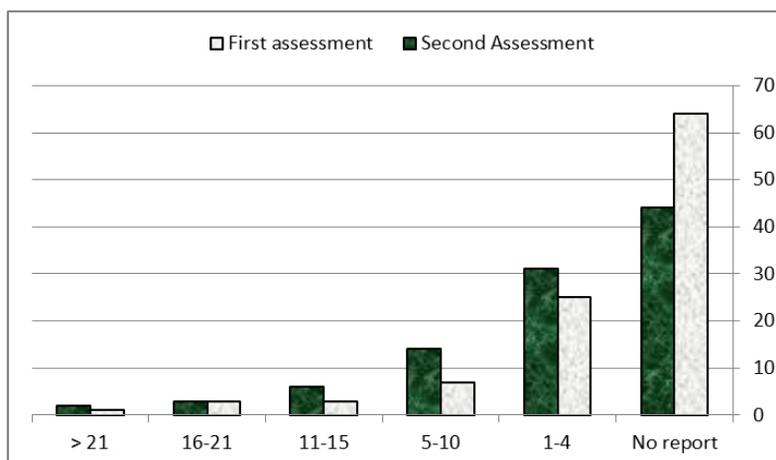
Discussion

Health and medical care is one of the most complicated challenges and it naturally has the potential of making danger when somebody is sick. One of the priorities of health systems in each country is safety in diagnosis and treatment of patients (21). Health system is not as safe as people think of it and our health system needs some improvements in its performance (17). Studies show that there is a significant relationship between understanding of the safety culture and clinical results (22). The current research was done using cultural dimension recognition approach. This approach that is used in our research had more application (19, 23). Linsley and Mannion emphasized the role and importance of cultural change from individual to collective culture by the study of risky behavior and safety from cultural point of view (24).

The rate of questionnaire return in this research was 56% that conform to Hellings et al.'s research in 2010 in Belgian hospitals (20). Nurses had the most participation in the research. Nurses play a key role in promotion of the patient safety culture. Research has shown that safety behavior and perception by nurses has an important effect on promotion of the patient safety culture (25). Besides, there is a significant relationship between perception of the safety culture by nurses and selected clinical results (22).

Over 70% of the personnel had less than 10 years of job experience and job experience over 21 years was not reported. This indicates the presence of relatively young and potentially motivated employees in the hospital. The increase in the dimension of sufficient personnel indicates that the number of employees has been increased in the hospital between the two assessments. Due to the positive relationship of nurse understanding and job experience and also employment type and job shifts, it is emphasized that nurses need help about the method of using data for patient safety promotion projects, and without help we can't change the system.

In the first assessment, 68% of the personnel had no history of error reporting and 24% reported that they had 1 to 2 times error reporting that included 92% of the personnel. Error reporting decreased to 44% in the second assessment. Besides, those who reported errors 1 to 2 times increased to 31% and those who reported errors 3 to 5 times increased to 6%. This shows considerable and meaningful improvement. Estimates show that in developed countries, 1 out of 10 patients get hurt during receiving treatments. In developing countries, danger of health care injuries is more than that in developed countries. Studies show that 16.6% of the receptions accompanied by sentinel events can be prevented by half. The high number of errors and events shows that a lot of errors have not been reported in hospitals that this needs effective and rapid interventions. The reason of not reporting the errors could be the fear of getting punished for errors.

Among the factors of patient safety culture, sufficient personnel with 30% score had the lowest score in the second assessment; this shows the shortage of employees. As noted in research findings section, 8 dimensions of supervisor/manager expectations and actions, organizational learning, management support on patient safety, overall perceptions of patient safety, feedback and communication about error, communication openness, frequency of events reported, non-punitive response to error, and patient safety culture in the hospital showed a significant increase. It could be indicated that our approach to the promotion of the patient safety culture was effective.

Three dimensions of teamwork within units, teamwork across units, and staffing showed an increase but it was not statistically significant. Mean score of patient handoffs and transition also had no significant difference. In the first assessment, this dimension had higher scores than the research done in Saudi Arabia (18) and Belgium (20). The decrease could indicate more realistic view of the personnel about the associated risk with patient handoffs and transition.

Abdi et al. showed in their survey of the personnel's attitude about the patient safety culture in selected hospitals of Tehran University of Medical Sciences that the score of patient safety culture in 10 dimensions of safety culture and 2 dimensions of consequences of the presence of safety culture was low. Among these dimensions, the

non-punitive response to error (17.8%) and teamwork across units (18.2%) had the lowest score and teamwork within units (47.2%) had the highest score. About the third dimension of the consequences of the presence of safety culture that is hospital rank in patient safety, hospitals A and B had an acceptable status and hospital C had a weak status. Finally, at the fourth dimension of consequences of the presence of safety culture, the number of reported errors and sentinel events during the last 12 months in hospital A was 1-2 times report whereas no error and sentinel event in hospitals B and C was reported. This shows the better status of the hospital in relation to reviewed dimensions in Tehran hospitals (1).

In the research conducted by Baghaei et al. entitled "the survey of the status of the patient safety culture in the personnel of healthcare centers affiliated with medical university of Orumiah in 2012", the score that personnel gave to the safety culture in their own ward was as follows: excellent and very good 23%, acceptable 52%, weak 20%, and rejected 5%. About 70% of the personnel said that they cannot criticize the hospital's managers freely (13). From this point of view, Fatemeh Zahra hospital in Najaf Abad has had a higher score. The strong points of the current research were as follows: teamwork within units, non-punitive response to error, staffing, communication openness, supervisor/manager expectations and actions, organizational learning, and management support on patient safety.

Whereas Fatemeh Zahra hospital in Najaabad was selected non-randomly and it is not possible to generalize the results to other hospitals, due to the quality improvement trend in the hospital and successes achieved in this area like international standard organization (ISO) 9001 certificate and the first certificate of reference laboratory of Iranian health ministry, it does not seem that other hospitals are much better than the hospital.

Kim et al. in South Korea reviewed the status of patient safety among nurses with the same questionnaire and recognized that the error reporting and cooperation between wards had a high priority (19). Results of the research done in 4 Saudi Arabian hospitals showed that except management support, other dimensions including report system and staffing need fast intervention (18) and these results conform to the current research, although in that research, there was no result for repeated assessment.

The findings of Hellings et al. in 5 Belgian hospitals showed that non-punitive response to error and staffing (20) conforms to the results of the current research as dimensions requiring immediate intervention. They saw in the second assessment after 18 months that only the management support dimension had increased meaningfully and organizational learning and handoffs and transition dimension decreased significantly. This indicates the potential of improvement in the Fateme Alzahra hospital and the effectiveness of the current approach in promotion of patient safety culture. It could be mentioned that the most important factors to build a safe organization are leaders' commitment to safety as a systematic responsibility and also the presence of safety culture. Leaders should consider the patient safety problems as their own system problems and monitor their system's progress. All types of medical errors and sentinel events should be considered as data for improvement of the system; this may have better long term consequences than educating the personnel for better performance (26).

Improvement in error reporting indicates that the hospital has established an effective system in this respect and needs to be reinforced. Teamwork improvement and better procedure education could help reduce the errors. Also, computerized systems for drug prescription and declaring the unwanted accidents for patients could be used to promote the patient safety (27).

The current research was done using the modified version of the questionnaire of National Patient Safety Agency in 12 dimensions. Totally, according to the results of the research, patient safety culture has an acceptable status. The chosen approach to promote the patient safety culture indicates a significant increase in patient safety culture and relative success. Although the staffing dimension and teamwork are the priorities of hospital improvement, better performance in these dimensions could help promote the patient safety culture, reduce the threatening risks, and finally promote the health care services.

This study has several limitations. First, the hospital was not randomly selected and therefore no general conclusions can be made for the hospital sector as a whole. Second, although the overall 58 percent response rate was acceptable, it is unclear why the second survey overall response decreased 2 per cent, so the results should be used cautiously (20). Third, for confidentiality reasons, some respondents did not receive a unique number, so score changes cannot be analyzed individually. Finally, only a quantitative approach to measuring safety culture was used. Qualitative approaches, like interviews or focus groups, focusing on specific safety cultures in specific parts of the hospital, are suggested in the future research.

Due to the importance of the role of patient safety culture in health care organizations and the findings of the current research, it seems that its promotion could have an effective role in that of the performance and efficiency of Fatemeh Al-Zahra hospital in Najafabad. So, we suggest the followings:

-The dimensions requiring immediate intervention such as staffing and teamwork should be prioritized.

-Management support, supervisor/manager expectations and actions, and commitment with more error reporting and system progress monitoring will optimize patient safety culture.

-Special attention should be paid to educating the personnel about the teamwork in relation to patient safety culture.

-Hospital needs the support of sentinel and error reporting system.

-The effectiveness of the actions could be assessed with repeated assessment of the patient safety culture after doing designed interventions.

-Besides, other hospitals could promote the patient safety culture modeling our approach.

References

1. Abdi J, maleki MR, Khosravi A. Study of Employee perception of patients'safety culture in Selected Training hospitals affiliated whith Tehran university of medical sciences. Payesh Journal, 2012; 10(4): 411-9.
2. Porter ME, Teisberg EO. Redefining health care: creating value-based competition on results. Harvard Business School; 2006. [Book]
3. Joint Commission on Accreditation of Health Care Organization. Hospital Accreditation standard. Joint Commission Resources; 2008. [Book]
4. Williams S, Osborn S. national patient safety agency: an introduction. Clinical Governance: An International Journal. 2004; 9(2): 130-131.
5. Khalighinejad N, Ataie M, Hadizadeh F. An Introduction to Clinical Governance and Clinical Excellence. Isfahan, Isfahan medical University Press; 2008. [Book in Persian].
6. Aspden P, Corrigan JM, Wolcott J, Erickson SM. Patient safety: Achieving a new standard for care. Institute of medicine. National Academies Press; 2004. [Book]
7. Kohn LT, Corrigan JM, Donaldson MS. To err is human: building a safer health system. Washington DC, National Academy Press; 2000.
8. World Health organization. Who Draft Guidelines for adverse event Reporting and learning systems. WHO; 2005.
9. Peters, G.A., Peters, B.J. Medical Error and Patient Safety: Human Factors in Medicine. USA, Taylor & France group; 2008.
10. Savage G T, Ford E W. Patient Safety and Health Care Management. Emerald Group Publishing Limited; 2008.
11. Nieva V.F. & Sorra J. Safety culture assessment: a tool for improving patient safety in healthcare organizations. Quality and Safety in Health Care, 2003; 12(II): ii17–23.
12. Page A. Keeping Patients Safe: Transforming the Work Environment of Nurses. Washington DC, National Academy Press; 2004.
13. Baghaie R, Noorani D, Khalkhali H, Pirnejad H. A Study of Employee perception of patients'safety culture in Selected Training hospitals affiliated by Uromiyeh university of medical sciences. Uromiyeh nursing, 2012; 10(2): 155-64.
14. Sexton JB, Helmreich RL, Neilands TB, Rowan K, Vella K, Boyden J, Roberts PR, Thomas EJ. The Safety Attitudes Questionnaire: psychometric properties, benchmarking data, and emerging research. BMC health services Research. 2006; 6(44): 1-10.
15. Fleming, M. Patient Safety Culture Measurement and Improvement: A "How To" Guide. Healthcare Quarterly, 2005; 8(Special Issue): 14-19.
16. Matsubara S., Hagihara A., Nobutomo K. Development of a patient safety climate scale in Japan. International Journal for Quality in Health Care, 2008; 20(3): 211–220.
17. Dabagh A, Akbari E M, Fathi M. Medical Errors in the Health System. Journal of Army University of Medical Sciences of IRAN. 2006; 4(3):957-966. [Article in Persian].
18. Hellings J, Schrooten W, Klazinga N S, Vleugels A. Improving patient safety culture. International Journal of Health Care Quality Assurance, 2010; 23(5): 489-506.
19. Walston S L, Al-Omar B A, Al-Mutari F A. Factors affecting the climate of hospital patient safety:A study of hospitals in Saudi Arabia. International Journal of Health Care Quality Assurance, 2010; 23(1): 35-50.
20. Kim J, An K, Kim M K, Yoon S H. Nurses' Perception of Error Reporting and Patient Safety Culture in Korea. Western Journal of Nursing Research. 2007; 29(7): 827-44.
21. Hasanzadeh A, Alizad S F. Quality in Healthcare. Tahran, social security research institute, 2006. [Book in Persian].
22. Bonner, Alice F, Castle, Nicholas G , Aijumen, Handler, Sterem M. Certified nursing assistants, perceptions of nursing home patient safety culture: is there are relationship to clinical outcomes? Journal of the American Medical Directors Association, 2009; 10(1): 11-20.
23. Hurwitz B., Sheikh A. Health care errors and patient safety. Oxford, Blackwell Publishing Ltd, 2009: 75-89.
24. Linsley P, Mannion R. Risky behaviour and patient safety: a critical culturist perspective. Journal of Health Organization and Management, 2009; 23(5):494-504.
25. Moody R F, Pesut D J, Harrington C F, Ronne F M. Creating Safety Culture on Nursing Units: Human Performance and Organizational System Factors That Make a Difference. Journal of Patient Safety. 2006; 2(4): 198-206.
26. Hughes, C M, lapane K L. Nurses' and nursing assistants' perceptions of patient safety culture in nursing homes. International Journal for Quality in Health Care, 2006; 18 (4):281-286.
27. Moghadasi H, Taheri AS, Hashemi N. Reducing medication errors: Role of computerized physician order entry system. Journal of Health Administration, 2007; 10(27): 57-67. [Article in Persian].