Developing an Error Reporting System for Health Centers

Nasrin Sharbafchi-Zadeh[1] (PhD); Saeed Karimi[1] (PhD) Yasamin Molavi Taleghani[1]* (PhD Candidate); Marjan Vejdani[2] (MSc)

[1.] Health Management and Economics Research Center, Isfahan University of Medical Science, Isfahan, Iran.
[2.] Iranian Research Center on Healthy Aging, Sabzevar University of Medical Sciences, Sabzevar, Iran.

A R T I C L E I N F O	A B S T R A C T
Article type: Original Article **Article history:** Received: 3-Oct-2017 Accepted: 24-Oct-2017 **Keywords:** Hospital Medicals' Errors Patient's Safety Reporting	**Introduction:** Unpleasant incidents are one of the biggest problems in health system and error reporting system is an efficient way to improve patient's safety. Therefore, this study was conducted with the purpose of assess reporting error system in one of the pediatric hospitals in Tehran and finally a proposed model for health centers was presented. **Materials and Methods:** This was qualitative study. The procedures of study included four phases such as identifying status of selected hospitals in the error management system, identifying the status of error reporting systems in selected countries, identifying the features, requirements and benefits of setting up an error reporting system and develop a proposed model for health centers. Triangular method was used to collect information and descriptive content analysis and consensus opinion was used to analyze the data. **Results:** Demographic, cultural, organizational, legal-regulatory and financial factors have been introduced as the main barriers of error reporting in the respective hospital. Structural and process criteria should be strengthened to establish a desired reporting system. The process of incidents detection, incidents drawing, incident analysis, review and share errors, implementing solutions and monitoring and evaluation are recommended to design an error reporting system. **Conclusion:** The competitive key to manage medical's error successfully is to establish a voluntary reporting system, commitment of senior managers, change the culture of blame and removing barriers of reporting errors. So, healthcare system needs to provide an error reporting system with learning and proactive approach to improve quality of services and safety of infrastructure.

Introduction

patient's safety is one of the most important aspects of quality of care and no matter such as damage to the patients is inconsistent with the philosophy of health care, but health measures and procedures are not always safe and there are possibilities of medical's errors and incidents to threat patient's safety (1).

Therefore, medical's errors are one of the main problems of healthcare system in the world causing morality and physical complications for patients and other members of society and even the society annually (2).

Medical's errors may occur in each step of healthcare process and cause serious complications (3).

These errors threat health and welfare of patients; and repetition of these problems change the quality of provided healthcare (4).

Unpleasant incidents are one of the biggest problems of healthcare system and one of the international concerns (5).

The results indicate that adverse incidents cause the death of 44000 to 98000 people annually in the American hospitals that most of them can be prevented (6, 7). In addition, the study by Baker in Canada showed that out of 255 patients experienced unpleasant incidents, 106 cases (41.6%) have been damaged that 20.8% of them could be prevented (8).

According to the statistics in America, only 3% of occurred medical's negligence result in complaints and in other hand, there is no evidence of medical's errors in 80% of complaints (9). In other word, unpleasant incidents occur in 30 to 40% of cases, but only 6.2% cases are reported (10). In addition to morality and

*Corresponding Author: Yasamin Molavi Taleghani, Health Management and Economics Research Center, School of Management and Medical Information, Isfahan University of Medical Science, Isfahan, Iran. Email: yasamin_molavi1987@yahoo.com

inability as the complications of these errors, enormous financial cost is exposed in healthcare system.

Reports indicate that adverse incidents annually losses about one to two million pounds into the British health care system (7). The statistics of medical's errors and unpleasant incidents are inevitable features of healthcare systems around the world and Iran, so efforts to improve patient's safety and reduce medical's incidents is a difficult action and the improvement of quality should be concerned and unsafe medical's processes should be identified to solve the problems (4, 11, 12).

Hence, concerns on repeating and damaging of medical's errors have led to efforts to design and deploy medical's error reporting system for hospitals and health care systems. Error reporting is the registration system through which incidents are reported regularly. These registration systems may be voluntary or mandatory, manually or electronically and established at a hospital or national level (13). By learning from the mistakes, organizations can manage the internal knowledge and create an organizational learning mechanism.

Also, applying an effective system especially in disasters and emergencies leads to the improvement of patient's safety and provides maximum efficiency with minimum effort human (14, 15).

Error reporting system is an efficient way to improve patient's safety as required standards in accreditation system of hospitals (16). Therefore, recognize, prevent and manage errors efficiently is one of the priorities of healthcare centers (12). In this study, one of the pediatric hospitals in Tehran has been evaluated in 2015 and then, a model was presented to set up a desired error reporting system in medical's-educational hospitals.

Materials and Methods

This was a qualitative study of descriptive and functional kind. In this study, one of the pediatric hospitals in Tehran has been evaluated in 2015 and then, a model was presented to set up a desired error reporting system in medical's-educational hospitals.

Case study method is important to solve the problems of healthcare system and contributes to better evaluation and theorizing. Totally, the procedures of study included four phases.

Phase 1: Identify the current status of selected hospitals on error management system especially medical's error reporting. In this phase, the current infrastructures and processes of hospitals have been examined through observation tools, interview and group discussion with participants to identify and reduce medical's errors.

Phase 2: Identify the current status of error reporting systems in the selected countries. In this phase, history of the counties with successful experiences in error reporting system has been identified and modelled through databases and sites.

Phase 3: In this study, features, requirements and advantages of setting up a medical's error reporting system were identified through seven sessions of concentrated discussion groups with expert's opinion, middle and senior managers of hospital (time period of one hour for each session).

Members participated in group discussion and interview included director of the hospital, technical director of the hospital, hospital administrator, supervisors, clinical supervisors, educational supervisor, administrator of patient's safety sector, risk management and patient's safety coordinator, quality improvement coordinator, technical director of the laboratory, radiology Technical coordinator, pharmacist, engineering coordinator, coordinator of establishing and select groups of supervisors (volunteers patient safety) and chief of treatment division. Content of group discussion included objectives of error reporting system, identify barriers of errors reporting, features and criteria of error reporting system, challenges and strategies to establish and improve error reporting system. Finally, descriptive content analysis and consensus opinion was used to analyze the findings of this phase.

Phase 4: Given the collected facilities and information, the proposed model was presented to establish a desirable error reporting system. This model has been approved by a three-stage Delphi technique regarding the safety and quality of members and experts of Tehran Medical's Sciences University.

Descriptive content analysis and total scores of participants were used to analyze data in this phase.

Results

Phase 1- Identify the current status of selected hospital on error management system especially medical's error reporting

The conducted actions in field of medical's error reporting in the hospital include patient's training, specify go-between of patient's safety to sectors, specify coordinator of patient's safety, holding risk management and patient's safety committee monthly, prepare localized and standard error reporting form, holding group, internal and single training classes in field of risk management and patient's safety, collecting the errors and analyzing them monthly and sharing the errors. It is noteworthy that, errors in the current status are collected by error reporting forms by error reporting box, interview with patient, survey documents and reports of monitoring, interview with go-between of patient's safety and medical's personnel in sectors monthly. Also, the feedback of errors is collected through sharing the errors in nursing drive, pavilion of doctors, hospital sites, bulletin boards and inter-sectoral meetings.

Phase 2- Identify the current status of error reporting systems in the selected countries

The status of selected countries on medical's error reporting system is shown in Table 1.

Table1: Status of selected countries in error reporting system

Area	Definition of system	Year	Country	Error reporting system
Medical's errors	Controlling medical's errors in three areas including follow-up and compensate the loss of patient, analyzing the occurred errors and follow-up the complaints	2002	America	Michigan health system (17)
Imaging errors	Image errors reporting in the national area through site (https:nrdr.acr.org)	2008		Error reporting system for medical's images (18)
Imaging errors	Identify factors of error and estimate the national data related to error reporting	2009		database to improve radiology
Errors of surgery	In this method, simultaneous clinical data and database controlling, consequences evaluation, providing the feedback of results and continuous audit of data are used to evaluate and measure the side-effects after surgery.			The overall project to improve the quality of surgical errors (NSQIP*) (19)
Anesthesia errors		1990	Australia	Error monitoring system (18)
Imaging errors	Discretionary error reporting system to collect data using diagnostic imaging and imaging analysis of incidents	2006		Australian Institute for Safety of Patient (18)
Anesthesia errors		1990	Germany	Optimistic systems of patient's safety (18)
Medicals' error	A voluntary and anonymous reporting system	2004		Incident Reporting and Learning System (17)
Errors associated with primary care and mobile care	Increase error reporting with the establishment of an electronic system of error reporting as well as creating a culture of patient safety	2003	United kingdom	NRLS System (national system for reporting and sharing error) (18)
Surgery errors	In this method, only risk manager aces the data and any confidential data is removed by the system before consulting in the committee.			CORESS: confidential reporting system of surgical errors.(10, 20)
	Unpleasant incidents are founded in the first stages by continuous monitoring and observing documents. Therefore, distinguish potential damages and actual incidents is important			Dermatological error reporting (10, 21)
Medicals' error	In this method, kind and intensity of incident is classified. also, descriptive information in demographic information of patient, incident information, influencing factors on incident and organizational results are in electronically form.	2005	Korea	Sensing Institute for Patient Safety (6)
Medicals' error	Educational and regulatory requirements have been used to create a preventive system in error reporting.	2001	Canada	Medical's safety institute (8)
Complications of medical's error – near to medical's errors	Identify incidents, analyze data and provide a strategy through valid scientific resource to prevent incident	2004	Pennsylvania	voluntary Patient safety reporting system.(18)
Medical's errors	Error reporting system supervises medical's and healthcare employees directly and analyzing the cause of errors.	2005	Belgium	Optionally reporting system with monitoring (22)
Medical's errors	In this system, errors are identified and analyzed through medical's observation program.			PDA** software systems (23)

*National Surgical Quality Improvement Program
**Personal digital assistant

Phase 3- specifications, requirements and advantages of setting up a medical's error reporting system.

Given the conducted interviews, manage and reduce medical's errors and increase patient's safety and employees, transfer valuable experience and learning have been introduced to prevent errors, empowering senior managers for future planning, prevent probable errors by increasing employees awareness and solving hospital's shortcoming, promoting systems and processes, reducing the patient's complaints and increase satisfaction with hospitals and medical's personnel, identify clear and hidden errors (finding problem), finding cause and effect chain of error occurrence and providing some solutions and preventive actions by analyzing nature and pattern of the incidents have been occurred have been introduced as objectives of error reporting system. Individual, cultural- organizational, legal-regulatory and financial factors have been introduced as the main barriers of errors reporting in the hospital. Main and subsidiary branches of barriers of error reporting in the hospital are shown in Table 2.

Table 2: Barriers of reporting errors in hospital in Tehran

Personal factors
1. The fear of (punishment, reprimand, a dishonor, etc.)
2-distrust
3. Lack of awareness, commitment and skills of those involved in the error reporting system, including: safety risk Manager or senior managers, employees, middle managers and ...

Cultural and organizational factors
1-bureaucratic structure of the organization
2-invitation gathering in silence
3- high workloads
4-The inefficient error reporting system and restrictions
4.1 attention to of narrow, complex and repetitive item
4.2 there is no guarantee that their names not be disclosed.
4.3- lack of available systems
4-4- hard reporting when multiple units are involved in an incident)
4-5- Limited reporting (the majority of incidents are reported by nurses only in the realm of nursing care)
5-paying no reward for reporting
6-lack of education in the process of errors reporting
7. not justifying the personnel of the items that must be reported
8. weaknesses of the organization in providing feedback on previous reports or taking corrective actions
9. The lack of support or pressure for reporting error by managers
10-lack of time (in two cases: (1) error reporting 2- perception or reported error)
11. poor safety culture (punish or blame the person involved in the incident, blaming the unit involved in the incident)

Legal and regulatory factors
1-increases The tariff of liability insurance for individuals
2-suspended license
3-Loss of reputation or job of person
4-Loss of reputation or organization

Financial factors
1- Insufficient cost of reporting
2-Possibility to cancel the contract

In any organization to establish desired reporting system, some principles should be established. In general, criteria of the error reporting system are Structural criteria and Process criteria.

Structural measures are classified into three broad categories:
1- purpose:(learning and systems reengineering / responsibility for law and regulatory agencies)
2- type of reporting system (mandatory -obligatory / internal reporting -external reporting / public organization, private organization, non-profit organization)
3- ability to privacy (personal / regional / organization level / national level)

also, process criteria to be classified as follow:
A) descriptive criteria
• Level of report (organizational / staff / patients and patient companion)
• Type of incident :(adverse incidents, phone and oral statements / risks / warning incidents / near to fault / pharmaceutical catastrophic incidents / mistake / incident/ instrumental error states)
• Collect data: (retrospective - futuristic / domestic resources, external resources)
• The reporting method (multiple procedures / manual / Fund of error reporting / e)
• Coverage levels (primary level of care / second level of care / third level of care)
B) evaluation criteria
• Errors analysis method: retrospective approaches, audit, inspection, frequency of type of incident, preventive methods, humanitarian approaches, and trend analysis and...
• The reporting method: electronic methods, standard forms, paper, Interactive voice response (IVR), department of error reporting, mail, phone, web, fax, and ...

How feedback: to be transferred experiences obtained at the organizational level, provincial and country to maintain privacy principle by treatment deputy.

Some methods of feedback include: newspaper, warning systems, websites, annual reports, periodic reports, public reporting, development of national standards, the development of patient safety guidelines, providing tools and training packages of patient safety, advices of patient safety, the development of national standards, posters, instructional videos, seminar, training programs, brochure, the development of patient safety tools, book, hazards warning systems.

In this study, improvement solutions to improve error reporting system are classified in two categories of external and internal in accordance with Table 3.

Table3: improvement solutions to improve error reporting system

External

1. Training programs by the deputy and superior organizations
2. Applying patient safety standards in the accreditation program
3. Establish an institute to support the activities of patient safety in hospital

Internal

A) organizational

1-Set special unit and persons responsible for collecting and sharing error report

According to the current accreditation system in Iran, the expert responsible for patient safety and coordinator expert of patient safety and risk management are responsible for overseeing the creating and training how to use the system of learning and sharing of adverse events in hospital. As well as to optimize the error reporting process, volunteers of patient safety to be considered by the separation of any parts of the hospital. (Detection of patient safety volunteers at the level of units and sectors)

2-participation of medical's team in errors reporting

Report of many errors needs to have at least some knowledge of medicine. So these reports should be done by physicians, nurses, operating room personnel or experts of clinic because having medical's knowledge is essential to identify and report these errors, nut this does not mean that people outside this area as department secretary, nurse aid, service personnel and the patient or his entourages not do any error. In addition, to improve the process of reporting errors, it is recommended authorities of patient safety to be visited the sectors continuously and with interviews, observation and investigating documentations of possible events to be identified errors. The procedure for reporting errors close to error or severity of low damage is an effective method.

3. The incentive mechanisms for the rapporteur and the people that present constructive solutions for the prevention and causes of error. Incentive mechanisms as a certain solution to increase the errors reporting is not considered, but this solution can be used as a side solution. For example, it can be considered rewarding mechanisms (material and spiritual) monthly for those who have reported the most errors. (reward for reporting near to error / rewards based on individual performance assessment)

4-redesign the organizational structure

The appropriate organizational structure conditions including the application of appropriate organizational culture that is free from blame and while create responsibility and commitment to quality services at the presenters and to strengthen communication skills in staff at all organizational levels is the inevitable requirement of reporting errors systems. In other words, in an organization that exist the view of sociological and systematic to errors, when an error not addressed individual but also a multi-cause looks for errors to be done in this case, the mutual support from the presenter and the patient is done and DME as an organizational value is accepted. In this case, the error can be more effectively managed and the possibility of error is minimized.

5-holding educational classes

Educational content in the field of patient safety and risk management should be developed based on individual staff development program, the authorities view of units, organization, periodic audit and evaluations and threatening subjects and training courses to be designed and held by health centers and deputies to promote perception of staff. As well as culture and allergy regarding this matter with the help of preparation of brochure, pamphlet, booklet and other learning tools - advertising, workshops and conferences are necessary.

6-develop guidelines, policies and special working procedures

Manage the errors reporting process to improve the process of errors reporting should be done in hospital, as well as it is needed the policy and error reporting procedure to be institutionalized.

7. The establishment of patient safety culture system: scientific justification and enhance the sense

f responsibility in front of mandatory assignment system

8-establish an effective system of reporting

A standard system should be created that definitions, procedures and reporting tools to be certain. Develop error reporting form and the availability of form in all sectors is as an essential tool in the reporting system of patient. But it should not be relied only on the forms of errors reporting but by developing errors reporting electronic system, phone system, oral communication and freely and mutually with the presence of officials of error reporting in sectors periodically and funds of error reporting can improve the process of error reporting. In general, it is better to use alternative mechanisms in error reporting with original process of error reporting.

9. information security and privacy of reporters

Fans of compulsory method believe that credit of report, without specification of reporter is questioned and it is not documented and reliable. On the other hand, in the case of more investigation and achieving more detailed information of issue, we need to access the reporter. On the other hand, despite the emphasis on non-legal reports and that the reports should not be used for question the parties and punish them, whether or not a caution and avoid getting involved with legal issues in personnel of treatment will be prevented the all errors reporting. Given the foregoing, the recommendation is that all co-workers and medical's personnel as much as possible to be mentioned their personnel information, to while validity of reports, the possibility of follow-up and full review to be provided, but if for any reason, not reluctant to present this information, present the report in the optional form.

10-ease of access to the reporting system

11-ease of using the reporting system: all employees of organization must be empowered in the process of errors reporting.

12- increasing confidence and belief to the reporting system: having work conscience and increasing sense of responsibility of medical's team in report of errors

13-improving human resources in the reporting management of patient safety

15-promotional activities (holding celebration of patient safety -posters of show)

16-supervision and inspection from employees' perception in patient safety

17-forming committee of patient safety and error management

18-sharing and providing feedback (exchange of successful and effectiveness outcomes)

Individual

1. Senior management support
2. Increase the ability of senior managers in the field of patient safety
3. Increase the ability of middle managers in the field of patient safety

Fourth phase: proposed model for desired system of error reporting

Adverse events and medical's errors is one of the major challenges that the health system of all countries faces with it, and policymakers to minimize them and reduce the damages caused by it effort. In general, the following steps to manage clinical incidents in hospitals to be recommended:

1-detection of incident

At this stage, the incidents are identified from four ways (the person involved, error control, supervisors, head nurses and supervisor of sectors and authorities and volunteers of patient safety). It can also be identified incident of errors through observation, documentation review and interviews with staff, patient and companion of patient. It is also better to responsible of patient safety continuously visiting the sectors.

2-Drawing and visualization of incident

Conventional means in errors reporting include: oral methods (feedback to volunteers of patient safety and supervisors, head nurses and supervisor of sectors), written procedures (complete form of error reporting and SMS) and error reporting e-system. It should be noted that the error report form or error report e-system shall be valid (it should have all essential items for efficiency of the error reporting system) as well as error reporting form should be available for all people.

Generally, at least cases that must be mentioned in reporting system include: time, position and place of occurrence, clinical information of patient and description of the incident, contributing factors in the incident, unit and individual involved in incident, injury severity, frequency of occurrence, possible causes of the incident and proposed solutions.

3. Analysis of incidents:

In the first phase, collected incidents based on error type, severity of damage (Table 4), frequency of occurrence, unit involved and the individual reporter are classified.

Note: errors of level one and two, which have potential to create damage but due to chance or timely intervention is stopped, say near to error.

Then in the next phase, incidents are prioritized to determine corrective action. In other words, errors based on the damage and frequency of errors in three categories: low risk, moderate risk and high risk are classified.

• Green level: Low risk: frequency of occurrence of error is placed low or in terms of the level of damage is placed in floors one, two and three.

• Yellow level: moderate risk: frequency of occurrence of error is placed in moderate level (depending on the hospital bed occupancy rate and the frequency of error reporting, this amount may vary in each hospital) or in terms of the level of damage is placed in floors four and five.

• Red level: High risk: The frequency of occurrence of the error is placed above or in terms of the level of damage is placed in floors six and seven.

Table4: Analysis of incidents based on severity of damage

Level		Definition	Example
Potential incident	First	Error is followed and stopped by the person	In the preparation phase, the error dose of drug was identified by person and injection was not taken place.
	Second	Error by another person or system is followed or stopped.	Preparation has been done by nursing student but before injection to the patient, the error dose was identified by head nurse and prevent from injection to patient.
Actual incident	Third	Minor injury without need to treat	Prescription of ibuprofen (uncomplicated) to the patient is error due to non-compliance with the instructions of correct patient identification
	Fourth	minor injury with need to treat	Get the drug with wrong dose that causes mild side effects.
	Fifth	Moderate damage	wrong patient transmission to the radiography Cancellation of elective surgery
	Sixth	Significant damage or creating a permanent disability during hospitalization or after discharge Any process that leads to prolonged hospitalization, readmission, transfer to the ICU and the need for resuscitation of patient.	Wrong surgical site and unnecessary cut of member
	Seventh	Death	Prescribe disparate blood that leads to fatal of patient.

4. Investigating:

• Errors at this stage in terms of the level of investigating are divided into the following classes:

• Errors that have been placed in green level: only the description of the incident and its causes between treatment units are sharing.

• Errors that have been placed in the yellow level: it is necessary to analyze the root of the incidents in detail for it or the incident in management and patient safety committee to be reviewed and according to the causes

identified, the proposed solutions to be presented.
• Errors that have been placed in red level: in the committee of mortality or pathology and morbidity to be done accurate investigation and fully using risk assessment models to be investigated and for them to be presented proposed solutions and preventive according to the causes identified.

5-Sharing errors:

Experiences from the investigating errors will be notified to all sectors of the hospital. In addition to benefiting from the experience of any health center, a site must be set up about errors reporting in treatment deputy.

6. Implementation of solutions:

Changes is carried out considering corrective actions specified in the system.

7. Monitoring and evaluation:

Effectiveness of solutions and trend of occurrence of errors should be checked as seasonal or once every six months, according to the result of indicators. The most important step to control organizations is evaluation. If control over function and programs designed not to be done, "certainly the ultimate goal is not realized and changes created in the organization are not fixed.

Discussion

Establishment of incident reporting system for the development and safer performance of health care systems is important. So embedding common framework for the collection, analysis and evaluation of errors is essential. This study was conducted aimed to design error reporting system as case for one of the pediatric hospitals in Tehran in 2016.

In this study, medical's error reporting systems in America, Australia, Germany, Great Britain, Korea, Canada, Pennsylvania and Belgium were investigated. Common point in all countries was that the error is inevitable and may occur in all aspects of health care, so errors should be managed. So, one of the best solutions for managing errors, desired error reporting system has been introduced (10, 24-27). Moreover, other issues that the majority of countries had investigated it are the issue of costs incurred errors to system of Healthcare (7, 28). Moreover, one of the requirements of the errors reporting systems is the issue of transparency and sincere expression of errors to patient that some countries have focused on this issue (29, 30).

Criteria and requirements for setting up the error reporting system depends on political infrastructures, social, cultural, economic and technology of countries (31). In general the objective determination from error reporting system, identify barriers of using it, determine content and types of errors, the process of reporting and analyzing errors as key factors for the development of error reporting system are known (6, 32), that in this study were investigated to determine the requirements of setting up of reporting system of all the cases.

Many studies have noted the barriers of error reporting. Among the most significant barriers of error reporting in these studies is fear (33-36), believe to ineffectiveness of reporting (35, 37), lack of feedback of errors from managers (33, 37, 38), lack of managers support for reporting (37), time of reporting (37, 38), lack of awareness of the reporting process (36, 39) and concern about legal consequences (37) that with the results of this study are consistent. In general, individual factors, cultural, organizational, legal-regulatory and financial as the main axis of error reporting barriers in this study are listed. Hwang and colleagues in their study classified error reporting barriers in total organizational classes and individual that with the results of this study is consistent (40).

According to the study of JANET and colleagues, defect in the adoption of patient safety culture, defect in detecting error (lack of resources, lack of time, lack of quality, lack of experience and skill, the imbalance between blame and responsibility), defect in the implementation and changes (non -acceptance of the offers, lack of resources, organizational issues, weakness in performance evaluation), defect in evaluating changes (using the informal methods continuous non-audit) and the lack of an effective system in the field of feedback and sharing errors are known as the challenges of deployment of error reporting system (41). By the perception of the challenges and barriers in the field of error reporting can consider effective improvement solutions for the deployment of error reporting system.

The study proposed a model for managing errors that has considered the majority of important cases. Of the first steps is the proposed system of detection of incidents that can be reported by observers or individual. itri has considered the stakeholders involved in the design and testing error reporting system necessary. According to the study, itri has preferred confidential reporting based on unnamed reporter and considered an assurance on accountability and transparency (18). In emphasizing the results of this study, hoffmann also has mentioned reporting system that is based on confidentiality and not mention the names of people as essential component in the error reporting system (17).

The next step in desired reporting system is visualization of incident. Mention medical's errors with systemic approach provide the possibility of quality control of services. The findings of this study recommend two methods of reporting system, mandatory, optional or both, according to the conditions. Mandatory reporting system is used more for errors that led to serious injury because such errors are detected by the audit process, in contrast, the optional reporting system is used for incidents uncomplicated and near to error (41, 42). in addition, the main categories of errors, including fatal incidents,

incidents without damage and near to errors that either of these cases should be identified and analyzed in the error reporting process (10).

The highest benefit after each medical's error is for the system when a continuous and systematic program to analyze errors exists. Kim in his study has considered analysis of reports to help prioritizing interventions and increase patients' safety that completely "is consistent with the findings of the study (6).

After analysis, it is essential that the errors to be checked and corrective solutions to be proposed to reduce or eliminate the error. At this stage, predisposing factors of errors should be identified in the committee of management and safety and by the control and elimination of risk factors prevent from repeating the errors in the system. Therefore, the Committee of management and patient safety in limited is known as the study on adverse incidents and their prevention and in broader level includes all aspects of health care and health services (43).

In addition, the strategies that will be pursued to improve safety to be focused on error reporting systems and changes in health care systems and professional behaviors (44). In the study of Ebrahimpur and colleagues, there are errors strategies in human resource management strategy classes, strategy of teamwork, continuous learning strategy and justify the admission of the person providing the service, continuous program monitoring strategy, strategy of engaging the patient in treatment process, management strategy of Medical's facilities and its standardization, strategy of accountability of people around the hospital for patient safety through the duties and responsibilities of all individuals, strategy of clear policies and procedures, strategies to improve communication between the health care team, patient identification process improvement strategy, strategy of ensuring from the availability of appropriate technology to improve the quality and strategy of setting prescription e-system (45), results of the study is to classify strategies for improving an efficient method.

The next step in the deployment of error reporting system is sharing error. In this stage, turn right and explicit information should be done about the errors. Also, by the sharing errors, motivation of people to work will be more. It should be noted, sharing errors alone does not improve patient safety but also learning from errors is essential (46). As Itri study results showed that effective reporting system should seek to

progress and improve, through feedback and sharing at the time of errors (18). hoffmann in his study offers the deployment of Internet-based reporting systems for sharing experience and knowledge to a wider audience (17). In general, the most important achievement of sharing errors is to get experience and prevent the errors.

In the next stage, safety improvement programs should be implemented and programs and changes created to be monitored and controlled. In other words, patient safety culture and systemic approach to errors in hospital environments should be prevailed. Incompetent people are only responsible for 1% of problems and errors and other errors are done by efficient people that systems and work processes has provided the perfect setting for error. If organizations and work places accept inevitability of error and realize the importance of collecting information in managing errors, certainly "systematic efforts in promoting patient safety lead to reduce the amount and severity of adverse incidents. So the prevention of error and managing them based on professional and intelligent methods is one of the most important missions of health care centers.

Conclusion

If organizations accept the inevitability of error and realize the importance of collecting information in error management, systematic efforts of organizations certainly reduce the amount and severity of adverse incidents. So, the competitiveness key is in the success of medical's error management, establishment of a voluntary reporting system, commitment of senior managers of organization, changing the culture of blaming the culture of safety and removing barriers of error reporting.

Now in the country's health care system, there is no error reporting system as a unique system. So, preparation and implementation of desired reporting system to improve the quality, safety and satisfaction of patients and medical's staff in all educational centers of the country to be recommended.

Acknowledgement

References

1- RM W. Understanding Patient Safety. 1st ed. . New York: Mc Graw Hill. 2008.

2- Bognár A, Barach P, Johnson JK, Duncan RC, Birnbach D, Woods D, et al. Errors and the burden of errors: attitudes, perceptions, and the culture of safety in pediatric cardiac surgical teams. The Annals of Thoracic Surgery. 2008;85(4):1374-81.

3- Kaafarani HM, Itani KM, Rosen AK, Zhao S, Hartmann CW, Gaba DM. How does patient safety culture in the operating room and post-anesthesia care unit compare to the rest of the hospital? The American Journal of Surgery. 2009;198(1):70-5.

4- Panozzo SJ. Lessons to be learnt: evaluating aspects of patient safety culture and quality improvement within an intensive care unit 2007.

5- WHO. World alliancefor patient Safety.WHO draft guidelines foradverse event reporting and learning systems:From information to action. . World Health Organization. 2005.

6- Kim J, Bates DW. Results of a survey on medical error reporting systems in Korean hospitals. International Journal of Medical Informatics . .55-148:(2)75;2006

7- Vincent C, Neale G, Woloshynowych M. Adverse events in British hospitals: preliminary retrospective record review. Bmj. 2001;322(7285):517-9.

8- Baker GR, Norton PG, Flintoft V, Blais R, Brown A, Cox J, et al. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. Canadian medical association journal. 2004;170(11):1678-86.

9- Friedenberg RM. Malpractice Reform 1. Radiology. 2004;231(1):3-6.

10- Hossain T, Hossain N. Incident reporting in surgery: a review of the literature. International Surgery Journal. 2015;2(2):157-60.

11- Milligan F, Dennis S. Building a safety culture. Nursing Standard. 2005;20(11):48-52.

12- Nasiripour A, Raeissi P, Jafari M. The Role of Disclosure and Reporting in Medical Errors Prevention. Safety Promotion and Injury Prevention. 2015;2(2):73-84.

13- Akbari Sari A, Doshmangir L. An overview of methods for identifying and measuring adverse events in healthcare and their strengths and weaknesses. Journal of Hospital. 2009;8(2):51-6.

14- Yarmohammadian MH, Atighechian G, Shams L, Haghshenas A. Are hospitals ready to response to disasters? Challenges, opportunities and strategies of Hospital Emergency Incident Command System (HEICS). Journal of Research in Medical Sciences. 2011;16(8.(

15- Kaldjian LC, Jones EW, Wu BJ, Forman-Hoffman VL, Levi BH, Rosenthal GE. Reporting medical errors to improve patient safety: a survey of physicians in teaching hospitals. Archives of internal medicine. 2008;168(1):40-6.

16- Hashemi F, Nasrabadi AN, Asghari F. The obstacles of reporting nursing errors in Iran: a qualitative study. ijme. 2011;4(2):53-64.

17- Hoffmann B, Beyer M, Rohe J, Gensichen J, Gerlach F. "Every error counts": a web-based incident reporting and learning system for general practice. Quality and Safety in Health Care. 2008;17(4):307-12.

18- Itri JN, Krishnaraj A. Do we need a national incident reporting system for medical imaging? Journal of the American College of Radiology. 2012;9(5):329-35.

19- Maggard-Gibbons M .The use of report cards and outcome measurements to improve the safety of surgical care: the American College of Surgeons National Surgical Quality Improvement Program. BMJ quality & safety. 2014;23(7):589-99.

20- Lewis A, Smith F, Tait P, Wilkins D. UK surgery already applies aviation safety practice. Bmj. 2011;342.

21- Gawkrodger D. Risk management in dermatology: an analysis of data available from several British based reporting systems. British Journal of Dermatology. 2011;164(3):537-43.

22- Verelst S, Jacques J, Van den Heede K, Gillet P, Kolh P, Vleugels A, et al. Validation of Hospital Administrative Dataset for adverse event screening. Quality and Safety in Health Care. 2010;19(5):e25-e.

23- Bent PD, Bolsin SN, Creati BJ, Patrick AJ, Colson ME .Professional monitoring and critical incident reporting using personal digital assistants. Medical journal of Australia. 2002;177(9):496-9.

24- Ahluwalia J, marriott l. Clinical Incident Reporting System. Semin Fetal National Med. 2005;10(1):7-31.

25- Holden RJ, Karsh B-T. A review of medical error reporting system design considerations and a proposed cross-level systems research framework. Human Factors: The Journal of the Human Factors and Ergonomics Society. 2007;49(2):257-76.

26- Hughes RG, Ortiz E. Medication Errors: Why they happen, and how they can be prevented. Journal of infusion nursing. 2005;28:14-24.

27- Tighe CM, Woloshynowych M, Brown R, Wears B, Vincent C. Incident reporting in one UK accident and emergency department. Accident and emergency nursing. 2006;14(1):27-37.

28- Kellogg VA, Havens DS. Adverse events in acute care: an integrative literature review. Research in nursing & health. 2003;26(5):398-408.

29- Lamb R. Open disclosure: the only approach to medical error. Quality and Safety in Health Care. 2004;13(1):3-5.

30- Cohen JR. Toward candor after medical error: the first apology law. Harvard Health Policy Review. 2004;5(1):21-4.

31- Yarmohammadian MH, Rezaei F, Ferdosi M, Haghshenas A. Healthcare incident reporting system in several countries: Concepts, infrastructure and features. International Journal of Health System and Disaster Management. 2013;1(3):143.

32- Beasley JW, Escoto KH, Karsh B-T. Design elements for a primary care medical error reporting system. WMJ-MADISON-. 2004;10.9-56:(1)3

33- Evans SM, Berry J, Smith B, Esterman A, Selim P, O'Shaughnessy J, et al. Attitudes and barriers to incident reporting: a collaborative hospital study. Quality and Safety in Health Care. 2006;15(1):39-43.

34- Schelbred AB, Nord R. Nurses' experiences of drug administration errors. Journal of advanced nursing. 2007;60(3):317-24.

35- Ulanimo VM, O'Leary-Kelley C, Connolly PM. Nurses' perceptions of causes of medication errors and barriers to reporting. Journal of nursing care quality. 2007;22.33-28:(1)

36- Pfeiffer Y, Manser T, Wehner T. Conceptualising barriers to incident reporting: a psychological framework. Quality and Safety in Health Care. 2010:qshc. 2008.030445.

37- Sanghera I, Franklin B, Dhillon S. The attitudes and beliefs of healthcare professionals on the causes and reporting of medication errors in a UK Intensive care unit. Anaesthesia. 2007;62(1):53-61.

38- Kingston MJ, Evans SM, Smith BJ, Berry JG. Attitudes of doctors and nurses towards incident reporting: a qualitative analysis. MEDICAL JOURNAL OF AUSTRALIA. 2004;181:36-9.

39- Smetzer J, Cohen M, Milazzo C. The role of risk management in medication error prevention. Medication Errors Washington DC: American Pharmaceutical Association. 1999:19.2-.3.

40- Hwang J-I, Lee S-I, Park H. Barriers to the operation of patient safety incident reporting systems in Korean general hospitals. Healthcare informatics research. 2012;18(4):279-86.

41- Anderson JE, Kodate N, Walters R, Dodds A. Can incident reporting improve safety? Healthcare practitioners' views of the effectiveness of incident reporting. International journal for quality in health care. 2013;25(2):141-50.

42- Storgård J, Erdogan I, Lappalainen J, Tapaninen U. Developing incident and near miss reporting in the maritime industry–a case study on the Baltic Sea. Procedia-Social and Behavioral Sciences. 2012;48:1010-21.

43- de Vries EN, Ramrattan MA, Smorenburg SM, Gouma DJ, Boermeester MA. The incidence and nature of in-hospital adverse events: a systematic review. Quality and Safety in Health Care. 2008;17(3):216-23.

44- Ward JK, McEachan RR, Lawton R, Armitage G, Watt I, Wright J. Patient involvement in patient safety: protocol for developing an intervention using patient reports of organisational safety and patient incident reporting. BMC health services research. 2011;11(1):1.

45- Heydarabadi AB, Hafez AA. Risk assessment of the selected processes in women's surgery ward by Healthcare Failure Mode. 2015.

46- Tabibi J, Nasiripour A, Maleki M, Raessi P, Mahmmoudi M, Azimi L. Survey of employees' safety attitude in a teaching hospital Tehran 2010. Iran Occupational Health. 2011;7(4):5-0.