The Impact of Implementing Electronic Safety Program on Patient Safety in Intensive Care Unit, Istishari Hospital

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ABSTRACT

Background: Patient safety has become a central focus for the most medical institutions which generate new programs to monitor safety and prevent medical mistakes. The use of new technologies, the employment of automated systems, the introduction of system redundancies, the use of event simulation, and staff training are all strategies that have been put in place in an attempt to reduce the rate of errors.

Objective: The aim of this study was to assess the effectiveness of implementing electronic safety program using the Health Services Executive (HSE) change module on patient safety in intensive care unit at Istishari Hospital.

Materials and Methods: Health Services Executive (HSE) change module was used as a guidance to change the workflow process in the safety management at Istishari Intensive Care Unit (ICU) department.

Results: The results of this study showed that implementing electronic safety program within Health Services Executive (HSE) change module would protect patient safety, and help health care providers to be aware of patient's condition and quality of care.

Conclusions: It is very important to adopt electronic safety program in the health care centers and hospitals that contribute to improvement in the quality of services that are provided for patients.

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1. Introduction:

Patient safety has become a central focus for the most of the medical institutions and many new programs were established to monitor safety and prevent medical mistakes (Iedema et al., 2009). The use of new technologies, the employment of automated systems, the introduction of system redundancies, the use of event simulation, and staff training are all strategies that have been put in place in an attempt to reduce the rate of errors (Nolan, 2000).

Stakeholders, directors and policy makers at healthcare services do a lot of work to develop a comprehensive system and workflows to improve and monitor safety in the hospitals, and this comes with collaboration with safety companies that just focus on patient and hospital safety (Vincent, 2006). These systems come to improve health care quality and reduce the risks of incidents related patient safety or property loss (Sharpe, 2004).

Most of the medical institutions and many programs are focusing on the patient safety and it has become the central focus for most of them (Brennan

et al., 1991); and many methods have been developed to prevent the rate of errors; such of these methods: use of new technologies, the employment of automated systems, use of event simulation and training for the new employees (Andrews et al., 1997).

Healthcare services do a lot of work to develop a comprehensive system and workflows to improve and monitor safety in the hospitals, and this comes with a collaboration with safety companies that create electronic safety programs which focus on patients and health care providers' safety (Vincent, 2006).

In the current study, authors are intended to implement electronic safety program which focuses on a proactive risk identification and process for mitigating the risk factors, which might show the opportunities for patient safety improvement that include security level, frequency of issue which may have potential harm to the patient, the results of investigations and analytical reviews, in depth evaluation, review and responses (Joint Commission International & Joint Commission on Accreditation of Healthcare Organizations, 2002). Thus, will help staff in the hospital to fast track all of the issues, and will know "how to" any incident report regarding process, or event, which may be subjected to investigation through root cause analysis to place appropriate and feasible solutions that prevent accident causation to be happened again (Sharpe, 2004).

2. Literature Review:

2.1. Patient Safety

One of the major parts of the quality agenda is patient safety (Joint Commission International & Joint Commission on Accreditation of Healthcare Organizations, 2002). Patient safety is the prevention of errors and adverse effects to patients associated with health care (WHO, 2017). It is a new term that emphasizes health care providers to report, prevent, and analysis of medical error to avoid these errors in the future (Joint Commission International & Joint Commission on Accreditation of Healthcare Organizations, 2002).

The daily work of the health care providers include stress situation, event and workload could affect the quality of care and safety of patient (Siegele, 2009). Therefore, to prevent the errors and adverse effects on patients associated with health care due to significant co-morbidities needs difficult decisions and increasing economic pressure on health care facilities leads to overload heath care environments (Iedema et al., 2010; Iedema, 2011)

WHO committed to enhance the quality of health care, and patient safety through developing active networks of patients and health care providers, sharing experiences, learning from failure and pro-active risk assessment, effective evidence-based care, monitoring improvement and empowering and educating patients and the public, as partners in the process of care (WHO, 2017).

Now health care institutions are aiming to implement a set of prevention items in their organization through research literature, education for patients and their family and staff, adapting innovative technologies, and enhancing incident reporting systems in the institution (Joint Commission International & Joint Commission on Accreditation of Healthcare Organizations, 2002).

Bio medical knowledge and technology in the last years have resulted in improving the health care delivery that is increasingly sophisticated and complex (Irvine, 1999; Leape & Berwick, 2005).

These systems-based perspectives on patient safety move the organizational learning and improvement towards, through focusing on how systems allows creating errors, and how we can prevent these errors to happen (Reason, 2000).

3. Materials and Methods:

Health Services Executive (HSE) change module was used as a framework for the current study. The HSE Change Model has been developed to: improve the experience of patients and service users, help staff and teams play a meaningful role in working together to improve services and promote a consistent approach to change the system. The HSE Change Model describes the journey of transformation that enables people to move from the current situation to the desired future, in line with a shared vision for change. HSE Change Model based on the four stages of the project management lifecycle: initiation, planning, implementation and mainstreaming (Health Service Executive, 2016).

The change process is complex, it involves people, processes, culture, structure, and behavior. Interdisciplinary work is required to make this change real. The change process was initiated to enhance patient safety as a part of applying the international patient safety goals in Istishari Hospital, the change process involved a set of departments in the hospital: Medical Department, Quality Management Department, Information Technology Department, and ICU nursing staff.

3.1. Health Services Executive (HSE) change module

3.1.1. Initiation

Administrative and clinical people in Istishari hospital intend to present the best practice service for their patients, and this drives the need to have a solution to aid the process of patient safety, taking this point in their consideration as a starting point for the current study to improve safety in the hospital.

After approval was taken from Istishari Hospital Higher Management, authors start implementation of the electronic safety program "Datix patient safety" in ICU department, the quality department did an awareness session for the ICU staff to inform them about the importance of the current study. The workflows for the incident reporting have been updated based on the system requirement, so the higher management can determine the root cause of the problem in the hospitals and from that, the hospital can provide a better service for the future, which facilitated the process to monitor the compliance of the International Patient Safety Goals, policies, and standards.

3.1.2. Planning

Planning phase has a reflection in all HSE phases, it comes after the detailed initiation phase, and this phase includes the following: Building commitment, determining the details of the change and developing the implementation plan (McAuliffe & Van Vaerenbergh, 2006).

Authors with a collaboration with quality department did awareness sessions about electronic safety program and workflows; these sessions explored the change in a detailed way using class training, and employee involvement which was a necessary and integral part of managing change. Determining the change was done through meetings with the quality department and medical department in collaboration with the information technology department, these meetings produced system new requirements.

Authors have updated the workflows based on the new requirements in a collaboration with IT department: training classes were established to train the end users about the electronic safety program and workflows.

3.1.3. Implementation

Per the planned schedule, the implementation of the project started in 15th August 2013 by doing these tasks: prepare the New Workflows, validate the new system and test it, train the end users about the new system and workflows and start execution of the study to see the effectiveness of electronic safety program.

Authors agreed with the higher management to implement the incident reporting tool due to that electronic safety program would be new for the staff to handle in the first phase of implementation and the scope of using it will increase gradually with a collaboration of quality department.

The incident reporting form has been designed in consultation with medical department and quality management department and it's used for both clinical and non-clinical incident reporting (Anthony et al., 2010).

Head Nurses in the ICU department took the access to analyze and run reports on the incident reports during the implementation phase, which are relevant to ICU department, while quality department can view incident reports that occur across the entire hospital. For example, the quality department may be concerned with medication errors within a specific area of the hospital and would like to be automatically alerted when a certain threshold is breached over a given timeframe (Anthony et al., 2010).

The next phase of the implementation was the following: Risk assessment, Safety alerts, Policy distribution, Patient experience and feedback and complaints, compliments, comments and concerns.

3.1.4. Mainstreaming

Ensuring that the new workflows and system as a permanent process in the department is the goal of the mainstreaming phase. This phase in the HSE module aims to "Making it the way we do our business" (Health Service Executive, 2016), and to make this happen the project team agreed with the hospital management about a set of strategies: The only accepted incident will be through Datix patient safety system, the only dependable reports will be through Datix patient safety Program and Any hotspot in the system will present the needed items in the department.

After applied electronic safety program, many things showed its' benefits, one of these benefits were staff involvement during the implementation and giving them feedback periodically. In addition, it was implemented in all departments of the hospital with a full scope of the system. The electronic safety program was progressed well, relatively smoothly and it was very useful in implementing it in the intensive care unit.

3.2. Evaluation tools

The evaluation of any change is an important component in the management of change initiatives and a concept that cannot be underestimated. Many people consider evaluation as something that occurs at the end of a project, Oermann and Gaberson (2016) believe that evaluation needs to be viewed as a continuous process and used as a tool to develop organizational efficiencies.

3.2.1. Design

Time series design was used in the current study, where data are collected over an extended period and an intervention is introduced during the period (Polit & Beck, 2008), as indicated in Figure 1.

O_1 X O_2

Figure 1. Time Series Design.

Pre-implementation phase: demographic survey consisted of 5 questions: 2 of them reflect the information about the staff (Level of qualification, and experience), 2 of them reflect the usage of the manual incident report and relation to patient safety in the department, the last one, talks about process itself, if it is efficient or not. The response rate of the study before implementing electronic safety program was 85.8%, as indicated in table 1.

Table 1: *response rate for each department in the study*

Department Name	Number of staff	Response Rate
Nursing Department	38	92.11%
Quality Department	5	80%
IT Department	5	100%
Higher Management	2	100%
Total	50	93.03%

Education Level and Experience:

Table2: *Staff education and experience*

Department Name	Education			Experience	
	Bachelors	Master	Diploma	>5 Years	<=5 Years
Nursing Department	25	6	4	20	15
Quality Department	4	0	0	1	3
IT Department	4	1	0	1	4
Higher Management	0	2	0	0	2
Total	33	9	4	22	24

Pre-Satisfaction Rate:

Table 3: *Satisfaction rate about the new system in both quality management department and nursing department*

Department Name	Very satisfied	Quite satisfied	Quite unsatisfied	Very unsatisfied
Nursing Department	1	5	20	9
Quality Department	1	2	1	0
Total	2	7	21	9

Expectation about the new system and level of satisfaction:

Table 4: *Staff expectation about the new incident report system and level of satisfaction in the nursing department and quality department*

Department Name	Acceptance		Level of satisfaction			
	Agreed	Not Agreed	Very satisfied	Quite satisfied	Quite unsatisfied	Very unsatisfied
Nursing Department	30	5	1	5	20	9
Quality Department	3	1	1	2	1	0
Total	33	6	2	7	21	9

The Post-implementation phase: questionnaire consisted of 8 questions: 2 of them reflects information about system satisfaction, 1 question reflects the training satisfaction, 1 question reflects the involvement of departments and consistency among them, 2 questions about future state workflows in the departments, 1 question about the expectation of future packages, 1 question about change management process satisfaction.

System satisfaction rate:

Table 6: *Acceptance of new system and level of satisfaction after implementing electronic safety program in both quality management department and nursing department*

Department Name	Acceptance		Level Of satisfaction			
	Agreed	Not Agreed	Very satisfied	Quite satisfied	Quite unsatisfied	Very unsatisfied
Nursing Department	19	16	5	5	22	3
Quality Department	4	0	3	1	0	0
Total	23	16	8	6	22	3

Training Satisfaction:

Table 7: *Training satisfaction about the new system*

Department Name	Level of satisfaction			
	Very satisfied	Quite satisfied	Quite unsatisfied	Very unsatisfied
Nursing Department	10	18	7	0
IT Department	3	0	2	1
Quality Department	2	1	1	1
Total	15	19	10	2

Workflows Comprehensiveness:

Table 8: *Workflows Comprehensiveness in the following departments*

Department Name	Workflows Comprehensiveness			
	Very satisfied	Quite satisfied	Quite unsatisfied	Very unsatisfied
Nursing Department	4	12	7	12
IT Department	5	0	0	0
Quality Department	2	1	1	0
Total	11	13	8	12

Implementing a new software

Table 9: *accepted number to implement new software in the following departments*

Department Name	Implementing New Packages	
	Agreed	Not Agreed
Nursing Department	20	15
IT Department	4	0
Quality Department	5	0
Total	29	15

Change Management Satisfaction:

Table 10: *change management' process satisfaction in the following departments*

Department Name	Change Management Satisfaction			
	Very satisfied	Quite satisfied	Quite unsatisfied	Very unsatisfied
Nursing Department	12	9	7	7
IT Department	4	1	0	0
Quality Department	3	1	0	0
Total	19	11	7	7

Interviews

Two interviews were done with the higher management, that is represented by deputy of general manager and head of medical departments to take feedback after implementation of electronic safety program; the results from these interviews were summarized as more involvement from the medical departments should be done, but in general, they are satisfied with the results of the study and, they are waiting to see the full picture of the software.

4. Discussion:

The core aim of the current study was to assess the effectiveness of implementing electronic safety program on patient safety in Intensive Care Unit at Istishari Hospital. The following items empower the current study through supporting the higher management in the hospital, a high number agreed to implement the new system at the hospital after training and the result of change management' process satisfaction. One limitation was found during implementing an electronic safety program. This limitation is that full package of the electronic safety program was not available, due to financial issues.

The current study helps the management system to achieve hospital mission and goals in patient safety through coordination of the incidents report to see how they can be solved in the right way and analyze issues to apply preventive actions for the future. It is very important to apply electronic safety program that could enhance the safety of the patients in the hospital through understand and manage risk in the organization.

5. Conclusion:

Safety is a fundamental and essential attribute of health care quality. Many Jordanian hospitals are focusing on the best practice. Patient safety has become a central focus for most medical institutions and many new programs to monitor safety and prevents medical mistakes have emerged as a result. The use of new technologies, the employment of automated systems, the introduction of system redundancies, the use of event simulation, and the implementation of new staff training are all strategies that have been put in place in an attempt to reduce the rate of errors. Therefore, the current study was initiated to enhance patient safety this mainly comes from the competitive environment between private hospitals.

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References:

1. Andrews, L. B., Stocking, C., Krizek, T., Gottlieb, L., Krizek, C., Vargish, T., et al. (1997). An alternative strategy for studying adverse events in medical care. *The Lancet*, 349(9048), 309-313.
2. Anthony K, Wiencek C, Bauer C, Daly B, Anthony M. K. (2010). No interruptions please: Impact of a no interruption zone on medication safety in intensive care units. *Critical Care Nurse*, 21-29.
3. Brennan, T. A., Leape, L. L., Laird, N. M., Hebert, L., Localio, A. R., Lawthers, A. G., et al. (1991). The incidence of adverse events and negligence in hospitalized patients. Results of the Harvard Medical Practice Study I. *The New England Journal of Medicine*, 324(6), 370-376.
4. Health Service Executive. (2016). *Improving Our Services*. Retrieved January 14, 2017, from Retrieved January 13, 2017, from http://www.hse.ie/eng/staff/Resources/hrstrategiesreports/Improving_our_Services,_A_Guide_to_Managing_Change_in_the_the_HSE__Oct_2008.pdf
5. Irvine, D. (1999). The performance of doctors: The new professionalism. Lancet, 353, 1174-1177.
6. Iedema, R. (2011). Creating safety by strengthening clinicians' capacity for reflexivity. *BMJ Quality and Safety*. doi:10.1136/bmjqs.2010.046714.
7. Iedema, R., Allen, S., & Britton, K. (2010). *Final Report: The '100 Patient Stories' Project including Indicators of Effective Open Disclosure and Open Disclosure Fundamentals. Sydney*: UTS Centre for Health Communication & Australian Commission for Safety and Quality in Health Care.
8. Iedema, R., Jorm, C., & Lum, M. (2009). Affect is central to patient safety: The horror stories of young anaesthetists. *Social Science and Medicine*, 69(12), 1750-1756.
9. Leape, L. L., & Berwick, D. M. (2005). Five years after to err is human: what have we learned? *JAMA*, 293(19), 2384-2390.
10. Joint Commission International, & Joint Commission on Accreditation of Healthcare Organizations. (2002). *Joint Commission International Accreditation Standards for Hospitals. Joint Commission Resources*.
11. McAuliffe, E. and Van Vaerenbergh, C. (2006). *Guiding change in the Irish health system*. Kells, Co. Meath: HSE National Organisation Development and Design Directorate.
12. Nolan, T. W. (2000). System changes to improve patient safety. *BMJ: British Medical Journal*, 320(7237), 771.
13. Oermann, M. H., & Gaberson, K. B. (2016). *Evaluation and testing in nursing education*. Springer Publishing Company.
14. Polit, D. F., & Beck, C. T. (2008). *Nursing research: Generating and assessing evidence for nursing practice*. Lippincott Williams & Wilkins.
15. The reason, J. (2000). Human error: models and management. *BMJ*, 320(7237), 768-770.
16. Sharpe, V. A. (2004). *Accountability: Patient Safety and Policy Reform*. Washington, D.C.: Georgetown University Press.
17. Siegele P. (2009). Enhancing outcomes in a surgical intensive care unit by implementing daily goals and tools. *Critical Care Nurse*, Vol 29 Issue 6, 58-70.
18. Vincent, C. (2006). *Patient safety. Edinburgh: Elsevier Churchill Livingstone*.
19. World Health Organization(WHO). (2017). *Patient safety*. (n.d.). Retrieved January 13, 2017, from http://www.euro.who.int/en/health-topics/Health-systems/patient-safety

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