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

Ali S. Muhsein 1* = Mohmmed A. Al-Slehat 2 = Mohammad F. Bani Ghuerra 3 = Ala’a A. Al-Shnaaq 4
Zeinab S. Salman 5 = Ahmad M. Saleh 6

1 Emergency Department, Al Khalidi Hospital & Medical Center, Amman, Jordan
2 Emergency Department, Istishari Hospital, Amman, Jordan
3 Quality Department, Istishari Hospital, Amman, Jordan
4 Ministry of Health, Amman, Jordan
5 Faculty of Pharmacy, The University of Jordan, Amman, Jordan
6 Department for Continuing Education, Al Khalidi Hospital & Medical Center, Amman, Jordan

al_raminy@yahoo.com

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 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.

To cite this article

Keywords: Electronic safety program, Health services executive, Change module, Patient safety.

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 health 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.
O₁ X O₂

**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

<table>
<thead>
<tr>
<th>Department Name</th>
<th>Number of Staff</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Department</td>
<td>38</td>
<td>92.11%</td>
</tr>
<tr>
<td>Quality Department</td>
<td>5</td>
<td>80%</td>
</tr>
<tr>
<td>IT Department</td>
<td>5</td>
<td>100%</td>
</tr>
<tr>
<td>Higher Management</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>95.03%</td>
</tr>
</tbody>
</table>

**Education Level and Experience:**

Table 2: Staff education and experience

<table>
<thead>
<tr>
<th>Department Name</th>
<th>Bachelors</th>
<th>Master</th>
<th>Diploma</th>
<th>&gt;5 Years</th>
<th>&lt;=5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Department</td>
<td>25</td>
<td>6</td>
<td>4</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Quality Department</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>IT Department</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Higher Management</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>9</td>
<td>4</td>
<td>22</td>
<td>24</td>
</tr>
</tbody>
</table>

**Pre-Satisfaction Rate:**

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

<table>
<thead>
<tr>
<th>Department Name</th>
<th>Very satisfied</th>
<th>Quite satisfied</th>
<th>Quite unsatisfied</th>
<th>Very unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Department</td>
<td>1</td>
<td>5</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Quality Department</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>7</td>
<td>21</td>
<td>9</td>
</tr>
</tbody>
</table>

**System satisfaction rate:**

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

<table>
<thead>
<tr>
<th>Department Name</th>
<th>Acceptance</th>
<th>Level of satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agreed</td>
<td>Not Agreed</td>
</tr>
<tr>
<td></td>
<td>Very satisfied</td>
<td>Quite satisfied</td>
</tr>
<tr>
<td>Nursing Department</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>Quality Department</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>6</td>
</tr>
</tbody>
</table>

**Training Satisfaction:**

Table 5: Training satisfaction about the new system

<table>
<thead>
<tr>
<th>Department Name</th>
<th>Very satisfied</th>
<th>Quite satisfied</th>
<th>Quite unacceptable</th>
<th>Very unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Department</td>
<td>10</td>
<td>18</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>IT Department</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Quality Department</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>19</td>
<td>10</td>
<td>2</td>
</tr>
</tbody>
</table>
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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Corresponding Author:
Ahmad M. Saleh, Ph.D.
Department for Continuing Education, Al Khalidi Hospital & Medical Center, Amman, Jordan
E-mail: al_ramiiny@yahoo.com
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