RISK ASSESSMENT BASED ON THE ANALYSIS OF ERROR FORMS AND EFFECTS IN A HOSPITAL IN THE CITY OF KERMANSHAH-2014
Meghdad Pirsaheb1, Younes Sohrabi1,2, Hamed Yarmohammadi2,3*

1Department of Environmental Health Engineering, School of Public Health, Kermanshah University of Medical Sciences, Kermanshah, Iran.
2Students research Committee, Kermanshah University of Medical Sciences, Kermanshah, Iran.
3Department of Occupational Health Engineering, Faculty of Public Health School, Kermanshah University of Medical Sciences, Kermanshah, Iran.
Email: yarmohammadi68@yahoo.com

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Abstract

Background and Objective: Nowadays, therapeutic staff errors are considered as one of the serious problems of health system as well as a threat to patient safety. There are several threats influencing the outbreak of therapeutic errors, which are not easy to recognize.

For the therapeutic group, it is necessary to prevent the outbreak of medical errors by planning the process of performance and identifying hidden threats and potential error forms in all steps of the process in a forecasting method of error evaluation. The purpose of this study was to evaluate risk based on mode analysis and error effects in a hospital in the city of Kermanshah.

Methods: The method of the present study was descriptive cross sectional using PHA and FMEA. PHA procedure is a primary method to identify risks in general and FMEA is a method of the analysis of error forms; a team-based, systematic and prospective method that is applied to prevent difficulties related to the process or services prior to occurrence. Finally, the obtained information was analyzed by EXCEL software.

Results: Totally, 262 cases of error were identified in various sectors of the hospital; the highest risks and the lowest risks were physical and psychological, respectively.

Conclusion: Regarding the current risks in therapeutic places in order to develop the quality of treatment and create a safe environment for staff and patients is essential. Applying risk management policies and programs at the hospital should be seriously pursued.

Keywords: Hospital, Risk, Analysis of error forms and Effects.
Introduction

Risk is uncertainty about an incident in the future, whatever the uncertainty is higher, and the risk is higher (1). In all organizations, especially organizations which provide public emergent services, a situation should be provided in which there is no damage or loss to customers and staff (2). Attending the safety of hospitals, as the most important institutions, providing health and therapeutic services has a great importance in which there is a collection of resources and equipment, human resources, students, patients; disabled people and entourage. Due to the fact that hospitals are considered as databases offering emergency services. In other words, hospitals should not only provide a secure and safe environment to protect patients and employees' health, but also should have requisites to play their own roles in the case of emergency without endangering the health and safety of the staff (3). Because of the special conditions in hospital, in the respect of individual aggregation, presence of disabled and patient individuals, different and complex equipment and agencies, consumed chemical and infectious materials, flammable products, carcinogen chemicals, and ionizing radiation, if safety principles are not obeyed, occurring of events such as fire and power shocking, and confronting hazardous factors in the work place will be inevitable. One example of such incidents in hospitals was a fire in Calcutta hospital of India which leaded to 89 dead people (4). According to recent estimates, of each 10 admitted people in a hospital one person experiences a serious event; about half of which is preventable. About one third of the events damage the patients, which can be varied in different forms from lasting the presence time to death (5). Lessening the possibility of clinical risks in hospitals is very important and vital because of the fact that it improves the quality of health care, the effective relationship among the hospital staff and patients, and increases patient satisfaction; in addition, limits the complaints about medical errors and nurse caring (6). The analysis of error forms and its effects is an effective technique for identifying and reducing error which was first used in air space industry in 1960. FMEA is a systematic, bottom-up tool based on team work, which can be described as identifying, preventing, deleting or controlling the states, causes and effects of potential errors, applying in a service system, and prior to the final services to the customer, it manages the performance and documentation of the activities (7). The most important achievement of the method is the determination of vulnerable ingredients and also system's critical areas (8). Requisite to it is predicting the errors and how to prevent them. The prediction is carried out by specialists who have enough knowledge and experience about the process or service. Consequently, selecting the team, programming FMEA, and administrating it entirely have a great importance (9). Primary application of the technique refers back to health care in 1990 which considered the production and consumption of
medicine and prevention of medical errors in hospitals (6). In 2002, the war affairs department of the patient safety national center in the United States offered an appropriate approach for health care called HFMEA which is considered to apply the FMEA model of health care (10). Furthermore, in 2008, the technical committee of International Standardization Organization (ISO), declared FMEA as a method of prospective risk analysis for medical laboratories.

The present study applies FMEA method as one of the assessment tools of risk management which has a systematic view on risks, to identify and prevent existing errors and risks. Since the precautionary and prospective approach of the method provides the opportunity to identify and delete the potential difficulties of each organization prior to their impact on the system, services and costumers (11).

In addition to that, applying the process of FMEA in health and treatment system, establishes a typical systematic thought directed to the safety of patient care (12). As mentioned above, this study aimed to evaluate risk based on the method of analysis of the error forms and effects in a hospital in the city of Kermanshah in 2014.

**Methods**

This research is descriptive which evaluates and analyses the error forms and effects using FMEA methodology in a quantitative-qualitative procedure. for the early identification of risks, the PHA method was used. Research procedure is a posteriori which is categorized in the applied class.

Research studies were carried during a year in different parts of a hospital in Kermanshah. Research information was gathered by group interview, in addition to holding weekly meetings of FMEA team (occupational health expert, environmental health specialist, nurses and department staff).

The results of each Phase were recorded in the final worksheet of FMEA, respectively. according to definitions, FMEA methodology is a systematic tool based on team work which is used to identify, evaluate and prevent, delete or control causes and effects of the potential errors in each system, process, planning or service prior to product or final service deliver to the costumers(11).

At the end, the collected data was analyzed using EXCEL software.

**Results**

Totally, 262 cases of risk were identified in different parts of the hospital in 7 danger groups. Risk group obtained by PHA is shown in table 1. Frequency of risk in terms of risk group is shown in table 2. Frequency of obtained risks in terms of examined wards/units in hospital is shown in table 3.
Table 1: Risk group obtained by PHA.

<table>
<thead>
<tr>
<th>row</th>
<th>risk group</th>
<th>risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>chemical risks</td>
<td>Disinfecting and sterilizing (glotaldhd, formaldehyde, acetic acid Perry, ethylene oxide), organic solvents (benzene, toluene, acetone ...), chemical medicine, anesthesia, latex, gases and chemical fumes, smoke.</td>
</tr>
<tr>
<td>2</td>
<td>physical hazards</td>
<td>noise, ionizing radiation (particles, electromagnetic and non-ionizing radiation: microwaves, magnetic field, laser, ultrasound waves, heat, moisture, and sharp objects.</td>
</tr>
<tr>
<td>3</td>
<td>mechanical and ergonomic hazards</td>
<td>moving the patient, move the patient, move and handle up and carry heavy objects, long-term standing,and improper status of the body at work.</td>
</tr>
<tr>
<td>4</td>
<td>biological hazards</td>
<td>infectious agents (viruses, bacteria, fungi)</td>
</tr>
<tr>
<td>5</td>
<td>mental risks</td>
<td>stress, work shift, sleep disorders</td>
</tr>
<tr>
<td>6</td>
<td>clinical risk</td>
<td>patient falls, bed sores, needle stick, and infected secretions to eyes and risk, hospital infections, medication errors spraying, laboratory errors, Para-clinic errors</td>
</tr>
<tr>
<td>7</td>
<td>management risk</td>
<td>lack of human force, lack of correct planning, lack of equipment and facilities, poor workforce arrangement, injustice and discrimination, disorder in the documentation, data entry errors, misuse of information.</td>
</tr>
</tbody>
</table>

Table 2: Frequency of risk in terms of risk group.

<table>
<thead>
<tr>
<th>risk group</th>
<th>safety</th>
<th>biological</th>
<th>mental</th>
<th>clinical</th>
<th>management</th>
<th>chemical</th>
<th>physical</th>
<th>ergonomic</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>frequency</td>
<td>20</td>
<td>11</td>
<td>3</td>
<td>175</td>
<td>35</td>
<td>3</td>
<td>14</td>
<td>1</td>
<td>262</td>
</tr>
</tbody>
</table>

According to table 2 the highest obtained risks were related to clinical risks and the lowest were ergonomic risks.

Table 3: Frequency of obtained risks in terms of examined wards/units in hospital.

<table>
<thead>
<tr>
<th>row</th>
<th>ward</th>
<th>frequency</th>
<th>percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>head nursing office</td>
<td>13</td>
<td>4.96</td>
</tr>
<tr>
<td>2</td>
<td>clinic head nurse</td>
<td>3</td>
<td>1.14</td>
</tr>
<tr>
<td>3</td>
<td>the infectious ward nurse</td>
<td>8</td>
<td>3.05</td>
</tr>
<tr>
<td>4</td>
<td>radiology head nurse</td>
<td>5</td>
<td>1.9</td>
</tr>
</tbody>
</table>
Discussion

The results showed that 262 cases of risk were identified in various wards of the hospital among which clinical hazards were the highest identified risk. Verbano and Turra, by investigating human error and the reliability of management system of clinical risk in sanitary and therapeutic institutions of Italy, concluded that individuals from different cultures notice risk and risk management differently; thus, risk culture should be improved through educational programs of risk management, implementation of clinical risk management and checking policies and
noticing clinical sovereignty in hospital (13). The method of analyzing potential error states and effects to assess different outcomes and processes is applied in health care (14). Of the advantages of the method are multifunctional teams, engaging patients and improving current processes understand (15). furthermore, Faye has mentioned that true performance of the techniques is that it does not consider the staff as guilty, rather, by finding out the causes of the errors, especially human errors and arising from work, tries to create a safe, riskless environment to the staff and aids the organization to achieve a reduction of complaints and an increase in customers satisfaction (16). The results of Teofighi's research showed that the FMEA methodology has a high effectiveness for identifying and classifying recoverable points of current triage process in a hardscrabble and complex ward such as emergency; additionally, for predicting effective actions of risk reduction. Nasseri in his study, in 1386, mentioned that the techniques such as FMEA which have a preventing approach and are based on teamwork can enhance the staff's accuracy and awareness of potential professional weaknesses, and their effort to omit those (16). The results obtained from Dominici's research in 2006 titled as use of FMEA in bariatric ward showed that collecting a team of different specialties, especially managers, for identification and classification of potential risks is very important in order to improve the outcomes of analyzing the effect of HFMEA on quality of patients care (17). In the study, the risks of oncology ward were identified which are the clinical risks. The Results are in accordance with Tilburg's research in 2005 which evaluated the prevention of potential risks in children oncology ward; this implies that hospital manager's support of the team plays a great role in applying their suggestions (18). in their study, Alan Wolfe and colleagues concluded that the rate of errors caused by events in the hospital emergency has been reduced from 3.24% to 48% by using risk management programs (13). Risk is the matter of all organizations. The risks are caused by external or internal factors, but the way of risk management is that will determine the success or failure of the organization (19). The results of Habibi and colleagues' study showed that risk management in the radiology department of the hospitals in Isfahan estimated as moderate and weak which means it is necessary to invest on such wards of the hospitals expand and focus on risk management (20). Governing system is a proper approach to the hospital. The basic objective of the establishment of hospital clinical system is to ensure the highest quality of clinical services at the right time and place. Clinical government encompasses a range of activities performed with an emphasis on clinical efficacy, clinical assessment, risk management, personnel management and learning and teaching. According to the notification of the ministry of health to public hospitals, other hospitals are expected to take fundamental steps toward the establishment of the system of clinical governance.
Conclusion

Hospital manager's awareness of risk management for developing the quality of treatment and creating a safe environment for staff and patients has a great necessity. Applying policies and planning for training and supervision of risk management activities in hospital should be taken seriously. Most of the errors identified by group members can be prevented; risk management requires health care to be done with more control in various departments to increase the efficacy and quality of the cares. In this study, the highest identified percentages of the risks were related to clinical and nursing wards. Most of the researches carried out in the field have investigated risks in some cases, because of the extensive domain of clinical errors in health and treatment system. In the present research it was intended to investigate all nursing care processes, and to identify potential risks in order to manage all hazardous factors. holding continuous educational courses in the field of risk management and assessment, improving proper planning of work shift, and applying motivational methods for nurses, applying experienced and interested forces, storage, repairs and continuous calibration of medical tools are among the important steps which help to delete, reduce, and control clinical errors. In the other hand, an effective, well-organized management system with pre-planned activities will reduce the negative effects of clinical risks, in the meantime; will provide the most efficiency of therapeutic services in the case of the lowest resources and human force.

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References


Corresponding Author:
Hamed Yarmohammadi*

Email: varmohammadi68@yahoo.com