

## The Role of Human Resources Management in Risk and Safety Management of Patient (Case study: Dr. Mojibian Hospital, Yazd)

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### ABSTRACT

**Introduction:** Reduction in risk possibility in hospitals is an important and vital issue for improving the quality of health care. This research was conducted with the aim of identifying, analyzing and prioritizing risks, providing solutions for reducing or controlling identified risks and examining the effective basics of risk management.

**Methods:** Hospital risk management team consists of 10 experts along with participation of experienced medical staff, tried to identify existing risks in the various hospital departments by FMEA method through inspection, observation and review of processes, within a year. These risks were identified in different classes and finally, the risk priority number (RPN) was calculated using the Excel software and the corresponding formula.

**Results:** Errors in nursing care were identified as the most important nursing work processes in the hospital. Among identified risks, 22 risks were assigned a RPN higher than 150, where corrective proceedings were a priority. The highest RPN (448) was related to lack of implementation for blood injection guidelines and medicate - missed dose process whit PRN (336) got the second place.

**Conclusion:** Major corrective proceedings include the formulation of educational programs, the adoption of policies and procedures, and the establishment of monitoring and evaluating programs to streamline risk management as well as reduction and control the risks in the hospital is considered as main part of the human resource management (HRM).

**Keywords:** Risk Management, Human Error, Hospital, FMEA, Human Resource

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## Introduction

Health workers are a large part of the workforce <sup>(1)</sup> and are always prone to many diseases, and their health is seriously endangered from service staff to lab staff <sup>(2)</sup>. Today, all professions and organizations face many risks, which have tended to risk management in order to maintain their own character in the competitive environment of the present day. Reducing the chance of risk in hospitals to improve the quality of health care, effective communication between hospital staff and patients, as well as limiting the proceedings of wrong treatment is very important <sup>(3)</sup>.

According to recent estimates, nearly one out of every 10 people admitted to hospitals, one person experiences an unpleasant event, about half of which can be predicted and about one-third of these events are harmful to the patient, which can be attributed to various forms of elevation residence to death is variable <sup>(1)</sup>. According to the UK Department of Health, medical errors affect over 850,000 people each year in the UK and often have been led to a long time spent by patients in hospital or community care units <sup>(4)</sup>.

Considering that nurses spend more time with patients than other employees, they are more prone to human error than the rest of the staff <sup>(5)</sup>. In any case, the study of the errors of medical care, including nursing, is important in this regard; these errors are on the rise and today are considered as a global problem <sup>(6)</sup>.

In general, there are two attitudes in the analysis of human errors that constitute the major failures of the service system, including the hospital: personal attitude and system attitudes. In personal attitude, center of attention is focused on human errors, and through this attitude, the perpetrators are always blamed for inconvenient acts.

But the centralization of the system's attitude is on the conditions in which permissive humans are working under those conditions and, according to its assumptions; it is inevitable that errors occur even in the best organizations. Thus, according to a systematic attitude, the best way to treat errors is to optimize working systems and processes, and more importantly, empowering employees through

evaluating the performance and training of fallible human rather than retaliate against blaming the wrongdoers <sup>(7,8)</sup>.

The safety of the hospital environment is very important in terms of economic, human and ethical issues. Risk management in hospitals is a program to reducing the incidence and prevalence of events <sup>(9)</sup>. Risk or danger is a threat from an event or action that unduly affects the ability of an organization to achieve its goals. Risk management is the process of identifying, evaluating and controlling process of potential accidental risks, which specifically, its potential events, damage or lack of change in existing status <sup>(10)</sup>.

Risk management is a set of continuous and developing processes that are used throughout the hospital strategy and must be systematically taken into account all risks associated with the past, present and future <sup>(11)</sup>. the accreditation council of health & therapy institutions in EC 1015 has forced the organization to manage and in accrediting, it will consider its status in reducing accidents <sup>(11)</sup>. One of the most important steps in risk management is the accurate and appropriate risk assessment that should be considered in selecting the method and doing it.

Risk assessment is the basis of any management action in the field of staff safety and health, and in particular patients, which is the key to reducing events and occupational illnesses <sup>(1)</sup>. The assessment should determine the risk of different exposures with error and risk, and then, given the exposure to the priorities, the management suggestions and solutions are required to provide control over them. Risk assessment techniques may be categorized in a range and from qualitative approaches to semi-qualitative and quantitative approaches. Limitations such as time, money, manpower, skills, managerial perceptions, community-driven risk communication and political pressures all affect the risk assessment that is to be made <sup>(12)</sup>.

There are several methods for evaluating risk, the most common of which are: FMEA (Analysis of Error Modes and its Effects), FMECA (Analysis of Critical Situations of Errors and Their Effects),

HAZOP (Related Hazard Analysis With the process) and FTA (tree error analysis), the most prestigious of which is the FMEA method are used by the US military to manage risks and reduce the effects of natural and abnormal disasters <sup>(13)</sup>.

One of the most common risk assessment methods, especially in hospitals, is the FMEA method that is a structured and group-based approach that in definition is used for identifying, preventing, eliminating or controlling the state of affairs, the causes and effects of potential errors in a service system <sup>(14)</sup> and can be defined and implemented to reduce or eliminate potentially identified risks, and eventually analysis and proceedings are documented to using them in future if necessary <sup>(12)</sup>. In this study, the FMEA method as one of the risk assessment and risk management tools that has systemic attitude in error <sup>(2)</sup> has been used to identify and prevent errors, which doing this method requires a series of steps and observing a set of rules that have been used in this study <sup>(15, 16)</sup>.

Human resources management includes appropriate selection of people, training, performance assessment, compensation of the services, etc <sup>(17)</sup>. In spite of the great attention to human resources as a vital source of the success of organizations, there is a significant gap in the field of human resources risk, and organizations have little preparation to deal with the risks associated with human capital <sup>(18)</sup> the three categories mentioned are closely related to the performance assessment, rewards and discipline. In general, performance assessment gains important information about the status of organization's safety performance. They are the proper tools for identifying, managing and improving the system and provide the necessary information for conscious decision making about the proceedings <sup>(19)</sup>.

In management science, we cannot control it until we cannot identify and measure the system's problems and gaps in order to progress the organization and the organization will decline subsequently. Therefore, it is necessary for the organization and staff to perform performance assessment which this identification, evaluation and

measurement of the performance lead to system intelligence and stimulate individuals to develop the desired behavior and this is the main part of the formulation and implementation of organizational policies. All organizations, especially those responsible for providing immediate services to the community, are required to provide the environment and conditions in which there is no harm to customers and employees of the organization <sup>(20)</sup>. One of the important factors in reducing or increasing the risks of an organization is human resources and its effective management to growth and development of countries and organizations is not covered on any of the managers, specialists and experts in this area <sup>(21)</sup>. Efficient human resources are considered as valuable finance and assets of each organization. Many organizations are unable to use these resources due to the lack of a competent and capable human resource despite having rich natural resources. Hospitals and medical institutions are not exempted of this issue, and their human resources are formed the basis of the health system. Hence, human resource management in hospitals is seeking to find scientific and applied methods which aimed at increasing the efficiency of therapy staff to take steps order to organization' goals and patient health <sup>(22)</sup>. Given the damages and risks caused by that in the hospital, the purpose of this study is identifying, analyzing and prioritizing the risks by using the FMEA method as an appropriate tool, as well as providing solutions for reducing or controlling identified damages and more importantly determining the role of HRM in controlling and reducing the risks and available errors in various ways.

## Methods

This was a descriptive-analytic study. The research population included the medical staff of Dr. Mojibayan Hospital in Yazd. The hospital's risk management team consists of 10 expert individuals along with participation of experienced medical staff, tried to identify existing risks in the various hospital departments by FMEA method through inspection, observation and review of processes, within a year. They identified risks in

the categories of medical orders, drug orders, nursing care, file registration, and so on.

After assessing the risks by the FMEA method, the risks were prioritized in collaboration with the team. By using tables 1 to 3 (Normal standardized tables for pointing error), and finally, by applying the points given by the team, Excel software and

formula 1 the risk priority score, RPN (Risk Priority Number) was calculated.

Formula 1:

$$RPN = S \times O \times D$$

S: Deterioration

O: Probability of occurrence

D: Probability of discovery

**Table 1.** Pointing the effect of the deterioration of the error

Characteristic	Effect intensity	Rank
It is regrettable deterioration such as risk of death	Dangerous - No warning	10
The deterioration is regrettable, but with warning	Hazardous - with a warning	9
The deterioration is irreparable - the loss of a body member	Very much	8
The deterioration is high, like burning equipment and burning the body	Much	7
The deterioration is high but compensatory. Like Local burn-Sectional injuries	Average	6
The deterioration is low. Such as beat-mild food and drug poisoning	Low	5
The deterioration is very low. But most people feel it - a partial leak of gas in the operating room leaves little effect. Like a scratch	Very low	4
It has a very small effect	Partial effects	3
No effect	Very Partial	2
Characteristic	Nothing	1

**Table 2.** Event Score (Error / Causes of Error)

Probability of risk	Possible rate of risk	Ranking
	1 in 2 or more	10
Very high: the risk is almost unavoidable	1 in 3	9
	1 in 8	8
High: repeated risks	1 in 20	7
	1 in 80	6
Average: Case risks	1 in 400	5
	1 in 2000	4
Low: relatively rare risks	1 in 15,000	3
Unlikely: improbable risks	1 in 15,000	2
Probability of risk	Less than 1 in 15,000,000	1

**Table 3.** Scoring the probability of detecting or identifying an error

<b>Criterion: The probability of detecting a risk</b>	<b>Discoverable capability</b>	<b>Rank</b>
There is no control or if there is, cannot detect potential danger.	Absolutely no	10
There is a very low probability of detecting existing by existing controls.	So insignificant	9
There is little probability of detecting and detecting risk by existing controls.	Insignificant	8
There is a very low probability of detecting risk by existing controls.	very low	7
There is low probability of detecting risk by existing controls.	low	6
In half of the cases it is possible to detect the potential risk by existing controls.	Average	5
There is a fairly large probability to detect the potential risk by existing controls.	Fairly high	4
There is a high probability to detect the potential risk by existing controls.	high	3
There is a lot of probability to detect the potential risk by existing controls.	A lot	2
Potential risk is almost certainly detected and exposed by existing controls.	Certainly	1

Identifying and prioritizing important errors was carried out based on the priority points of the risk assessment obtained, and among them, proposed and corrective proceedings were provided to prevent and control the important and key errors. And finally proportional executive solutions were proposed for each error mode. The RPN score of each error was calculated from 1000, with accepts an error with the rate of 10%, errors with a RPN score of less than 150 were discarded from the review cycle, and for other errors that had scores above 150, were proposed a prioritization and appropriate strategy. Proposed proceedings and suggested solutions were developed by the opinions of relevant experts in the form of an action plan. Action Plan was developed for doing corrective action, and

approved by the head of the hospital, and followed by the necessary corrective actions. Subsequently, risk reduction methods and proposed corrective proceedings were examined to determine the role of HRM in risk improvement strategies.

### Results

Errors related to nursing cares were identified as one of the most important work processes of nurses in the hospital by using the FMEA technique in hospital risk assessment. Among identified risks, 22 risks were assigned a RPN higher than 150, where corrective proceedings were a priority. As shown in Table 4, the highest RPN was related to lack of implementation of blood injection guidelines.

**Table 4.** Identified risks with an RPN of over 150 and their corrective proceedings

Row	Risk / Identified risks	Severity	Occurrence	Detection	RPN	Department under evaluated	Predicted Control measures
	Lack of implementation of guidelines for blood injection	8	8	7	448	Therapy departments	<ul style="list-style-type: none"> <li>- Compilation and review of blood transfusion instructions</li> <li>- Face-to-face training by the relevant expert in relation to blood transfusion</li> </ul>
	The process of medicate - missed dose	6	8	7	336	Therapy departments	<ul style="list-style-type: none"> <li>- Compilation of the medical booklet</li> <li>- Teaching how to calculate the dose and use the formula for calculating the dose</li> </ul>
	Lack of adequate training for the patient	6	9	6	324	Therapy departments	<ul style="list-style-type: none"> <li>- Development of educational pamphlets for patients at the time of admission and discharge</li> <li>- Monitor the training given to patients</li> </ul>
	Lack of segregation of infectious waste and non-infectious	5	8	7	280	Therapy departments	<ul style="list-style-type: none"> <li>- training the segregation of waste to employees</li> <li>- coloring waste bins and labels for all waste bins</li> </ul>
	Failure to determine the blood group of patients who need surgery	10	7	4	280	Therapy departments	<ul style="list-style-type: none"> <li>- Strict supervision of the head nurse and emphasis on supervision by two nurses</li> </ul>
	The process of medicate - missed dose	7	7	5	245	Therapy departments	<ul style="list-style-type: none"> <li>- Establishing guidelines for implementing the risk management process by 2 nurses</li> <li>- Monitoring the patient's identification process by supervisor</li> </ul>
	Lack of sufficient awareness of employees at work	6	8	5	240	Therapy departments	<ul style="list-style-type: none"> <li>- The use of new forces after training courses</li> <li>- Applying new forces as auxiliary forces in shift for one month</li> <li>- Emphasis on keeping hands clean</li> </ul>
	The risk of transmission of infection	7	6	5	210	Therapy departments	<ul style="list-style-type: none"> <li>- Continuous training of therapy staff</li> <li>- providing equipment and washing personal protective equipment</li> <li>- Standardization in connection with the isolated room</li> </ul>
	Being Low the head of the bed at the time of gavage	7	6	5	210	Therapy departments	<ul style="list-style-type: none"> <li>- Continuous training of gavage in patients</li> <li>- Empowering personnel through control and supervision of supervisors</li> <li>- Applying experienced, enthusiastic and experienced forces</li> </ul>
	Creation of Bedsore	8	6	4	192	Therapy departments	<ul style="list-style-type: none"> <li>- Continuing staff training and improving nursing care</li> <li>- Continuous monitoring of nursing care delivery</li> </ul>
	The process of medicate - giving medicine to the wrong person	8	4	6	192	Therapy departments	<ul style="list-style-type: none"> <li>- Implementing patient identification protocol</li> </ul>

falling patient from the bed	9	7	3	189	Therapy departments	<ul style="list-style-type: none"> <li>- Teaching the importance of patient's initial assessment and checklist of falling from the bed and ensure that the beds are high</li> </ul>
The process of medicate - giving medicine to the wrong person	7	5	5	175	Therapy departments	<ul style="list-style-type: none"> <li>- Implementing the risk management process by 2 nurses</li> <li>- Monitoring the patient's identification process by supervisor</li> </ul>
The process of medicate - prescribing the wrong drug (for any reason)	7	5	5	175	Therapy departments	<ul style="list-style-type: none"> <li>- providing the process of medicate</li> <li>- Monitoring the process of medicate</li> <li>- therapy errors training</li> </ul>
Patient care, injections, blood sampling, suturing and dressing	8	7	3	168	Therapy departments	<ul style="list-style-type: none"> <li>- Vaccination of new employees, use of personal protective equipment, observance of safety points during work</li> <li>- Continuous training of employees and reminders of the importance of the issue of needle sticks</li> </ul>
The risk of contact with sharp objects and infectious materials due to the incorrect separation of department' waste	7	6	4	168	Therapy departments	<ul style="list-style-type: none"> <li>- Constant and ongoing monitoring of the correct separation of hospital wastes</li> <li>- Laminate preparation for familiarization with waste separation and exposure of employees</li> </ul>
Failure to proper perform the hand washing process	7	8	3	168	Therapy departments	<ul style="list-style-type: none"> <li>- Continuous monitoring of the process of hand washing</li> <li>- Continuous Hand washing Training</li> </ul>
Lack of knowledge about high-risk drugs and antidoteates	8	7	3	168	Therapy departments	<ul style="list-style-type: none"> <li>- Preparation of a list of high-risk and anti-duoden drugs as same for departments</li> <li>- -Install a bad side for all beds</li> <li>- -Teaching mothers in the pediatric department</li> </ul>
Falling from the bed, especially the children	9	6	3	162	Therapy departments	<ul style="list-style-type: none"> <li>- -Installation of laminate and warning boards for special attention to the mothers of the pediatric department</li> <li>- Nurses' Empowerment in Relation to the Use of Defibrillator and Nursing Continuing Education in Special Sectors</li> </ul>
CPR process - nurse unfamiliar with how to work with the Ect device	8	5	5	160	Therapy departments	<ul style="list-style-type: none"> <li>- Selection of qualified staff for CPR</li> <li>- Teaching the staff about not passing the patient at blood donation with the order of the doctor and in the nursing profession</li> </ul>
Transmission of patient in getting blood for sonography	10	5	3	150	Therapy departments	<ul style="list-style-type: none"> <li>- Providing profile bracelets for all hospitalized patients</li> <li>- Correct implementation of the instructions of identifying the patient (correct patient, correct diagnostic, correct therapy)</li> </ul>
Sending wrong laboratory sample due to inaccurate identification of the patient	7	5	4	140	Therapy departments	<ul style="list-style-type: none"> <li>- Staff training related to the importance of the subject</li> <li>- Formulation of nominal similarity policy</li> </ul>



## Discussion

The need to establish an FMEA process is that by reducing the risk of an error, there is a possibility of changing the risk number of another error; therefore, it is necessary to reviewing the risk priority numbers after the implementation of the improving measures, both in order to monitoring the effectiveness of measures and to determine the changes made in the indexes of other errors that are correlated with the improved error<sup>(23)</sup>. About the possibility of creating a positive or negative change, Robinson et al., during a research by FMEA method, showed that although the establishment of computerized registration systems for medical order reduces the management, distribution, and management of chemotherapy errors rather than manual recording, however, it is expected to occurring different errors. Therefore, he has proposed continuous use of the FMEA method order to cope with these errors<sup>(24)</sup>. In this study also all the corrective proceedings were placed by the FMEA and the second RPN worksheet was used to explore and evaluate the effectiveness of the corrective action. In the present study, the highest RPN was belonged to the lack of implementation of guidelines for blood injection and the second rank was related to medicate-missed dose process, which **corrective** suggestions were included compilation and review of instructions as well as training. According to Sedaghat and et al., (2008), besides providing subsidiary requirements of the treatment and medicine to reduce human errors, it is nesecary to increase the monitoring personnel performance, pay more attention to given reports as well as periodic evaluation to upgrade workforce skills, through holding and participating in the relevant training classes<sup>(25)</sup>. Considering that most corrective proceedings related to continuing education and professional items were placed in the field of human resource management, therefore, we investigated the role of human resources management in reducing hospital dangers and errors; therefore, human resource management with serious planning and using training, encouraging and punishing methods play

a significant role in reducing and controlling the risk of clinical risks and improving patient safety.

The Role of Human Resources in Risk Management:

Job analysis determines the required tasks and skills. The first step of job analysis is job specifications.

The second activity of human resource management is the recruitment of human resources, to attract those forces that have the ability to do task in the intended position efficiently. The third step of human resources management is, orientation of early recruitment training and job training This process will make people familiar with the missions, history, organization culture and provide basic information for a good start.

The Canadian Association for Standardization (CSA) has widely considered training as an important component Occupational Health and Safety (OHS) programs. One of the most important proceedings of managers and supervisors, and especially human resource managers is to provide safety training which reflect their practical support of safety. Training is the process by which employees to achieve knowledge, learn about new skills, or get an incentive to do things in a particular way. Providing safety training in the organization makes employees aware that their health and safety is important for organization management<sup>(26)</sup>. Training and improving human resources is a kind of useful investment and a key factor in development, which can have a significant economic returns if properly and competently planned and implemented<sup>(27)</sup>.

In the current over-competitive world, organizations, regardless of their size have to invest on their employees by implementing objective-based training, in order to maximize productivity. In fact, this kind of training leads to improve in organizational performance<sup>(28)</sup>.

Communications is an essential skill for human resources management and can play an important role in interpersonal relationships processes, interviewing and new personnel recruitment process, training and performance evaluation, and



more. The generalization and expansion of the inter-organizational communication culture will be necessary in achieve of explanatory purposes in reducing the risk of human resources. Since today the conditions has changed in such a way that staying in the organization's sphere of work and gaining competitive advantage over other competitors requires the training and learning new knowledge and technology, therefore, senior management of organizations and companies should be concerned with the field organizations that need to learn the necessary courses have the necessary knowledge. Human resources management is considered as a systematic approach to people management, which is trying to integrating different activities so that they are compatible with each other <sup>(29)</sup>. The heart of the activities of organizations and industries are human resources <sup>(30)</sup>. What distinguish successful, developed and advanced organizations and companies from others are their human resources. Today, human resources is the only source of ideal and eternity, that their correct management can provide the basis for the growth of the organization and the employees <sup>(31)</sup>.

In spite of the great attention to human resources as a critical source of the success of organizations, there is a significant gap in human resources risk, and organizations have little readiness to deal with the risks associated with human capital <sup>(18)</sup>.

Human resources management includes appropriate selection of people, training, performance assessment, compensation services, etc <sup>(17)</sup>. Proper management of the human resources will increase employees' commitment and engagement, increase in job satisfaction and maintaining employees, effectiveness and ultimately, safety of the organization <sup>(32)</sup>.

In this study, the potential effects, causes of error and its control and current control and corrective proceedings were determined for RPN risks more than 150, and the responsible for implementation and

follow-up was identified for each corrective action. These corrective proceedings were classified into four categories:

- 1- Training and empowering nurses to improve nursing cares in the main processes
- 2- -Assessment of performance and continuous monitoring of nurses' performance, employee assessment and training of staff subsequently.
- 3- Applying skilled and experienced personnel with scientific interviews and non-accepting staff without early entrance justification training.
- 4- Sorting forces based on workload.

Major corrective proceedings focused on staff training, assessment of their performances, and preparation of necessary guidelines centralized as a part of the HRM tasks.

### Conclusion

Due to the existence of various dangers and risks in the hospital, excellence in risk management position is essential for improving the quality of treatment and enhancing the safety of patients and employees. In this regard, human resource management, in developing educational programs, adopting policies and procedures, and establishing monitoring and evaluation to streamline risk management as well as reducing and controlling risks in the hospital plays an important role.

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### Conflict of interes

None

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