

# Hospital incidents' prevalence rate and its effective agents in the staff of a military hospital

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## Abstract

**Aims:** Awareness of hospital incidents and their causes can affect the managerial planning of hospitals and finding preventive measures in order to reduce occupational incidents and ultimately reduce in hospital expenses. This study was performed with the aim of investigating the prevalence rate of hospital accidents and their associating factors among the staff of one of Tehran hospitals.

**Methods:** This descriptive cross-sectional study was performed on 190 staffs of one of Tehran hospitals during 2008-2009. All incidents were considered and subjects were selected by systematic random sampling method. Data was collected by a questionnaire and a checklist. Data was analyzed by SPSS 17 software using Chi square test and paired proportion test.

**Results:** 62.6% of cases had been injured only once and 34.7% had been injured more than once. Cuts, perforations and ulcerations (92 cases) had the highest prevalence rate. Inobservance and imprudence was the cause of most cases of incidents and unsafe working conditions and lack of individual protective equipments were in the next order respectively. The effect of subjects' education level ( $p < 0.001$ ) and work experience ( $p < 0.05$ ) on incident rate was significant.

**Conclusion:** Cuts, perforations and ulcerations have the highest prevalence rate among hospital accidents. Inobservance and imprudence is responsible for most cases of incidents. The education level and work experience have significant effect on the rate of hospital incidents.

**Keywords:** Hospital Incidents, Prevalence Rate, Hospital Staff

## Introduction

Incident is an unplanned and often destructive event that disrupts the administration, development or continuation of the work. Incident is caused by unsafe tasks or working in unsafe conditions or a combination of the two, because of the lack or weakness in its detection, or due to some failures in risk control systems [1]. In today's modern world that all affairs rely on advanced and complex and risky technology, there is always a fear that, due to the events and incidents caused by work, non-compensable damages will be happen. Events usually happen due to the lack of discipline in the work, defects in machines, inobservance and imprudence, lack of physical or psychological coordination or compromise with the type of labor [2].

Events that happen during the task for employees are called occupational incidents. Occupational incidents, in addition to physical injuries and disability in labor force, cause the loss of capital and equipment and result in economic losses. Therefore, investigating the events from the human, social and economic points of view is very important [3]. Given the importance of prevention of incidents for maintaining staff health, creating security in work environment is essential in all levels. One of the fundamental institutions

providing health-treatment services is hospital that plays an important role, through its special facilities, in returning the physical and mental health to the patients in society, medical research and teaching export forces required for sanitary and health section [4]. In fact, hospitals are supportive for community and any problems that interfere with the service or job and its employees' activity, imposes a deficiency or defects to the society and creates a disturbance in the development of society. In each hospital because of diversity of activities carried out in it, all kinds of risks are in ambush of patients, staff, supplies and equipment and protecting them from these dangers is crucial. Maintaining the safety and proper maintenance of the hospital is one of the responsibilities of the Hospital staff and it should be among the general policies of hospital. In this regard, hospital administrators and managers must be sure about the existence of safe environment for patients, staff and visitors and be sure about the safety and proper maintenance of equipment and facilities [2]. Hospital or Health-treatment center management is responsible for developing local and administrative procedures in providing maintenance and safety for staff, patients and other people of society. However, there is no absolute and 100% safety course and never will be obtained practically. This is why it is said that

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safety is relative maintenance against the dangers [2]. Each year, millions of incidents happen in world. Some of these incidents cause deaths and another ones lead to partial or total disability and generally speaking, all incidents cause suffering, pain and economic losses for all their victims [3]. Some of the most important events that might occur in hospitals include toxicity with chemical vapors and gases and medical gases, exposure to radiation randomly, eye contact with vapor of disinfection materials, spraying the contaminated fluid to head and face, jumping foreign body in eye, spraying chemicals in the eye, accidental, cut with sharp and tip objects, electricity - shock, firing, falling objects, falling from height, sliding, falling down and being beaten or injured of hospital staff by patients or other clients [5].

One of the major hospital incidents is caused by contacting with needle. These injuries include cut, perforations, crack, scratch, and deep ulceration that caused by sudden accidental needle. Damages caused by contact with the needle can cause transfer of many other diseases, such as disease caused by biological factors. Another very important event in the hospital happens for staff that uses cold sterilization with Glutaraldehyde in operating room, dialysis section and intensive care unit. This chemical non-color liquid, is oil with nasty and severe odor. Hospital staff often uses it in diluted form with water. Contacting with Glutaraldehyde causes different damages such as throat and lung irritation, asthma, asthma like symptoms and hard respiratory, blood nose, burning eyes, itching, contacting dermatitis with allergic, spots on the hands, headaches and nausea.

Being aware of these incidents and causes of their occurrence can be effective in hospital management planning and finding the preventive actions in order to decrease the number of incidents caused by work and finally reducing the hospital's cost.

This study aimed to investigate the prevalence of hospital incidents and its influencing factors in a military hospital staff in Tehran.

## Methods

This descriptive cross-sectional study was done on 190 staffs of one military hospital in Tehran who were injured in this hospital from the beginning of 2008 to the middle of 2009. All incidents were considered and the subjects were chosen through systematic random sampling method.

First, the necessary coordination and correspondence with relevant authorities was done.

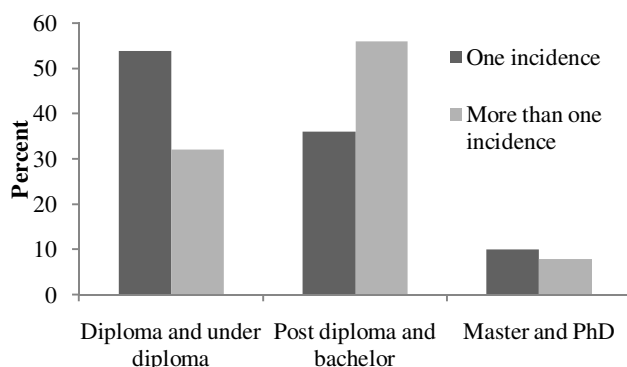
For data collection, available forms and checklist for investigating hospital incidents were observed and since the health management of hospital had opened a file and completed the reported paper for injured staff for several years, the available forms in hospital health management were investigated and the information about all happened incidents in mentioned period were registered in a designed checklist. The designed checklist and the form for registering personal information were based on the standard checklist of ministry of labor which has been used in many researches and its validity and stability had been proved previously. Demographic information of injured people (grade or rank, age, level of education and marital status) and information about the incident (injured part of body, time of incident and cause of incident) were completed. In cases where information was incomplete, required information was completed through referring to or interviewing with people involved in accidents. Since there was the possibility that some occurring events in hospital had not been reported due to various reasons such as avoiding important injuries, these people were identified through informing statement to all hospital staff and incident questionnaire was also made for these people. In this design, important hospital incident factors were targeted and investigated such as cutting with sharp objects and objects with tips, accidental Needle in the body, skin contact with blood or other body fluids, jumping of foreign body in the eyes, chemical spraying in the eyes, splashing contaminated fluids to head and face, eye contact with disinfection material vapors, exposure to radiation accidentally, poisoning with gases and chemical vapors, chemical toxicity due to working with solvents, firing, electrical shock, burnings, falling from height, sliding and falling down, Trauma back pain while changing the status of patients, being beaten or injured by the patient or other clients, sports injuries and other incidents. Due to the wide range of events type, for ease of presentation the results, different types of events were placed in six main groups including lacerations, accidental Needle, slide and collision, burns, electric shock and other cases. Since the purpose of this research was overall investigation of hospital incident and not between section investigations, therefore, no comparison was done between different sections of hospital. Collected data were analyzed by SPSS 17 software using Chi square test and paired proportion test. Analyzing the effect of age, work experience and education on incident occurrence was performed using Chi square test and analyzing the effect of gender and marital

status on incidents' occurrence was done using paired proportion test.

### Results

137 subjects (72.1%) were men and 53 women (27.9%) were female. Also, 168 subjects (88.4%) were married. The mean of age was 36 years. Minimum age was 19 and maximum age was 66 years and the age range was 47. 27% of injured subjects had the average age over 40 and others were less than 40. Significant relationship was not observed in the effect of age on the occurrence of the incidents.

People with master degree and higher had the lowest accident. But the number of incidents was more in people who had bachelor's and post diploma degrees than those who were high school graduates or less. This issue was quite evident in the occurrence of more than one incidence (Diagram 1). Impact of people's education on the occurrence of incident was statistically significant ( $p < 0.001$ ).



**Figure 1-** Proportion of incidents based on the level of education in injured subjects

**Table 1-** Relative frequency and total percentage of occurrence causes

Causes of occurrence	Number	Percent
Unsafe action or individual's inobservance	102	35.5
Lack of personal protective equipment	48	16.7
Failure in instruments or used machines	26	9.1
Not using personal protective equipment	26	9.1
Destruction of personal protective equipment	4	1.4
Unsafe working conditions	79	27.5
Insufficient training or lack of information	2	0.7

Among the causes of incidence, lack of precision or individuals' inobservance was the main reason. Unsafe working condition was in second position. The third cause of the accident was the lack of personal protective equipment. Also, the least cause of incident was the lack of training (Table 1). Most injuries cuts, perforations and lacerations which were 92 cases.

After that, contusion and beat with 32 cases and mild and moderate burns with 29 cases were in the next positions. 62.6% of subjects were injured once and 37.4% were injured more than one time.

The second important factor affecting the incident was experience of subjects specifically that the effect of experience of people on the occurrence of incidents was statistically significant ( $p < 0.05$ ).

Men in both occurrence of an incident and occurrence of more than one incident were injured more than women. Therefore, gender influenced the occurrence of the incidence. Marital status was also effective in occurrence of the incidents, but contrary to common expectation married people were injured more than single people. Differences in comparison between married and single people was significant both in the occurrence of one incident and in occurrence of more than one incident.

### Discussion

Providing optimal health services and improving hospital processes is impossible without participation of all human resources and continuous, effective and ideal services. Mehrabi et al. studies about incidence in a military organization [6] showed that the age of most of injured subject had been 25 to 35 and they have expressed the lack of training and sufficient expertise as the main reason of incidents. Ghaffari and Khosravi [7] in their study on incidence of occurrence which has been done in one of provinces of the country came to the conclusion that incidences are more in young groups than adults and older people. These results are in accordance with the results of this study. Lazarus et al. in their study expressed inappropriate environmental factors and existence of stress in military people as one of the main causes of incidents [8]. Being sensitive and having aggressive spirit is one of the main causes of incidents in men. This result has been reported by Jonah et al in their study [9]. While in the current study lack of precision has been the main reason for the incidents. The results of this study show more incidents in men than women, in the way that 72% of incidents occurred for men and 28% occurred for women. Baumrind in his study emphasized on determining factors of family and peers behaviors that transfer to person [10].

Most of the occurred incident was due to the accidental sticking of the needle into the medical staffs' fingers. This type of incident is very important because of the probability of transferring dangerous diseases such as hepatitis and AIDS. The result of

Studies of Yavari [11] and Rangras [12] show that cuts form the most incidents in Iran. Results of the studies of Mehrabi et al. [6] showed that the literacy rate is very important in creating the incident, in the way that most victims had been under diploma or at last diploma degree. Lacerations and amputations were the most important effects of incident. In this research it was revealed that more accidental Needle was in right hand fingers (82%) and then eyes (12%) respectively. In addition, most injuries were related to people with the work experience of less than 10 years. Asgarian et al. [12] in research that had investigated the amount of injuries caused by accidental Needle in the 52 Hospital and Health Center in Fars province reported that at least 49% of the staff had once experimented accidental Needle. Of this number, 95% were related to the accidental sticking of needle to finger and others related to other organs of body. Also, this incident has been repeatedly occurred in large group of people injured by accidental needle body. 31% of People with diploma degree or fewer degrees had a history of more than one case of accidental Needle but in staff with educational degree over diploma this action has been repeated in only 14% of cases. It seems that staff with higher education, after one incidence have had more care in avoidance of incidence repetition. Absence from work is an important consequence of hospital incidents. Vincent et al. [13] in research which was conducted in three hospitals in Canada indicated that 77% of hospital incidence had led to absence from work. They knew the movement of objects and patients by hospital staff as the most important cause of these incidents. They also identified that lack of inadequate training of safety regulations and prevention of incidents in hospital staff is the main problem in occurrence of incidents. Most causes of incidents in this study were inaccuracies in the work, unfavorable conditions and lack of protective equipment respectively. While Robert et al. [14] identified ergonomic problems and inappropriate equipment as the main cause of injuries in a hospital in England. Lewis et al. [13] in their study conducted in Medical University of Dublin in Ireland has known needle accidents as the main hospital incidents and then back pain due to movement and transport, falling down and contact with chemical liquids respectively. Transmission of diseases through the needle accident as job incidence in United States includes 80 to 90% of total infectious occupational diseases [14]. According to U.S. statistics, every year, 699 thousand to a million injuries occur through accidental

needle-stick that about 16 thousand of cases are infected with HIV but only 10 cases are reported. Generally, there are more than 1000 transmitted infection through blood that is transferred by sharp objects the tip of which is contaminated with blood. Babamahmoodi in his study [15] in 1996 has shown that more than 57% of hospital staffs in Mazandaran province had the experience of contacting with needle. Afrasiabifar who has done his research about hospital incidents in Yasuj [16], has indicated that 39% of staff has experienced cutaneous injury induced by accidental needle. In Nigeria, Ofilia [17] fulfilled a research regarding the cause of incidents in a hospital and express totally four main reasons including lack of available appropriate protective device, type of staff performance, inadequate tools and tendency to excessive speed in working as the main reasons of hospital incidents. While, Inga [18] In Australia, considered back pain as the most common symptom in the nurses that its reason was sliding in moving equipment or patients' bed. Nikpoor et al. [19] investigated Factors affecting the hospital incidence through collecting data from 814 staff of triple hospital parts diagnostic and paraclinical, supporting and general parts. Among the occurred incidents, contact with blood and other body fluids had the highest frequency that is consistent with the results of this study. Also, firing with burning had the lowest frequency and among the hospital incidents with the experience and gender variables significant statistical relationship was observed which is similar to our current study.

Occupational incidents are one of the most important problems in developed and underdeveloped countries. The most important part of these incident costs is their human cost. Disabilities and absenteeism due to these incidents cause a waste of life and related costs. Significant human costs demands more attention to safety and health work. Quality of hospital services is not isolated from the safety issue in hospital and until the management, does not do effective action to reduce hospital incidents, create proper safety in hospitals will not be achieved. Paying attention to the results of this study it is suggested to reduce and control incidents in the hospital through appropriate action. Holding safety education courses for medical staff and other hospital staff, close supervision on all staff vaccination especially against hepatitis, making additional safety issues to training courses and appropriate training courses especially for managers, are the most important steps in reducing incidents in the hospital.

## Conclusion

Most incidents are related to cuts, perforations and ulcerations. Inobservance and imprudence are the major causes of incidents. An unsafe working condition is in the next position and the least cause of the incident is the lack of individuals' training. People with masters' degree and higher education level face the least incidents. Work experience and education level are significantly effective in incidents. Gender and marital status of people also affect incidents.

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