

Frequency and Types of Medical Errors in Infectious Patients Referred to the Emergency Department of Imam Reza (AS) Hospital in Kermanshah, Iran (2014-2015)

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ABSTRACT

Introduction: Medical errors have significant economic and clinical consequences and are considered as great challenges for the healthcare systems of different countries. With regard to the importance of medical errors, this study aimed to evaluate the frequency and type of medical errors in infected patients, admitted to the emergency department of Imam Reza (AS) Hospital in Kermanshah, Iran in 2014-2015.

Materials and Methods: In this cross-sectional, descriptive study, we evaluated medical errors affecting infected patients, admitted to the emergency department of Imam Reza (AS) Hospital in Kermanshah, Iran. Data were collected, using a questionnaire including demographic and clinical information and type of medical errors.

Results: Data were collected from 385 clinical records available at the emergency department of the hospital. In a total of 809 distinguished errors, the highest rates of error were as follows: medication errors (30%, CI 95%: 0.26-0.34), diagnostic errors (24.60%, CI 95%: 0.22-0.28), and admission for more than 6 h in the emergency room (14.34%, CI 95%: 0.12-0.16). Based on the findings, unnecessary prescription of antibiotics accounted for the highest percentage of medication errors (16.07%, CI 95%: 13.52-18.62).

Conclusion: According to the results of the present study, errors in diagnosis and treatment were the most frequent medical errors. Therefore, it is necessary to plan on reducing the frequency of these errors.

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Introduction

Medical errors, described as errors or mistakes made by physicians, are considered as a threat to patient safety, leading to various complications and enormous costs for healthcare systems (1, 2). Medical errors are defined as mistakes in medication prescription, surgical procedures, diagnosis, administrative tasks, and use of technologies and facilities (3). Medical errors have significant economic and clinical consequences and are great challenges for the healthcare systems of different countries; therefore, countries try to minimize these errors and reduce the associated damage (4, 5).

According to the literature, in spite of scientific advances and recent technologies, 3-17% of patients,

admitted to hospitals, suffer from damages or complications caused in some way by medical errors or undesirable events in hospital settings. On the other hand, almost half of these errors can be prevented by observing the available standards (6, 7). Medical errors are caused by a variety of factors and there are different solutions for dealing with these errors. However, acquiring accurate statistics about medical errors can be challenging. In fact, inconsistent rates have been reported with regard to the incidence and prevalence of medical errors in different studies (8, 9).

According to a report by the Agency for Healthcare Research and Quality, nearly 7000 deaths occur due to

medical errors. Besides, medication side-effects, known as the main cause of medical errors, were estimated to cost about 3.5 billion dollars in 2006. Medical errors are a major cause of mortality in the United States.

Based on a report by the American Institute of Medicine, rate of mortality caused by medical errors has been estimated to be even higher than the annual mortality rates caused by road accidents, breast cancer, or AIDS (7-10).

Based on the statistics, in developing countries such as Eastern Mediterranean regions, about 4.4 million medical errors occur annually at therapeutic centers. In these countries, more attention has been paid to medical errors, especially in recent years (11).

Therefore, identification of medical errors can considerably help reduce the occurrence of errors and the associated complications in patients and decrease treatment costs. The most common type of medical errors and medication side-effects include hospital-acquired infections, surgical injuries, incorrect surgery, wound infection, and inaccuracies or delays in disease diagnosis (12, 13).

Serious errors with severe consequences occur more frequently in intensive care units, operating rooms, and emergency departments (14). Considering the large number of patients referred to emergency departments and the probability of physician error, one of the susceptible sections in hospitals is the emergency department; in these settings, errors can negatively affect patient treatment plans (14-16).

By considering the importance and impact of medical errors on patient safety, identification and registry of these errors, especially in emergency departments, can be one of the primary steps in controlling medical errors (17, 18).

Therefore, this study was conducted with the purpose of determining the frequency of medical errors in infected patients, admitted to the emergency department of Imam Reza (AS) Hospital, affiliated to Kermanshah University of Medical Sciences in 2014-2015.

Materials and Methods

This descriptive, cross-sectional study was conducted at a hospital, affiliated to Kermanshah University of Medical Sciences after obtaining permission from the Ethics Committee of the university. Clinical records of patients, referred to the emergency department of Imam Reza (AS) Hospital in 2014-2015, were selected via sampling, among which 385 cases met the inclusion criteria.

Imam Reza (AS) Hospital is the largest medical teaching center in the west of the country with 714 active beds and the highest referral rate to the emergency department. Patients referring to the emergency department are first screened by a physician and then visited by an emergency medicine specialist. Following the initial diagnosis, the patients are transferred to the infectious service unit.

In this study, the data collection tool (consisting of two parts) was designed with respect to the study objectives and relevant sources (related articles). The first part included demographic and clinical information of the patients such as age, sex, illness or complaint, referral status, intervention, and treatment.

The second part contained a list of 12 potential medical errors in the areas of diagnosis, treatment, and laboratory services. The tool was confirmed after revisions and reviews by specialists (two infectious diseases specialists).

Medical errors in this study included all the occurred errors in therapeutic and observational processes. Checklists were completed by extracting the information available in the records. The frequency of medical errors was assessed separately by two specialists of infectious diseases in accordance with diagnostic and therapeutic protocols and literature on infectious diseases. Finally, the necessary information was extracted and the data were analyzed using descriptive statistics (frequency, percentage, and confidence interval) via SPSS Version 23.

Results

The results of this study showed that among 385 studied cases, 222 (59.60%) were male and 156 (40.60%) were female. According to the findings, the most prevalent reason for patient referral was lower respiratory tract infection (30.60%), while the least frequent causes were upper respiratory tract infections (0.7%) and fever with an unknown cause (0.2%) (Table 1).

Table1: Frequency distribution of disease diagnosis in the studied samples

Diagnosis	Number	Percentage
Upper respiratory tract infections	3	0.7
Lower respiratory tract infections	118	30.6
Urinary tract infections	47	12.1
Sepsis with an unknown cause	72	18.7
Skin and soft tissue infections	59	15.3
Central nervous system infections	15	3.8
Gastrointestinal and intra-abdominal infections	32	8.3
Bone and joint infections	15	3.8
Fever with an unknown cause	1	0.2
Viral infections	13	3.3
Brucellosis	6	1.5
Cardiovascular infections	4	1.0

The absolute and relative frequencies with respect to the error type are presented in Table 2. In a total of 385 studied cases, 809 medical errors were reported in the evaluated emergency department, where the largest number of errors was related to unnecessary medication treatments (n=242, 30%), misdiagnosis (n=199, 24.60%), and hospital admission for more than 6 h in the emergency department (n=116, 14.34%). With

regard to unnecessary treatments, the most common errors included treatment regimens with unnecessary antibiotics (n=131, 16.07%) and unnecessary prescription of ranitidine or pantoprazole (n=111, 13.72%).

Table2: Absolute and relative frequency distribution of error types in the emergency department of Imam Reza (AS) Hospital of Kermanshah in 2014-2015

Error type	Number of errors (absolute frequency)	Percentage	CI 95%
Unnecessary medication treatments	242	29.91	(0.26-0.34)
Misdiagnosis	199	24.60	(0.22-0.28)
Admission for more than 6 h in the emergency unit	116	14.34	(0.12-0.16)
Request for unnecessary laboratory tests	78	9.46	(0.08-0.12)
Request for unnecessary medical imaging procedures	64	7.91	(0.078-0.082)
Unnecessary consultation	51	6.31	(0.04-0.08)
Delayed response to necessary consultations	44	5.44	(0.03-0.07)
Unnecessary procedures	15	1.85	(0.01-0.03)
Total	809	100	

Misdiagnosis also accounted for 24.60% of medical errors, which were mostly undocumented in the records on initial and final clinical diagnosis. According to the findings of the current study, the most unnecessary procedure was echocardiography performed in 15 cases (1.85%). Also, considering errors related to unnecessary imaging procedures, the majority of cases were related to sonography and chest CT scan (68.75% and 15.63% of imaging errors, respectively) (Figure 1).

In addition, 6.31% of unnecessary consultations were given by various sources in which the delay in the response of the required consultations also accounted for 5.44% of the cases.

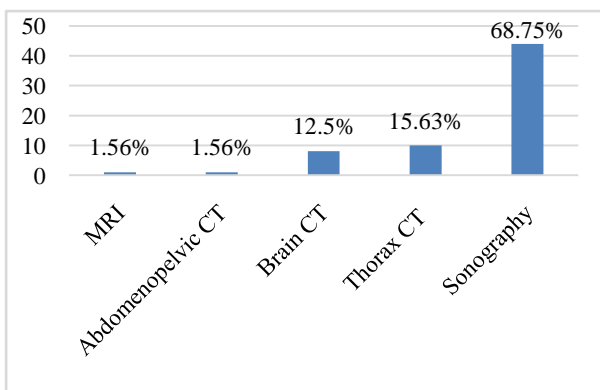


Figure1: Absolute and relative frequency distribution of unnecessary imaging procedures.

Discussion

The results of the present study showed that 809 errors occurred in the emergency department of the studied hospital over one year. In this regard, the results reported by Khamrnya and colleagues demonstrated that 357 (8.2%) medical errors in hospitals were reported in emergency departments (ranked the fifth place) (19). Considering the importance of medical errors, it seems that the high frequency of these errors in the emergency department can be related to the patient's personality, overcrowding, confrontation of physicians with different clinical conditions, monitoring, and overwork at the emergency department, as working conditions are among factors leading to unsafe clinical practices and errors (20, 21).

The results of this study showed that medication and diagnostic errors accounted for the largest percentage of errors; this finding was consistent with the results of previous studies in this area (22-25). In comparison with the current study, Pourali et al. in an investigation of 82 complaints about emergency medicine specialists showed that diagnosis and treatment errors were the most prevalent medical errors (23).

Also, Rezazadeh and colleagues investigated the frequency and cause of hospital errors at Imam Khomeini (RA) Hospital of Shirvan, Iran in 2012 and observed that medication, clinical skill, and laboratory errors accounted for the highest percentage of medical errors (24). Also, Shoja et al. in a study on the frequency and influential factors of medical errors at Imam Khomeini (RA) Hospital of Esfaryen, Iran showed that 105 (36%) out of 290 identified errors were medication errors (25).

Medication errors are the most prevalent medical errors, majorly occurring in physician prescriptions (4, 12, 26). Discrepancies which are sometimes observed in the frequency of medical errors in various studies can be related to variations in the nature and type of activities in different medical fields and hospital conditions, such as execution of procedures according to the standards, effective relationship between health team members, and proper registration and error reporting systems (27-29).

Studies performed in developed countries have shown the increasing rate of medication errors in recent years. In developing countries, presenting exact statistics on medication errors is difficult due to the absence of registration and reporting systems (29). In a previous study, in a total of 242 detected medication errors, 16.07% were related to unnecessary antibiotic treatment regimens. This finding can be justified as the use of antibiotics is prevalent in many regions of Iran (29).

Also, according to the US Agency, due to the widespread use of antibiotics and availability of various brands, these agents are the most prevalent pharmaceutical drugs with the highest probability of

error (30). Among the identified errors, hospital admission for more than 6 h in the emergency department accounted for 14.34% of errors. This finding is of significance, as overcrowding in emergency departments is constantly proposed as a serious and pervasive problem, affecting the quality of healthcare services. Lack of timely identification or provision of services for the patients leads to the increased risk of malignant consequences, dissatisfaction of patients and their relatives, and finally violence and interference in the normal affairs of the emergency section (14).

Similar to previous research, the present study had certain limitations. In spite of reviewing 385 cases in the current study, the setting was limited to one single department (emergency department), and consequently, the results may not be generalizable to the entire hospital. Therefore, it is suggested that similar studies be performed in other hospital units so that the results can be compared. In addition, performance of similar studies in other hospital settings can present more comprehensive results. Based on the findings, identification and examination of effective and

underlying factors in medical errors are recommended in future research.

Conclusion

Based on the results of the present study, emergency departments of public hospitals are prone to medication errors, as the most prevalent medical errors. As this type of error occurs due to the improper use of drugs, leads to mortality and morbidity among patients, and imposes heavy costs on hospitals, more attention should be paid to its prevention and management.

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