

Review article

Emergency Pharmacist-A Safety Valve In Hospital Emergency

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Summary

The Emergency Department is a fast-paced work environment. The hectic nature of work in the department often leads to risk of medication error(s). Many factors are involved resulting in wide range of issues. One of the major factors implicated in this regard is verbal orders associated with high risk of dosing errors and therapeutic errors. Pharmacists are experts in the use of medications and bring a unique set of knowledge and skills to the medical team. Active participation of pharmacists in patient care in the hospital emergency department may result in safer and more effective use of medication. These pharmacists are typically involved in assuring appropriate administration of drugs, monitoring patient adherence to therapy, providing drug information to providers, monitoring patient responses and laboratory values, and providing patient education. Since service in the emergency department is getting more and more challenging inclusion of a pharmacist in the team may be an option to improve the situation and help ensure improved care.

Introduction

Emergency department (ED) is known to be a high-risk environment with frequent medication errors. The 1999 Institute of Medicine (IOM) report 'To Err is Human' reported that the ED has the highest rate of preventable adverse events among other clinical environments studied. Clearly, adverse drug events that occur in the ED are a significant public health problem and need to be reduced, but this must be accomplished without making the ED less efficient. Many Published studies have asserted that ED-based pharmacists have the potential to reduce preventable harms to patients¹.

Unique Nature of Emergency Department

Emergency Department in Hospital setting has a very unique environment. Its unique characteristics like overcrowding scene, higher prevalence of IV medication, verbal orders, urgency of use, high stress, multi-tasking, interruptions, unfamiliar patients, limited access to medical record, less opportunity for follow-up, high volume of work, no pharmacy check as in rest of hospital leads to a different and unique environment in ED².

Numerous factors affect the potential for medication errors in the ED. It has been motioned that by nature, the ED is a relatively chaotic and sometimes stress-

ful environment. This is further complicated by overcrowding, which results in patients boarding (remaining in the ED after hospital admission because of a shortage of inpatient beds) for inordinate amounts of time. In addition, the medical record is often incomplete and inadequate, including the current medication list and allergy information^{3,4}. The combination of interruptions, intense pressure, and a fast-paced environment can lead to medication errors and fewer error interceptions. In the ED, USP found that fewer (ie, 23%) errors were intercepted before reaching patients as opposed to general interception rate of 39% of all areas of hospital⁵. Although ED overcrowding has been a topic of frequent investigation, current definitions of the problem are often implicit or focus on factors outside of the ED itself. A more consistent approach to defining ED overcrowding would help to clarify the distinctions between causes, characteristics, and outcomes of overcrowding⁶.

Need of hospital emergency pharmacist

Over the past few years, various reports on pharmacy services specific to the emergency department have elaborated a variety of pharmacist responsibilities, including identifying drug-related problems, providing patient education, taking patient medica-

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tion history, providing pharmacokinetic monitoring and toxicology information services, and participating on cardiopulmonary resuscitation teams. Any situation involving drugs is an opportunity for the pharmacist to utilize his pharmacotherapeutic skills by assessing the patient, recommending the most suitable drugs, preparing and administering drugs, and documenting the whole procedure. These activities can improve job satisfaction and increase the profile of the pharmacist as the drug expert on the health care team. Although emergency medicine (EM) as a specialty practice area for pharmacists has existed since the 1970s, there has been significant growth in this area in the last 15 years^{7,8}.

As far as other health care professional's attitude towards the involvement of pharmacist in ED is concerned a study evaluated it. In that study function of a pharmacist in emergency medicine, clinical pharmacy practice, education and research, are described, and an evaluation of physicians' and nurses' attitudes toward pharmacist involvement in these areas is evaluated. All respondents felt the pharmacist was an important component of the department and a benefit to its patient care and educational programs⁹.

High incidence of medication errors in emergency department

Adverse drug events are a complication of medication use and have received considerable attention after the release of the Institute of Medicine (IOM) report *To Err Is Human*. Although the extent of the problem remains the subject of dispute, medication errors affect patient safety. Approximately 20% of medical injuries or deaths among hospitalized patients may be the result of an adverse drug reaction. In addition, the mean length of stay, cost, and mortality are nearly double for patients suffering an adverse drug reaction¹⁰.

Medication errors in the ED are common, and most errors occur in the prescribing and administering phases. Boarded patient status, increasing number of medications orders, increasing number of medications administered, and part-time nursing status are associated with an increased risk of medication error¹¹.

The enormous increase in the number of available drugs on the market have made it all but impossible

for physicians and nurses to possess the knowledge base necessary for fail-safe medication practice. Patients presenting for care in EDs are usually unfamiliar to their EPs and nurses, and the unique patient factors affecting medication response and toxicity are obscured. An appropriate history, physical examination, and diagnostic workup will assist EPs, nurses, and pharmacists in selecting the safest and most optimum therapeutic regimen for each patient. EDs deliver care "24/7" and are open when valuable information resources, such as hospital pharmacists and previously treating physicians, may not be available for consultation. New developments in information technology and the advent of electronic medical records with computerized physician order entry, ward-based clinical pharmacists, and standardized bar codes promise substantial reductions in the incidence of medication errors and adverse drug events. ED patients expect and deserve nothing less than the safest possible emergency medicine service¹². Unexpected growth in medication use has escalated demand for pharmacists that has outpaced supply. As the profession has moved from a product orientation (dispensing medications) to a patient focus, clinical training requirements have expanded¹³.

Emergency department (ED) is the third most commonly mentioned, appearing in 6% of all medication error reports. The predominant medication error event types in the ED include wrong dose/over dosage, drug omission, and wrong drug. The predominant classes of drugs mentioned in wrong-dose/over dosage error reports include antibiotics, steroids, anticoagulants/antithrombotics, opioids, and nonsteroidal anti-inflammatory agents. Possible risk reduction strategies include expanding the role of the pharmacy department in the ED's medication-use process, limiting the number and variety of medications and concentrations available in the ED, and incorporating redundancies (e.g., order read-back) throughout the medication use process¹⁴.

Opportunities for pharmacist in hospital emergency

An emergency pharmacist has a lot of opportunities in an institution through which he can gain prestige and job satisfaction by involving in direct patient care.

It has been "revealed that pharmacists have been involved in the ED for decades. Services provided by pharmacists in the ED included traditional clinical

cal pharmacy services, responding to medical emergencies, providing consultations on medication issues, identifying and reducing medication errors, and conducting medication histories at hospital admission. Some services were shown to be cost saving”¹⁵.

Following are some roles a pharmacist can play in the Emergency Department.

Drug or Toxicology information provider

Pharmacist can't only be involved in all areas of normal clinical pharmacy practice but can also perform his part also in other areas specific to the Emergency Department too. These include advice and support in emergency toxicology, reporting adverse drug reactions, and preparation of drugs during an arrest. Education is also a high priority and the pharmacist is often requested to provide presentations, help write protocols, and assist with professional development programs¹⁶.

Preventing prescribing errors

In contrast to the practice in most healthcare settings, prescriptions in the ED may not be prospectively reviewed by pharmacy. Very little time is available during prescribing, dispensing, and administration of medications in the ED. These challenges of the medication use is coupled with the fact that physicians and nurses are following multiple patients which often lead to frequent interruptions and risk for medication errors¹⁷.

Drug prescribing errors are frequent in the hospital setting and pharmacists play an important role in detection of these errors. A study was conducted with an objective to describe the drug prescribing errors rate during the patient's stay, to find which characteristics for a prescribing error are the most predictive of their reproduction the next day despite pharmacist's alert. Since 51% of prescribing errors occurred on the first day of stay, pharmacist should concentrate his analysis of drug prescriptions on this day¹⁸.

Taking proper medication history

Placement of a pharmacist in the ED may lead to prevention of many drug related problems in hospital emergency. Taking improper medication history is one of the leading causes in the ED. Gross discrepancies were observed in medication histories taken

by the ED providers (physicians, and nurses) and clinical pharmacists. On the arrival of a patient, ED providers completed a standard assessment that included the patient's medication history. Patients admitted through the ED were interviewed by the emergency pharmacist. In addition to a medication history, the pharmacist collected the patient's height, weight, immunization history, and allergy information. Pharmacist-acquired medication histories in the ED were more complete than those acquired by other health professional¹⁹.

Presence of emergency pharmacist leads to decrease in hospital cost

Many studies have shown that presence of emergency pharmacist leads to saving of hospital cost on drug related illness. Drug-related illnesses (DRIs) records in the emergency department were identified and classified, and the cost involved was analyzed. The target variables were medication and allergy history, drug involved, diagnosis, patient compliance, serum drug concentrations, and length of hospital stay. The most frequently involved drugs found to be albuterol, insulin, and warfarin. Many DRIs seen in the ED patients were preventable, and these preventable illnesses contributed substantially to ED and hospital costs²⁰.

A 3-month prospective, study was conducted in tertiary care medical-surgical ICU. To describes the activities of a clinical intensive care unit (ICU) pharmacist and to determine whether pharmacist-initiated consultations lead to changes in drug costs. And pharmacist-initiated therapeutic consultation leading to changes in drug therapy. When changes in drug therapy occurred, drug costs before and after the change were determined and it was concluded that Dedicated ICU pharmacists are crucial healthcare team members in a multidisciplinary ICU. In addition to substantially reducing drug costs, they provide continuity in individualized pharmacotherapeutic care, and serve an important educational function²¹. It was also shown that provision of clinical services in the ED by a pharmacist appears to have improved medical care, imparted knowledge to ED personnel, and reduced institutional expenditures²².

Medication orders verification

Healthcare facilities may consider the feasibility of increasing the involvement of pharmacy departments in the ED's medication-use process. This may

include involving a pharmacist for important periods of time in the ED and including him or her in meetings involving medication use. A study to determine the frequency of medication errors in one facility's ED before and after an ED pharmacist was assigned to check medication orders found that the rate of errors decreased significantly (66.6%) when pharmacists prospectively reviewed the orders²³. Previous research has shown that a clinical pharmacist can significantly decrease the rate of medication errors by being an active member of the medical team in the ICUs²⁴.

Role of pharmacist in pediatric emergency

A prospective observational study characterized incidence and nature of medication errors during paediatric resuscitations. It was found that medication errors commonly occur during all stages of paediatric resuscitation. Many errors could be detected only by analyzing syringe content, suggesting that such errors may be a major source of morbidity and mortality in resuscitated children²⁵. As well as the role of emergency pharmacist is concerned, the incidence of medication errors in paediatric emergency cannot be avoided as a study conducted to describe the incidence and type of drug errors in a pediatric ED and determine factors associated with risk of errors. It was concluded that in the pediatric ED, trainees are more likely to commit prescribing errors, and the most seriously ill patients are more likely to be subjected to prescribing errors²⁶.

Emergency pharmacist's role in drug therapy recommendations

In addition, other healthcare facilities that have used pharmacists in their EDs have shown improvements in many aspects of medication use, such as reducing medication order turnaround time, making medications more readily available and improving compliance with clinical indicators. In such facilities, pharmacists have assisted ED staff with drug selection, drug administration, and patient monitoring, as well as with emergency and trauma-related codes. Pharmacists have expanded their role in the ED to assist with culture and susceptibility report follow-up, antibiotic selection, review of patients' known medication history, analysis of unidentified tablets, and assisting in the medication-reconciliation process²⁷.

Visibility of emergency pharmacist

For an emergency pharmacist (EPH) to be used to their full potential, they must be highly visible and easily accessible. Many of the activities an EPH performs regularly involve working closely with the ED team. The EPH should be present at the patient's bedside when key decisions are being made about medication therapy. Many emergency pharmacy practitioners frequently walk through the ED because this helps them identify the most critically ill patients while ensuring that staff members are aware of the pharmacist's presence. Carrying a pager or cell phone permits the EPH to be reached for consultation at any time. The EPH also should have access to a computer in a highly visible area of the ED, so that the EPH can be readily available to serve as a resource to everyone involved with patient care²⁸.

Pharmacist participation in Medical/Trauma resuscitation

The clinical pharmacist in the emergency department is now commonly incorporated as a member of the emergency department trauma team. As such, the emergency pharmacist needs to have detailed knowledge of the pharmacotherapy of resuscitation and be able to apply the skills needed to function as a valuable member of this team. In addition to the traditional skills of the discipline of clinical pharmacy, the emergency pharmacist must be familiar with the intricacies of treating life-threatening injuries in an emergent setting and be able to anticipate the direction of the patient's care. The ability to provide valuable pharmacological interventions throughout the resuscitation and stabilization process requires familiarity with the process of resuscitation, including rapid sequence induction, analgesia and sedation, seizure prophylaxis, appropriate antibiotic and tetanus prophylaxis, intracranial pressure control, hemodynamic stabilization, and any other specific drug therapy that the clinical situation demands. This article discusses the aforementioned pharmacotherapeutic topics and describes the role of the Emergency Pharmacist on the ED trauma team²⁹.

Staff acknowledgment for emergency pharmacist

A study reinforced the value of many specific duties of the EPH program and found that doctors and nurses overwhelmingly favor the presence of an EPH in the ED, frequently seek their advice, and feel they improve quality of care. Staff acceptance is clearly not a barrier to implementation of Emergency phar-

macy implementation³⁰. Pharmacy services have developed to support service provision in EDs with similar roles to in-patient pharmacists. Pharmacy services in some EDs are now extensive with funded, full-time pharmacy posts but pharmacy service review is required to optimize ED patient care where there is limited or no current pharmacy input. New pharmacy services must fit with local ED service models and skill mix. Evaluation of these new services is vital to maximize benefit to patients³¹.

New innovative opportunities for Emergency Pharmacist

Role of Emergency Pharmacist should not only been confined to ED. Pharmacists can be involved in many aspects of emergency planning and response. Pharmacy personnel should be prepared for multiple types of emergency situations, including bioterrorism, chemical emergencies, mass casualties, natural disasters, radiation emergencies, and outbreaks infections.

The American Society of Health System Pharmacist (ASHP) believes that it is imperative for pharmacists to have a key role in preparing and responding to emergency situations. Pharmacists can be involved in many aspects of emergency planning and response. The ASHP believes that it is imperative for pharmacists to have a key role in preparing and responding to emergency situations. Health-system pharmacists can be involved in a variety of areas in emergency preparedness including coordination of policies, maintaining pharmaceutical supplies, patient management, and response integration. Selecting the appropriate pharmaceuticals for stock-piles and inventories and maintaining a system for pharmaceutical distribution are essential in emergency planning. Pharmacists can share their expertise in drug therapy by assisting in policy creation. Pharmacists have a great opportunity to share their

drug expertise and can take a leading role in disaster planning committees and hospital disaster Drills³².

Conclusions

The Emergency Department in a hospital is a unique environment and many safety mechanisms used in other hospital settings cannot be applied in the ED. Clinical pharmacists have traditionally provided extra layers of protection to hospital inpatients by cross-checking provider orders for appropriate dosing, contraindications, and interactions. Because medications in the ED must be accessed immediately and are often one-time doses, the use of central pharmacy services would introduce an unacceptable delay to the administration of medication. Although some hospitals have programs in place in which a pharmacist responds to the ED for cardiac arrests or trauma team activations, few have reported programs which involve a clinical pharmacist assigned exclusively to the emergency department. Nonetheless, reports have asserted that ED-based pharmacists can increase patient safety. Although this concept appears logical, no study has attempted to show that these programs reduce potential adverse drug events in the ED. Although the medication errors can and do occur in all clinical settings. However, the complexity and fast paced nature of care provided in the ED enhance the probability of errors occurring. The precise role of a pharmacist in the health setting is altering and varies significantly from country to country. In contrast to the developed world, pharmacists in developing countries are not fully executing their potential role. They are still struggling for the recognition of their role that can help improve the health care system. Access to and appropriate use of medicine is among the major health sector problems in most of the developing countries. The health care system without pharmacists is unable to cope effectively with most medicine-related issues.

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