The Journal of Emergency Medicine, Vol. 46, No. 6, pp. 857–864, 2014

0736-4679/$ - see front matter

ELSEVIER

http://dx.doi.org/10.1016/j.jemermed.2013.11.124

Brief Reports

ADVERSE DRUG EVENT NONRECOGNITION IN EMERGENCY DEPARTMENTS: AN EXPLORATORY STUDY ON FACTORS RELATED TO PATIENTS AND DRUGS

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☐ **Abstract—Background: Many adverse drug events (ADEs) are not identified by emergency physicians. Research has been done to study risk factors for ADEs and help emergency physicians diagnose ADEs. However, no research has specifically examined the causes underlying a lack of attribution of ADEs to medications in emergency department (ED) patients. Objective: We conducted an exploratory study in a medical ED to search for the factors associated with ADE nonrecognition that are related to ED patients and ADEs. Methods: We conducted an observational study in the medical ED of a French tertiary care hospital between January and December 2009. The study focused on all ADEs, whether or not they were related to the patient's chief complaint. ADEs were identified by an expert physician and pharmacist based on National Electronic Injury Surveillance System criteria. An ADE was considered "attributed" if any evidence of ADE suspicion, ADE diagnosis, or ADE management was documented on ED charts. Factors associated with ADE nonrecognition were identified using multiple logistic regression analysis. Results: Of the 465 included patients, 90 experienced an ADE at ED visit (19.4%; 95% confidence interval [CI] 15.9%–23.2%). Emergency physicians correctly recognized 36 of these cases (40.0%; 95% CI 29.8%–50.9%). On multivariate analysis, ADE nonrecognition was significantly associated with the following variables: nonrelation between the ADE and the patient's chief complaint; daily prescription of four drugs or more; and hospitalization ADE severity category. Conclusions: Our results emphasize the importance of searching for ADEs in patients with daily polypharmacy or whose chief complaint does not seem to be drug related.** © 2014 Elsevier Inc.

☐ **Keywords—emergency department; adverse drug event; pharmacoepidemiology; diagnosis**

INTRODUCTION

Emergency departments (EDs) are an essential part of health care systems and serve as an interface between hospitals and communities. EDs are specialized to allow for the recognition and emergent care of any patient's chief complaint or condition severity, with complex decisions that often need to be made with very little information. This context makes the ED an ideal place to study adverse drug events (ADEs) (1,2).

ADEs are a significant cause of morbidity in many patients presenting to the ED with higher severity and substantially increased health services utilization and cost (1,3–9).

Successful treatment of ADEs first depends on the ability of emergency physicians to attribute ADEs to a medication-related problem and intervene when necessary, especially with drug regimen optimization or drug

RECEIVED: 22 March 2013; FINAL SUBMISSION RECEIVED: 23 July 2013;
ACCEPTED: 27 November 2013

discontinuation at ED, and communication with other care providers (10). Recent data suggest that emergency physicians are moderately successful in identifying ADEs in patients presenting to the ED, and are less able to identify ADEs that are not related to the patient's chief complaint (11–13).

Research was done to study how best to improve the emergency physician's skill in diagnosing ADEs. Risk factors for ADEs were highly studied in hospitalized patients and, to a lesser extent, in ED patients (1,6,8,12,14–17). Clinical decision rules were recently developed to identify ED patients at high risk for ADEs who require medication review by a medication specialist (18). However, to date, no research has specifically examined the causes underlying a lack of attribution of ADEs to medications in ED patients.

We conducted an exploratory study to contribute to the research on factors associated with ADE nonrecognition in ED patients. The study objective was to search for factors associated with ADE nonrecognition that are related to ED patients and ADEs.

METHODS

Study Design and Setting

This exploratory study was conducted in the medical ED of a French 3,000-bed tertiary care hospital with an annual ED census of 64,000 visits. The trauma, gynecologic, and psychiatric EDs are physically separated from the medical ED and were not included in this study.

At the time of the study, emergency medicine in France was a supra-specialty that was not recognized as a standalone specialty (19). At any time of day or week, every patient admitted to our medical ED was managed by a fellow physician who was supervised by a senior physician with a qualification in emergency medicine. Emergency physicians that intervened in our medical ED during the study were unaware of its specific objective, even if they were informed that a research project on ADEs in ED patients was being conducted there. The investigators reported any ADE that they could identify at the time of the care to the emergency physicians.

Institutional Review Board approval for noninterventional studies was obtained.

Selection of Participants

The selection process was designed as described previously (20). All adult patients presenting to the medical ED of the study hospital between January 2009 and December 2009 were eligible for enrollment. Of 261 weekdays during the study period, 85 were randomly selected, which allowed us to balance the number of time slots per weekday and per yearly quarter.

All patients who were physically present in the ED at the beginning of each time slot were screened for eligibility, regardless of entry date or illness severity. Patients were included if they (or their support person) agreed to participate, they did not visit the ED due to intentional drug poisoning, and it was their first visit to the ED during the study period. Readmissions were analyzed separately so as not to miss any ADE.

Data Collection and Processing

The investigators in this study were an emergency physician with special experience in internal medicine and a trained clinical pharmacist, neither intervened in the care of included patients. They are subsequently referred as "the investigator pair."

Data were collected by 12 pregraduate pharmacists (5th-year graduate students) completing a training course in the ED on weekday mornings during their university hospital internship (21). The students became familiar with the data-collection process during a standardized 1-week pilot period. They were trained by the clinical pharmacist to review all available ED charts (eg, clinician records, nursing notes, emergency medical services logs, and discharge instructions) and interview the patients or their relatives when possible. Information was prospectively collected in real time after patient inclusion, at the time of the care, under daily supervision.

Data were collected in a standardized abstraction form (Sphinx 5 software, Sphinx Développement, Chavanod, France). The data collected included sociodemographic characteristics, medical history, current clinical status, and final diagnosis. Special attention was focused on drug exposure during the 2 weeks preceding the ED visit. If data collected during the ED visit were insufficient to identify an ADE with certainty, additional information was obtained from other medical contact, but not from the patients themselves.

Drugs were classified by pharmacy students on the basis of the Anatomical Therapeutic Chemical Classification Index (World Health Organization Collaborating Centre for Drug Statistics Methodology). ED diagnosis and injuries associated with ADEs were coded by the investigator pair according to the *International Classification of Diseases,* 10th revision (22). The Charlson Comorbidity Index, one of the most extensively studied comorbidity index for predicting mortality, was used to assess the burden of concomitant disease for each patient (23,24).

Methods of Measurement

ADEs were classified according to the definition used by the National Electronic Injury Surveillance System: Cooperative Adverse Drug Events Surveillance System