Conference Paper

Occurrence and Preventability of Adverse Drug Events in Hospitalized Patients: A Systematic Review

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Abstract

Patient safety is now recognized as a priority by health systems around the world, drug-related problem is one of the component for patient safety assessment. The objective of this study is to systematically review the occurrence and preventability of Adverse Drug Events in hospitalized patients. This study uses systematic review based on the Prisma Protocol. A search was conducted on electronic databases such as ProQuest, SpringerLink, and Scopus using relevant keywords. The relevant studies were further selected using inclusion and exclusion criteria. Three studies were included in this review, two of which were research study by group and one was a dissertation study. All studies were conducted in hospitals. From the three journals, it can be seen that the incidence of ADE occurs in nearly all hospitals studied and that drug-related problems are still a significant burden for healthcare facilities. Adverse Drug Events are relevant problems in hospitalized patients. The occurrence of ADE was confirmed in all studies and ADE less can be prevented by the use of CPOE.

Keywords: adverse drugs events, medication-related problem, adverse drug reaction reporting system, hospitalized patients

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1. Introduction

No doubt the statement of Sir Liam Donaldson, Chair of the WHO World Alliance for Patient Safety at the date of May 2, 2007 when he inaugurated the 'Nine Life-Saving Patient Safety Solutions' at the WHO Collaborating Centre for Patient Safety: 'Patient safety is now recognized as a priority by health systems around the world'. Patient safety has been recognized as a priority in health care [1].

In Indonesia, as in June to August 2006 PERSI, KKPRS, KARS and the Ministry of Health, in collaboration with Becton Dickinson, perform 'Road Show' program socialization Patient Safety in 12 cities in front of a total of 461 hospitals, showed that Patient Safety began become a priority in many hospitals [1].

And as one component of the assessment of patient safety in hospitals is drug-related problems.

Prior medication error research has focus on:

1. Medication error rate
2. Individual responsible for medication error
3. Medication most often associated with medication errors
4. Patient risk factor contributing to medication errors
5. Cost and additional length of stay as a result of medication errors
6. Preventable medication error and intercepted errors [2].

In this systematic review authors tried to focus on occurrence and preventability of adverse drug events in hospitalized patients.

Drug-related problems are a significant burden for healthcare facilities as they account for 5.3–12.1% of hospital admissions, depending on the studies and the definition used for an adverse drug event [3, 4]. For instance, adverse drug events (ADEs) were defined by Nebeker et al. as "any injury from medical intervention related to a drug." This broad definition encompasses unpreventable ADEs also called adverse drug reactions (ADRs) and preventable ADEs, resulting from medication errors (ME) [5]. An ADR was defined by the World Health Organization (WHO) as "any noxious and unintended effect of a drug occurring at doses normally used in man for the prophylaxis, diagnosis, or therapy of the disease, or for the modification of physical function." [6]

Adverse drug events (ADEs) are a major cause of morbidity and mortality in hospital practice [7]. An ADE is defined as an injury resulting from medical interventions related to a drug. A preventable ADE is caused by an error in the medication use process, such as a prescribing error [8]. The occurrence of ADEs in hospitalized patients described in the literature varies between 2 and 52 ADEs per 100 admissions. An estimated 15% to 59% of these ADEs are considered preventable [9].

Medication safety research and clinical pharmacy practice today is primarily focused on managing preventable adverse drug events (pADEs) [10]. These types of adverse

drug events (ADEs) are caused, by definition, by errors in the medication process. However, most of these medication errors do not result in ADEs [11].

ADE prevention initiatives have been undertaken among others by utilizing information technology, among others, with computerized physician order entry (CPOE) and clinical decision support systems (CDSS). The introduction of computerized physician order entry CPOE) and clinical decision support systems (CDSS) has been successful in reducing the number of medication errors.

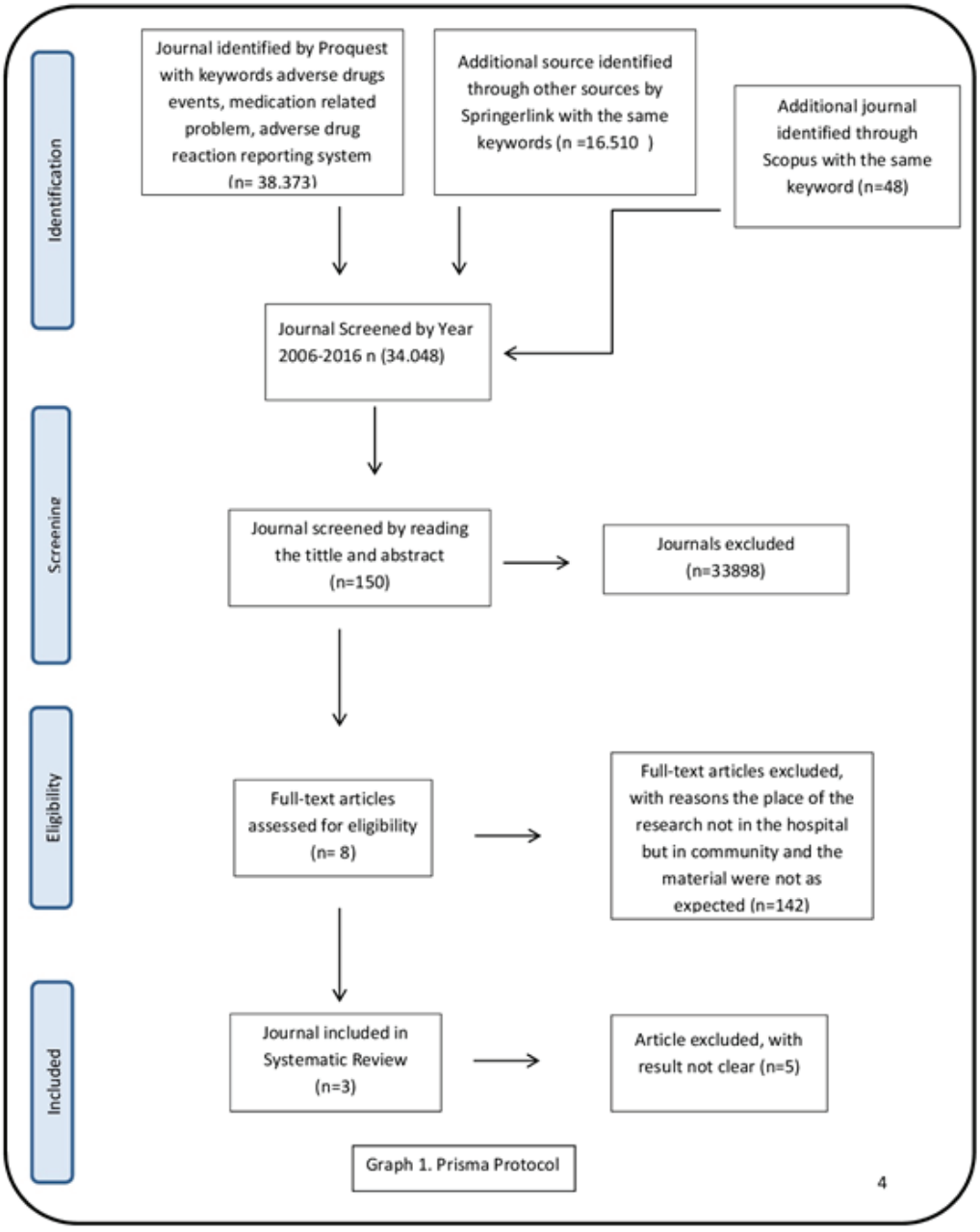

Figure 1: Flow chart of systematic review.

2. Methods

This study used a systematic review based on the Protocol Prisma. The literature search was conducted on December 3rd to 6 on 2016. Restriction of the search includes the availability of complete and articles.

2.1. Search process

The search focused on electronic databases by using remote-lib.ui.id website. The Author did a search on ProQuest, SpringerLink, and Scopus. On ProQuest, entered the advanced search page and entered the keyword 'adverse drugs events', 'medication related problem' and 'adverse drug reaction reporting system'. With these keywords the author obtained 38.373 journal, then narrowed our search by limiting the studies conducted in 2006 to 2016 and the results obtained were 24.031.

On SpringerLink we used the same keywords, and found 16.510 journals. We focused our search on studies in 2006 to 2016 with a total of 9.971 journals.

On Scopus we also used the same keywords, resulting in 48 journals. We focused our search on studies in 2006 to 2016 with a total of 36 journals. Total journal obtained on early identification stage is 34.048 journal.

After identification the author conducted initial screening by reading the titles and abstracts. In the initial screening we managed to remove 33.898 journals and left only 150 to be proceeded.

At eligibility stage, 142 journals Full-text articles excluded, with reasons the place of the research not in the hospital but in community and the material were not as expected. Included criteria in this stage were obtained 3 journals.

3. Results

Occurrence and preventability of adverse drug events in hospitalized patient from three journals systematic review, two studies were research study by group and one studies was dissertation study. From all of these studies, we have a lot of fact on Occurrence and preventability of adverse drug events in hospitalized patient.

The systematic review done by Jolivot et al. showed Among the 743 ICU admissions included during the study period, 173 (23.3%) were due to ADE, with 102 (13.7%) related to preventable ADE and 71 (9.6%) to unpreventable ADE, yielding a preventability rate of ADE of 0.59 (102/173) [12].

According to Dequito et al., During the study period 609 patients were admitted to the study wards, of whom six (approximately 1%) refused to take part in the study. Overall, 349 (58%) of 603 hospitalized patients experienced one or more ADE. A causal relationship of the event with a medication error (pADE) was established for 42 (12%) patients (7% of the total population studied). The remaining 307 (88%) patients with an ADE (51% of the total population studied) were classified as patients experiencing an ADR [13].

Study done by Campbell, the average age for adverse drug event cases was 33 while the average age for control patient was 37. Severity of illness was determined by the Carlson Comorbidity Index score (CCI), 55% of adverse drug event cases had no CCI while 36% of control patient had no CCI diagnoses. Approximately 20% of the control patient had two or more CCI diagnoses, while 6% of adverse drug event patient had two or more CCI diagnose. The differences in mortality rate between patient who had an adverse drug event and patient who did not have an adverse even was not found to be statistically. Average LOS for ADE cases was 23.7 day while patient who did not have an ADE stayed in the hospital 10.6 days. On average ADE patients stayed in the hospital 13 days longer than patients who did not have an ADE [2].

From the three journals can be seen that the incidence of ADE occurs in nearly all hospitals studied, of course, is consistent with earlier references stating that Drug-related problems are a significant burden for healthcare facilities.

4. Discussion

Study done by Jolivot et al., The incidence of ICU admissions due to ADE found in this study is the third highest incidence reported in the literature. This high proportion of ICU admissions due to ADE can be explained by:

1. The use of a broad definition of ADE, taking into account unpreventable ADE and all types of preventable ADE and
2. The profile of the hospital in which the study was conducted with oncology, hematology and hepatology departments which can be important providers of unpreventable ADE.

This shows that in hospitalized patients on intensive care have a tendency to increase an ADE as research results Jolivot et al.

Meanwhile on Dequito et al., in this study, and after implementation of a CPOE system, hospitalized patients primarily experienced ADEs that were not caused by

medication errors (i.e., ADRs). This implies that basic CPOE systems are not enough to prevent ADRs since they focus primarily on detecting medication errors, for example, DDI or over dosage.

This study confirms findings from other studies that women have a greater risk of developing ADRs compared with men, and this may be explained by intrinsic differences in pharmacokinetic, immunological, hormonal and behavioral sex- related factors.

On Campbell's study, Descriptive analysis for the 3,105 patient that made up the medication error cohort are presented and include error rate calculation and quantification of numerous system factor. The medication error rate in this study was 1.2 to 2.4 per 100 admissions over the study period. Adverse drug events rate were 0.1 to 0.18 per 100 admission.

For purposes of analysis two group were defined and compared, the sample of patient who had a medication errors but did not suffer any harm (no ADE) were compared to the sample of patients who experienced and ADE (ADE compared to no ADE).The average age for the medication errors cohort was 34 year old, with 56% was between 16 to 61 years of age. While 28% were less than 16 years of age, and 16% were greater than 61 years of age. But the distribution difference between medication error cohort and ADE was not statistically significant. The distribution of male to female was similar.

Nurses were documented as being responsible for 59% of all medication errors and 62% of ADE, Pharmacist was responsible for 35% of all medication errors and 31% of ADE and Physician and other healthcare professional were responsible for 6% of medication errors and 7% of ADE. There does appear to be an association between the occurrence of an ADE and the professional responsible for it (nurse, pharmacist or other healthcare professional). In the study the majority of ADE occurred in general care unit (86%), critical care unit (7%), emergency unit (5%) but statistically there does not appear to be an association between patient care unit and the occurrence of ADE.

5. Conclusion

Occurrence and preventability of Adverse Drug Events in hospitalized patient become a serious concern because the incidence is always available at all hospitals in this systematic review. Based on the systematic review, authors have a few suggestions:

1. The incidence of ADE in patients on intensive care have a tendency to be higher
2. ADE less can be prevented by the use of CPOE
3. Women have a higher tendency than men in ADE when using CPOE techniques while the average there are no gender differences in the case of ADE on other research.
4. On average ADE patients stayed in the hospital 13 days longer than patients who did not have an ADE
5. Nurses, pharmacist and healthcare professional were responsible for ADE

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