The role of drug information centers to improve medication safety in Saudi Arabia - a study from healthcare professionals' perspective

Mansour Almuqbil, Lamees Alrojaie, Haya Alturki, Abdullah Alhammad, Yasmin Alsharawy, Aljawharah Alkoraishi, Abdulaziz Almuqbil, Sara Alrowaijeh, Syed Wajid, Mohamed N. Al-Arifi

A. Clinical Pharmacy Department, College of Pharmacy, King Saud University, Riyadh, Saudi Arabia
B. Department of Pharmacy Practice, College of Pharmacy, AlMaarefa University, Diriyah, 13713 Riyadh, Saudi Arabia
C. Pharmaceutical Services Department, King Saud Medical City, Riyadh, Saudi Arabia
D. Pharmacy Services Department, King Khalid University Hospital, King Saud University, Saudi Arabia
E. College of Medicine, Imam Mohammed Ibn Saud Islamic University, Riyadh, Saudi Arabia

Abstract

Background and objective: The primary function of the Drug Information Center (DIC) is to provide drug-related information to healthcare professionals. The purpose of this research was to assess the use of drug information centers by healthcare professionals to improve medication safety in Saudi Arabia.

Methods: A retrospective study was carried out at King Khalid University Hospital's drug and poison information center (DPIC). During the study period, requests received by drug information specialists were saved in the DPIC questions' bank. Patients' demographic, type of drug information request, caller information, number of references used, medications, class of medication, medication error type and subclass were assessed and analyzed using descriptive analysis. Medication error types were captured based on nature of questions.

Results: A total of 243 drug information inquiries were assessed. Most of the inquiries were about adult population (n = 168; 69.1%). Most drug information inquiries were received from pharmacists (n = 117; 48.1%), followed by physicians (n = 94; 38.7%), then nurses (n = 23; 9.5%). Prescribing error were the most type of medication error prevented by drug information specialists (n = 214; 88.1%) followed by dispensing errors (n = 11; 4.5%). Approximately half of the medication errors in this study were near-misses (n = 110; 45.3%), followed by potential near misses (n = 84; 34.6%). Only, (n = 49; 20.2%) were identified as errors.

Conclusion: This study highlights the role of drug information specialists in providing evidence-based information and helps in preventing possible medication errors which will enhance the safety of the services provided to the patients.

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1. Introduction

Despite the accessibility to drug information, healthcare professionals' opportunities and capabilities for searching and critically evaluating drug information might be limited (Amundstuen et al., 2016). Finding the best evidence and interpreting the outcomes into clinically meaningful information that applied to specific patient was difficult (Amundstuen et al., 2016). The primary function of the Drug Information Center (DIC) is to answer drug-related questions from healthcare professionals by identifying and interpreting scientific literature, then applies these findings to specific clinical situations and discusses possible solutions with the Enquirer (Amundsen et al., 2016; Al-Arifi et al., 2015, Amundstuen et al., 2016, Manosalva et al., 2016). According to the Pan American Health Organization (PAHO), DIC are operational units that provide scientific information about drugs in timely manner (Nova Manosalva et al., 2016). Historically, the first drug information center in Saudi Arabia opened its doors in 1978, at King Saud university, college of pharmacy (Alomi 2016). In 1980,
were about drug dosage and administration, with Lexi comp/C210 (23.7%), and then nurses (10.1%). Around half of the questions inquiries were from pharmacists (61.2%), followed by physicians (139 inquiries were received by DPIC over one year. Most of the study conducted in King Saud Medical City found that a total of ranged from five minutes to weeks (Asiri et al., 2007). Another to answer drug-related questions. The time devoted to the service distributed monthly across all MOH hospitals (Alomi 2016; Alomi et al., 2019). A previous study conducted in Saudi Arabia found that Drugdex, Textbooks, Iowa Drug Information Services (IDS), PubMed, and Poisondex were the most common resources used and improving medication safety. The World Health Organization (WHO) identified medication error as a target area to enhance patients' safety as it directly affects mortality and morbidity (Assiri et al., 2019, Lu et al., 2011).

Medication errors are defined as any preventable event that leads to inappropriate use of medications or patient harm (NCCMERP, Dos Santos et al., 2015). Such events may be related to professional practice, health care products, procedures, and system including prescribing, order communication, product labeling, packaging, nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use. Our study investigated the role of DPIC in hospital settings, and how it could decrease the number of medication errors by responding to health care provider or patients inquiries which in turn would result in better quality and safety of the services provided to the patient. Therefore, the aim of this study is to assess the impact and utilization of DPIC in providing drug information and improving medication safety.

2. Methods

2.1. Study design, setting, and population

A retrospective study was conducted to evaluate the impact of drug information centers in improving medication safety. The study was conducted in DPIC at KKUH, an 850-bed tertiary academic hospital in Riyadh, Saudi Arabia. A total of 2975 questions were received in the period between November 2016 to December 2018 and all of the questions were saved in the questions' bank. After receiving each call, employees or trainees under the supervision of their preceptor fill out a form which includes the details of the question and caller.

2.2. Ethical approval

This study was approved by Institutional Review Board, College of Medicine, King Saud University, on 6 May 2019, the reference number was 19/0614/IRB.

2.3. Data collection sheet and procedure

The data collection sheet was created and filled from the DPIC questions bank. It includes information about patient demographics, the type of question, the type of answer, the caller information, the reference's used to answer, number of references used, medication/s, class of the medication, type of the medication error, and the subclass of medication error. Questions were received from physicians, pharmacists, nurses, interns, residents, and patients. The types of medication errors were prescribing, dispensing, administration, or monitoring stage. The subclass of medication error was wrong frequency, wrong route of administration, wrong medication, wrong dose, wrong dosage form, wrong strength, wrong duration, drug-drug interaction, drug-disease interaction, drug-food interaction, drug-herb interaction, wrong time, wrong storage, expired medication, wrong patient, and others. The type of the questions that included in the study were about dosage, administration, pregnancy, lactation, side effect, adverse drug event, interactions, compatibility, stability, pharmacokinetics, identification, vaccines, dose adjustment, and extemporaneous preparation. While the questions that were related to non-drug-related, medication approval and availability were excluded.

Potential near-miss as when a physician asked about wrong information before prescribing, the near-miss is when a pharmacist asked about wrong information before dispensing, and Medication error was defined as when the caller asked about wrong information that exists currently (Al Rahbi et al., 2014; Brand and Kraus 2006, Alamri et al., 2017).

2.4. Statistical analysis

Data were initially collected in Excel sheet and analyzed using SPSS version 26. Descriptive analysis, numbers, and percentages, were used to describe the data and identify the most type and subclass of medication error.

3. Results

A total of 1336 drug information requests were assessed during the study period, with 243 drug information requests being included in the final analysis. Fig. 1 showed the inclusion/exclusion process. Most of the inquiries were about adult population (69.1%). Around half of the inquiries were from pharmacists (48.1%), followed by physicians (38.7%) then nurses (9.5%). The demographics and inquiries history showed in Table 1.

Most of the medication errors prevented by drug information specialists were prescribing errors (88.1%) followed by administration errors (6.6%) and dispensing errors (4.5%). Among the identified MEs, around half of them were near misses (45.3%), (34.6%) of them were potential near-miss and (20.2%) were identified as errors (Fig. 2).

Outpatient pharmacy accounted for (15.5%) of the questions received, while (13.1%) were from the inpatient pharmacy followed by discharge pharmacy and gynecology department (Table 2). Most of the (86.4%) requests were received by the use of only one reference, while (8.6%) of the drug information requests were solved by the use of two drugs information resources (Fig. 3). The type of questions received by the DPIC and the references used to answer are shown in Table 3.

Regarding the class of drugs, most of the drug information requests were about antibiotics (13.6%) followed by antihypertensive agents (11.1%), anticoagulants (8.5%), and anticonvulsants (6.8%) (Table 4).

4. Discussion

Pharmaceuticals are medicinally active substances that are used to treat, prevent, or diagnose diseases. However, obtaining the correct information for the proper use of such substances is difficult, which may have resulted in medication-related harms or errors, as well as poor health outcomes and increased risk of morbidity and mortality among patients. (Al Rahbi et al., 2014). Previous research found that pharmacists are the most common drug information providers because either they received formal training or
are supervised by a drug information specialist, which may aid in controlling medication-related errors (Brand and Kraus 2006). Therefore, it is essential to include qualified pharmacists to achieve optimum patient outcomes.

A descriptive study conducted in Brazil identified and described medication errors related to drug information inquiries reported that most of them were potential errors (Dos Santos et al., 2015). These findings were also supported by the results of the present study which found a higher rate of potential errors. That indicates the helpful actions taken by DPIC pharmacists who responded effectively to drug related inquiries raised by other health-care professionals which in turn will ensure an optimal patient care and prevent possible errors. Our study found that most of the errors take place during prescribing, and that was reported by Dos Santos et al. as well (Dos Santos et al., 2015). Qureshi et al. (2011) These findings were confirmed also in other review that reported prescribing errors as the most preventable types of MEs since they occur in the early stages., Council (2021): Medication errors are defined as any preventable event that leads to inappro-
In this study, most of the drug information requests were received from pharmacists followed by physicians. These results were similar to a previous study published by Almazrou et al. who reported that the majority of the drug information inquiries were received from pharmacists followed by physicians then nurses (Almazrou et al., 2017). While another two studies by Alamri et al in 2017 and alkatheeri et al. in 2021 reported physicians being the most common enquirers of drug information (Alamri et al. in 2017; Alkatheeri et al., 2021). That was consistent with other studies conducted in different countries which observed physicians as the most common enquirers (Aspden 2004; Aston and Young 2009).

In this study, most of the questions were about dosage and administration followed by interactions then pregnancy and lactation among others. Similar study published by Chauhan et al reported drug identification as the most type of questions followed by drug safety or contraindication, adverse drug reactions and questions related to pregnancies (Chauhan et al., 2013).

Regarding the references used to answer drug information requests in this study, the most reported references were medications data-base (i.e. Lexicomp, Micromedex, Sanford Guide). While Asiri et al reported Drugdex, reference books, Iowa Drug Information Services (IDIS), PubMed and Poisonex as the most common resources used to answer drug information requests (Asiri et al in 2007). Similarly, another recent study by Alamri et al reported that Lexi-Comp’s Drug Information Handbook, Micromedex, IDIS and Up-to-date as the most used references to answer the drug information questions (Alamri et al., 2015). The most resource of drug information used in the United States was Lexi-Comp, while many international and national studies discovered Micromedex to be another option chosen by health care providers for drug-related information (Hanrahan and Cole 2014; Moorman et al 2017). That difference across studies might be related to the resources availability at the study site and pharmacist or health care provider preference.

A study conducted in Saudi Arabia estimated the information-seeking behavior and awareness regarding DPICs among physicians found that, approximately half of the physicians used DPICs services to collect drug-related information followed by formulary addition request and poison-related inquiries. These findings once again highlight the role of pharmacists in providing unbiased and accurate drug information, focusing on patient-oriented evidence (Almazrou et al., 2019).

There are certain limitations to the current study. The findings came from a single institution in Saudi Arabia’s capital with a small sample size which may affect the generalizability of the results. Also, the detection of medication errors was reliant on the willingness of drug information providers to write description of the questions, which could result in underestimating some types of error.
5. Conclusion

Our findings highlight the role of DPIC pharmacists in enhancing the quality of health services by providing evidence-based information to the enquirer. Also, it shows their role in preventing possible medication errors which will improve patient safety.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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