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Review Article

The Role of Clinical Pharmacists in the Detection and Evaluation of Adverse Drug Events: A Review Article

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Abstract

Adverse drug events (ADEs) are a major healthcare systems issue in hospitals. They are difficult to detect because of incomplete or unavailable medication history. Clinical pharmacists have an important role to play in detection and evaluation of adverse drug reactions. The clinical pharmacist's role in medication management should extend beyond simply dispensing drugs, and this article delineates the rationale and proactive approaches for clinical pharmacist detection and assessment of adverse drug reaction (ADRs). This article was designed to overview the role of clinical pharmacists in detecting and evaluating ADRs. Search and analysis of related articles in web sites revealed that clinical pharmacists have an important role in evaluating, identifying, and preventing ADRs, which leads to proper management and decreased number of morbidity and mortality cases. Therefore, healthcare systems need to be redesigned to more fully utilize health information technologies and clinical pharmacists in detecting and responding to ADRs.

Keywords: Adverse drug events, Clinical pharmacists, Detection, Evaluation, Role.

Introduction

Adverse drug reaction (ADR) is defined by the World Health Organization (WHO) as "a response to a drug which is noxious and unintended, and which occurs at doses normally used in patient for the prophylaxis, diagnosis, or therapy of disease, or for the modification of physiological function" [1]. Adverse drug events (ADEs) are responsible for a significant amount of economic burden as well as morbidity and mortality [2]. According to estimates, the annual cost of controlling ADEs in the US might be as high as $30.1 billion [1]. Approximately, 7% of hospital admissions are caused by ADRs [4]. General medicine units address a wide range of acute and chronic medical conditions, typically with the help of a multidisciplinary team that includes a clinical pharmacist. Patients admitted to general medicine units are frequently at risk for drug-related problems (DRPs), which may be linked to higher rates of morbidity and death, as a result of their numerous comorbidities [5]. Clinical pharmacists, as drug experts and the most accessible healthcare providers, are uniquely suited to detect and report ADEs [6]. The role of clinical pharmacists in hospitalized patient care has changed, with a greater focus on collaborative treatment and patient involvement. ADRs, adverse drug events, health-related quality of life, economics, medication appropriateness, and patient satisfaction are all areas in which clinical pharmacists intervene [7]. Besides, the role of clinical pharmacists in medication safety includes preventing ADEs, such as adverse drug reactions,

medication errors and other DRPs, which may occur throughout the medication management pathway [8,9]. The idea of pharmacovigilance and drug safety is based on increasing knowledge of the different impacts of medications [10]. The goal of this article is to provide an overview of ADRs and the role that clinical pharmacists play in lowering them.

Methods

In order to find scientific literature about clinical pharmacists' role in lowering adverse drug reactions, online search engines were utilized. Specifically, the articles published between 2018 and 2024 were searched through PubMed, Google, Research Gate, Google scholar, and Web of Science databases were searched to locate studies that meet the objectives of this systematic review. A number of keywords were also utilized to find any post that might be relevant. Clinical pharmacists' roles, medication error detection, DRPs, medication safety, clinical pharmacist intervention, and medication management were among the keywords that were used. The resulting studies were then first filtered according to their abstracts and titles. The following factors contributed to the exclusion of some studies: ADE case reports of specific medications, research for pharmacy students, models to enhance ADE signal detection, and the absence of clinical pharmacists among the healthcare professionals polled.

Results and Discussion

Adverse Drug Events (ADEs)

Unintended and negative consequences stemming from the use of medications are known as adverse drug effects, and they can

range in severity from minor to severe, perhaps requiring additional medical interventions [11]. ADRs happen every day in hospitals and other healthcare facilities, and they may have an impact on patients' quality of life as well as increased morbidity and mortality [12]. Additionally, ADRs and potentially avoidable prescription errors account for the majority of DRPs, which result in between 44,000 and 98,000 deaths annually in the United States [13]. One individual per 131 outpatients and one individual per 854 inpatients are thought to die as a result of medication errors or issues brought on by drug use during a medical prophylactic or therapeutic regimen [14]. Instead of referring to the sickness itself, DRPs describe situations or occurrences that impede the intended health outcome through the appropriate administration of pharmaceuticals. These issues result in high expenses as well as different kinds of morbidity and death for the people who utilize them to try to get better [14]. ADRs rank among the top 10 leading causes of death in the US, affecting around 3.4 million people each year due to the nature of the resulting medical issue and the requirement for additional corrective action to address these unfavorable drug side effects [15,16]. Research demonstrates that medication therapy management is successful in lowering the incidence of ADRs and in improving the results for patients. Medication therapy management (MTM) services managed by clinical pharmacists, for instance, have been demonstrated to result in fewer hospitalizations owing to ADRs and improved medication adherence [17-20]. ADRs are common in the pediatric, adult and geriatric population as well. Vaccines, anti-infective, and respiratory medications are the medications that cause adverse ADRs in children; while antibiotics, cardiovascular, antineoplastic, immunosuppressive, corticosteroids, anticoagulants, non-steroidal anti-inflammatory drugs, and opiates are the medications that cause ADRs in adults [21,22]. Off-label use of prescribed medication for newborns, children, and infants may raise the risk of adverse drug reactions [23-25]. ADR reports at a major Saudi hospital increased by 40.6% following the implementation of incentives, with a total of 967 ADRs reported over the course of two years [26]. ADRs can range from mild symptoms to severe ones that kill 0.1% to 0.3% of hospitalized patients [27,28]. ADRs, drug-drug interactions, a lower quality of life, and difficulties adhering to medication regimens can all be caused by polypharmacy [29,30]. Interventions by clinical pharmacists can successfully stop these types of errors. The various types of errors demonstrate that clinical pharmacists' actions and ongoing education are necessary [31,32].

Clinical Pharmacists' Contribution to ADR Prevention and Reduction

Clinical pharmacists play a vital role in hospitals as they are responsible for ensuring the safe and effective use of medications. As a crucial part of the healthcare team, clinical pharmacists are vital to patient care and drug administration [33]. They are specialists in medications, and by applying their specific expertise and abilities, they help to improve patient outcomes. Because they are in charge of making sure that drugs are used safely and effectively, clinical pharmacists serve a vital

role in hospitals. To provide patients with the best care possible, they collaborate closely with other medical specialists. Some of the duties and obligations of clinical pharmacists in hospital are listed below.

Medication Counseling: Clinical pharmacists offer patients medication counseling, outlining the drug's intended use, possible adverse effects, and any additional usage instructions or precautions.

Adverse Drug Reaction Monitoring: Clinical pharmacists monitor and detect ADRs in patients. In order to manage and prevent medication-related issues, they work with healthcare practitioners, recognize symptoms of side effects, and inform patients about potential ADRs.

Medication Management: Clinical pharmacists make sure that drugs prescribed by medical professionals are dispensed accurately and safely. They check through prescriptions, look for possible drug interactions or allergies, give patients the right dosage instructions, and educate them how to take their drugs as prescribed.

Drug Information and Education: Clinical pharmacists offer consumers, healthcare providers, and other team members reliable, evidence-based drug information. They are able to offer thorough information about pharmaceutical efficacy, safety, interactions, and appropriate use since they keep up with the most recent findings and recommendations.

Chronic Disease Management: Clinical pharmacists play a vital role in managing chronic diseases, such as diabetes, hypertension, and asthma. They provide information on disease management, medication adherence strategies, lifestyle modifications, and self-monitoring techniques. Clinical pharmacists also play a crucial role in preventing medication errors.

Medication Therapy Management (MTM): In order to maximize drug therapy for patients with complicated prescription regimens or chronic diseases, clinical pharmacists participate in MTM services. They evaluate the efficacy of medications, monitor for side effects, perform thorough medication reviews, and work with medical professionals to modify prescription therapy as needed.

Medication Safety: Clinical pharmacists are responsible for ensuring medication safety in hospitals. They monitor medication orders to prevent errors in dosing, drug interactions, or contraindications.

Clinical Pharmacy Services: Clinical pharmacists provide clinical pharmacy services in hospitals by working with healthcare teams to provide patient-specific drug therapy recommendations [34,35].

Several studies on the epidemiological features (occurrence, prevalence, or incidence) of DRPs, particularly ADRs, have also been published in Iran. These studies have focused on the preventative role that clinical pharmacists play in reducing these types of problems [36-45]. Clinical pharmacists are highly educated and have a professional responsibility in the provision of pharmaceutical care, which includes the identification, prevention, and resolution of DRPs. It is one of their core jobs to ensure the safe use of medicine. Reporting ADRs is equally important [46]. When it comes to ADEs, which have a substantial impact on

patient adherence and general health outcomes, clinical pharmacists play a crucial role. They are essential in modifying medication schedules, keeping an eye out for possible adverse drug events, and providing patient-specific advice to guarantee efficacy and safety [47]. When delivering pharmacotherapeutic services, clinical pharmacists must carefully assess each patient's risk of ADEs; taking into account their specific health status, comorbidities, and concurrent medications [48].

Additionally, clinical pharmacists provide comprehensive patient education to guarantee that people understand their prescriptions, possible adverse effects, and the significance of following treatment. By successfully controlling these side effects, clinical pharmacists enhance therapeutic results and patient safety, guaranteeing that the advantages of taking medication exceed the disadvantages [49]. Last but not least, clinical pharmacists must constantly evaluate the risk-benefit ratio of every drug, particularly for patients receiving high-risk treatments or those with complicated medical conditions. In order to make well-informed clinical decisions and guarantee that patients receive the safest and most effective pharmaceutical regimen for their needs, this comprehensive evaluation is essential [50].

Conclusion

Administrators, academics, and medical professionals must collaborate and offer training on adverse drug reaction reporting in order to create a learning system. This review found a correlation between clinical pharmacists' attitudes, pharmacovigilance knowledge, and ADE reporting. Once a clinical pharmacist's knowledge of how to report ADEs is categorized as insufficient, this lack of knowledge is influenced by the clinical pharmacist's attitude, feeling of obligation, and level of schooling. In order to improve the patient's outcome, clinical pharmacists may also discuss with the doctor the possibility of changing the prescribed drug if it is not suitable for the patient.

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