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Review Article

Clinical pharmacists' role in paediatric patients' medical care

Raveena Pachal Balakrishnan[1]*, Rajganesh Ravichandran[1], Jaya Shree Dillibatcha[1], Abrana Lakshmi Ravi[1], Nikhil Cherian Sam[1], Ramya Nuthalapati[2]

[1]Department of Pharmacy Practice, C. L. Baid Metha college of Pharmacy, The Tamil Nadu Dr. M. G. R. Medical University, Chennai, Tamil Nadu, India
[2]Clinical Pharmacist, Gleneagles Global Health City, Perumbakkam, Chennai Tamil Nadu, India

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***Correspondence:**
Dr, Raveena Pachal Balakrishnan,
E-mail: raveenab97@gmail.com

ABSTRACT

Clinical pharmacists give valuable administrations to adult patients, however, their advantages for pediatric and neonatal patients are less characterized. Many studies state that medication errors in children are more common than in adults with a greater risk of death.Clinical Pharmacists are accepted as the primary source for providing evidence-based information and advice, to ensure the delivery of correct, safest, and most effective medication to patients. This paper presents a review of the role of clinical pharmacists in the pediatric unit and emphasis the importance of clinical pharmacists for all patients, especially in the pediatric age group.

Keywords: Pediatric clinical pharmacist, Patient education, Health care quality, Medication misadventure

INTRODUCTION

Pediatrics is a branch of medicine dealing with the development, diseases, and disorders of children. Each age groups have their own physiological, pharmacological, pathological, and therapeutic characteristics which need to be considered while handling respective age groups in clinical situations.[1] The risky population to be affected easily by Drug related problem (DRP) comes under the pediatric group of the population, as the pharmacodynamics and pharmacokinetic behavior of drugs in this population are usually different than adults.[2] Most of the studies state that medication errors in children are more common than in adults with a greater risk of death.[3] Recently in 2019, the American academy of pediatrics supported the involvement of pharmacists in all settings.[4] Clinical pharmacists (CP) give valuable administrations to adult patients, however, their advantages for pediatric and neonatal patients are less characterized.[5] In some countries, Clinical pharmacists are accepted as the primary source for providing evidence-based information and advice, to ensure the delivery of correct, safest, and most effective medication to patients.[6]

This review was conducted to outline the roles of clinical pharmacists in pediatric department.

METHODS

The online search engine was used to obtain scientific articles related to the role of clinical pharmacist in Pediatric units, thereby articles were obtained through Google scholar, Pub med. About 50 articles were obtained of which 41 were included for this review.

SERVICES AND ACTIVITIES OF CP

A clinical pharmacist has become a crucial element of the healthcare team and has up-to-date knowledge about the drugs and continuous interaction with the physicians can help them to bridge the gap between patients and physicians.[7] The connection between the clinical

pharmacist and the physician can provide a good patient care.[8]

The main goal of a clinical pharmacist is to check for drug therapy to ensure whether the patient is Forreceiving the appropriate dose, dosage, dosage form, duration of therapy for their medical condition. better patient care, clinical pharmacists match up the followings -signs, and symptoms of the patient, laboratory results, medical diagnosis, and therapeutic goals with the medication history.[9]

Ward rounds

As a member of the healthcare team, clinical pharmacists actively participate in the ward rounds. They provide suggestions to the physicians by understanding patient's history to provide quality low-cost medicines, optimize the quality of patient care and clinical outcomes, and also ensures that the medicines suggested are as per formulary and local guidelines.[9]

Patient counselling

Generally, patients have many questions regarding their disease, medication, lifestyle modification, diet, duration of therapy. Hence clinical pharmacists provide education to the patients regarding these areas and most importantly patient counseling is considered as the major role of a Clinical pharmacist. The points covered during counseling/educating to the patients and their caretakers include: the generic name, the brand name of the drug, dosage, indications, storage, how to take the medication?, when and how long to take medication?, special precautions about the drug, what to do when the dose is missed? And foods to be avoided.[9,10]

It is also recognized that patient counseling before discharge has improved compliance of patients.[11,12] Clinical pharmacists use patient counseling aids like leaflets, oral, pictograms, and it was also found that pictograms provides a better understanding and are more effective to the patients and their caretakers before discharge.[9]

PHARMACISTS' PATIENT CARE PROCESS

Clinical pharmacists have licensed practitioners with advanced education and training who practice in all types of patient care settings with a focus on comprehensive medication management. These pharmacists are focused on achieving optimal use of medications, emphasizing dosing, monitoring, identification of adverse effects, and economic efficiency to achieve optimal patient outcomes. The pharmacist process of care published in 2015, include multiple steps in the medication therapy sequence. The steps are shown in figure 1 and include the collection of pertinent patient care data, assessment of data, development of patient-centered pal, implementation of a care plan for therapy and monitoring, and final revision of the plan in collaboration with the care team. The pharmacist process of care is more standardized and serves as the model for pharmacy.

Pharmacist's patient care process

Pharmacists use a patient-centered approach in collaboration with other providers on the health care team to optimize patient health and medication outcomes.

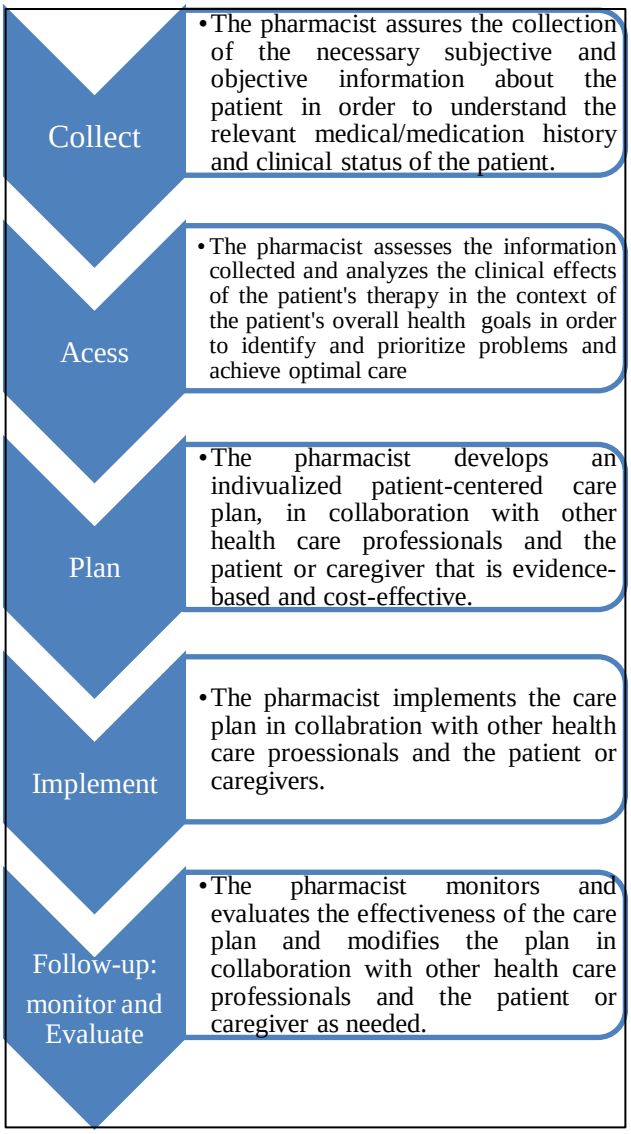

Figure 1: Principles of evidence-based practice.

A clinical pharmacist with pediatric training is responsible for providing other healthcare professionals about information regarding new and investigational drugs, adverse effects and contraindications of drug therapy, stability information, drug interaction, pharmacogenomics, the pharmacokinetics of pediatric population, helps in dose calculation, dosage form modification, pediatric formulary and also provides counseling to parents regarding medication and immunization.[7,14]

CLINICAL PHARMACISTS ROLE IN VARIOUS DEPARTMENTS

Clinical pharmacist's services are not limited to the below-mentioned activities. They work together with other health care professionals to support lifestyle changes to improve the outcome of the patient.

Pulmonology

A study was conducted by Chan et al which described the pharmacist's role in an inter-professional program for children with asthma at US Army Medical Center. In this study, the pharmacists provided counseling and education about asthma to the children during an inpatient stay.[15] A similar study conducted by Condren et al narrated an inter-professional education and management program targeting moderate to severe persistent asthma within a general pediatric clinic.[16] The clinical pharmacist plays a key role by providing education and management about asthma, spirometry monitoring, proper inhaler technique, and regular telephone follow-up. Clinical pharmacists also provide education on medication administration, storage/stability, side effects, and medication adherence.[17] Many studies have supported that clinical pharmacists have demonstrated improvement in the care of pediatric patient.[18]

Neurology

Clinical pharmacists in the neurology department identify potential drug interaction, risk group of patients (bleeding), and also reduces adverse effects.[8] A study was conducted by ChaaitanyaLakshmi and her colleagues stated that patients and their caretakers responded positively to the advice they received by the clinical pharmacists.[19] A study conducted by Went et al where the clinical pharmacists were responsible for monitoring and evaluating patients. After intervention by clinical pharmacist, the average hospital stay decreased from 8.56 to 7.24 days and the early hospital mortality rate was also decreased from 3.34% to 1.95%.[20] Clinical pharmacists also influence the patient's behavior towards drug intake and also promoting quality health care.[19]

Hematology-oncology

Chemotherapy medications are the most potent medications given to children and have a narrow therapeutic window with high potential for toxicity and even small errors can lead to serious harm.[21-23] Cancer patients have been identified as high-risk to suffer medication misadventur.[24] Mannasse defined medication misadventure as "any iatrogenic hazard or incident associated with drug therapy".[25] A study conducted by Ramadaniati justified the role of clinical pharmacists through their interventions during dispensing-related activities in improving medication safety and patient care in pediatric hematology-oncology area.[24]

ROLE OF CLINICAL PHARMACIST IN PREVENTING ADVERSE DRUG REACTION

Adverse drug reaction (ADR) are considered as "an effect that is noxious and unintended which occurs at doses used in an individual for prophylaxis, diagnosis, or therapy.[26] ADRs are also known as unpleasant or harmful reactions that result from the interference of medication use.[27] A study states that ADRs are common in the pediatric as well as in the geriatric population.[28] During the last three decades, several clinical pharmacology studies have shown the age-mediated changes of absorption, distribution, metabolism, and excretion processes of medications would affect the pharmacology response and the safety in pediatric patients when compared to adults.[29] In a review, it was reported that ADRs incidence in hospitalized children was in the range of 0.6%-16.8%.[30]

Clinical pharmacists look over the medical and medication history of the patient and also checks for medication errors which include prescription, dispensing, and administration error. They are also engaged in the identification of drug interaction, monitoring ADR, suggestion of dosage regimen for each patient provides patient counseling, etc. In case of any adverse reaction to the drug, then it is the responsibility of the clinical pharmacists to notify the doctor and suggest another treatment. In addition to all these services they also do drug dilutions, monitor dosage, dose calculations, extemporaneous preparations etc.[31] Participation of clinical pharmacists in wards/ICU rounds will help to identify, prevent, or reduce ADRs and drug interactions.[32]

ROLE OF CLINICAL PHARMACIST IN MEDICATION ERROR

Pediatric patients can be harmed during treatment, the most common and preventable are the medication errors.[33,34] Pediatric patients have a much higher risk of death than adults when medication error occurs.[35] Medication errors are defined as the preventable, inappropriate use of medications that may occur at any stage of the medication process, including ordering, transcribing orders, dispensing, administering, and monitoring. Rarely, medication errors result in an adverse drug event.[36] A study done in the US prevented 78% of potentially harmful prescribing errors by clinical pharmacists.[37] Many studies suggest that clinical pharmacist intervention has a major impact on reducing medication errors, especially in pediatric patients. The reduction of medication errors can be done by a clinical pharmacist in many ways: by checking physician prescription order and if necessary, suggesting an alternative order, by calculating dose based on weight, renal and hepatic impairment, checking daily process reports, and detecting administration errors and by checking drugs on the discharge of patients and switching the route of drugs to ensure patient compliance.[38]

Recently the Pediatric pharmacy advocacy group (PPAG) highlighted a need for increased education of both student and practicing pharmacists for infants and children. PPAG supports the involvement of pediatric pharmacists in pharmacogenomic testing and in using those results to provide safe and effective medication use in pediatric patients.[39] It is also said that patient safety has been improved by reducing medication errors.[40,41]

CONCLUSION

Pediatrics are the most important group of the population and are more prone to drug-related problems due to their underdeveloped pharmacokinetics and pharmacodynamics changes.

The role that the pediatric clinical pharmacist played at the hospital was valuable as it highlighted the gaps in patients' and parents' understanding of their medication profile. Clinical pharmacist's participation has shown to reduce and prevent the number of medication errors, ADRs, and in turn, reduced mortality, and morbidity rates. Thus, concluding that the interaction between clinical pharmacists and physicians influence the teamwork and alsoprovides better patient care.

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