

Article

Systematic Review on the Role of a Clinical Pharmacist in Patient Management According to the Pharmaceutical Care Concept

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A B S T R A C T

Aim: To draw attention towards the role of clinical pharmacists in patient management according to the pharmaceutical care concept in Indian scenario.

Evidence Acquisition: Several online databases like Scopus, web of science, PubMed, Google Scholar, Research Gate and E-library of NIMS University were searched from January, 2010 to December, 2019.

Data Extraction: Studies, in accordance with the roleplay of clinical pharmacist i.e. articles discussing role of clinical pharmacist and implying upon the importance of clinical pharmacy services in patient management according to the pharmaceutical care concept in India or even elsewhere. This search identified 35 articles that meet the aforementioned criteria.

Results: 35 articles were studied including articles that established need of pharmaceutical care in patient management and drug information centers (n = 4); detection and managing the adverse drug reactions-ADRs (n = 4), developing drug utilization pattern (n = 14), detection and managing the medication errors (n = 9) and other miscellaneous clinical pharmacist services (n = 4). Most of these were related to the aforementioned. Few reviews were added related to origin of pharmacy practice, clinical pharmacy as well as pharmaceutical care in India.

Conclusion: Data of this review suggests the necessity of clinical pharmacists in the healthcare sector in India as there is a dire need of Drug Therapy Monitoring, better Patient Counselling services, improvement in Medication Adherence and ADR Monitoring in Indian healthcare system.

Keywords: Clinical Pharmacist, Patient Management, Pharmacy Practice, Patient Counselling, Medication Adherence

Introduction

Clinical Pharmacy

Clinical Pharmacy is a branch of pharmacy where the pharmacists provide clinical pharmacy services that include pharmaceutical care, medication management and ADR monitoring. Pharmaceutical care is a patient centered activity - it is used to analyse the drug related problems for the positive outcome and to enhance the safety, efficacy and cost effective therapy. Medication management includes the better selection of the drug, appropriateness of the drug, monitoring of the drug and its adverse reactions, drug interactions and also counselling the patient in ultimately achieving the safe, efficient and the cost effective therapy.¹

Clinical Pharmacy Services in India

In 1993, clinical pharmacy services were started by Trivandrum Medical College as an extension to hospital pharmacy services. Patient counselling department was set up to provide counselling information to the patients. Later in 1997, the drug information services were started by Karnataka State Council in Bengaluru along with JSS, ooty and JSS, Mysore with the support from Australian faculty/hospitals.

In 2001, M. Pharm in Pharmacy Practice course was introduced, which led to the initiation of pharmacy practice departments in colleges and hospitals. In 2008, Pharm.D course was started with an objective to enhance the clinical pharmacy services by being a part of the healthcare team.²

Benefits of Clinical Pharmacy Services

Various stakeholders are benefited through these services³:

- **Pharmaceutical Industry:** According to WHO, in India, more than 1 lakh formulations are found to have adverse drug reactions, and drug interactions, by the means of leaflets and literature, the patient gets the relevant information.
- **Prescribers:** A well trained clinical pharmacist can be of great support to the prescriber in implementing rational drug use, because the prescribers have very less time available for the consultation of patients. In order to provide a prescription along with the drug related problems like adverse drug reactions, drug interactions and patient counseling information, trained clinical pharmacists are of great help.
- **Pharmacists:** Clinical pharmacists, obtains the information from the drug information centre, thereby provides pharmaceutical care which will be of a great help to the physicians. From the drug seller to taking care of inventory, the pharmacist can be promoted in providing the clinical pharmacy services.
- **Patients** are the stakeholders, with greatest benefit through clinical pharmacy services. Patient counseling

information reduces a lot of medicine mismanagement, non-compliance, and non-adherence.

- **Government:** As our Indian government is pharmaceutical industry based, rather than health based or hospital based, to develop national formulary, national standard treatment guidelines, and national essential drugs list, the government requires the clinical pharmacy services.

Pharmaceutical Care Concept

Pharmacy practice has evolved since the 1850s, between 1850 - 1900 the prime responsibilities of a pharmacist are stocking in the pharmacies and providing medication. During the years 1900 - 1960, the American Pharmaceutical Association described the role of a pharmacist as prescribing and dispensing of medicines. In the late 1950s - 1990s pharmacists made themselves more into clinical aspects. In the 1990s the concept of Pharmaceutical care (optimization of patient medication/therapeutic outcome) came into form by Hepler and Strand, which includes drug utilization review (DUR) - prospective or retrospective and medication therapy management (MTM).

Pharmaceutical care is defined as the provision of drug therapy towards improving patient's quality of life and medication outcomes (curing the disease, eliminating/reducing patient symptoms, slowing the disease process and preventing disease or symptoms).

Pharmaceutical care addresses four points - societal need, patient-centered approach, care for and about the patients and responsibility to provide optimal therapy.

Patient-centered care is the cornerstone of pharmaceutical care, which is holistic. Healthcare includes different disciplines medical, maternal, mental health, surgical, neonatal, pediatric, dental and nursing care, including pharmaceutical care. Pharmaceutical care has become one of the important cornerstones in pharmacy practice since the 1990s. Patients' drug-related needs are categorized into appropriate drug treatment, effective, safe, and compliant.

A pharmacist to be a good healthcare practitioner should have thorough knowledge of drug therapy and nondrug therapy, laboratory parameters and diagnostics, communication skills, patient management, physical assessments skills, drug information skills, therapeutic planning and knowledge on disease. The other requirements are developing a therapeutic relationship with the patients, understanding the responsibilities of the practitioner (patient care process), applying a systematic and rational process (pharmacotherapy workshop), appropriate knowledge on clinical skills, practice standards and follow ethics, and documentation (SOAP-E, TITRS, and FARM techniques).

Patient care process involves the pharmacist initiating

a relationship with the patient, gathering and assessing information, developing a patient care plan, complete intervention by communicating with the patient and implementation of follow-up.⁴

Materials and Methods

Several online databases like Scopus, web of science, PubMed, Google Scholar, ResearchGate and E-library of NIMS University were searched from January, 2010 to December, 2019 for making this systematic review article and all the policies of advanced research publications and prisma guidelines were kept in mind while the creation of the article. Studies, in accordance with the role of clinical pharmacist i.e. articles discussing role of clinical pharmacist and implying upon the importance of clinical pharmacy services in patient management according to the pharmaceutical care concept in India or even elsewhere. This search identified 35 articles that meet the aforementioned criteria.

Roles of clinical Pharmacist

The clinical pharmacy services start with *ward round participation*,⁵ which is of the following types - pre rounds, registrar rounds, professor rounds, and teachers rounds.

Pre rounds - before attending the ward rounds with the doctors, a clinical pharmacist should attend pre rounds, in order to know about the various problems like drug interactions, and adverse drug reactions the patient may complain of, the administration techniques, and any dose and duration changes. Ward rounds are the day to day activity wherein a physician checks on the patient with regard to their progress and makes necessary changes in the doses.

Registrar rounds - attending the rounds with the registrar or the doctor of a particular ward responsible for the ward rounds and learning about the various problems they come over.

Professor rounds - the professor rounds are meant for clinical reasoning using a case-based format, wherein for each session a pharmacist presents a case of a patient with a disease process based in a particular specialty (pulmonary, gastrointestinal, renal, infectious, and hematology/oncology).

Teaching rounds - teaching rounds are performed, which helps a clinical pharmacist in gaining knowledge in the areas of pathophysiology and disease management.

Drug Therapy Monitoring⁶

Drug therapy monitoring helps the pharmacist in monitoring the dose of the drug, duration of the therapy and drug related problems/medicine related problems. The various kinds of drug related problems are-

- Presence of indication with no drug prescribed - e.g. diabetic patients are easily prone to co-morbid conditions, wherein it is the responsibility of the pharmacist to suggest the physician for initiating a medicine.
- Failure of therapy/non-compliance - this may be due to improper patient counseling, and high cost of the treatment (tuberculosis, diabetes, antibiotics, HIV drugs etc.). It is the responsibility of the pharmacist to rule out and reduce the reason for non adherence/compliance.⁸
- Sub-therapeutic dosage, over dosage and wrong drug - these are the main problems that occur with the narrow therapeutic index drugs, in which therapeutic concentrations are to be monitored.
- Adverse drug reactions (ADRs) - the ADRs may be type I (augmented) or type II (bizarre), and it is the responsibility of the pharmacist to identify, monitor and detect the ADR and find out whether it is preventable or not.²¹
- Drug interactions - e.g. a patient on ciprofloxacin, should have control of the intake of dairy products as there are chances of interaction leading to therapeutic failure.⁷

These are also called as a clinical intervention⁹, where the pharmacists suggest the physician about the changes required in the prescription.

Therapeutic Drug Monitoring (TDM)⁶ includes measurement of plasma drug concentrations and it is used to set dose so that therapeutic efficacy can be maximised and maintained. TDM can optimise patient management and improve clinical outcomes.

Examples of drugs which require TDM are theophylline,²² lithium,²³ carbamazepine,²⁴ valproate,²⁵ digoxin,²⁶ cyclosporine²⁷ and aminoglycosides.²⁸

Aim of TDM: Objective of TDM is to develop a medication regime that has the most effectiveness against the illness and least toxic activity.

TDM is used when:

- Drugs have a narrow therapeutic range like digoxin, phenytoin.²⁹
- Relationship between the drug/drug metabolite plasma concentration level and the pharmacological/toxic effects is detected.
- Therapeutic efficacy is difficult to assess.
- At any specific dose, great variations in plasma concentrations are detected.

TDM is unnecessary when:

- Drugs with a wide therapeutic range such as beta blockers and calcium channel blockers.

- Clinical/therapeutic outcome doesn't depend on plasma concentration levels(dosage).
- Dosage need not be individualized.
- The pharmacological effects can be clinically quantified.
- When concentration affects the relationship remains unestablished.

Indications of TDM:

- Low therapeutic index
- Poorly defined clinical end point
- Non compliance Therapeutic failure
- Drugs with saturable metabolism
- Wide variation in the metabolism of drugs
- Major organ failure
- Prevention of adverse drug effects

TDM in Cardiovascular Disease

Digoxin, used in Congestive heart failure (CHF), is widely prescribed and therapeutically monitored. Therapeutic drug monitoring (TDM) is essential in clinical practice for efficacy as well as to avoid digoxin toxicity¹⁰. Indication for digoxin TDM: Confirmation of toxicity, assessing the effect of factors that alters pharmacokinetics, initiating therapy or dose changes, therapeutic failure and medication adherence. Monitor digoxin levels (7-21 days) and renal function and potassium levels during the therapy.

TDM in Organ Transplantations

Therapeutic drug monitoring (TDM) is essential to maintain the efficacy of many immunosuppressant drugs (e.g., cyclosporin A, tacrolimus)^{11,15} while minimizing their toxicity.

Indications for TDM in organ transplantations include the following:

- Immunosuppressants have a narrow therapeutic index.
- Significant variability between individuals (drug-nutrient interaction³⁰, renal insufficiency, inflammation and infection, gender, age, polymorphism and liver mass).
- Devastating results in suprathreshold infection or side effects, subtherapeutic allograft rejection.

TDM in Seizure Disorders

TDM is essential in seizure disorders because:

- If the same dose leads to different blood concentrations (due to multiple drug therapy, disease state, age and body weight).
- Narrow therapeutic index.
- If the endpoint is not clearly defined.
- If pharmacokinetics of the drug shows significant inter-individual variability.

Anticonvulsant drugs include carbamazepine²⁴, phenobarbital³¹, phenytoin²⁹ and valproic acid¹².

Patient Counselling¹³

Patient counselling is the process of advising the patients. It is the prime responsibility of a pharmacist to advise the patients regarding the use of drugs while dispensing. In a clinical pharmacy setting, advice needs to be given to both inpatient and outpatient. Every hospital has a patient counselling centre and a drug information centre, wherein all the patients are counselled at their discharge. A pharmacist should counsel the patient about the use of drugs, frequency and about the food to be taken. Medicine oriented and disease oriented patient counselling is seen, especially in chronic diseases like diabetes, hypertension, asthma etc.

Pamphlets³² are to be prepared with all the detailed information of different diseases, in the local language understandable by patients.

Patients should recognize the importance of medication, as some patients will have misconceptions regarding the usage of medicines.

Objectives¹⁴

- Patients should believe that medicines are helpful in maintaining proper health, and the pharmacist should develop proper relationships with the patient.
- Patient understands that strategies need to be improved. For example, isosorbidedinitrate may cause headache³³ when used for cardiac disorders, and the pharmacist should advise the patient to spit it out once headache starts.
- Patient should be able to take the medication at time.

Pharmacist is a professional who provides pharmaceutical care to the patient. Drug interactions and adverse effects and other medication errors need to be reduced.

Stages in Patient Counselling

There are three stages of patient counselling - introduction, process and conclusion.

- **Introduction** - includes the details of patient and pharmacist, involves reviewing the patient's record, introducing themselves, explaining the purpose of counselling, obtaining drug related information like drug allergies, herbal medicine usage, and assessing the patient's understanding of reasons for therapy, assess any actual or potential concerns or problems of importance to the patient.
- **Process** - includes content (includes what should be told) and manner (involves how to tell).
- **Conclusion** - conclude by verifying the understanding of patients by asking open ended questions.

Barriers may be patient based, system based or provider based. Patient may not understand the language of the

pharmacist, whereas the pharmacist should be aware of the local language. The system based barriers can be overcome by persistence of the pharmacist. The lack of knowledge and language are the major problems faced by the pharmacists. Pharmacists should recognize the barrier and need to overcome it. A patient counseling room should be big enough with tables, chairs, and pamphlets. Pharmacists should have a proper attitude, positive approach, and should be more empathetic towards illiterate patients.

Patient counselling can be done by explaining the patients regarding removal of the drug from package, timing of the dose, duration of use, administration of the drug, storage, side effects, possible allergies and drug interactions, refill information etc., which is very helpful for all kind of patients, both educated and uneducated. Counselling about inhalers is essential as most of the patients are not aware of their use. Rectal suppositories should be brought to room temperature before administering³⁴, and the most used suppositories are glycerol gelatine and cocoa butter. Vaginal inserts are dipped in water before insertion. Suspensions and ointments should not be kept in the refrigerator, and insulin has to be kept in the ordinary chamber of the refrigerator. Narcotic substances should be kept under lock and key, as they may be abused. Iron and antibiotics should be kept away from children.

Duplicate prescription and proper records are to be maintained in case of opiate drugs. Proper counselling points need to be explained regarding the usage of transdermal patches, clean and dry areas of skin without hair is preferable (e.g. abdomen). Patient leaflets are helpful in patients who forgot to take their medications¹⁶.

Pharmacists should be qualified and confident enough to counsel the patients. Power point preparation on all the diseases may help in explaining the patient properly. Consistent works with documentation of different forms are recorded daily. Staff and patients are made aware of drug information. Communication has many barriers like hearing loss, cognitive problems, poor memory etc., which has to be overcome by pharmacists.

Medication Adherence⁸

Medication adherence (compliance) is a cluster of behaviours that ranges from patients not taking the medication to taking it in a wrong way. In 2006, WHO defined medication adherence as the way a patient follows one's medication (therapeutic, behavioural, or lifestyle). Non-adherence to the treatment shows no improvement, occurrence of adverse reactions and exacerbations that may lead to hospitalization.

Dimensions for adherence – health care system (provider and communication), socio-economic status, symptoms/clinical presentation, patient-related and system complexity.

Measurement of Adherence

- Direct measurement (using urine or blood sample) - presence of metabolite.
- Indirect measurement - observations, pill counts, self-reporting (maintenance of a diary), claims data analysis, medication possession ratio (MPR = days of supply/ number of days elapsed) and Monksy's medication adherence scale.

Measures to Overcome Adherence - telephone reminders, self-monitoring, use of fixed dose combinations, unit dose packaging, education counselling, disease management.

Acronym: SIMPLE - S (simply regimen), I (impact knowledge), M (modify patient beliefs of behaviour), P (provide communication), L (leave biases) and E (ensure adherence).

ADR Monitoring and Management

An adverse drug reaction (ADR), according to WHO is "any response to drug that is noxious and unintended that occurs at doses normally used in man for prophylaxis, diagnosis and therapy of disease or for modification of physiological function"²⁰. Adverse drug reaction is the major problem worldwide, which causes morbidity and mortality, among 20% of the patients admitted in hospital, 5% face adverse drug reactions, so it is the responsibility of the pharmacist to check for adverse drug reactions.

The causality assessments are done using various algorithms like WHO and Naranjo scales¹⁹ which are helpful in managing the ADR, where the drug has to be withdrawn (e.g. toxic conditions like epidermal necrolysis) or dosage has to be reduced. The regular documentation can be done by the use of documentation forms provided by the government, whereas physicians voluntarily come out with any ADR with a process known as spontaneous reporting system.

The role of a clinical pharmacist in the management of ADRs is as follows¹⁸:

- Monitoring high-risk patients:** A clinical pharmacist is required to monitor the patients who are at high risk of ADRs. For example, a clinical pharmacist should regularly monitor pediatrics and geriatrics for ADR's because of the difference in their physiological characteristics and pharmacokinetic and pharmacodynamic parameters.
- Monitoring patients taking drugs of high risk:** A clinical pharmacist should monitor patients taking drugs that are more likely to cause ADRs. For example, anticancer drugs commonly cause ADRs like nausea and vomiting³⁵.
- Assessment and documentation of previous allergies:** A clinical pharmacist plays a key role in avoiding allergies and ADRs by collecting, analyzing and documenting details about the patient's medical, medication and social history and also about his/her known allergies.
- Assessing the drug therapy for appropriateness:** A

clinical pharmacist should check if the drug therapy, that has been initiated after the diagnosis of a patient's condition, is appropriate or not. This is very important for achieving better healthcare outcomes.

- v **Assessing drug interactions:** A clinical pharmacist should check a prescription and a patient's case sheet for all possible drug-drug, drug-disease and drug-food interactions.
- vi **Assisting other healthcare professionals (HCP's):** A clinical pharmacist should assist other HCP's like physicians and nurses in the detection, assessment and management of ADR's and design a healthcare plan for achieving better healthcare outcomes.
- vii **Encouraging other HCP's to report ADRs:** A clinical pharmacist should encourage other HCP's to report ADRs. An ADR should be reported irrespective of its seriousness and type.
- viii **Documentation and reporting of suspected ADRs:** Once an ADR is identified, it is the responsibility of a clinical pharmacist to document and report it in format designed by the ADR monitoring centers at both national and international levels.
- ix **Follow-up of the patient:** A clinical pharmacist should follow-up with the patient to know the outcome of the ADR management.
- xi **Educating the patients:** A clinical pharmacist is responsible for educating patients regarding various possible ADR's, diseases and lifestyle changes in order to improve health related quality of life.
- xii **Dissemination of signals:** All the signals that are generated by assessing an ADR should be disseminated by a clinical pharmacist to all other HCP's through various publications and newsletters. In this way, many ADs can be prevented as a result of awareness.

Result & Discussion

The pharmacist is a responsible practitioner in a health care system capable of ensuring the quality of pharmaceutical care services to the patient. It is their responsibility to understand their role as a health care provider rather than just dispensing medications as pharmaceutical care is more patient oriented rather than just product centered. The basis of this service is a therapeutic outcome where the clinical pharmacist is supposed to optimise drug therapy to achieve both safety and efficacy.

Conclusion

Data of this review suggests the necessity of clinical pharmacists in the healthcare sector in India as there is a dire need of Drug Therapy Monitoring, better Patient Counselling services, improvement in Medication Adherence and ADR Monitoring in Indian healthcare system.

Conflict of interest: None

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