



Received on 20 October 2021; received in revised form, 02 February 2022; accepted, 05 May 2022; published 01 July 2022

A PROSPECTIVE STUDY ON IDENTIFYING PRESCRIBING ERRORS AND AWARENESS OF PATIENTS' MEDICATION KNOWLEDGE IN A TERTIARY CARE HOSPITAL

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Keywords:

Medication errors, Multidisciplinary,
Clinical pharmacist, Counselling,
Hospital formulary

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ABSTRACT: Background: Patients' drug administration errors are often promoted by poor drug knowledge resulting from inadequate oral or written information. Patients' insufficient or wrong knowledge regarding the medication they use may vary and probably lead to the incorrect use of the latter, thus causing a decrease in its efficacy or other health problems. Patients' knowledge enhances active participation in therapy, thus increasing adherence and ultimately leading to better treatment outcomes. The primary aim of this study was to assess the impact of patient medication counseling by comparing the levels of patient's medication knowledge achieved by medication counseling in an outpatient clinic. Medication errors are at the forefront and common provision of modern healthcare and one of the many hazards of hospitalization. The problem is of multidisciplinary and multifactorial in nature. Medical errors are events that are considered as a threat to patient well-being that should not happen or recur. The medication error is not only clinically significant in many occasions; it has serious economic consequences like extended hospital stays, additional treatment, and malpractice litigation. Clinical pharmacist counseling was found to be more effective for improving patients' knowledge and understanding of prescribed medications and their factors. These techniques were valuable in helping to reduce the incidence of recurrent ADRs and improve adherence to the regimen. **Objective:** The purpose of the study was to analyze the prescription and assess patients' medication knowledge before and after counseling. To identify prescribing errors, categorize the most frequent types of errors, and to evaluate their potential clinical significance. **Methods:** The study was carried out over a period of 6 months at Shadan Institute of Medical Sciences, Shadan Hospital, Hyderabad. The study followed the prescribing activities of the physician. Handwritten prescriptions were clinically reviewed. Each prescription was checked twice to assess patients' medication knowledge and again to check prescribing errors. All Prescriptions were checked for errors using WHO Good Prescribing Guidelines. Subjects of both genders were taken into consideration who had co morbid pathological conditions were also included. **Results:** 300 Outpatient Cards were collected, 152 were paediatric and 148 were general medicine. Percentages found before and after counseling were found to be: **Before counseling:** 53.70%. **After counseling:** 85.91%. The most common errors found in our study were missing medication dose. Missing time of administration of medication. Illegible handwriting. Missing duration of therapy. **Conclusion:** Our study concluded that overall frequency of patients' medication knowledge was found to be 80%. Clinical Pharmacists can play a major role in early detection and prevention of errors and thus can improve quality of care to the patients. This study clearly shows the need for clinical pharmacists to work full time at the medicine ward and develop hospital formulary and prescription policies. Improvement in patients' medication knowledge showed a positive effect on medication adherence. An organization should assign resources to address error prevention strategies in an effort to improve patients' outcomes and decrease morbidity and mortality associated with medication errors.

INTRODUCTION:

Patients' Medication Knowledge: A patient's medication knowledge is defined as the awareness of drug name, purpose, administration schedule, adverse effects or side effects and special

administration instructions. It has become evident that use of medications either with or without physician's prescription and over the counter has increased in the past few years all over the world ¹.

Patients' medication knowledge plays a pivotal role in their disease management ². Patient involvement in preventing outpatient medication errors is predicated upon patient knowledge of their medications ². Patient education ensures optimal use of medicines and minimizes drug-related problems. Patient knowledge enhances active participation in therapy, thus increasing adherence

<p>QUICK RESPONSE CODE</p>	<p>DOI: 10.13040/IJPSR.0975-8232.13(7).2877-86</p> <hr/> <p>This article can be accessed online on www.ijpsr.com</p> <hr/> <p>DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.13(7).2877-86</p>
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and ultimately leading to better treatment outcomes³. Patient knowledge and the intended benefits of their prescribed medications play an important role in medication adherence. Adherence to prescribed medications is extremely important to ensure the efficacy of medical treatment regimens and more positive health outcomes⁴. Adherence has been demonstrated to be influenced by several variables, including patients' knowledge about the indications for the medications they take⁵. The level of patients' knowledge about their prescribed medications can be better understood by examining the counseling they receive³. The set of information acquired by the patients is needed to reach the therapeutic goal, including indication and efficacy, the process of use (posology, regimen, route of administration and treatment duration), safety (adverse effects, precautions, contraindications), interactions)⁶.

Poor medication knowledge negatively impacts medication adherence and patient safety and increases the use of medical resources. Patients' insufficient or wrong knowledge regarding the medications they use may vary and probably lead to the incorrect use of medications. Thus, causing a decrease in its efficacy or the appearance of other health problems⁶. Polypharmacy without prescription knowledge contributes to patients' non-adherence to physician's prescriptions. Polypharmacy increases the risk of morbidity, mortality, loss of functional independence, and multiplicity of cognitive and physical problems in this population¹⁰.

Patients' Living Conditions Appears to Influence Medication Knowledge: Patients living independently with a partner are more knowledgeable in this respect than patients living in retirement are less knowledgeable⁵. Poor drug knowledge often promotes patients' drug administration errors resulting from inadequate or oral information⁸. The use of personal medications could lead to adverse drug events without proper verification procedures⁹. Many patients desire to self-medicate while in the hospital to ease anxiety over the loss of self-control of their care. Patients with chronic diseases often undertake multiple medication regimes to manage their conditions, prevent complications, and maintain their quality of life. Many patients with chronic disease conditions

are elderly and may struggle in following medication instructions such as taking the prescribed dosage and following the administration schedule. Persistent adherence to drug regimens is crucial for treatment efficacy. Studies reveal that patients often take medicines without sufficient knowledge. Several factors have been identified to be associated with poor adherence, such as patient and pharmacological characteristics, insufficient knowledge of drugs, and poor communication between the physicians & patients¹⁰. And less economy also leads to self-medication which could be the wrong choice¹¹.

Patient counseling has always been considered one of the most effective measures to enhance medication adherence. In the absence of proper counseling, patients may not have enough information about their medication, including the indication, dosage regimen, side effects, or missed dose. Lack of information may compel them to not take the medication in the way it was intended, which may result in therapeutic failure, adverse effects, additional expenditure on investigations and treatment, and even hospitalization. The American Society of Health-System Pharmacists (ASHP) statement on pharmacists' responsibility indicates that pharmacists are responsible for ensuring the safe and appropriate use of drug products and the control and distribution of all drug products, which extend throughout the setting served⁹. Allowing patients to use their own medications while hospitalized has been discouraged because the medications may be misbranded or adulterated¹⁰.

Small studies suggest that pharmacists providing counseling to patients about medications and providing basic information about ADRs and their management together with written information will improve knowledge¹². Patient satisfaction is also an improvement tool for health care providers has been established. It is essential that patients realize how early detection and treatment can help prevent problems and aid in proper and early recovery¹³. It seems logical that the regimen is one of the aspects of the medication that most awakens patients' interest and is the most known, given that it implies a direct action, taking the medication at a given time. Patient knowledge is a potential determinant of medication adherence because it influences

perceived or anticipated medication benefits and the necessity of treatment¹⁴. The level of patients' knowledge about their prescription medicines can be better understood by examining the counseling they receive. Providing written information and verbal counseling enhances patient knowledge and encourages safer medication use. Patient education ensures optimal use of medicines and minimizes drug-related problems. Patients' knowledge enhances active participation in therapy, thus increasing adherence and ultimately leading to better treatment outcomes¹⁵.

A fundamental source of patient education about medicines is clinical pharmacists, as they typically offer the last health professional advice before patients start taking their medicines. Counseling is one of the suitable methods to impart this required knowledge¹¹. Effective counseling has been associated with better and positive outcomes in terms of knowledge, attitude and practice of the safe and effective utilization of medicines. Thus, to enhance medication safety, this research aimed to assess the knowledge, attitude, and practice towards their medications, provide counseling regarding their understanding of medication use, and evaluate the impacts of such counseling. This also emphasizes the need of counseling or other suitable interventions to impart proper knowledge and change the attitude and practice. This would improve patient compliance and medication adherence and could also be a milestone in preventing medication misadventures¹¹. Therefore, their responsibility is to provide medication counseling every time they dispense a prescription medicine. Effective counseling includes two fundamental processes: asking patients what they already know and filling in knowledge gaps. Good pharmacy counseling improves patients' knowledge and their use of medicines³.

Medication Errors: Medication errors may be defined as "Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer.

Such events may be related to professional practice, healthcare products, procedures, and systems including prescribing; order communication; product labeling, packaging, and nomenclature;

compounding; dispensing; distribution; administration; education monitoring, and use. Medication errors are at the forefront and common provision of modern healthcare and one of the many hazards of hospitalization. The problem is of multidisciplinary and multifactorial.

The U.S. Food and Drug Administration (FDA) gives this advice when you get a prescription filled: Read the label each time before you use the medicine. Be sure it's right in these ways:

- ❖ The right medicine (check the product name and its appearance, too).
- ❖ For the right patient (your name).
- ❖ In the right amount (correct dose).
- ❖ At the right time (when and how often to take it).
- ❖ In the right way (e.g., swallowing instead of chewing a pill).

A Pharmacist View on Medication Errors: A medication error is an episode associated with the use of medication that should be preventable through effective control systems (ASHP1993). Pharmacists have long-standing interest in improving medication safety and have studied ways to reduce medication errors. Pharmacists' definition used in medication errors study was a more restricted definition of error. A medication error was defined as any deviation from the prescriber's order (Allen1990). This definition does not include the clinical outcome of the Error.

The American Society of Health-system Pharmacists (ASHP) definition includes prescribing, dispensing, medication administration, and patient compliance errors (ASHP1993).

They define the following categories of Medication Errors:

- Prescribing errors.
- Omission errors.
- Wrong time errors.
- Unauthorized drug errors.

- Improper dose errors (administration of the dose that is greater or less than the amount prescribed).
- Wrong dosage form errors (administration of a drug product in a different dosage form from that 'prescribed).
- Wrong drug preparation errors (drug product incorrectly formulated or manipulated before administration).
- Wrong administration or technique errors (inappropriate procedure or improper technique in the administration of the drug).
- Deteriorated drug errors (administration of a drug that has expired or whose physical or chemical dosage form integrity has been compromised)
- Monitoring errors (failure to review a prescribed regimen for appropriateness or failure to assess response to prescribed therapy).

Types of Medication Errors: Medication errors can be broadly classified as prescribing, dispensing or drug administration errors:

Dispensing Errors: Dispensing errors occur at any stage during the dispensing process, from the receipt of a prescription in the pharmacy through to the supply of a dispensed product to the patient. Dispensing errors may undermine the patient's confidence in the pharmacist and increase the likelihood of litigation procedures. These errors include the selection of the wrong strength/product. This occurs primarily when two or more drugs have a similar appearance or similar name (look-a-like/sound-a-like errors).

The use of computerized labeling has led to transposition and typing errors which are among the most common causes of dispensing error. Other potential dispensing errors include wrong dose, wrong drug, and wrong patient. One of the most important causes of dispensing errors is confusing the name of one drug with another. Lack of knowledge of new medicines and the use of outdated and/or incorrect references can also be a contributory factor. Other factors include poor

dispensing procedures, inadequate checking, unreasonable workloads and poor housekeeping standards. Studies have also supported an association between dispensing errors and lighting levels, prescription workload, and noise. It is suspected that distractions and interruptions can lead to performance errors.

Administration Errors:

1. Patient-Centered: Wrong medicine (by mistake from the group), Wrong time, Wrong Number or quantity.

2. Nurse Centered: Wrong drug (deviation from the prescription), Wrong patient (one patient's drug to another patient), Wrong route, Wrong time, Wrong dosage form, Omission of a drug. A drug administration error may be defined as a discrepancy between the drug therapy received by the patient and the drug therapy intended by the prescriber.

Drug administration is associated with one of the highest risks in nursing practice. The "five rights" have long been the basis for nurse education on drug administration *i.e.* giving the right dose of the right drug to the right patient at the right time by the right route. Drug administration errors largely involve errors of Omission where the administration is omitted due to a variety of factors *e.g.*, wrong patient, lack of stock¹⁶.

3. Prescribing Errors: Medical prescribing errors (MPEs) are one of the most common and well-studied causes of adverse events. MPEs occur as a result of a prescribing decision or prescription writing process, leading to an unintentional and significant (1) reduction in the probability of treatment being timely and effective and increasing the risk or harm compared with generally accepted practice¹⁸.

Errors in prescribing can be divided into:

- ✓ Irrational Prescribing
- ✓ Inappropriate Prescribing
- ✓ Ineffective Prescribing
- ✓ Under Prescribing and Overprescribing and¹⁸

Prescribing errors are an important cause of patient safety incidents. Prescribing errors affect patient safety throughout hospital practice.

Prescribing errors are known to account for a substantial proportion of all medication errors and are an important cause of harm to patients, making them a priority area for patient safety initiatives¹⁶.

First, junior doctors are responsible for the majority of actual prescribing in hospitals, although they may not be responsible for all prescribing decisions.

Prescribing without considering the patient's clinical status, failure to communicate essential information and transcription errors are all considered as prescribing errors¹⁷.

Medication errors and ADEs most frequently occur at the drug ordering or prescribing stage. Prescribing errors occur in 0.3–39.1%¹⁴ of medication orders for hospital inpatients, and harm due to prescribing errors has been reported in approximately 1% of inpatients¹⁷.

Detection of Medication Errors: Medication errors are mainly detected by voluntary reporting by patients, direct observation of actual patient care of inpatients, pharmacy procedures like attending medical rounds or comparison of medication administration records to physician orders, by returned doses to pharmacy, urine testing or tracer drug analysis and comparison of drugs removed from automated dispensing device with that of physician orders, although the system of voluntarily reporting of medical errors is often incomplete and underreported.

The objective of analysis of medication error is to investigate and detect the underlying factors/root-cause of non-reporting and/or underreporting of medication errors.

They should also be encouraged and involved in data collection, root cause identification, recommendation generation, and implementation.

Prevention of Medication Errors: Eliminating the causes mentioned above of prescribing, dispensing, and administration errors is the first step toward controlling medication errors.

1. Role of Health Care System: Developing and implementing the fool-proof policies to combat medication errors, periodic training of staff and

work distribution as per the qualification, tracking of prescription orders, interdepartmental communication, standardization of doses and frequencies, preparation and drug distribution system can result in obviating errors in medication use.

2. Role of Information Technology: Emerging technologies like computerized physician order entry (CPOE) or smart cards, CPOE with clinical decision support systems, automated drug utilization review system, automated drug dispensing system, barcoding, the clinical pharmacy information systems can provide Care to Patient with high accuracy, efficiency, and promising advancement.

3. Role of Clinical Pharmacists: The pharmacist's role has evolved substantially in recent decades. The increased number of medicines being consumed by the elderly and the rising cost of newer pharmacotherapies have intensified the pressure on healthcare organizations to identify and implement cost-control measures.

Clinical Pharmacists have a major role in lowering costs by critically reviewing the pharmacotherapy of multi-morbid elderly patients.

The reduction of inappropriately prescribed medicines produces savings in the cost of each medicine. It reduces the risk of adverse drug events (ADEs) that often contribute to prolonged and expensive hospital admissions.

Most primary care physicians do not have enough time to provide all the preventive and chronic disease services patients require. This is where other multidisciplinary team members can make a valuable contribution in picking up any shortfalls.

Clinical Pharmacists can play a vital role in filling many of these gaps, as they have more time and the appropriate expertise to provide high-quality patient-centered health care. The clinical and economic benefits of community pharmacist involvement in chronic disease management have been well defined. It is envisioned that clinical pharmacists can take on greater roles in chronic disease management and help generate significant healthcare cost savings in the future.

Clinical pharmacists' interventions can effectively prevent these errors. These types of errors indicate the need for continuous education and implementation of clinical pharmacist interventions.

TABLE 1: IMPORTANCE OF PREVENTION OF MEDICATION ERRORS

Safety Action	What is Involved	Example of Impact
Ensure access to medication	Evaluate ability to pay for medication; explore alternative medications or payment means	Finding patient assistance programs or working with insurers to make the medication available that patients otherwise could not afford, improving adherence and safety
Supply medication information	Educate patients and caregivers on safe and effective medication use	Reviewing proper dosing with patients or providers can prevent medication errors and adverse drug interactions
Evaluate medication appropriateness	Assess medication appropriateness, effectiveness and safety for each individual patient	Individual consideration of "five rights" in light of patient condition, medication list, age, weight, ethnicity, diet, allergies and kidney and liver function can result in recommendations for changes in therapy or monitoring to increase medication safety
Improve medication adherence	Help patients take medication as it is prescribed	Reviewing how patients are using medications can result in suggestions for changes in medication, dosing, or additional therapies that improve patient adherence
Provide health and wellness services	Deliver direct health and wellness service	Blood pressure screenings can reveal poorly controlled hypertension

METHODOLOGY:**Plan of Work:**

Study Environment: This study was conducted at the General and Pediatric outpatient Departments of Shadan Hospital, Hyderabad.

Patient Sample:

Awareness of Patients' Medication Knowledge: 300 outpatients.

Identifying Prescribing Errors: 200 outpatient cards.

Data Collection:

Study period: The data for this study was collected between August 2018 to January 2019.

Study Approval: This study was approved by Ethics Committee and permission for collecting Patients' data was given by the Superintendent of Shadan Hospital and HOD of General Medicine and Pediatric Departments.

Questionnaire Development: A questionnaire was developed to assess patient knowledge and medication adherence.

There was a before and after study investigating management that included a questionnaire in addition to clinical pharmacist counseling in order to improve knowledge and understanding of prescribed medications. The questionnaire was divided into two parts:

- ✓ The first section comprised 6 open-ended questions dealing with patients' knowledge about medications and consisted of questions focusing on specific counseling elements regarding the medication purpose:
 - ✓ Dose
 - ✓ Administration route and time
 - ✓ Duration of therapy and
 - ✓ Recognition of medication effectiveness.
- ✓ The second section comprised of 6 questions regarding patients' knowledge after pharmacists' counseling and further queries.

Study Design:

- Prospective observational study.
- Evaluation of outpatient cards and assessing patients' medication knowledge before and after counseling.
- Identifying and calculation of prescribing errors.
- Documentation of results.

Study Criteria:**Inclusion criteria:**

1. Out patients visiting general medicine and paediatric departments.

2. Patients of either gender.
3. Patients willing to participate in the study.

Exclusion Criteria:

1. Patients who are not willing to participate in the study.
2. Patients admitted into the hospital after op consultation.

Sources of Data: Outpatient cards.

RESULTS: 300 out patients were counseled for awareness of medication knowledge.

Before Counseling: 53.70%

After Counseling: 85.91%

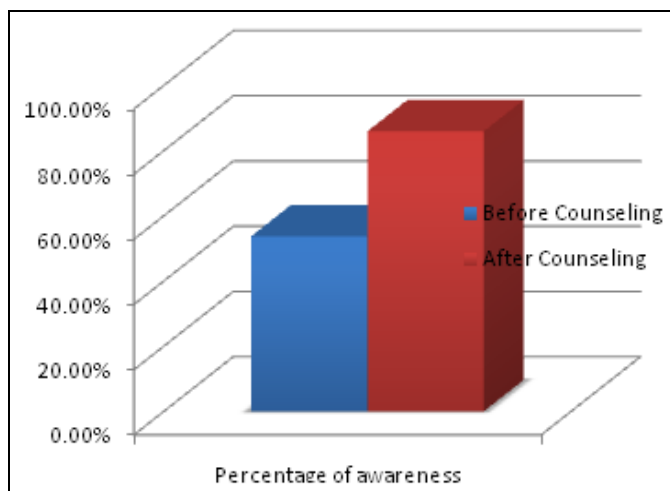


FIG. 1: TOTAL NUMBER OF ERRORS PER MEDICATION (PAEDIATRIC DEPT.) 115 prescriptions containing a total of 344 drugs prescribed showed 176 errors.

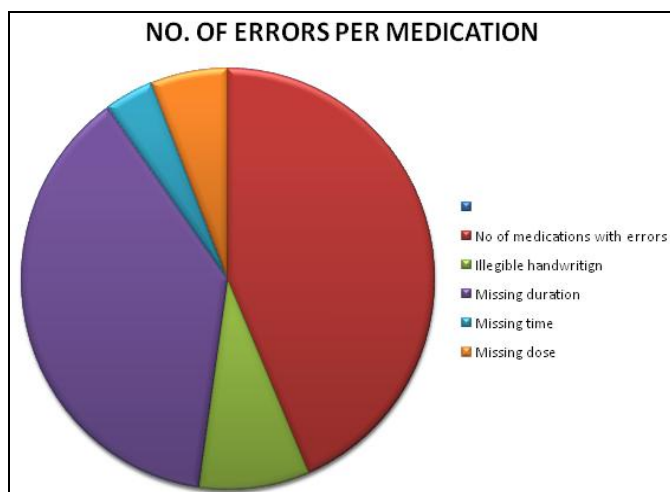


FIG. 2: TOTAL NUMBER OF ERRORS PER MEDICATION (GENERAL DEPT.) 85 prescriptions containing a total of 282 drugs prescribed showed 315 errors.

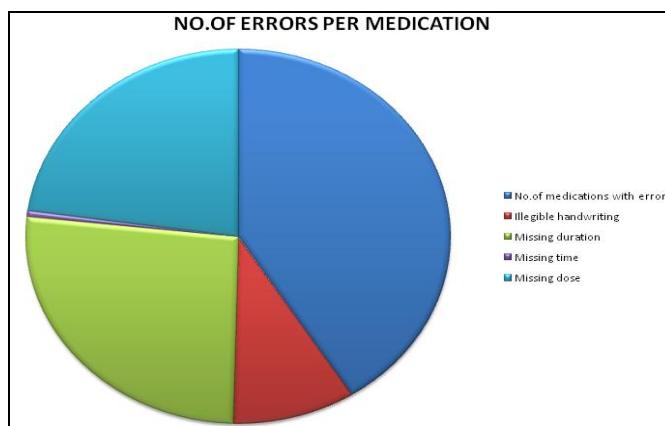


FIG. 3: PRESCRIBING ERRORS

The majority of the errors found in the OPD cards collected were:

1. Missing dose of medication.
2. Missing time of administration of medication.
3. Illegible handwriting.
4. Missing duration of therapy.



FIG. 4: PERCENTAGE OF MEDICATION ERRORS IN GENERAL AND PAEDIATRIC DEPARTMENT

Sex	Male	Female
No. of Patients	81	118

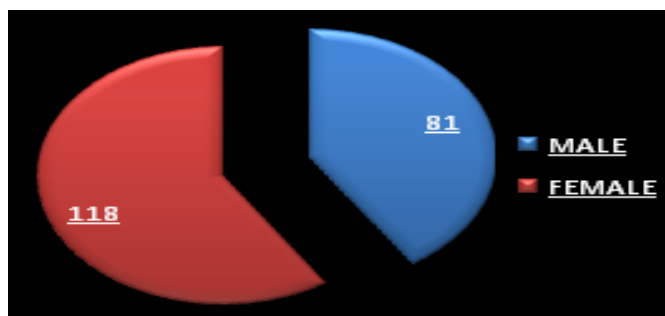


FIG. 5: DISTRIBUTION BASED ON GENDER

Department	General	Paediatric
No. of Patients	85	115

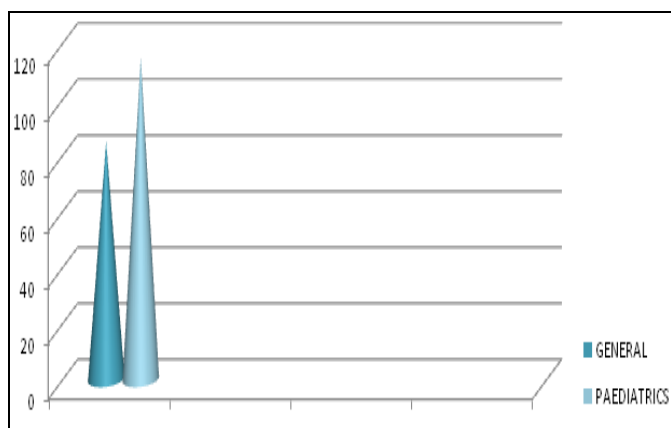


FIG. 6: DISTRIBUTION BASED ON AGE GROUP

Sex	Below 3 yrs	4-12	13-25	26-40	Above 40 Yrs
Male	25	12	9	11	11
Female	28	35	7	29	19

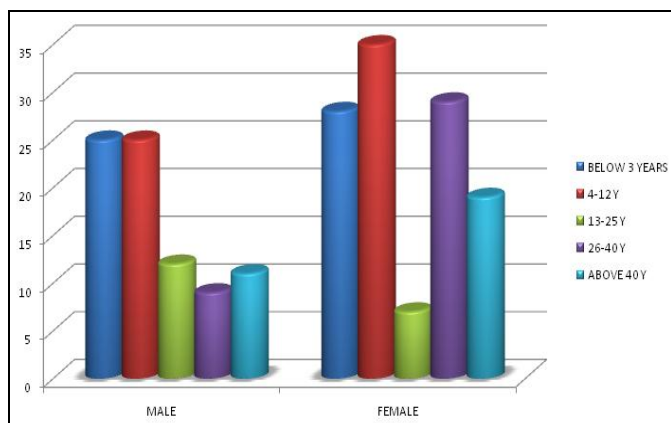


FIG. 7: DISTRIBUTION BASED ON AGE GROUP WITH REFERENCE TO GENDER IN GENERAL AND PAEDIATRIC DEPARTMENT

DISCUSSION: Current pharmacy education system in India has many drawbacks in it such as no clinical/hospital exposure for pharmacists, entry of non-meritorious students into the course, different syllabi for different universities, non-focused way of learning, outdated curriculum, lack of industrial and clinical exposure, unskilled ways of practical and laboratory training, non-commercialized and poor research *etc.* It is estimated that poor adherence costs \$100 billion annually in the U.S. Non-adherence may be voluntary or involuntary, and there are many reasons for patients not taking their medication as prescribed. Some reasons for not taking medication are involuntary, such as forgetfulness. Some are voluntary, such as fear of adverse events or a negative attitude toward medications in general. Other reasons include high cost; complex regimen; lack of education; poor quality of life; busy

schedule; poor patient physician relationship; perceptions of disease severity and drug effectiveness; asymptomatic disease (*e.g.*, hypertension, diabetes, hyperlipidemia); depression; stress; lack of social support; poor coping skills; substance abuse; and low literacy. The clinical pharmacists can assess the patient self-report, pill counts, pharmacy databases or refill rates, and blood levels, which also are employed in research, Dosing simplification and minimization of adverse effects are extremely successful strategies for improving adherence.

Clinical pharmacists in the US have established roles in many healthcare teams. Most are part of a multi-professional team for acute care or ambulatory care populations, but some have a private practice upon referral from a broad population of physicians. Since medication management is the primary focus, most measurements reflect optimal use of medications and avoidance of adverse events. Pharmacy practice is still in the initial stages of development in India, but the launching of the Doctor of Pharmacy (Pharm. D) study program has brought serious discussions about clinical pharmacy in the country. As the profession is in a budding stage in the country, the patients, physicians, nurses, other healthcare providers, recruiters in pharmaceutical industries, prospective students, and their parents have numerous questions about this profession and study course.

In clinical review, pharmacists have to check the drug therapy to ensure that the patient is getting the most appropriate dose, dosage, dosage form, and duration of therapy for their medical / disease state. Also, he has to correlate the signs and symptoms of the patient, laboratory results, medical diagnoses, and therapeutic goals with the medication history for better patient care. Patient counseling can be considered the most important Clinical Pharmacy service from the patient's point of view. The pharmacists may provide the information about the patient's current clinical condition/proceedings and educate him about the safe and appropriate use of medicines, thereby enhancing his therapeutic outcomes. Benefits of patient counseling include patient satisfaction, prevention of medication errors, better clinical outcomes, and psychological

support to the patient. Patient education especially plays an important role in chronic diseases.

CONCLUSION:

Awareness of Patients' Knowledge: Our study showed suboptimal medication-related knowledge and suboptimal patients' interaction and understanding of the prescribed medications. Although lack of awareness is common, most of the patients were unaware of their diagnosis and medications. Among older patients with Polypharmacy, only a minority of them correctly reported the indications for all prescribed drugs they were taking.

1. Patients' Knowledge: Patients showed consistent knowledge about medication purpose, dose, application rate, and timing and administration route. Patients in this study showed a serious knowledge deficiency about medicine considerations and adverse effects. After counseling, patients were considered knowledgeable if they could at least name three items (eg: indications, adverse effects, and time).

2. Medication Counseling: The level of patients' knowledge about their prescription medicines can be better understood by examining their counseling. Patients indicated they were frequently given directions for medication use, whereas information on considerations and adverse effects was seldom provided. Properly informed patients are likely to feel more control over and less apprehension about their medication use. They are more attentive to adverse effects, which they detect more quickly than patients who do not receive adequate information. Many patients in this study stated they did not receive counseling about important medication information at their most recent pharmacy visit. Nevertheless, patients rated pharmacist counseling 4.5 out of 5 on average, and 80% of those surveyed assessed counseling with the highest possible score. Despite expressing a need for further information, especially about safety issues, patients seemed satisfied with the clinical pharmacist counseling they received. Misinformation about medication consumption by seniors was common. Undertaking routine medication reviews (with emphasis on OTC use), asking specific questions about actual consumption, encouraging the use of one prescriber and one

pharmacist, discouraging storage of discontinued medications, and reducing the use of medication samples were beneficial.

Role of Clinical Pharmacist: Clinical Pharmacists' counseling after the visit to the physician improved patients' knowledge about the prescribed medications and their factors along with medication adherence. Efforts should be to extend the role of the pharmacist and its positive effect on patient outcomes. Other factors (*e.g.*, psychosocial and lack of time) likely play more important roles in medication adherence and should be targeted in future interventional strategies to optimize medication adherence.

Prescribing Errors: The majority of the errors found in the OPD cards collected were:

- ❖ Missing dose of medication.
- ❖ Missing time of administration of medication.
- ❖ Illegible handwriting.
- ❖ Missing duration of therapy.

The most common errors we identified were missing therapy duration, missing administration time, and illegible handwriting. It was found that each prescription had at least one or more errors. Therefore, there is a need to emphasize the legibility of prescription, correct spelling of drugs, authorized spellings, and all other prescription information concerned with the patient to minimize the errors. Medication errors can occur at any phase of the medication use cycle from prescribing, dispensing, and administering a drug to the patient. It increases morbidity and mortality of the population and increases the cost of the treatment.

Further, it also affects patient's confidence in medical care. Errors should be considered as potential areas for better medication use to improve patient safety. As stated, this result again emphasizes the need to enhance the prescription system. Replacing the traditional handwritten processes with information technology may potentially improve the quality of prescribing process. The clinical pharmacists can play a major role in the early detection and prevention of

prescribing errors and thus can improve the quality of care to the patients. They have a long-standing interest in improving medication safety and have studied the ways and means to reduce medication errors. This study clearly shows the need for a clinical pharmacist to work full time in the respective departments and develop hospital formulary, drug protocols, and prescription policies. The results might be better proof that a ward-based clinical pharmacist can prevent negative consequences related to medications.

ACKNOWLEDGEMENT: This work would not have been possible without the support and dedicated involvement of my colleagues, and the guidance of my professors (Dr. Syed Aseem, Dr. Ahmed, and Dr. Israruddin). Special thanks to the director of my college Dr. Shaikh Mohdkhasim for his trust and support provided during the entire study

CONFLICTS OF INTEREST: There is no conflict of interest.

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How to cite this article:

Fatima M, Ateeq A, Hai AT, Aseem S and Israruddin M: A prospective study on identifying prescribing errors and awareness of patients' medication knowledge in a tertiary care hospital. *Int J Pharm Sci & Res* 2022; 13(7): 2877-86. doi: 10.13040/IJPSR.0975-8232.13(7).2877-86.

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