PATIENT COUNSELLING: A STUDY ON PRESCRIBING AND DISPENSING PRACTICE IN A SOUTH INDIAN CORPORATE HOSPITAL

Dissertation submitted to
The Tamilnadu Dr. M.G.R Medical University, Chennai
In partial fulfillment for the award of the Degree of

MASTER OF PHARMACY

(PHARMACY PRACTICE)

APRIL-2014

DEPARTMENT OF PHARMACY PRACTICE
KMCH COLLEGE OF PHARMACY
KOVAI ESTATE, KALAPPATTI ROAD, COIMBATORE-641048

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Submitted by

Reg.No:261240604

Under the Guidance of

Mrs. K. GEETHA, M. Pharm., (Ph.D.,)

DEPARTMENT OF PHARMACY PRACTICE
KMCH COLLEGE OF PHARMACY
KOVAI ESTATE, KALAPPATTI ROAD,
COIMBATORE-641048

Dr. A. RAJASEKARAN, M. Pharm, Ph.D.,
Principal,
KMCH College of pharmacy,
Kovai Estate, Kalapatti Road,
Coimbatore - 641048.

CERTIFICATE

This is to certify that the work as embodied in the dissertation entitled **"PATIENT COUNSELLING: A STUDY ON PRESCRIBING AND DISPENSING PRACTICE IN A SOUTH INDIAN CORPORATE HOSPITAL"** submitted by **Reg. No: 261240604** is a bonafide work carried out by the candidate under the guidance of **Mrs. K. GEETHA, M. Pharm., (Ph.D.,)** to The Tamil Nadu Dr. M.G.R. Medical University**,** Chennai, in partial fulfillment for the Degree of **Master of Pharmacy** in **Pharmacy Practice** at the Department of Pharmacy Practice, KMCH College of Pharmacy, Coimbatore, Tamil Nadu during the academic year 2013-2014.

Date:
Place: Coimbatore

Dr. A. Rajasekaran, M. Pharm., Ph.D.,
Principal

Mrs. K. GEETHA, M. Pharm., (Ph.D.,)
Department of Pharmacy Practice,
KMCH college of Pharmacy,
Kovai Estate, Kalapatti Road,
Coimbatore-641048.

CERTIFICATE

This is to certify that the project work entitled **"PATIENT COUNSELLING: A STUDY ON PRESCRIBING AND DISPENSING PRACTICE IN A SOUTH INDIAN CORPORATE HOSPITAL"** was carried out successfully by **Reg.no: 261240604.** The work mentioned in this dissertation was carried out at the Department of Pharmacy Practice, K.M.C.H College of Pharmacy, Coimbatore – 641048, under the guidance of **Mrs. K. GEETHA, M. Pharm., (Ph.D.,)** in partial fulfillment for the Degree of **Master of Pharmacy** in **Pharmacy Practice** during the academic year 2013-2014.

Date:
Place: Coimbatore

Mrs. K. GEETHA, M. Pharm., (Ph.D.,)
Department of Pharmacy Practice

DECLARATION

I hereby declare that this dissertation entitled **"PATIENT COUNSELLING: A STUDY ON PRESCRIBING AND DISPENSING PRACTICE IN A SOUTH INDIAN CORPORATE HOSPITAL"** submitted to the Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfillment for the award of Degree of **Master of Pharmacy in Pharmacy Practice** was done by me under the institutional guidance of **Mrs. K. GEETHA, M. Pharm., (Ph.D.,)** at the Department of Pharmacy Practice, KMCH College of Pharmacy, Coimbatore, during the year 2013– 2014.

Date: **ARUN .N.A**

Place: Coimbatore

EVALUATION CERTIFICATE

This is to certify that the dissertation work entitled **"PATIENT COUNSELLING: A STUDY ON PRESCRIBING AND DISPENSING PRACTICE IN A SOUTH INDIAN CORPORATE HOSPITAL"** Submitted By University **Reg.No:261240604** to **The Tamil Nadu Dr. M.G.R. Medical University**, Chennai, in partial fulfillment for the Degree of **Master of Pharmacy** in **Pharmacy Practice** is a bonafide work carried out by the candidate at the Department of Pharmacy Practice, KMCH College of Pharmacy, Coimbatore, and was evaluated by us during the academic year 2013 – 2014.

Examination Centre: KMCH College of Pharmacy, Coimbatore.

Date:

Internal Examiner **External Examiner**

Convener of Examination

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ARUN N.A

INDEX

ABBREVATIONS

ASCP	American Society of Consultant Pharmacist
CPOE	Computerized Provider Order Entry
CBPRS	Computer Based Patient Record Systems
EHR	Electronic Health Record
GP	General Practice
ICU	Intensive Care Unit
IJCP	Indian journal of Clinical Practice
MPEs	Medication Prescription Errors
eMAR	Electronic Medication Administration System
OTC	Over the Counter
WHO	World Health organization

ABSTRACT

Medication errors are one of the leading causes of mortality and morbidity in many countries can occur in any step of medication use process that is, prescribing, administration and dispensing error. The main aim of this study was to evaluate the prescribing and dispensing practice in a corporate hospital in south India. This prospective observational study conducted in outpatients those who participate in patient counselling. Among 328 cases 261 cases were medication errors and it is found that, out of 261 cases (67.81%) were prescribing errors and (70.49%) dispensing errors. The most type of prescribing error was incomplete prescription (66.10%) and illegible handwriting (20.33%). Dispensing error mainly caused by incorrect labelling (85.32%). Thus it was concluded that a clinical pharmacist can play a major role in this situation appears to be a strong intervention and early detection and prevention of medication errors and thus can improve the quality of care to the patients. Educating the patients about the drug and their importance of right use, literacy can be helpful in minimizing errors.

DEFINITION AND KEY CONCEPTS

Clinical pharmacy

Clinical pharmacy has been defined by the American College of Clinical Pharmacy as a "Health science specialty which embodies the application by pharmacists, of the scientific principles of pharmacology, toxicology, pharmacokinetics and therapeutics to care for the patient[8]"

Prescribing

The act of deciding to treat a patient with a drug and communicating the decision and the instructions for preparation and use of the drug. [33]

Dispensing

Dispensing practice ensure that as effective form of the correct medicine is delivered to the right patient in the correct dosage and quantity with clear instruction and is a package that maintain the potency of the medicine dispensing includes all the activities that occur between the time the prescription is printed and the time the medicine or other prescribed item are issued to the patient.[3]

Pharmaceutical Care

In 1990, pharmaceutical care was defines ad "The responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life" (Hepler and Strand). The definition has changed and was in 2004 defined as "a patient-centred practice in which the Practitioner assumes responsibility for a patient's drug-related needs and is held accountable for this commitment".[8]

Medication Profile

A medication profile is a patient record specific to one single patient, including information on patient demographics, diagnoses and health problems, medications (both past and present), doses, dosing frequency, allergies, and other information relevant for the medication therapy review. Information is collected both from the patient records at hospital and provided by the patient.[8]

Medication errors

According to ASCP, A medication error is 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 health care professional, patient, or consumer. Such events may be related to professional practice, health care products, procedures, and systems including: prescribing; order communication; product labelling, packaging, and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use.[3]

Prescribing Error

The inappropriate selection of a drug (based on indication, contraindication, known allergies, existing drug therapy, and other factors),dose, dosage form, route of administration, concentration, rate of administration, inappropriate or inadequate instruction for use of a medication order by physician.[3]

Polypharmacy

Polypharmacy has been variously defined; in research studies a commonly applied definition has been the concomitant use of five or more drugs[34].

Drug interaction

"The pharmacologic or clinical response to the administration of a drug combination different from that anticipated from the known effects of the two agents which given alone."

(Tatro (Ed.) drug interaction facts J.B Lippincott Co.st.Louis 1992)

Incomplete prescription

According to WHO Guide to Good Prescribing Practical Manual

A Prescription should include:

•- Name, address, telephone of prescriber

•- Date

•- Name of the drug, strength

•- Dosage form

•- Name, address, age of patient

•- Signature or prescriber

If there is any missing of above contents in any prescription consider as incomplete prescription.[3]

Dispensing Error

The failure to dispense a medication upon physician order (omission error) or within a specified period of time from receipt of the medication order or reorder (time error) dispensing the incorrect drug, dose, dosage form; failure to dispense correct amount of medication; inappropriate, incorrect, or inadequate labelling of medication; incorrect or inappropriate preparation, packaging, or storage of medication prior to dispensing; dispensing of expired, improperly stored, or physically or chemically compromised medications.[3]

Wrong drug:

A medication that is different from what the prescriber wrote on the prescription order or, for refill prescriptions, what is printed on the prescription label.

Wrong strength:

A dosage unit containing an amount of medication that is different from what the prescriber specified is dispensed without an adjustment to the dosing instructions to the patient.

Wrong dosage form (correct drug):

The form of the medication used to fill the prescription is different from what the prescriber wrote on the prescription order.

Wrong quantity*:*

The number of dosage units or the volume of a product was different from what the prescriber ordered. Unless the observer could see a difference in the number of solid oral dosage forms without counting on a tray, we assumed that the correct quantity was used. Liquid measures were included if it was possible to observe the volume dispensed. If the quantity or volume of liquid could not be determined, the prescription was classified as "no error" if there were not errors in any other categories.

Wrong label instructions:

The directions on the prescription label deviated in one or more ways from what was prescribed, except for changes made based on good pharmaceutical practice.

Deteriorated drug:

A medication that had passed its expiration date was used to fill a prescription or a prescription was filled with a medication that was stored in a location not in accordance with the manufacturer's recommendations.[3]

INTRODUCTION

Over the past decades, the pharmacy profession had gone through various stages to conquer one of the relevant positions in the Health care system throughout the world. Earlier, pharmacy professionals called compounders were focused on the preparation, compounding, storage and dispensing of medicines. With significant growth and development over the past 30years, the profession of pharmacy has evolved a new concept called pharmaceutical care.

Now-a-days medical practitioners really more heavily on medications than in the past.[8] For these medications to work to their full potential, patients need to take them correctly. One of the important aspects of pharmaceutical care is counselling patients concerning medications. It has been the responsibility of pharmacists to counsel the patient's before dispensing the medication. Counselling not only enhances compliance, but also reduces complications resulting from non-adherence to treatment.[6] Patient counselling is defined as providing medication information orally or in written form to the patient or their representative on direction of use, advice on side effects, precaution, storage, diet and life style modification**.** Good communication skills are needed to gain the patients' confidence and motivate the patient to adhere to the recommended regimen.**[7]** In 1994 the WHO assembly drew up a declaration that stated "Patients have the right to be given factual, supportable, understandable and appropriate information, to be provided in such a way as to allow them to decide whether they wish to receive therapy". There has also been an increase in the demand for health-related information by patients.[9]

National scenario:

In India the first master in pharmacy practice was developed in 1996 but from then more emphasis was given on attending ward rounds, drug information and drug therapy review but important given for patient counselling was not up to the mark. In India 95% of pharmacist do not offer counselling services to patients. This is because of provider based, patient based and system based barriers.[7]

International scenario:

In developed countries pharmacist take the responsibility of patient counselling. In America the pharmacist counselling patients on the correct use of medication was started from 1964 and the use of private hospital for patient pharmacist interaction, counselling the patients was started from 1965.[7]

Medication Error

"Medication error as the administration of the wrong medication or dose of medication, drug, diagnostic agent, chemical, or treatment requiring the use of such agents, to the wrong patient or at the wrong time, or the failure to administer such agents at the specified time or in the manner prescribed or normally considered as accepted practice[4]".

Barker & McConnell (1962)

Health professionals are always looking for to improve the quality and safety of healthcare. Medicines are a key component of healthcare and errors relating to medication may impact on patient safety.[12] Medication error, one of the leading causes of mortality and morbidity in many countries, can occur in any step of medication use process i.e. prescribing errors, administration errors, dispensing errors.[13] In 1999, the Institute of Medicine reported that 44,000 to 98,000 people annually die in US hospitals as a result of medical errors. Medication errors occurring either in or out of the hospital are estimated to account for at least 7,000 deaths each year. Although most of these errors are harmless, or intercepted on time, some do result in an adverse drug event (ADE).[15] Medication errors are more common than adverse drug events, but result in harm less than 1 % of the time. About 25 % of adverse drug events are due to medication errors. In Indian Hospital pharmacies dispense hundreds of thousands to millions of medication doses annually, for both ambulatory and hospitalized patients.[7] A medication error is a failure in the treatment process that leads to, or has the potential to lead to, harm to the patient.[13] Many Healthcare literatures are rich with evidence indicating the medication errors that lead to increased hospital readmissions and healthcare costs.[7]

The American Society of Health-System Pharmacists (1993) defined a medication error 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 health care professional, patient, or consumer. Such events may be related to professional practice, health care products, procedures, and systems including: prescribing; order communication; product labelling, packaging, and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use.[4] Prescription and dispensing errors are the most sensitive phases in medication errors[5]. Sometimes prescribing errors leads to cause dispensing errors. Errors made during prescribing and dispensing are the most common type of error and it is avoidable.

Medication Errors occurring either in or out of the hospitals resulting patient injury and death are significantly high and unacceptable numbers. One of the most important works was the Harvard Medical Practice study. In this study, it was shown that 3.7% of patients admitted to hospitals in the State of New York experienced injury resulting from care. It was also shown that 19% of these injuries were caused by the use of medications. Evidence from a number of sources over several decades indicates that a substantial number of patients suffer iatrogenic injuries while in hospital[10]. Medication errors should be identified and documented in order to recognize recurring causes and therefore develop systems to minimize them.[7] The difficulty, however, in detecting medication errors has been recognized for many years. It is accepted that most medication errors are probably undetected and that of those that are detected only 5% are reported. The remainders are not reported for a variety of reasons including lack of awareness that an error has been made, lack of familiarity with reporting mechanisms, difficulty/time constraints in completing report forms, fear of possible legal ramifications for both individual and the organization, and lack of feedback to staff causing a reduction in motivation to continue submitting reports. Direct comparison of error rates between studies becomes difficult when a variety of error definitions and data collection methods have been used.[12] Ongoing monitoring programs for the detection and management of medication errors within a hospital are needed. According to the American Society of Health System Pharmacists guidelines on preventing medication errors in hospitals, medication errors should be identified and documented and their causes studied in order to develop systems that minimize recurrence. A first step toward improving the quality of a drug distribution system and reducing drug-related errors is to employ an effective mechanism for systematic collection and feedback on errors. The main aim of this study was to detect, identify and document the onset, underlying cause, incidence and type of medication errors and assess the severity of medication errors in the outpatient departments of a south Indian hospital.[10]

REVIEW OF LITERATURE

In this section I can deal with various studies and literatures. This helped to get clear cut picture, which gives a direction how to formulate, what are all the methods, which I can apply in this study

Alvarez Diaz A.M et al calculated the error prevalence occurred in different medication dispensing systems, the stages of occurrence and contributing factors. This study shown that applying new technologies to the dispensing process has increased its safety, particularly implementation of CPOE has enabled to reduce dispensing errors.[16]

Elizabeth Allan Flynn et al investigated the possible association between interruption and distraction and the occurrence of dispensing errors. In ambulatory care pharmacy, interruption and distraction over a half an hour period were associated with dispensing errors, a majority of which involved incorrect label information.[17]

Adnan Beso et al determined the frequency and types of dispensing errors identified both at the final check stage and outside of a hospital pharmacy, to explore the reasons why they occurred, and to make recommendations for their prevention. Dispensing errors occur in about 2% of all dispensed items. About 1 in 100 of these is missed by the final check. The impact on dispensing errors of developments such as automated dispensing systems should be evaluated.[18]

Sonal Sekhar M et al performed a prospective study to assess the prevalence and determine the various types of dispensing errors occurring in inpatient prescriptions; also to create awareness among the pharmacy professionals about the various types of dispensing errors and thus help to minimize them. The incidence of dispensing errors was found to be 4.8% and the most frequent type of dispensing error was found to be wrong medication (43.1%).[19]

Jennifer L. Cina et al conducted a study at an academic tertiary care hospital to characterize the incidence and severity of medication dispensing errors in a hospital pharmacy. Given the volume of medications dispensed, even a low rate of drug distribution process translates into a large number of errors with potential to harm patients. Pharmacy distribution systems require further process redesign to achieve the highest possible level of safety and reliability.[1]

Anacleto TA et al carried out a cross-sectional study focusing on the occurrence of dispensing errors in a general hospital and determine the dispensing error rate and to identify factors associated with them and to propose prevention actions. The dispensing system at the pharmacy can produce many latent failures and does not have an adequate control; it has several conditions that predispose it to the occurrence of errors, contributing to the high rate reported.[5]

Tony Avery et al performed a retrospective review of unique medication items to determine the prevalence and nature of prescribing errors in general practice; to explore the causes, and to identify defences against error. From this study, many factors increase the risk of error. Strategies for reducing the prevalence of error should focus on GP training, continuing professional development for GPs, clinical governance, effective use of clinical computer systems and improving safety systems within general practices and at the interface with secondary care. [11]

Fernanda R.E. Gimenes et al performed a study to identify factors related to medication errors in the computerized physician order entry and their advantages and disadvantages according to doctors, nursing team and administrative officers. This study concluded that the computerized prescription order entry represents a great progress among the strategies used to minimize medication errors caused by prescriptions badly formulated. However, it doesn't eradicate the possibility of medication error occurrences, needs newer techniques. [14]

Kirsten Colpaert et al investigated if the introduction of a computerized ICU system reduced the incidence and severity of medication prescription errors (MPEs). The ICU computerization, including the medication order entry, resulted in a significant decrease in the occurrence and severity of medication errors in the ICU.[15]

Dyah Aryani Perwitasari et al conducted a study to know the occurrence of medication errors including prescribing error, pharmaceutical error and dispensing error and the occurrence of the most type happened in these errors. Medication errors are still common problem in outpatients. Pharmacists needed to prevent and to overcome the medication errors.[35]

R. Bolt et al performed an investigation were to analyse the extent of weight-adjusted prescribing error in children admitted under the care of the oral/maxillofacial team and to assess prescriber compliance with predetermined markers of correct drug chart completion. In addition to assessing performance against established hospital standards, we sought to establish future standards in prescribing accuracy and explore simple, yet effective methods to bring about improvement in prescribing practice. Inaccuracy of prescription chart completion is a common phenomenon seen in both adult and paediatric settings. Dosage and frequency errors may potentially act synergistically to create a significant disparity between the recommended and actual amount of drug that is delivered.[20]

Eric G. Poon et al performed a study to prevent such errors, technology has been developed to verify medications by incorporating bar-code verification technology within an electronic medication-administration system (bar-code eMAR). Use of the bar-code eMAR substantially reduced the rate of errors in order transcription and in medication administration as well as potential adverse drug events, although it did not eliminate such errors. Our data show that the bar-code eMAR is an important intervention to improve medication safety.[21]

Dellemin Che Abdullah et al conducted a retrospective study to determine the medication errors among geriatrics at the outpatient pharmacy in a teaching hospital in Kelantan and the strategies to minimize the prevalence and it is very clear that the role of pharmacist is very great in preventing and minimizing the medication errors beside the needs of correct prescription writing and other strategies by all of the heath care components.[22]

Mohammad Al-Shara et al conducted a study to determine the factors contributing to medication errors and related areas for improvement, as perceived by nurses. A wide range of factors perceived as contributing factors of medication errors were identified. These results provide valuable information that could be used to improve the medication system[23]

Benjamin C. Grasso et al compared the effectiveness of using a review team and the usual self-reporting method in detecting different types of medication errors in a state psychiatric hospital. Use of a review team should be considered as a method for detecting and reporting medication errors.[24]

Josh F. Peterson et al determined the degree to which CPOE medication orders matched actual dose administration times. Medication administration discrepancies are likely to persist even after implementing CPOE and bar-coded medication administration unless recommended interventions are made to address issues such as determining the true urgency of medication administration, avoiding overlapping duplicative medication orders, and developing a safe means for shifting dosing schedules.[25]

Elizabeth Allan Flynn et al investigated dispensing accuracy rates in 50 pharmacies located in 6 cities across the United States and describe the nature and frequency of the errors detected. In this study, about 250 prescriptions were prescribed daily at a rate of about 4 errors were reported per day in a pharmacy filling. An estimated 51.5 million errors occur during the filling of 3 billion prescriptions each year.[26]

Marianne Lisby et al investigated the frequency, type and consequences of medication errors in more stages of the medication process, including discharge summaries. There is a need for quality improvement, as almost 50% of all errors in doses and prescriptions in the medication process were caused by missing actions. We assume that the number of errors could be reduced by simple changes of existing procedures or by implementing automated technologies in the medication process.[27]

Tinsy Thomas et al evaluated the rate of occurrence of the dispensing errors and the factors which contributed to the dispensing errors. During peak hours, an insufficient number of pharmacists were found to be the most important factor which contributed to the dispensing errors. This also shows the need for a sufficient number of pharmacists to be posted during the peak hours at the filling section and in the in-patient pharmacy to minimize the dispensing errors.[28]

Christine M. Collins et al performed a study to reduce the probability of failure in the oral chemotherapy order, review and administration process and to reduce oral chemotherapy-related prescribing errors intercepted by clinical pharmacists prior to reaching the patient. Prescribing oral chemotherapy is a failure mode with significant risk of inducing patient harm. CPOE is effective in reducing prescribing errors of oral chemotherapy and should be considered part of a fail-safe process to improve safety.[29]

Amanda G. Kennedy1 et al implemented a prescribing-error reporting system in primary care offices and analyse the reports. Nurses and office staff are a valuable resource for reporting prescribing errors. However, without ongoing reminders, the reporting system is not sustainable.[30]

Candice Estellat at al described the pharmacists' interventions during validation of drug prescriptions on a computerized physician order entry system, the impact of these interventions on the prescribing process and the extent to which computerized physician order entry was responsible for the identified errors.[31]

Marianne Lisby et al investigated the frequency, type and consequences of medication errors in more stages of the medication process, including discharge summaries. There is a need for quality improvement, as almost 50% of all errors in doses and prescriptions in the medication process were caused by missing actions. We assume that the number of errors could be reduced by simple changes of existing procedures or by implementing automated technologies in the medication process.[32]

Cyrille Delpierre et al analysed the impact of computer-based patient record systems (CBPRS) on medical practice, quality of care and user and patient satisfaction. CBPRS increased user and patient satisfaction, which might lead to significant improvements in medical care practices. However, the studies on the impact of CBPRS on patient outcomes and quality of care were not conclusive. Alternative approaches considering social, cultural, and organizational factors may be needed to evaluate the usefulness of CBPRS.[33]

David C Radely et al conducted a study to estimate the medication errors reduction in hospitals attributable to electronic prescribing through CPOE. On their findings suggest that CPOE can substantially reduce the frequency of medication errors.[36]

Chomtrikup T, et al conducted a study to identify the rate of post-dispensing errors and classify post-dispensing errors at outpatient pharmacy. Overall, 3.91% of 256 prescriptions were identified at least one of those dispensing errors. The most frequently found dispensing error was incorrect drug item.[38]

OVERVIEW

Prescribing errors

"A clinically meaningful prescribing error occurs when as a result of a prescribing when, decision or prescription writing process, there is an unintentional significant (1) reduction in the probability of treatment being timely and effective, (2) increase in the risk of harm when compared with generally accepted practice"

Dean B (2002)

Prescribing is the process whereby a doctor, nurse or other registered professional authorises use of medications or treatments for a patient and provides instructions about how and when those medication should be used. Although the term commonly refers to orders for medicines, the concept can equally encompass laboratory tests, medical imaging, psychological treatments, eye glasses, eating and exercise regimes or other instructions to help optimise health and wellbeing. Prescriptions are handwritten or computerised documents containing the patient's name and address, the date, the specific treatments prescribed and an authorising signature.[10] Prescription is a way for prescribers to communicate with pharmacists or others who in turn fill the prescription. Prescriptions can help people stay healthy or manage long-term conditions or emergency situations. However, as with other components of healthcare, prescriptions are also subject to error and can lead to unintended harm. Medication errors are one of the most common patient safety issues and prescribing errors are one of the most common types of medication errors. Prescribing errors can take many forms, but commonly involve incorrect doses, illegible details or ordering inappropriate medications or drugs that may react with other medications already being taken.[12]

The issue of prescribing errors was discussed from 1962, when Barker and McConnell in the United States of America (USA) first demonstrated that medication errors occur more frequently than suspected. They estimated a rate of 16 errors per 100 doses and suggested that the apparent increasing rate of prescribing errors was proportionate to the increasing number of drugs available.[1] subsequently reporting systems for reporting medication errors were set up in the USA and Europe. Health care professionals who encounter actual or potential medication errors are encouraged to report them confidentially or anonymously if preferred. In 1995, a multidisciplinary group of 17 national organizations formed the National Coordinating Council for Medication Error Reporting and Prevention.

Since then there have been many other landmark developments with regard to reporting of prescribing errors.[3]

Prescribers are human and thus make mistake. However, this type of medication mistake is preventable.[18] Prescribing errors may be defined as an incorrect drug selection for a patient, the dose, the strength, the route, the quantity, the indication, the contraindications. This definition can be further expanded to include failure to comply with legal requirements for prescription writing. The prescriber must specify the information which the pharmacist needs to dispense the drug in the correct dosage and form and the directions the patient needs to take it safely.[13] The dispensing error categories used were as follows:

Omission error

- Incomplete prescription
- Use of abbreviation
- Illegible handwriting

Decision error

- Banned/Prohibited drugs
- Wrong time
- Contraindication
- Polypharmacy
- Drug interaction
- Inappropriate dosing
- Inappropriate duration
- Inappropriate dosing frequency

Dispensing errors

Dispensing medication is the core function of pharmaceutical care and approximately 900 million medicines are dispensed each year by community and hospital pharmacies across England and Wales. Dispensing is a complex process unequivocally under the supervision of the pharmacist. Traditionally, dispensing has involved pharmacy staff manually selecting medication from shelves, transferring the correct number of medication dose units to a container and/or labelling the assembled product.[5] However, in recent years the use of automated dispensing systems has been widely advocated to improve efficiency, maximize storage capacity and minimize dispensing errors. Consequently, automated

dispensing systems are becoming increasingly commonplace in hospital and community pharmacies across the world. Errors can arise at any stage during the dispensing process. It is estimated that each year 1,34,341 dispensing errors occur in community pharmacies in England and Wales.

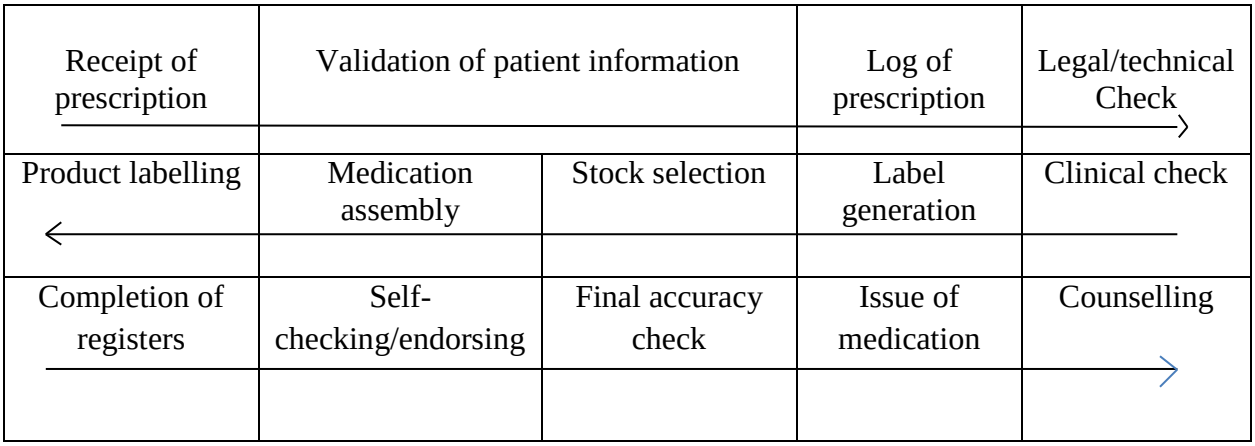


Figure 1 Dispensing process in community and hospital pharmacies

There is growing concern about the number of patients harmed by medication errors; the volume of research on this subject is growing exponentially. However majority of the research is focused on prescribing and administration errors[3]. While dispensing errors can also result in significant patient harm, there is relatively less research work done in this area. The process of drug dispensing involves providing the medication to the individual who will administer the drug and dispensation is considered as one of the sensitive phases of the medication process. The term dispensing error refers to the medication errors linked to the pharmacy or to the health care professional who dispenses the medication.[21]

Flynn defined a dispensing error as a discrepancy between the prescriber's interpretable written order and the filled prescription (including written modifications made by the pharmacist pursuant to contact with the prescriber or in compliance with pharmacy policy). The dispensing error categories used were as follows[4]:

Drug/content error

- Wrong drug dispensed
- Wrong strength dispensed
- Expired/deteriorated drug
- Failure to supply drug

Labelling error

- Wrong drug
- Wrong strength
- Wrong dosage form
- Wrong direction
- Wrong patient name
- Wrong quantity

Other

- Issued to wrong patient
- Incorrect bagged

METHODOLOGY

Objective

To evaluate the prescribing and dispensing practice used in outpatients in a corporate hospital.

Study design

It is a Prospective Observational Study

Study site

The study was conducted in the patient counselling department in a multispecialty hospital in Coimbatore.

Study period

The study was conducted from June 2013 to January 2014.

Source of data

The data was collected from various sources such as patient prescription and dispensing drugs from the pharmacy.

Study procedure

A prospective observational study performed in an 800 bedded private corporate hospital to evaluate the drug prescription and drug dispensing practice used in outpatient. The concept of this practice was adopted from the discrepancy between the written instruction found on prescription and the accomplishment of this instruction by the pharmacy when drug was dispensed to the outpatient. Data collection was performed only the patient who participate in patient counselling. Patient counselling was performed during the day in the patient counselling department. Data were collected from all patients including paediatric, geriatric, and all types of population and also from various departments like (General Medicine, Psychiatry, Cardiology, Gynaecology, Orthopaedic, Urology, Endocrinology, Nephrology, Paediatric, Ophthalmology, Neonatology, Dentistry, Rheumatology Otolaryngology, Pulmonology, Gastroenterology, Neurology, Dermatology, and oncology)..

The study was limited to pharmacy dispensing activities between 10AM to 5PM when the majority of medication are dispensed.

Here Prescribing and dispensing errors were classified into various types: Prescribing errors were classified into omission error and decision error. Dispensing errors were classified in to drug/content error and labelling error.

The following were excluded from the study: the patients who admitted in hospital (in patients) and also the patients who are not interested in patient counselling. OTC medication is not included. The following were included in the study: All prescriptions were collected which contain two or more than two medication. All types of errors were included both harm and harmless. Data were collected from outpatients those who participate in the patient counselling and willing to participate in the study. Data were collected from individual patients in the designed data collection form. Data were analysed.

Table: 1 Shows Gender wise distribution among study population (n=261)

GENDER	PERCENTAGE
Male	52.87%
Female	47.12%

Figure-2 Gender wise distribution

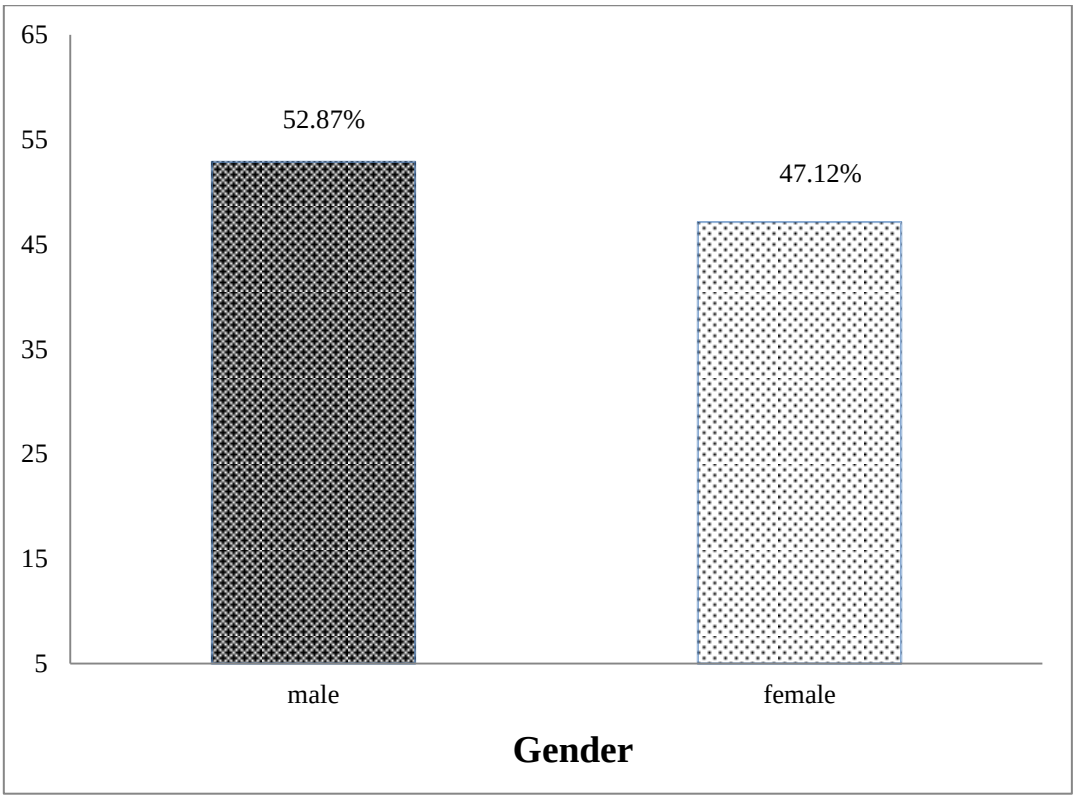


Table: 2 Shows literacy status among study population (n=261)

LITERACY	PERCENTAGE
Below matric	65.51%
Matric	25.67%
Above matric	8.42%

Figure-3 Literacy status wise distribution

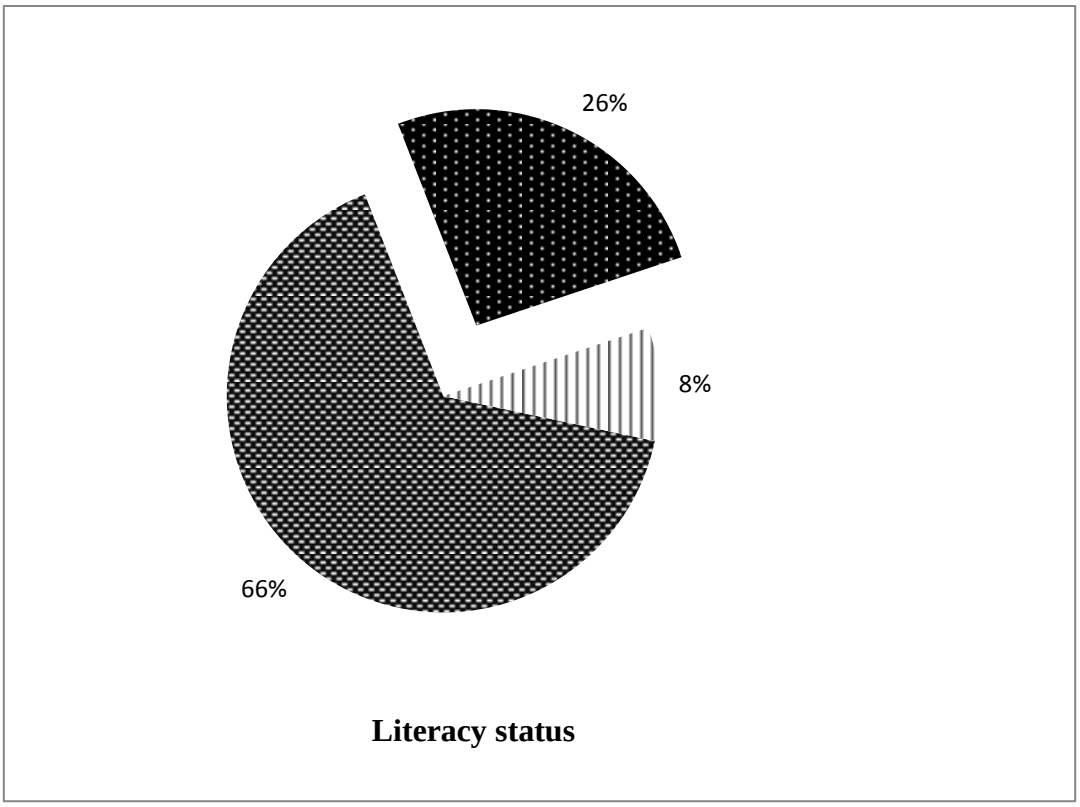


Table: 3 Shows age wise distribution among study population (n=261)

AGE	PERCENTAGE
Below 12	1.21%
13-60	73.94%
Above 60	24.52%

Figure-4 Age wise distribution

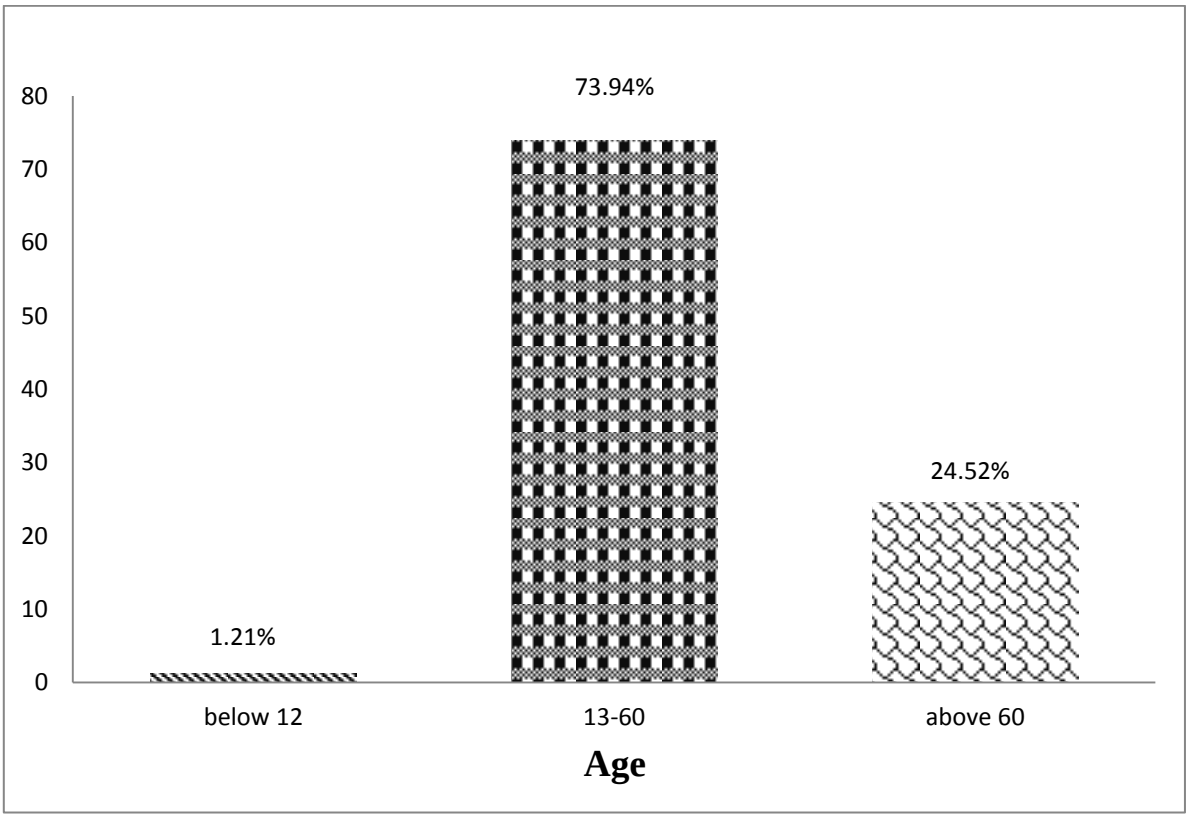


Table: 4 Shows types of prescription among study population (n=328)

TYPES OF PRESCRIPTION	PERCENTAGE
Handwritten prescription	96.03%
Computerized prescription	3.96%

Figure-5 Types of prescription

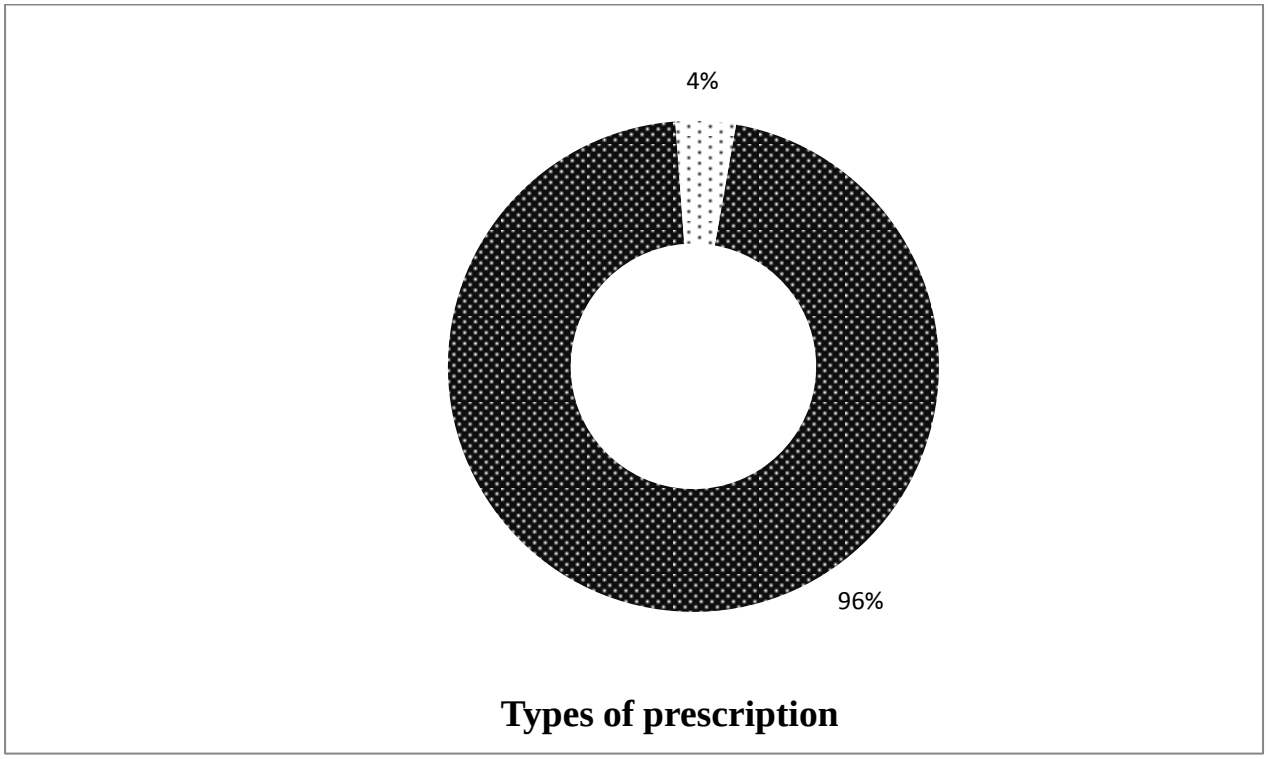


Table: 5 Shows medication errors among study population (n=328)

MEDICATION ERROR	PRECENTAGE
Prescribing error	67.81%
Dispensing error	70.49%
Both	42.52%

Figure-6 Medication errors wise distribution

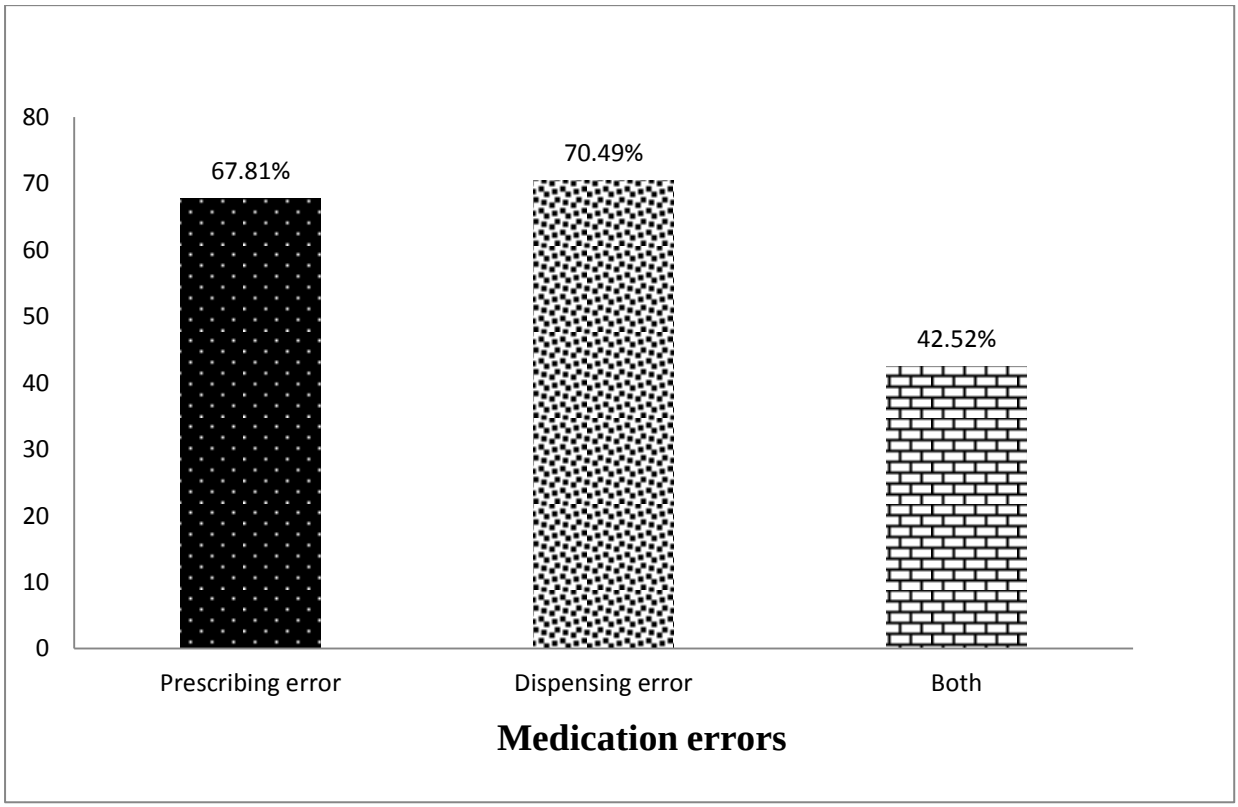


Table: 6 Shows Prescription errors among study population (n= 177)

PRESCRIPTION ERRORS	PERCENTAGE
Omission errors	86.44%
Decision errors	13.55%

Figure-7 Prescription error wise distribution

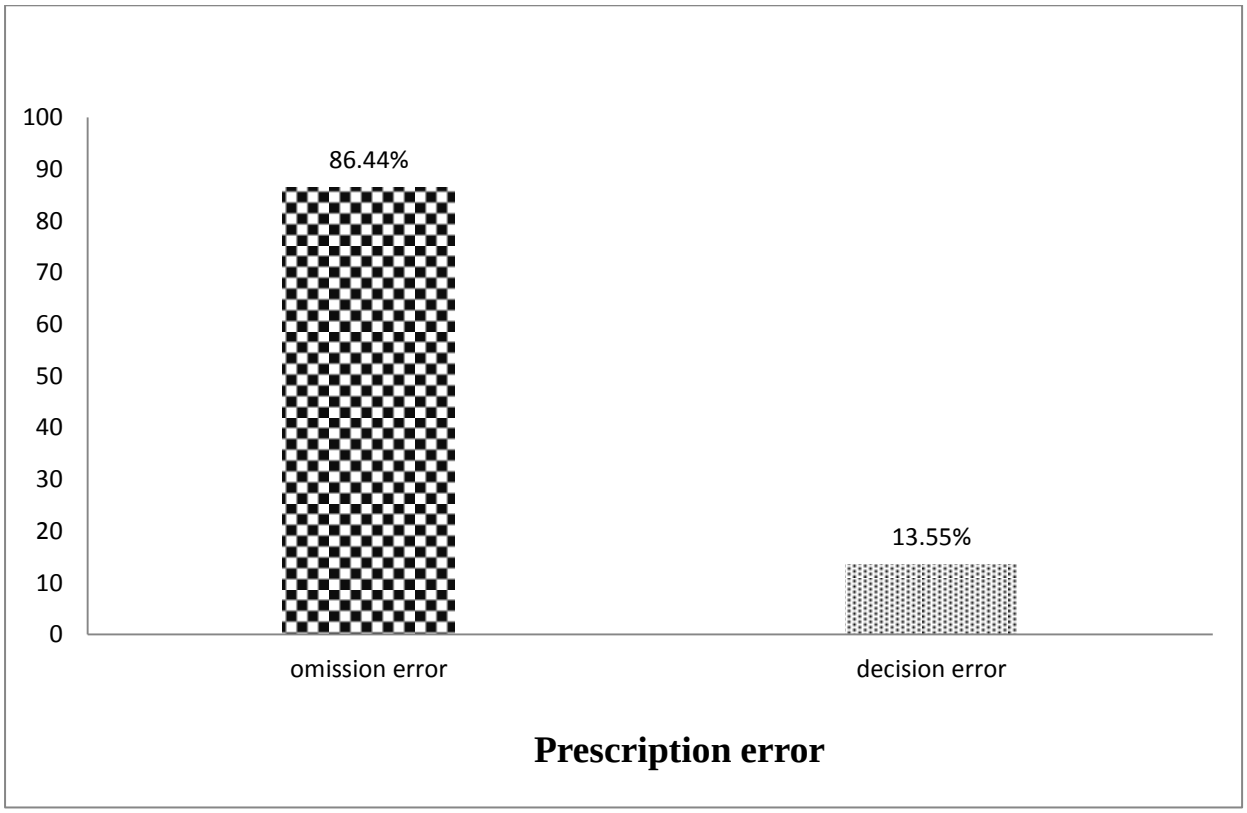


Table: 7 Shows Omission error distribution among study population (n=153)

OMISSION ERROR	PERCENTAGE
Incomplete prescription	66.10%
Illegible hand writing	20.33%

Figure-8 Omission error wise distribution

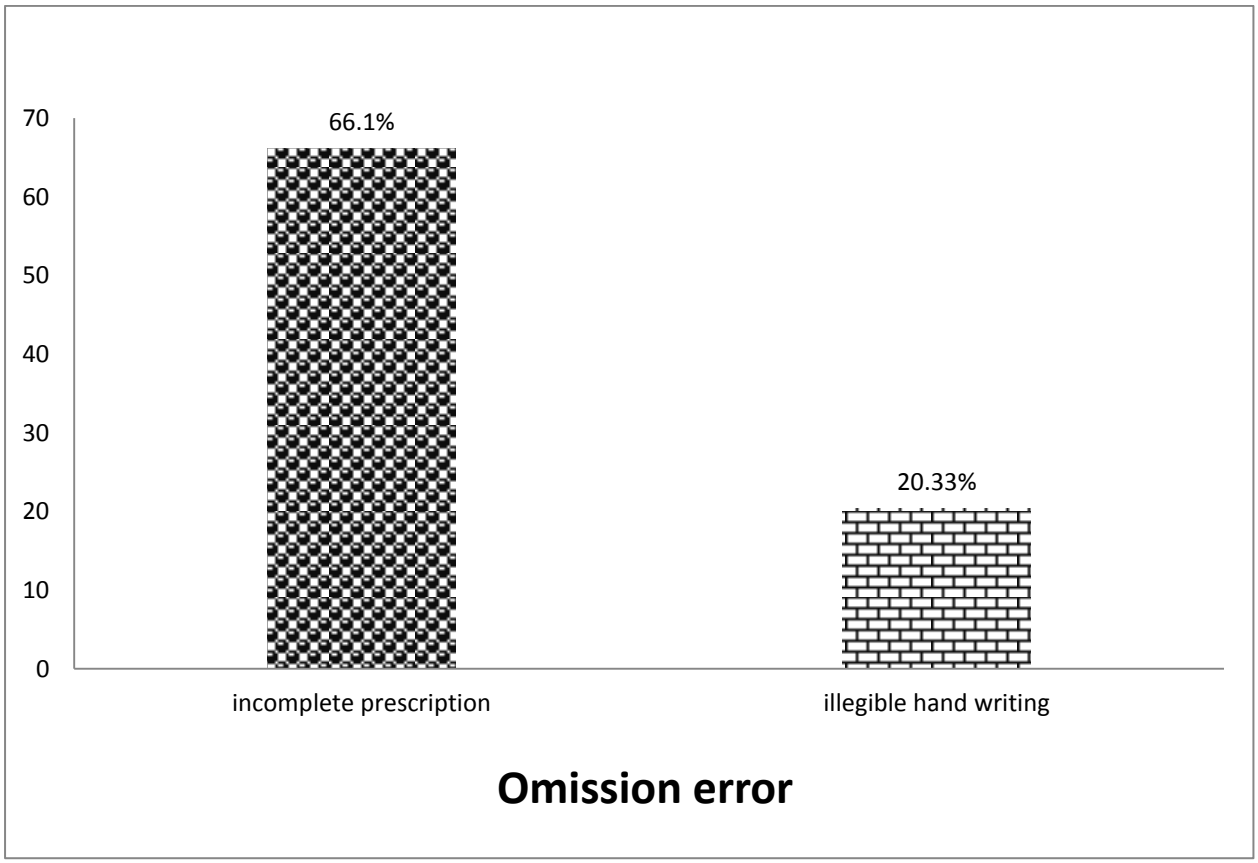


Table: 8 Shows Decision error distribution among study population (n=24)

DECISION ERRORS	PERCENTAGE
Inappropriate drug frequency	1.69%
Inappropriate direction	2.25%
Inappropriate dosing	2.82%
Banned drug	2.82%
Drug interaction	3.95%

Figure-9 Decision error wise distribution

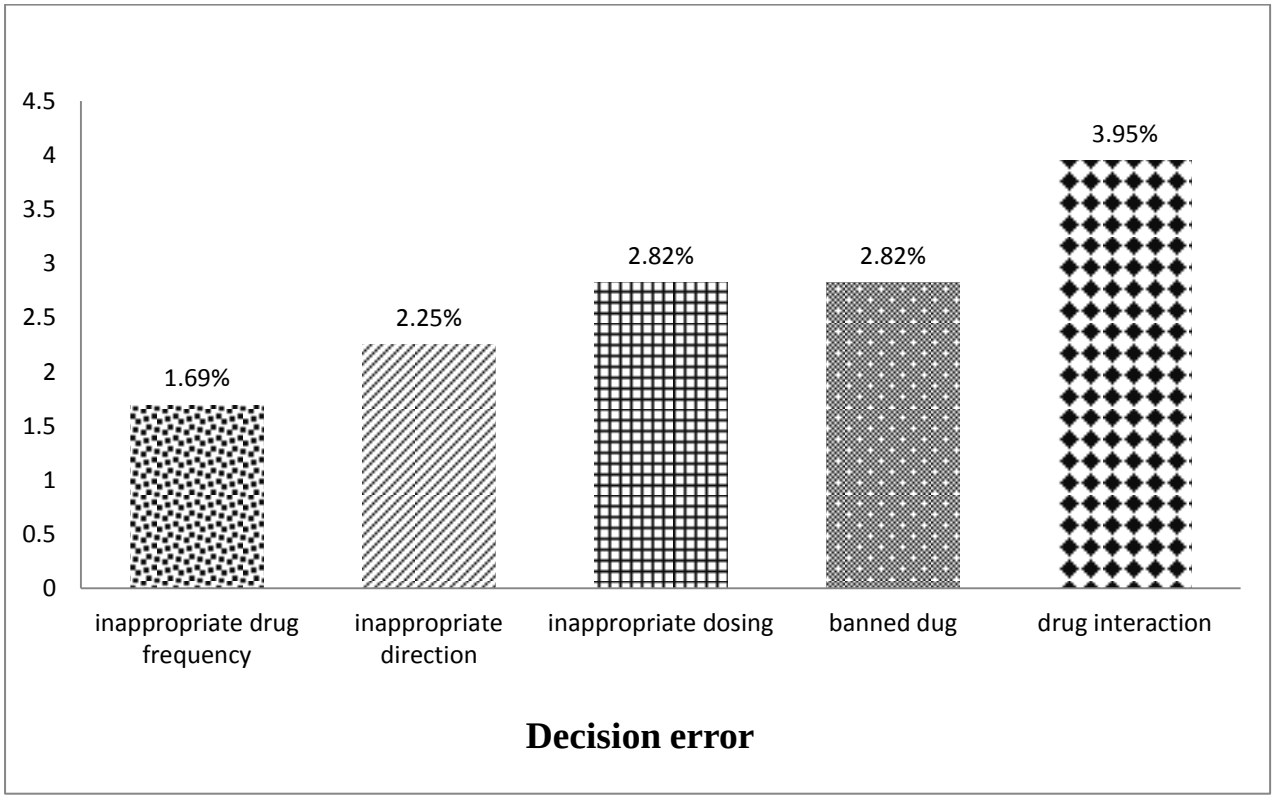


Table: 9 Shows dispensing errors distribution among study population (n=184)

DISPENSING ERRORS	PERCENTAGE
Drug / content error	14.67%
Labelling error	85.32%

Figure- 10 Dispensing error wise distribution

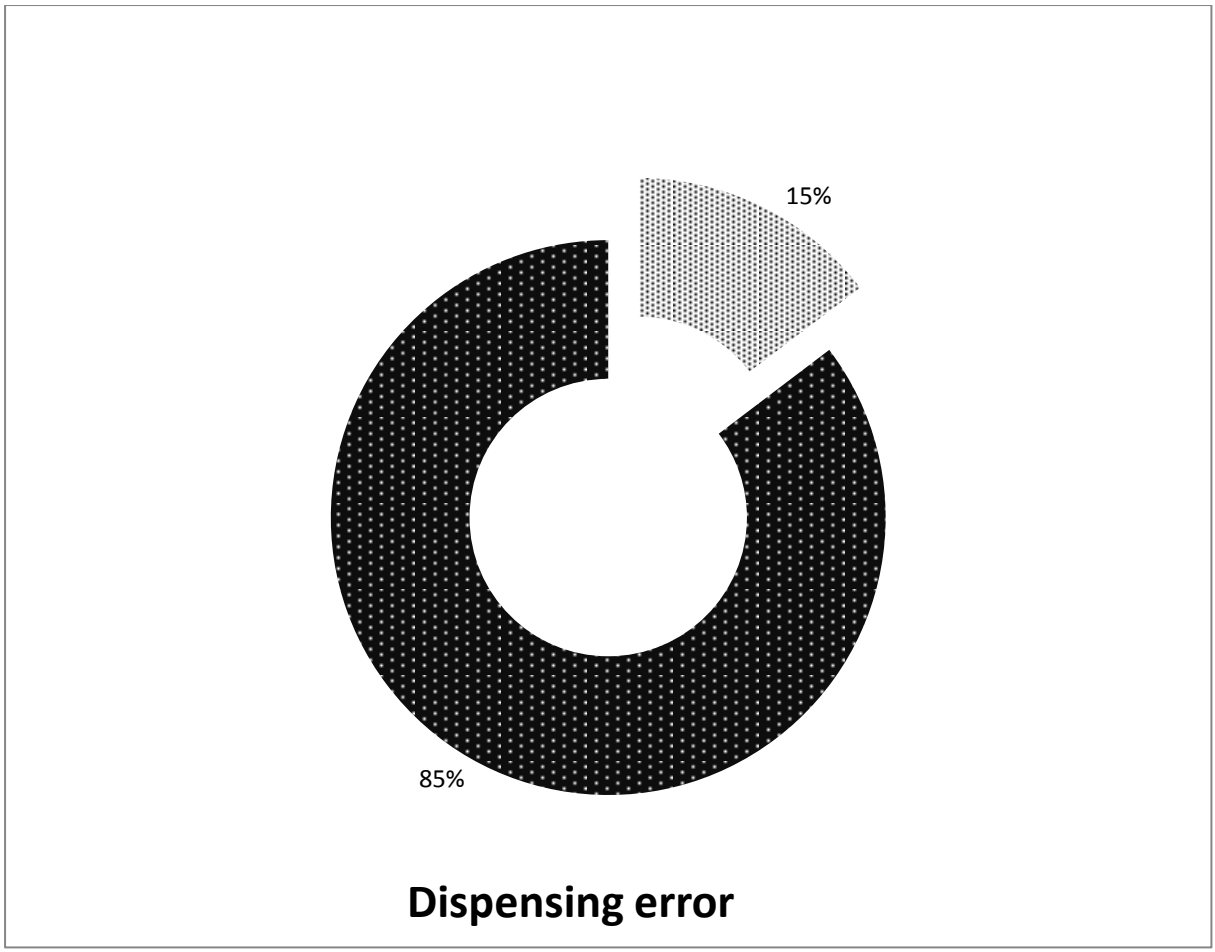


Table: 10 Shows Drug /Content error wise distribution among study population (n=27)

DRUG/CONTENT ERROR	PERCENTAGE
Wrong drug quantity	8.15%
Wrong labelling error	3.80%
Wrong strength dispensed	2.71%

Figure-11 Drug /Content error wise distribution

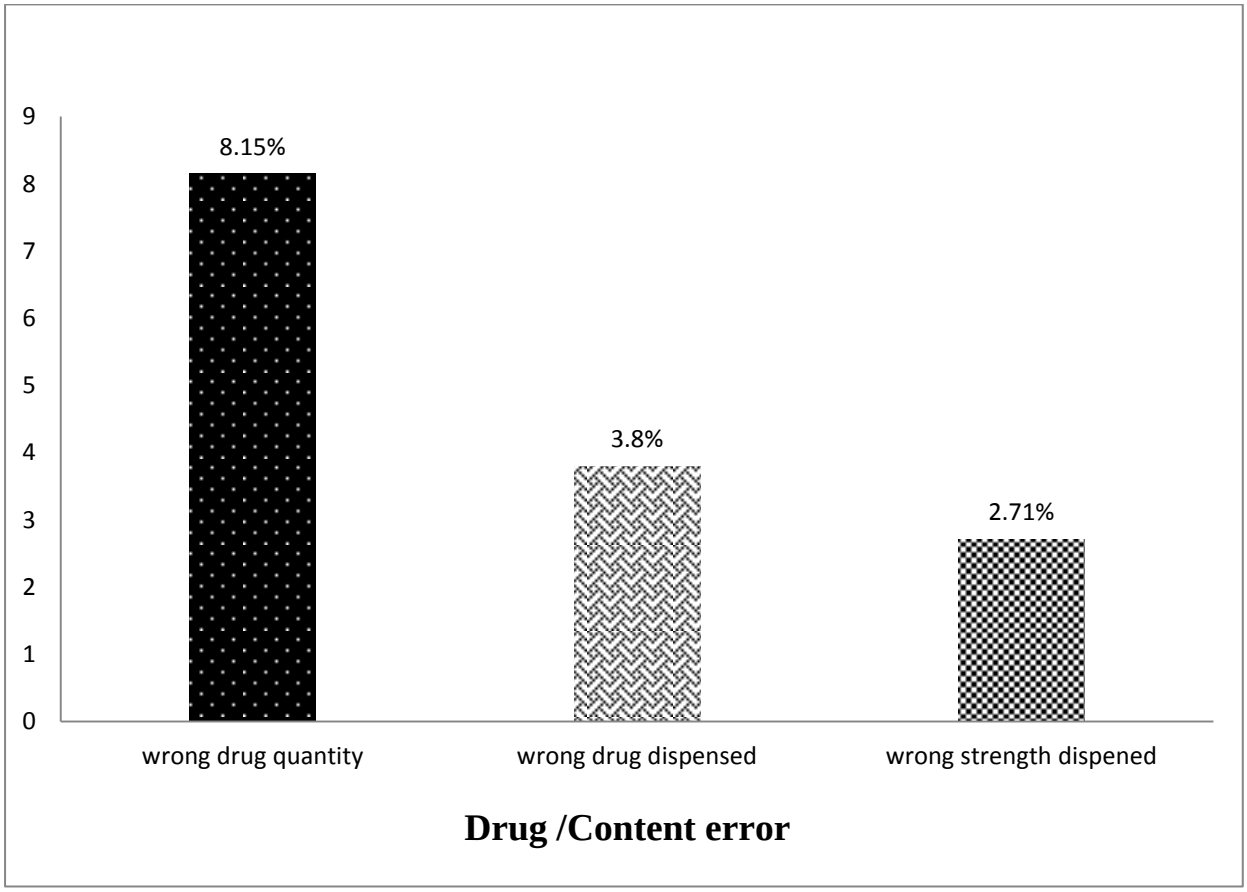


Table: 11 Shows Labelling error wise distribution among study population (n=157)

LABELLING ERROR	PERCENTAGE
Wrong direction	72.82%
Wrong drug name	12.50%

Figure-12 Labelling error wise distribution

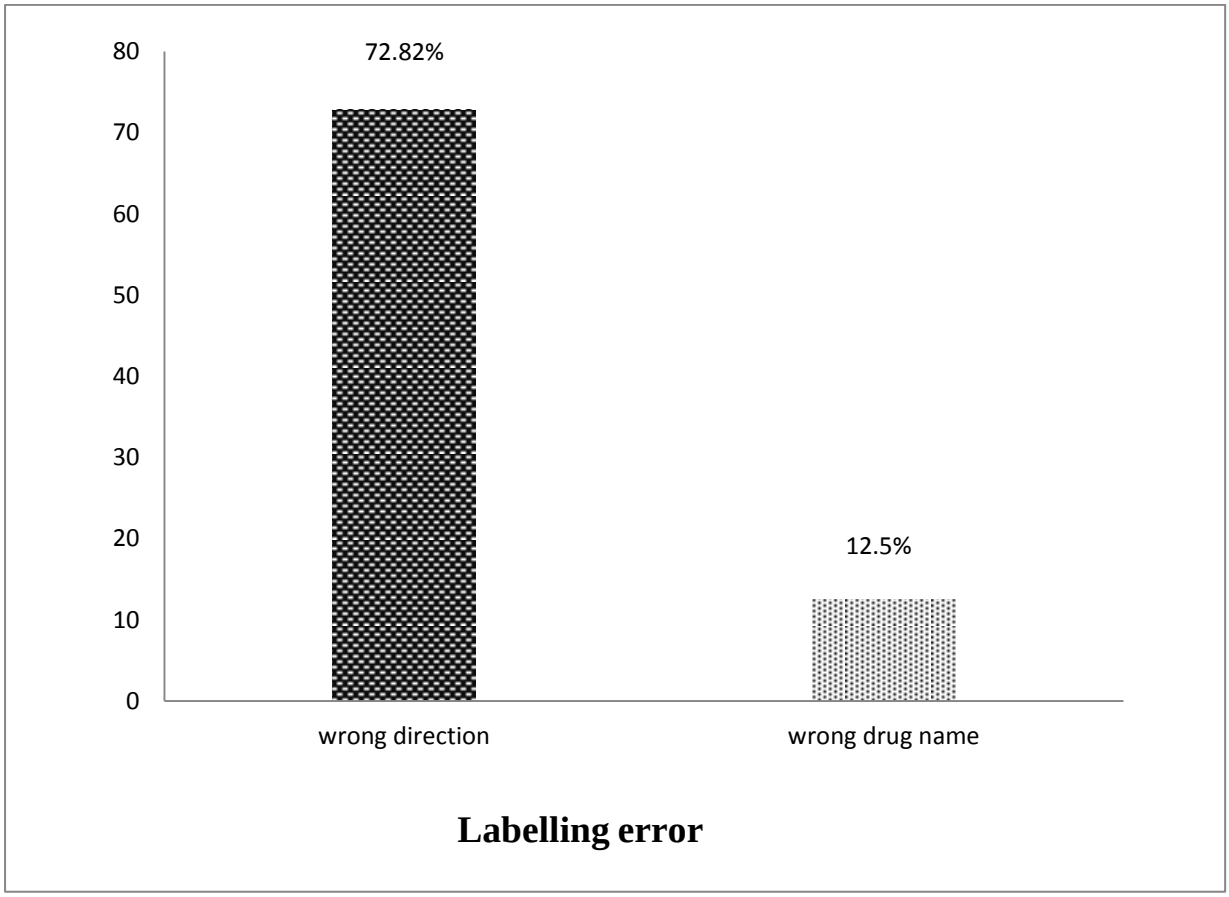


Table: 12 Shows Department wise medication error distribution among study population (n=261)

DEPARTMENT	PERCENTAGE
General medicine	12.26%
Cardiology	4.21%
Psychiatry	8.04%
Gastroenterology	4.59%
Gynaecology	1.91%
Dermatology	8.04%
Orthopaedic	15.7%
Urology	4.98%
Endocrinology	17.24%
Rheumatology	1.14%
Pulmonology	9.19%
Neurology	3.06%
Nephrology	1.53%
Paediatric	0.76%
Ophthalmology	1.14%
Otolaryngology	3.83%
Dentistry	1.14%
Neonatology	1.14%

Figure-13 Department wise medication error distribution

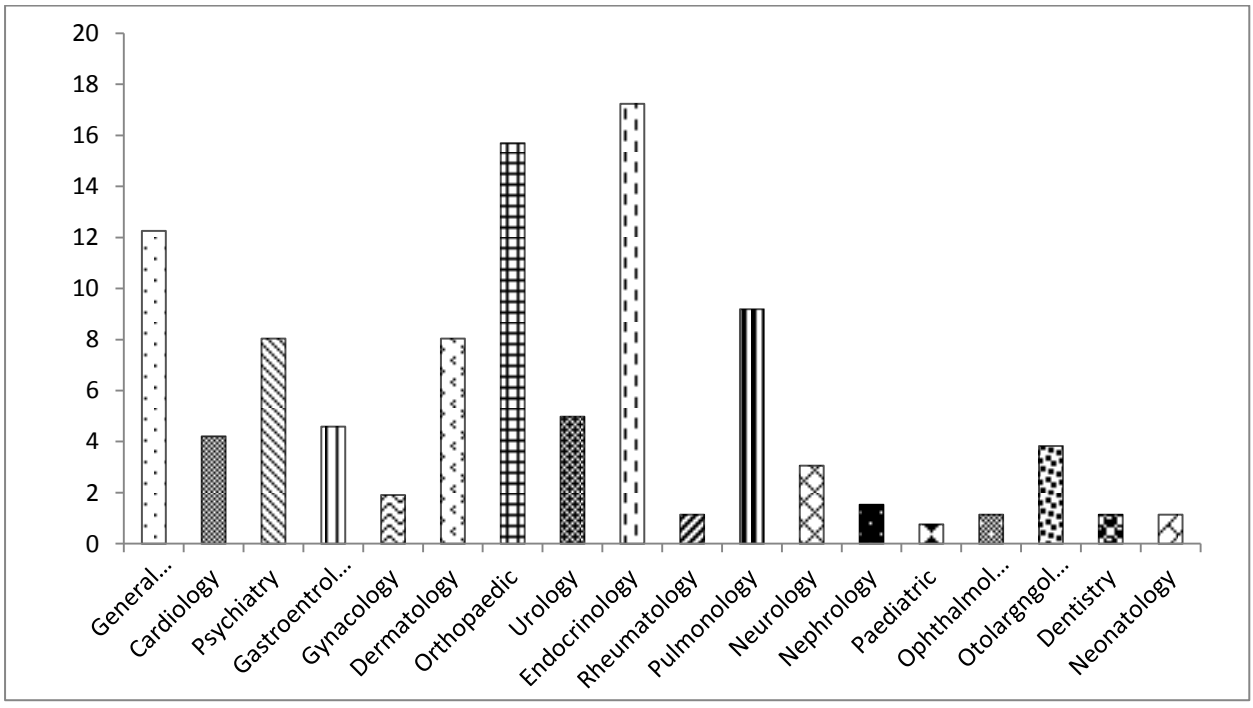
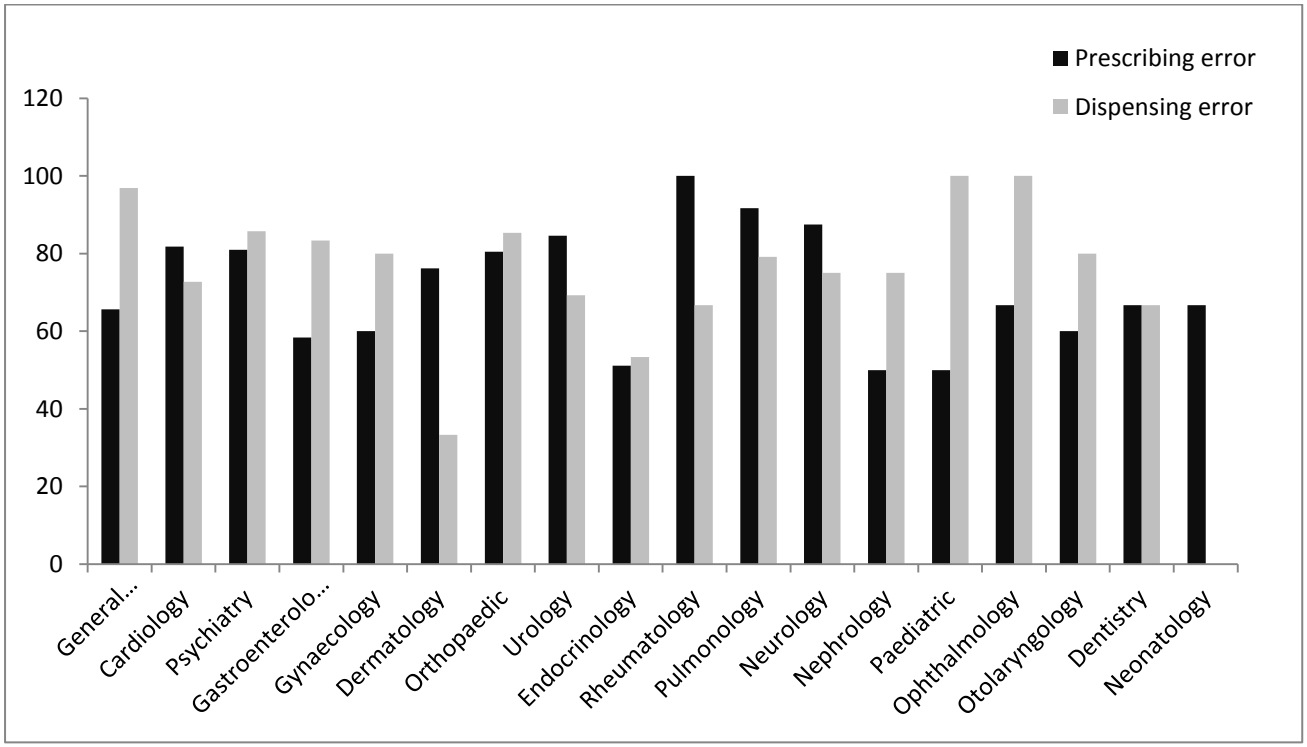


Table: 13 Shows Department wise Prescribing and Dispensing Error distribution among study population

DEPARTMENT	PRESCRIBING ERROR (%)	DISPENSING ERROR (%)
General medicine	65.62% (n=32)	96.87% (n=32)
Cardiology	81.80% (n=11)	72.72% (n=11)
Psychiatry	80.95% (n=21)	85.71% (n=21)
Gastroenterology	58.33% (n=12)	83.33% (n=12)
Gynaecology	60.00% (n=5)	80.00% (n=5)
Dermatology	76.19% (n=21)	33.33% (n=21)
Orthopaedic	80.48% (n=41)	85.36% (n=41)
Urology	84.61% (n=13)	69.23% (n=13)
Endocrinology	51.11% (n=45)	53.33% (n=45)
Rheumatology	100.00% (n=3)	66.66% (n=3)
Pulmonology	91.66% (n=24)	79.16% (n=24)
Neurology	87.50% (n=8)	75.00%(n=8)
Nephrology	50.00% (n=4)	75.00%(n=4)
Paediatric	50.00% (n=2)	100.00% (n=2)
Ophthalmology	66.66% (n=3)	100.00% (n=3)
Otolaryngology	60.00% (n=10)	80.00% (n=10)
Dentistry	66.66% (n=3)	66.66% (n=3)
Neonatology	66.66% (n=3)	00.00% (n=3)

Figure-14 Department wise Prescribing and Dispensing error distribution



RESULTS

The study was carried out at a multispecialty corporate hospital in south India. A total of 328 out patients were counselled from patient counselling department of the hospital were included in this study. In 328 cases a total of 1093 medication were prescribed. Out of 328 prescriptions which contain 315 (96.03%) hand written prescription and 13 (3.96%) were computerized prescriptions. Out of which 261 (79.56%) medication contain 177 (67.81%) prescribing and 184 (70.49%) dispensing error. The average number of medications prescribed per patient was found to be 3.33.

The demographic detail among the subjects reveals that 183 (55.79%) were male while 145 (44.20%) were female. Medication errors were identified in 261 cases out of these 138 (52.87%), 123 (47.12%) cases related male and female respectively. About 4 (1.2%) were below 12 years age group, 193 (73.94%) were 13-60 years age group and 64 (24.52%) were above 60 years age group. Medication errors from each department like General medicine 32 (12.26%), out of 32 cases (65.62%) prescribing and (96.87%) dispensing errors followed by Cardiology 11 (4.21%), out of 11 cases (81.80%) prescribing and (72.72%) dispensing errors. In psychiatry 21 (8.04%), out of 21 cases (80.95%) prescribing and (85.71%) dispensing errors. Gastroenterology 12 (4.59%), among of 12 cases (58.33%) prescribing and (83.33%) dispensing errors. Gynaecology 5 (1.91%), out of 5 cases (60.00%) prescribing and (80.00%) dispensing errors. Dermatology 21 (8.04%), out of 21 cases (76.19%) prescribing and (33.33%) dispensing errors. Orthopaedic 41 (15.70%), out of 41 cases (80.48%) prescribing and (85.36%) dispensing errors. Urology 13 (4.98%), out of 13 cases (84.61%) prescribing and (69.23%) dispensing errors. Endocrinology 45 (17.24%), out of 45 cases (51.11%) prescribing and (53.33%) dispensing errors. Rheumatology 3 (1.14%), out of 3 cases (100%) prescribing and (66.66%) dispensing errors. Pulmonology 24 (9.19%), out of 24 cases (91.66%) prescribing and (79.16%) dispensing errors. Neurology 8 (3.06%), out of 8 cases (87.50%) prescribing and (75.00%) dispensing errors. Nephrology 4 (1.53%), out of 4 cases (50.00%) prescribing and (75.00%) dispensing errors. Paediatric 2 (0.76%), out of 2 cases (50.00%) prescribing and (100.00%) dispensing errors. Ophthalmology 3 (1.14%), out of 3 cases (66.66%) prescribing and (100.00%) dispensing errors. Otolaryngology 10 (3.83%), out of 10 cases (60.00%) prescribing and (80.00%) dispensing errors. Dentistry 3 (1.14%), out of 11 cases (81.80%) prescribing and (96.87%) dispensing errors. Neonatology 3 (1.14%), out of 3 cases (66.66%) of prescribing and (00.00%) dispensing errors. Prescribing errors were classified into two omission error 153 (86.44%) and decision error 24

(13.55%). In omission error 117 (66.10%) were incomplete prescription and 36 (20.33%) illegible handwriting. In decision error 3 (1.69%) inappropriate drug frequency, 4 (2.25%) inappropriate direction, 5 (2.82%) inappropriate dosing, 5 (2.82%) banned drugs, 7 (3.95%) drug interaction. Out of 328 prescriptions 43 (13.10%) prescription were polypharmacy. Dispensing errors were also divided into drug/content error 27 (14.67%) and labelling error 157 (85.32%). In drug/ content error 15 (8.15%) wrong drug quantity, 7 (3.80%) wrong drug dispensed, 5 (2.71%) wrong strength dispensed. In labelling error 134 (72.82%) wrong direction and 23 (12.50%) wrong drug name.

SL No	Types of Error	Drugs	Description	Outcome
01	Banned Drug	Dextropropoxyphene	This drug and its formulations are prohibited by Indian government under G.S.R No 332 (E) dated on 23/5/2013.	Justified
02	Drug Interaction	Methotrexate + Pantoprazole	Major drug interaction, Increase the concentration of Methotrexate in the blood level and toxicity increases.	Justified
03	Inappropriate Dosing	Pantoprazole (80mg)	Maximum oral dose of pantoprazole is 40mg.	Justified
04	Incorrect direction	Thyroxin	It should be taken at empty stomach	Justified

Figure: 15 Examples of some intervention in patient counselling

DISCUSSION

Medication errors are serious problems in health care and can be a source of significant morbidity and mortality in the health care settings. A report from the Institute of Medicine (2001)[39] suggested that medical errors account for 44,000-98,000 deaths per year and is recognized as the 8th leading cause of death. A report from the IJCP'S MEDINEWS (2008)[40] said that the medication errors are responsible for almost 1, 00,000 illegal deaths each year. A medication error is an episode associated with the use of medication that should be preventable through effective control systems. The factors that increase the chance of a medication error are attributes of the complex mechanisms involved in the prescribing, dispensing and administration of drugs. Many authors have reported mechanisms for reducing the opportunity for errors in medicine like CPOE, EHR BAR-CODE etc. They include reduced reliance on memory, improved access to information, simplification, standardization and training Problems of medication safety are now the grave concern of many persons involved with patient care. The multiplicity of drugs, increased number and kinds of medications prescribed per patient, the increased number of patients being treated and ever changing concepts of medical care make it mandatory that a system of safe medication practices to be developed and maintained to ensure that the patient receives the best possible care and protection.[41]

In the recent years, the rapid obsolescence of drugs, the availability of more specific drugs per disease entity, and the general increase in the prescribing of medication have placed a greater responsibility on healthcare professionals. To keep a record to report an error is a good practice, any action taken subsequently to prevent such error in future and its recurrence. It is ideal to have a protocol in place for dealing with complaints. "Substantial evidence suggests that pharmacists in decentralized patient care settings can reduce the frequency of medication errors".

Medication errors are inherently risky and study reveals that medication errors are inevitable occurrence in hospital pharmacy. A study conducted by **Dyah Aryani Perwitasari et al** [35] observed the prescription of 229 out patients. It found that 226 of medication errors. of the 226 medication errors, (99.12%) were prescribing errors and (3.66%) were dispensing errors. The most type of prescribing errors was incomplete prescription. In this study

prescription errors were (67.81%) and dispensing errors were (70.49%). This study also reveals that the most type of prescribing errors was incomplete prescription.

Majority of dispensing errors were led by prescribing errors. A study conducted by **Tania azevedo anacleto et al** [5] analysed 422 prescription and registering 81.8% with at least 1 dispensing errors. Opportunities for errors were higher in the prescription order forms. In this study 328 prescriptions were analysed and found 261 prescriptions were medication error (70.49%) were dispensing errors, and among this (42.52%) of dispensing errors is caused by prescription. Prescribing errors instigated by the incomplete or illegible handwriting prescription order which were written by the physician. Now a day's physicians are really busier on medication than in the past. This study examined that incomplete prescription (66.10%) and illegible (20.33%) handwriting were the major problem in prescribing errors.

This study is about preventing medication errors using quick list to computerized provider order entry system or electronic health record can eliminate the errors such as dose formulation, drug interaction and allergy. The introduction of quick-list was followed by a significant reduction in prescribing errors. A study conducted by **David C Radely et al** [39] to estimate the medication errors reduction in hospitals attributable to electronic prescribing through CPOE. Prescription through a CPOE system decrease the likehood of error on that order by (48%) given this effect size, and the degree of CPOE adoption and use in hospitals in 2008, it estimate a (12.5%) reduction in medication error, or ~17.4 million medication errors averted in the USA in 1 year. Other studies conducted by **Bates et al** [45]**, Bizovi et al** [46]**, Cordero et al**[47] suggest that CPOE can substantially reduce the frequency of medication errors in patients. In this study 13 (3.96%) prescription were CPOE system. Among this prescription there was no prescription error.

The patient errors were also most common causes of medication in outpatients settings, a study conducted by **Friedman AL et al** [48] showed that prescription errors were being second causes of medication error after the patients errors. The present study doesn't show the patient errors, because I did not follow the patient compliance. But this study observed that majority of patients participate in patient counselling was under education. Here I assume that literacy is also a problem that causes patient error.

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A study by **Languluri Reddenna et al** [44] assess that high incidence of medication errors in females (73%) over males and (27.50%) of medication errors in patients. The present study also shows similar results of above stated study that is high incidence of medication errors in males (52.87%) than females (47.12%)

The dispensing errors were the wrong drugs which were given to the patients, wrong labelling and patient did not receive drug information. The studies conducted by the **Almut G. winter stein et al** [41], **Alison Dale et al** [42] and **S. Nadeem H. Shan et al** [43]showed that prescription errors are the most common among the types of errors. The present study showed that dispensing errors 184 (70.49%) was the most common among the types of errors, in these particularly wrong direction errors were most common types of errors 134 (72.82%). These errors could be caused due to the higher number of prescription, limited number of pharmacist, sound alike drugs and look like medicine. In order to prevent the medication errors, potential strategies could be followed, educating the physicians about the risk factors of medication errors and updating the knowledge. Pharmacy must Preparing the structured medication system for outpatients setting. Educating the pharmacist to increase their role in pharmaceutical care. In sufficient number of satellite pharmacy.

The limitation of this study could not follow the patient behaviour during drug consumption, therefore impossible to find the adverse events which were related with medication errors. The Severity of the prescribing errors detected but it could not be justified. The patient's detailed data is not accessed hence other prescription errors might be undetected. These Problems can be overcome by implementing the medication safety centre.

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CONCLUSION

This study concludes that overall prevalence of medication error was around 80% but there were no life threatening events was observed. A clinical pharmacist can play a major role in this situation appears to be a strong intervention and early detection and prevention of medication errors and thus can improve the quality of care to the patients. Educating the patients about the drugs and their importance of right use, literacy can be helpful in minimizing errors. "This helps to ensure that the **'right'** patient is receiving the **'right'** drug in the **'right'** dose in the **'right'** time by the authorized clinician".

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PATIENT DOCUMENTATION FORM

OP –number: Date: Time:

Age: Sex: M/F Allergies:

Hand-written prescription ☐ Computerized prescription ☐

Literacy Status:

☐ Below matric ☐ Matric ☐ Above matric

Name of Prescriber:

Current medical problem:

Past medication:

Current medication:

DRUG	DOSE	FREQUENCY	A/B FOOD	DURATION

NATURE OF ERROR

Prescribing Error ☐ Dispensing Error ☐ Both ☐

Details of Error:

Disease counselled:

Time taken for counselling: ☐ less than 10 min.

☐ 10 to 20 min.

☐ More than 20 min.

Counselling provided to: ☐ patient

☐ Patient Representative

If patient's representative give reason:

☐ Patient is unconscious

☐ Language problem

☐ Hearing problem

☐ Paediatric patient

☐ Others (specify

Counselling aids used: ☐ Pictograms

☐ Dummy inhalers

☐ Spacer

☐ Others

Counselling material provided: ☐ Patient Information Leaflets

☐ In built product information leaflets

☐ Others (specify)

Counselling steps followed: ☐ case sheet reviewed

☐ Self-introduction done

☐ Purpose of counselling told

☐ Initial drug related information obtained

☐ Patient was warned about taking OTC medication,

☐ Actual counselling done

☐ Patient understands towards therapy was ascertained

☐ Counselling points summarized

Points covered during counselling session:

- ☐ Name and purpose of medication
- ☐ Dosage regimen
- ☐ Advice on missed dose
- ☐ Potential side effects (prevention & managements)
- ☐ Significant interactions
  (Drug-Drug, Food-Drug, Drug-Disease)
- ☐ Precaution to be taken
- ☐ Storage recommendations
- ☐ Benefits of completing the medication course.
- ☐ Life style modification

Any major barriers involved: ☐ YES ☐ NO

If yes,

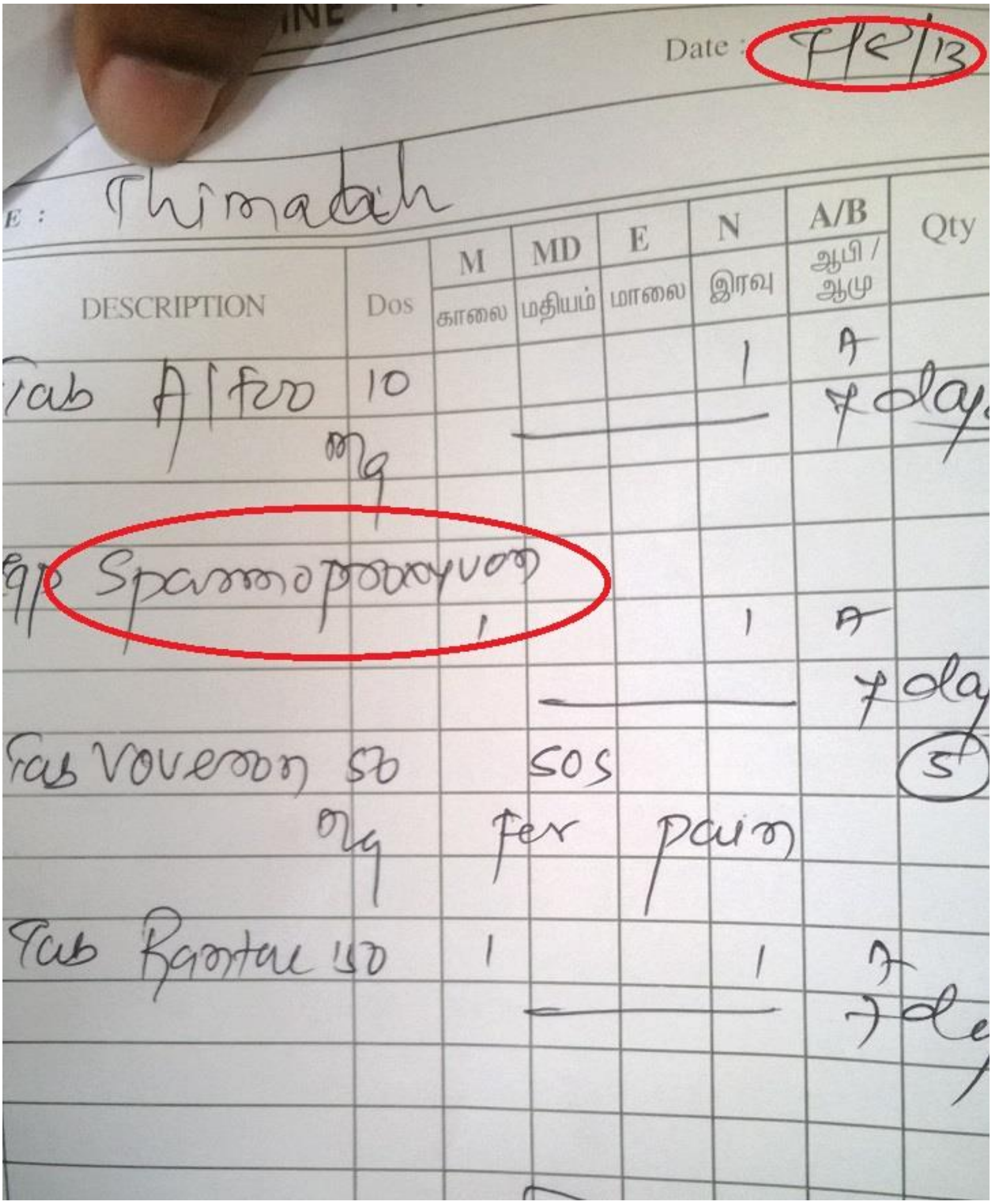
- ☐ patient based
- ☐ Provider based
- ☐ System based

Understanding of the patient ascertained: ☐ YES ☐ NO

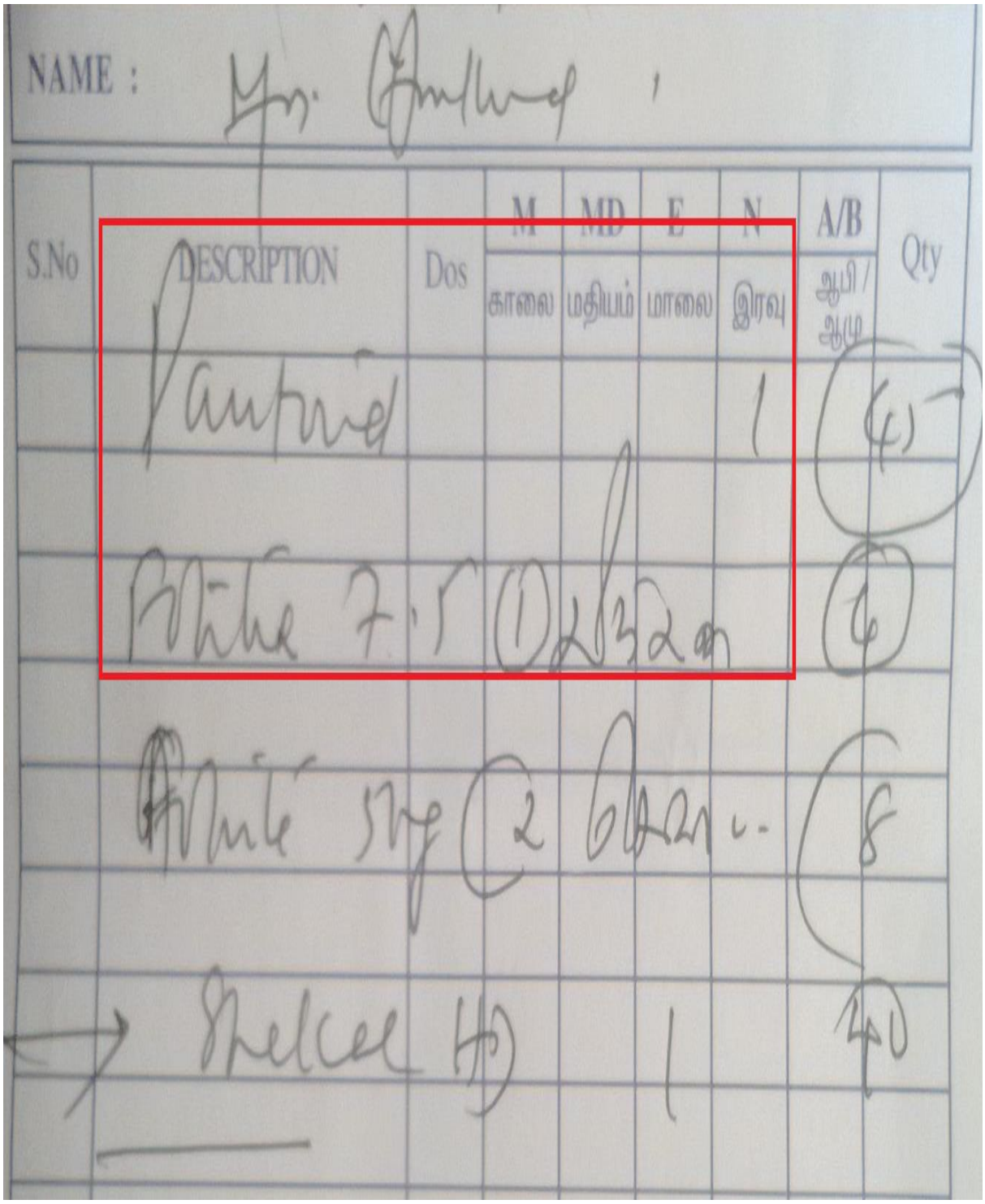
Name of counselling pharmacist: Signature:

Name of patient: Signature:

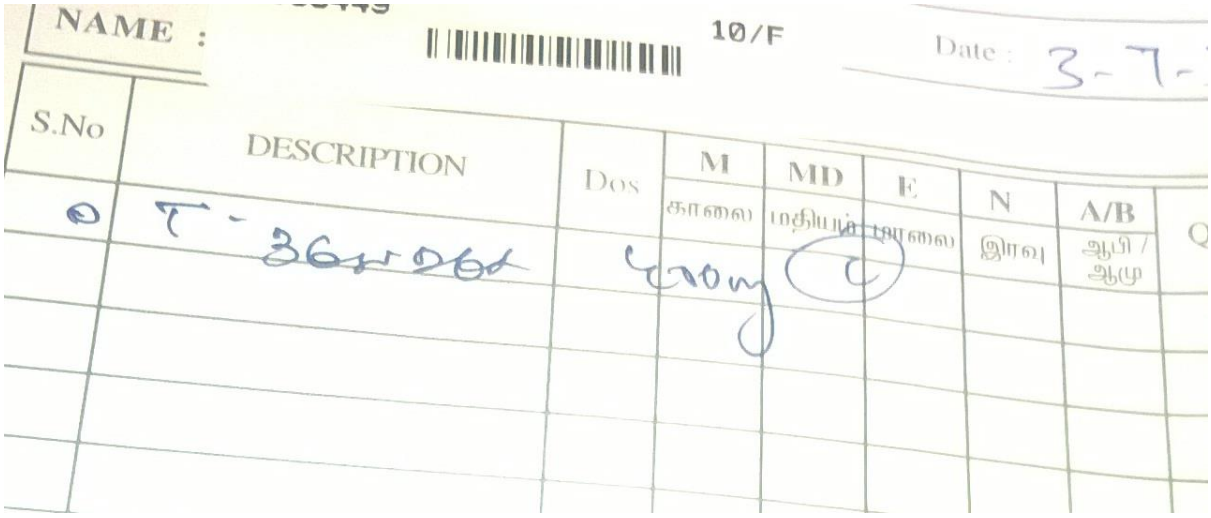
BANNED DRUG

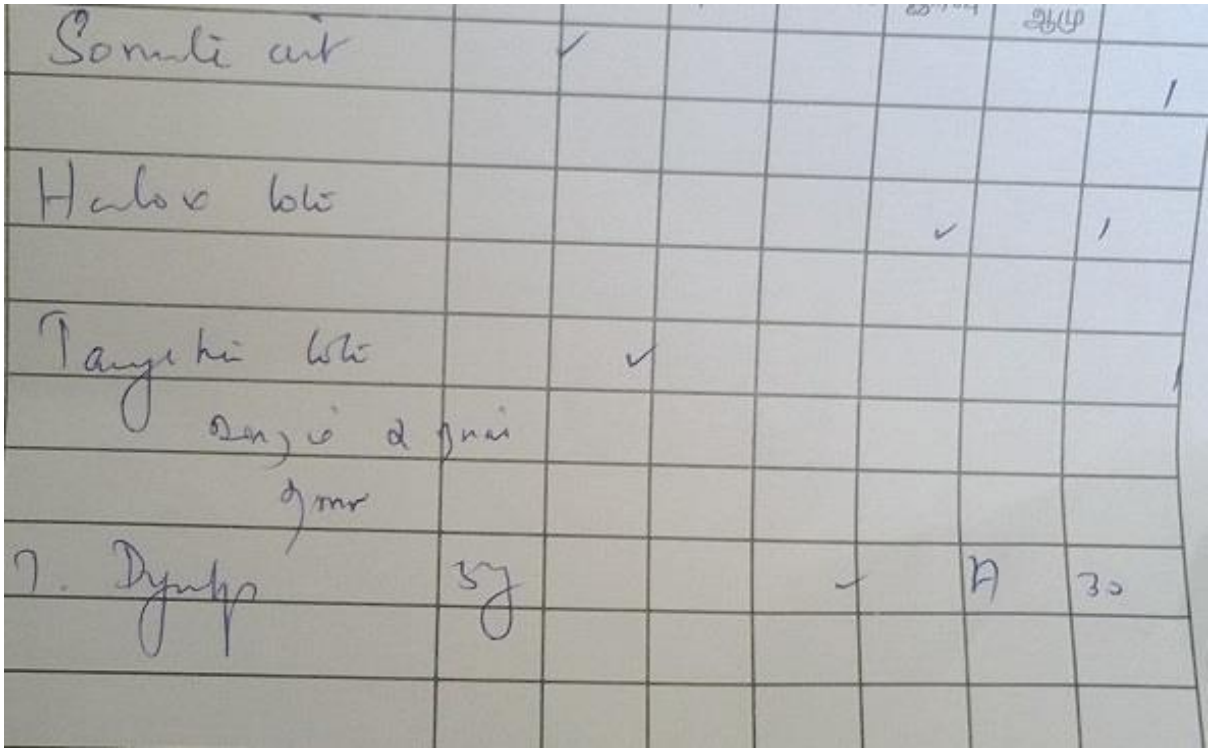

Date : 7/12/13
Thimaiah
DESCRIPTION
Dos
M
MD
E
N
A/B
Qty
காலை
மதியம்
மாலை
இரவு
ஆபி / ஆமு
Tab Alfoo 10 mg
7 days
Tab Voveran 50 mg SOS for pain
5
Tab Rantac 150
7 days

DRUG INTERACTION

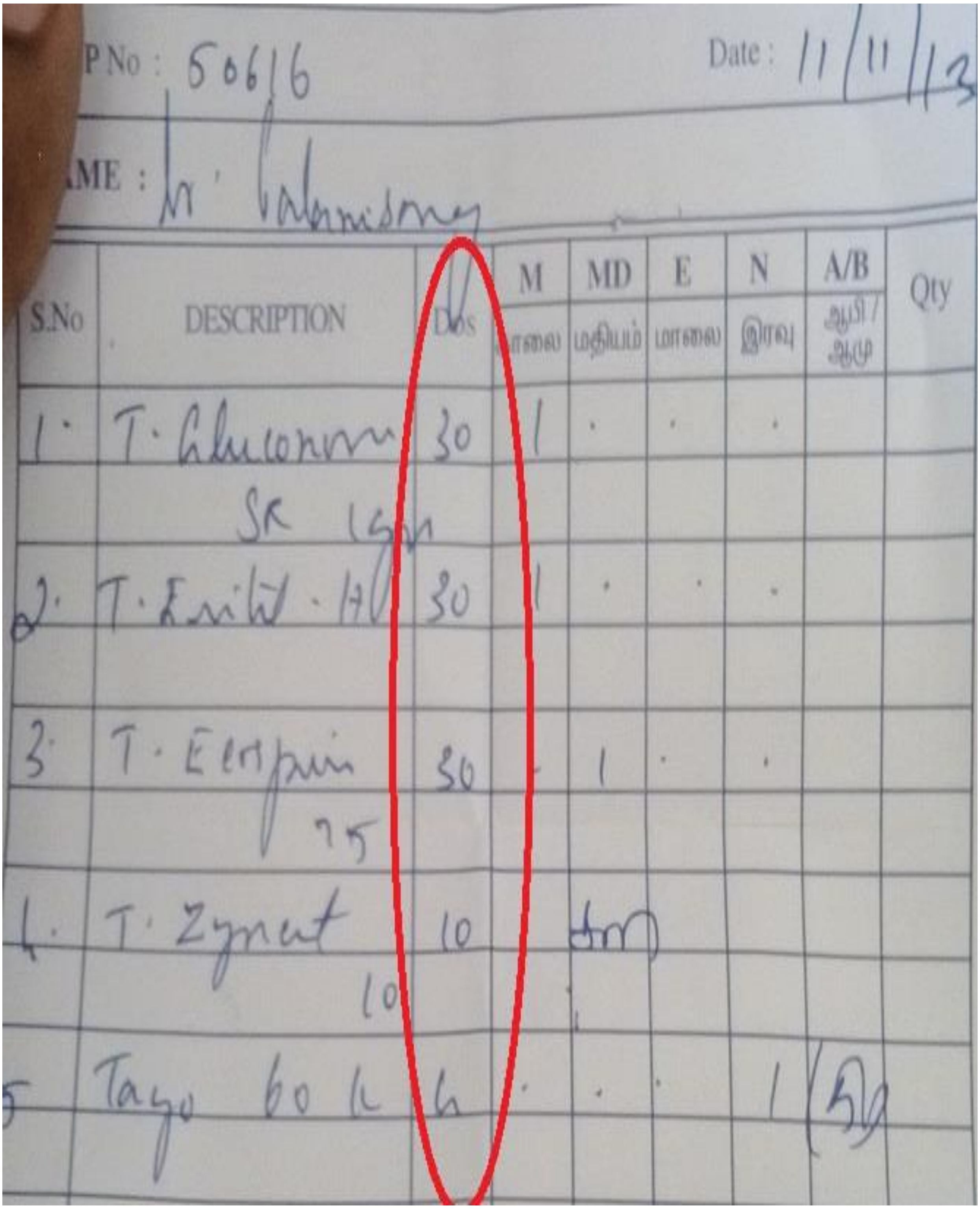


ILLEGABLE HANDWRITTING





INAPPROPRIATE DOSING



COMPUTRIZED PRESCRIPTION

Medicine Prescription

Order No	6973		
Order Date	21-10-2013		
Reg.No	896958	Age/Sex	47 / M
Pat.Name	Mr.RAJENDRAN,B		

S.No	Descriptions	Qty	Mn காலை	Af மதியம்	Ev மாலை	Nt இரவு	A/B
1	CAP.PG NAC - 50 MG	10	1	0	0	1	A
	5 Days & Twice a Day						
2	TAB.RABONIK - 20 MG	5	1	0	0	0	B
	5 Days & Once a Day						
3	TAB.OLEPTAL DT- - 150 MG	10	1	0	0	1	A
	5 Days & Twice a Day						
4	TAB.CLONOTRIL - 0.5 MG	5	0	0	0	1	A
	5 Days & Once a Day						
5	GEL.ICE - 25 GM	1	0	0	0	0	A
	5 Days & If nessasry						

B - உணவுக்கு முன்பு A - உணவுக்கு பின்பு

-- End of Prescription --