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A LITERATURE REVIEW ON IMPORTANCE OF PRESCRIPTION AUDITING AND ASSESSING RATIONAL AND IRRATIONAL PRESCRIBING PATTERN

Bismi S.[1]*, Chintha Chandran[1], Deepthi Mariya Davis[1], Dhanya S. S.[1], Dhanya Dharman[2] and Shaiju S. Dharan[3]

[1]Vth Year Pharm.D, Department of Pharmacy Practice, Ezhuthachan College of Pharmaceutical Sciences, Marayamuttom, Neyyattinkkara, Trivandrum.

[2]Assistant Professor, Department of Pharmacy Practice, Ezhuthachan College of Pharmaceutical Sciences, Marayamuttom, Neyyattinkkara, Trivandrum.

[3]Principal, Ezhuthachan College of Pharmaceutical Sciences, Marayamuttom, Neyyattinkkara, Trivandrum.

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***Corresponding Author**
Bismi S.
Vth Year Pharm.D, Department of Pharmacy Practice, Ezhuthachan College of Pharmaceutical Sciences, Marayamuttom, Neyyattinkkara, Trivandrum.

INTRODUCTION

A prescription is a written communication from a registered medical practitioner to a pharmacist regarding instructions on dispensing of prescribed medication. Prescription audit is a quality improvement process that seeks to improve patient care.[1] Medical Audit may be defined as a process with the aim of making improvements in patient care and proper use of resources. It is systematic and critical analysis of the quality of medical care. It is a continuous cycle implementing changes and to develop a new practice. Thus medical audit is a systematic approach which gives a clear review of medical care. Effective prescription audit is important for health care professionals and managers, patients, and the public also supports the health professionals in making sure the patients receives the best care.[2]

Introduction to prescription

Prescription order is an important transaction between the physician and the patient. It is an order for a scientific medication for a person at a particular time. It brings into focus the diagnostic acumen and therapeutic proficiency of the physician with instructions for palliation or restoration of the patient's health.[2] Prescription is a written document that

engages the medical and legal responsibility not only of the physician but of all those subsequently involved in its execution.[1] Prescription writing used to be an art as well as a science. Unfortunately, times have changed. More often than not, we find incomplete and illegal prescriptions being handed over to patients, and, more unfortunately, honored at pharmacies. This has resulted in a disturbing trend of putting the patients safety at risk; and there is an urgent need to put things right.[2] Nowadays the prescribing pattern is changing and it has become just an indication of medicine with some instructions of doses without considering its rationality.[2]

History

Early medicines were made up of multiple ingredients requiring complex preparation, and Latin was adopted as the standard language of the prescription to ensure understanding between physician and pharmacist and consistency in pharmaceutical composition. Latin no longer is the international language of medicine, but a number of commonly used abbreviations derive from old Latin usage. The symbol "Rx" is said to be an abbreviation for the Latin word recipere, meaning "take" or "take thus," as a direction to a pharmacist, preceding the physician's "recipe" for preparing a medication. The abbreviation "Sig" for the Latin Signatura, is used on the prescription to mark the directions for administration of the medication.[3]

Parts of the prescription

The elementary requirements of a prescription are that it should state what is to be given to whom and by whom prescribed, and give instructions on how much should be taken how often, by what route and for how long or total quantity to be supplied.

1) **Date:** Prescriptions are dated at the time they are written and also when they are received and filled in the pharmacy. The date is important in creating the medication record of the patient. The Date is also important to pharmacist in filling prescription of controlled substances. No Prescription order of controlled drugs may be dispensed or renewed more than 6 months after the date prescribed.

2) **Address of doctor:** It is important to write physician’s name, address, telephone number and Drug Enforcement Agency (DEA) number or Medical council registration number in India on prescription pads.

3) **Superscription {Symbol (Rx)}:** This is the symbol R generally is understood to be a contraction of the Latin verb recipe, meaning take thou or you take. The stroke after "R" is considered as an invocation to Jupiter. Jupiter is a god of healing. Sign of Jupiter employed as request for healing. Today, the symbol is representative of both the prescription and the pharmacy itself.

4) **Inscription or the Name and Dose of medication prescribed:** This is the body or principal part of the prescription order. It contains the name and quantities of the prescribed ingredients. Today, majority of the prescriptions are written for medication already prepared or prefabricated into dosage forms by industrial manufacturers. The medications may be prescribed under their trademarked or manufactures proprietary name or by their nonproprietary or generic names. Pharmacists are required to dispense the trademarked products when prescribed, unless substitution of an equivalent product is permitted by the prescribing physician or by the state law. Prescription orders requiring the pharmacist to mix ingredients are termed compounding prescriptions. Prescriptions requiring compounding contain the names and quantities of each ingredients required. The names of the ingredients generally are written using the nonproprietary names of the materials, although occasionally proprietary names may be employed. Quantities of ingredients to be used may be indicated in the metric or apothecary system of weights and measures; however, the use of the apothecary system is diminishing. In the metric system the decimal point is often replaced by vertical line that may be imprinted on the prescription blank or drawn by the prescriber.[3]

5) **Subscription or dispensing directions to pharmacist:** This part of the prescription consists of directions to the pharmacists for preparing the prescription. In majority of prescriptions, the subscription serves merely to designate the dosage form (as tablets, capsules, etc) and the number of dosage units to be supplied. Examples of prescription directions to the pharmacist are "make a solution," "mix and place into 30 capsules," or "dispense 30 tablets.[3]

6) **Signature or instructions for patient:** The prescriber indicates the directions for the patient's use of the medication in the portion of the prescription called signature. The word, usually abbreviated signa or sig means mark thou. The directions in the signa commonly are written using abbreviated forms of English or Latin terms or a combination of each.[3] Examples are Tabs ii q4h (Take two tablets every four hours) Caps I 4xd pc &

hs (Take one capsule four times a day after meals and at bedtime) Instill gtts ii od (Instill two drops into the right eye) The directions for use must be both drug-specific and patient-specific. The simpler the directions, the better; and the fewer the number of doses (and drugs) per day, the better. Many physicians continue to use Latin abbreviations; for example, "1 cap tid pc," will be interpreted by the pharmacist as "take one capsule three times daily after meals." However, the use of Latin abbreviations for these directions only mystifies the prescription and is discouraged. This can be a hindrance to proper patient physician communication and is an otherwise unnecessary source of potential dispensing errors. Because the pharmacist always writes the label in English (or, as appropriate, in the language of the patient), the use of such abbreviations or symbols is unnecessary. Many serious dispensing errors can be traced to the use of abbreviations.[3] Instructions to patients should be clear and preferably in English or vernacular language.

7) **Signature of the doctor:** It is the end of prescription.[3]

Current scenario of prescribing

Indian markets are flooded with over 70,000 formulations, compared to roughly 350 preparations listed on the WHO Essential Drugs List.[4] There are thousands of drug companies, and several companies manufacture generic preparations using different brand names. In addition, thousands of formulations of vitamins, tonics, and multi-drug combinations that are unique to the Indian market are manufactured and marketed regularly.

A visit to the physician has come to necessarily mean a prescription comprising of a broad-spectrum combination of antibiotics — one or more, an anti pyretic or frequently an unnecessary combination of the two drugs, a multivitamin tonic, and a cough syrup. Intravenous, rehydration, and parenteral medication are also used frequently.[4]

Worldwide, more than half of all medicines are prescribed, dispensed, or sold unacceptably, and 50% of patients take them wrongly. Moreover, about one third of the world's population lacks access to essential medicines.[4] A survey conducted in 8 hospitals in southern Ethiopia that investigated their prescription patterns concluded that irrational prescribing, as evidenced by high average number of drugs prescribed per encounter, high percentage of injections, and high percentage of antibiotic use, was prevalent in the studied region .It is obvious that irrational prescribing is a global problem. Bad prescribing habits lead to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harm to the patient, and higher costs.

Irrational prescribing patterns are perpetuated through patient pressure, bad example of colleagues, and high-powered salesmanship by drug company representatives. In teaching hospitals, new graduates will copy from seniors, completing the vicious circle. Changing existing practice of prescribing habits becomes very difficult. Assessment of drug use patterns with the WHO drug use indicators is becoming increasingly necessary to promote rational drug use in developing countries.[4] Physician prescribing is the most frequent medical intervention with a highest impact on healthcare costs and outcomes. Therefore improving and promoting rational prescribing is of great interest. In a study a four arm randomized trial with economic evaluation was conducted in Tehran. Three interventions (routine feedback, revised feedback, and printed educational material) and a no intervention control arm were compared. Physicians working in outpatient practices were randomly allocated to one of the four arms using stratified randomized sampling. The interventions were developed based on a review of literature, physician interviews, and current experiences in Iran and with theoretical insights from the Theory of Planned Behavior. Effects of the interventions on improving antibiotic and corticosteroid prescribing were assessed using regression analyses. Cost data was assessed from a health care provider's perspective and an incremental cost effectiveness ratio was calculated.[3] The another study by Soleymani et al determined the effectiveness and cost-effectiveness of three interventions and determined the most effective interventions in improving prescribing pattern. Study concluded that if the interventions are cost effective, they would likely to be applied nationwide.[4]

Before activities to promote rational drug use are started, an effort should be made to describe and quantify the situation. Several well-established survey methods are available for this purpose. One assessment method is a prescribing and patient care survey using the WHO health facility drug use indicators. These quantitative indicators are now widely accepted as a global standard for problem identification and have been used in over 30 developing countries.[3] Prescribing patterns need to be evaluated periodically to increase the therapeutic efficacy, decrease adverse effects and provide feedback to prescribers.[4]

Introduction to good prescribing: What constitutes good prescribing?

Barber stated that 'Drugs are the stronghold of medical treatment, yet there are few reports on what constitutes "good prescribing" and the existing direction tends to imply that right answers exist, rather than recognizing the complex trade-offs that have to be made between conflicting aims'.[4] There are four aims that a prescriber should try to achieve, both on first

prescribing a drug and on subsequently monitoring it. They are: to maximize effectiveness, minimize risks, minimize costs, and respect the patient's choices.[4] This model of good prescribing brings together the traditional balancing of risks and benefits with the need to reduce costs and the right of the patient to make choices in treatment.'The four aims are shown as a diagram plotting their commonest conflicts, which may be used as an aid to discussion and decision making.[4]

Assessing good prescribing

Barber said that "Whereas consensus may be gained within medicine on how to balance effectiveness, risk, and cost of drug treatment for a condition, including the patient makes judgments on the quality of prescribing difficult to conduct at a distance. In contrast, drug and therapeutics committees, pharmacists, medical advisers, and commissioning agencies are increasingly making judgments on the acceptability of prescribing. These approaches need not be mutually exclusive. The model of good prescribing proposed … can be integrated with the proscriptive, protocol driven approach currently gaining favors – for example, by setting a standard that 80 per cent of prescribing meets the protocol. The level at which the standard is set must come from debate among prescribers, patients, and commissioning agencies".[5]

Types of prescribing

There are two types of prescribing based on approach of prescriber, one is Rational (Appropriate) and another approach is irrational (Inappropriate) prescribing.

Rational (Appropriate) prescribing

The terms "appropriate" and "rational" use of drugs will be used interchangeable.[6] Laing R stated "What is rational use of drugs? What does rational mean? People may have different perceptions and meanings regarding rational use of drugs or more specifically regarding rational prescribing".[6] However, the Conference of Experts on the Rational Use of Drugs, convened by the World Health Organization in Nairobi in 1985, defined rational use as follows:

Rational use, and thus rational prescribing of drugs, requires that patients receive medicines appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community.[6] Rational use of medicines refers to the correct, proper and appropriate use of medicines. Rational use requires that patients receive the appropriate medicine, in the proper dose, for an adequate period of time, and at the lowest cost to them and their community.[7] The requirements for

rational use will be fulfilled if the process of prescribing is appropriately followed. This process includes steps in defining a patient's problems (or diagnosis); in defining effective and safe treatments (drugs and nondrug); in selecting appropriate drugs, dosage, and duration; in writing a prescription; in giving patients adequate information; and in planning to evaluate treatment responses.[7] The definition implies that rational use of drugs, especially rational prescribing, should meet certain criteria as follows:

- Appropriate indication. The decision to prescribe drug(s) is entirely based on medical rationale plus safety and effectiveness of drug therapy.
- Appropriate drug. It depends on efficacy, safety, suitability, and cost of drug.
- Appropriate patient. No contraindications exist, with minimum adverse reactions and acceptable to the patient.
- Appropriate patient information. Patients are provided with relevant, accurate, important and clear information regarding their conditions and for the prescribed medication(s).
- Appropriate evaluation. Appropriately monitored and interpret unexpected effects of medications.

Irrational (Inappropriate) prescribing

Vance MA reported that "Medically inappropriate, ineffective and economically inefficient use of pharmaceuticals is commonly observed in health care systems throughout the world, including developing countries".[8] However, various forms of inappropriate prescribing often remain unnoticed by those who are involved in health sector decision making or delivery of health services. This problem will usually come to the attention of health decision makers or managers when there is an acute shortage of pharmaceutical budget that requires action for cost-efficiency.[8] Promoting appropriate use of drugs in the health care system is needed not only because of the financial reasons with which policy makers and managers are usually most concerned. Appropriate use of drugs is also one essential element in achieving quality of health and medical care for patients and the community. Obviously, quality of care is of concern to practitioners. Actions or intervention programs to promote the appropriate use of drugs should, therefore, be continuously implemented and systematically incorporated as an integral part of the health care system.[8] Unfortunately, in the real world, prescribing patterns do not always conform to these criteria and can be classified as inappropriate or irrational prescribing. Irrational prescribing may be regarded as "pathological" prescribing when the above-mentioned criteria are not fulfilled.[8] Common patterns of irrational prescribing may, therefore, be manifested in the following forms:

- Use of drugs when no drug therapy is indicated, e.g., antibiotics for viral upper respiratory infections
- Use of the wrong drug for a specific condition requiring drug therapy, e.g., tetracycline in childhood diarrhea requiring ORS
- Use of drugs with doubtful or unproven efficacy, e.g., the use of antimotility agents in acute diarrhea
- Use of drugs of uncertain safety status, e.g., use of dipyrone (Baralgan, etc.)
- Failure to provide available, safe, and effective drugs, e.g., failure to vaccinate against measles or tetanus, or failure to prescribe ORS for acute diarrhea
- Use of correct drugs with incorrect administration, dosages, and duration, e.g., the use of IV metronidazole when suppositories or oral formulations would be appropriate
- Use of unnecessarily expensive drugs, e.g. the use of a third generation, broadspectrum antimicrobial when a first-line, narrow spectrum agent is indicated

Some examples of commonly encountered inappropriate prescribing practices in many health care settings include— overuse of antibiotics and antidiarrheals for nonspecific childhood diarrhea, indiscriminate use of injections, e.g., in malaria treatment, multiple or over-prescription, excessive use of antibiotics for treating minor acute respiratory infection, multivitamins and tonics for malnutrition and unnecessary use of expensive anti-hypertensive. The drug use system is complex and varies from country to country. Drugs may be imported or manufactured locally. The drugs may be used in hospitals or health centers, by private practitioners and often in a pharmacy or drug shop where over the counter preparations are sold. In some countries all drugs are available over the counter as in India. Finally, the public includes a very wide range of people with differing knowledge, beliefs, and attitudes about medicines. Consumers may have a very different perspective of what is rational.[8]

Factors contributing to inappropriate use of medicines

Various different factors have an effect on the irrational use of drugs. In addition, different cultures view drugs in different ways, and this can affect the way drugs are used.

- **Lack of Skills and Knowledge:** Diagnostic uncertainty, lack of prescriber knowledge of optimal diagnostic approaches, lack of independent information such as clinical guidelines, lack of opportunity for patient follow-up, or fear of possible litigation, lead to inappropriate prescription and dispensing of medicines.

- **Inappropriate unethical promotion of medicines by pharmaceutical companies:** Most prescribers get medicine information from pharmaceutical companies rather than independent sources such as clinical guidelines. This can often lead to overuse. Some countries allow direct-to-consumer advertising of prescription medicines, which may lead to patients pressuring doctors for unnecessary medicines.
- **Profits from selling medicines:** In many countries, drug retailers prescribe and sell medicines over-the-counter. Extra income can be generated by more sale and generate more income leading to overuse of medicines, particularly the more expensive medicines.
- **Unrestricted availability of medicines:** In many countries including India, prescription medicines such as antibiotics, are freely available over-the-counter. This leads to overuse, inappropriate self-medication and non-adherence to dosing regimes. This creates drug resistance.
- **Overworked health personnel:** Many prescribers have too little time with each patient, which can result in poor diagnosis and treatment. In such conditions prescribers rely on prescribing pattern as they do not have the time to update their knowledge of medicines.
- **Unaffordable medicines:** Where medicines are too costly, people may not purchase a full course of treatment or may not purchase the medicine at all. Instead they may seek alternatives, such as medicines of non-assured quality from the Internet or other sources, or medicines prescribed to family or friends.
- **Lack of coordinated national pharmaceutical policy:** Less than half of all countries implement the basic policies recommended by World Health Organization (WHO) to ensure the appropriate use of medicine. These include appropriate measures and infrastructure for monitoring and regulation of medicine use, and training and supervision of prescribing health workers. The major forces can be categorized as those deriving from patients, prescribers, the workplace, the supply system including industry influences, regulation, drug information and misinformation, and combinations of these factors.[9]

Impact of inappropriate use of drugs

The impact of irrational use of drugs can be seen in many ways:

- Reduction in the quality of drug therapy leading to increased morbidity and mortality
- Waste of resources leading to reduced availability of other vital drugs and increased costs
- Increased risk of unwanted effects such as adverse drug reactions and the emergence of drug resistance, e.g., malaria or multiple drug resistant tuberculosis

- Psychosocial impacts, e.g. when patients come to believe that there is "a pill for every ill." This may cause an apparent increased demand for drugs.[10]

Consequences of incorrect use of medicines

Incorrect use of medicines occurs in all countries, causing harm to people and wasting resources. Consequences include:

a) **Antimicrobial resistance:** Overuse of antibiotics increases antimicrobial resistance and the number of medicines that are no longer effective against infectious disease. Many surgical procedures and cancer therapies are not possible without antibiotics to fight infection. Resistance prolongs illnesses and hospital stays, and can even cause death, leading to costs of US$ 4–5 billion per year in the United States of America and €9 billion per year in Europe.[11]

b) **Adverse drug reactions and medication errors:** Harmful reactions to medicines caused by wrong use, or allergic reactions to medicines can lead to increased illness, suffering and death. Adverse drug reactions have been estimated to cost millions of dollars each year.[10-11]

c) **Lost resources:** Between 10–40% of national health budgets are spent on medicines. Out-of-pocket purchases of medicines can cause severe financial hardship to individuals and their families. If medicines are not prescribed and used properly, billions of dollars of public and personal funds are wasted.

d) **Eroded patient confidence:** Exacerbated by the overuse of limited medicines, drugs may often go out of stock or be available at unaffordable prices and as a result, erode patient confidence. Poor or negative health outcomes due to inappropriate use of medicines may also reduce confidence.[11]

Measures to improve rational use of medicines

Rational use of drugs is multifaceted. Its medical, social, and economic aspects are well reflected in the World Health Organization (WHO) definition: "Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost to them and their community".[11] A major step towards rational use of medicines was taken in 1977, when WHO established the 1st Model List of Essential Medicines to assist countries in formulating their own national lists. The present definition of rational use was agreed at an international conference in Kenya in 1985. In 1989, the International Network for the

Rational Use of Drugs (INRUD) was formed to conduct multi-disciplinary intervention research projects to promote more rational use of medicines. Following this, the WHO/INRUD indicators to investigate drug use in primary health care facilities were developed and many intervention studies conducted. A review of all the published intervention studies with adequate study design was presented at the 1st International Conference for Improving the Use of Medicines (ICIUM) in Thailand in 1997.[12] The effect varied with intervention type, printed materials alone having little impact compared to the greater effects associated with supervision, audit, and group process and community case management. Furthermore, the effects of training were variable and often unsustained, possibly due to differences in training quality and the presence or absence of follow-up and supervision.

Role of prescription auditing

Prescription audit or medication audit seeks observation, evaluation and further recommendation on the prescribing practices of medical practitioners to make rational prescribing and cost effective. The most important part of healthcare system is to deliver the right medicine to the right people. Prescription auditing is one of the important tool to avoid misuse of drugs and improves rational use of drugs. Worldwide, it is estimated that over half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take their medicine correctly.[13]

The inappropriate use of drugs is a global health problem, especially in developing country like India. Irrational prescriptions have an ill effect on health as well as health-care expenditure. Prescription auditing is an important tool to improve the quality of prescriptions, which in turn improves the quality of health care provided.

Examples of irrational use of medicines include: poly-pharmacy, inadequate dosage, and use of antimicrobials even for non-bacterial infections, excessive use of injections when oral forms are available and inappropriate, self-medication and noncompliance to dosing regimes.[14]

Prescription audit cycle

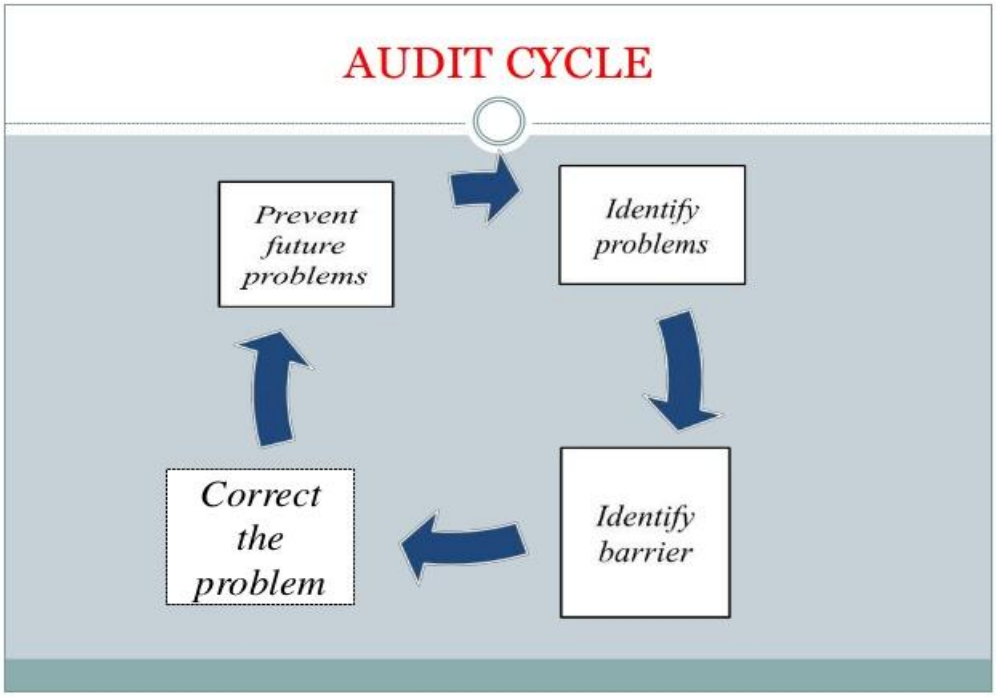

Figure 1: Audit cycle.

Steps in prescription auditing

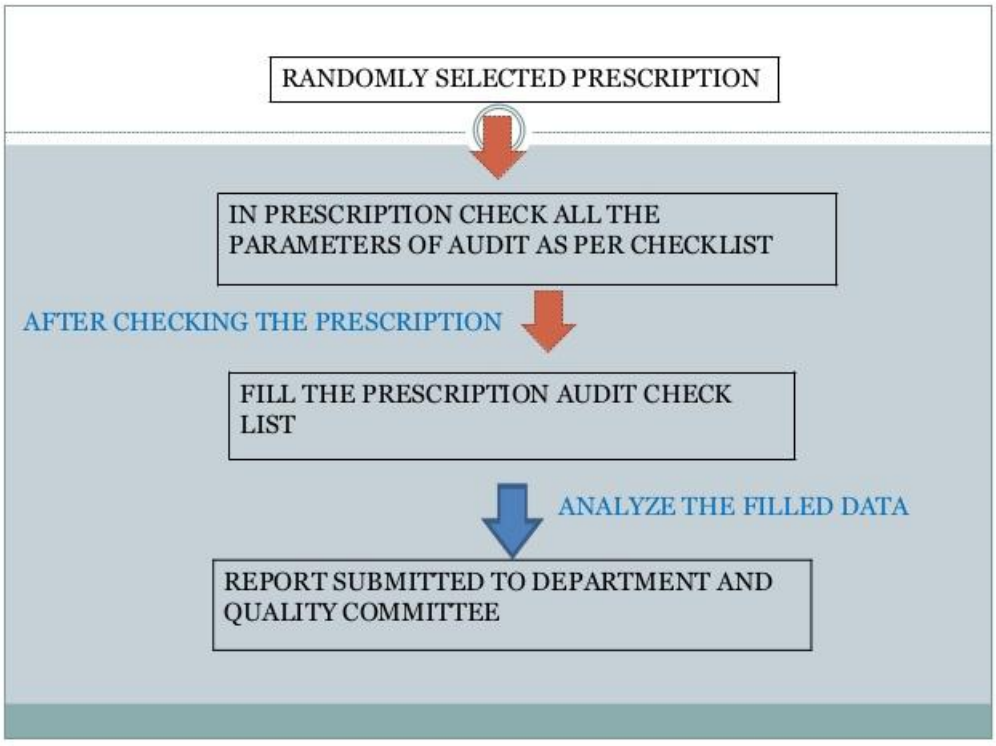

Figure 2: Prescription auditing steps.

Implement of prescription auditing

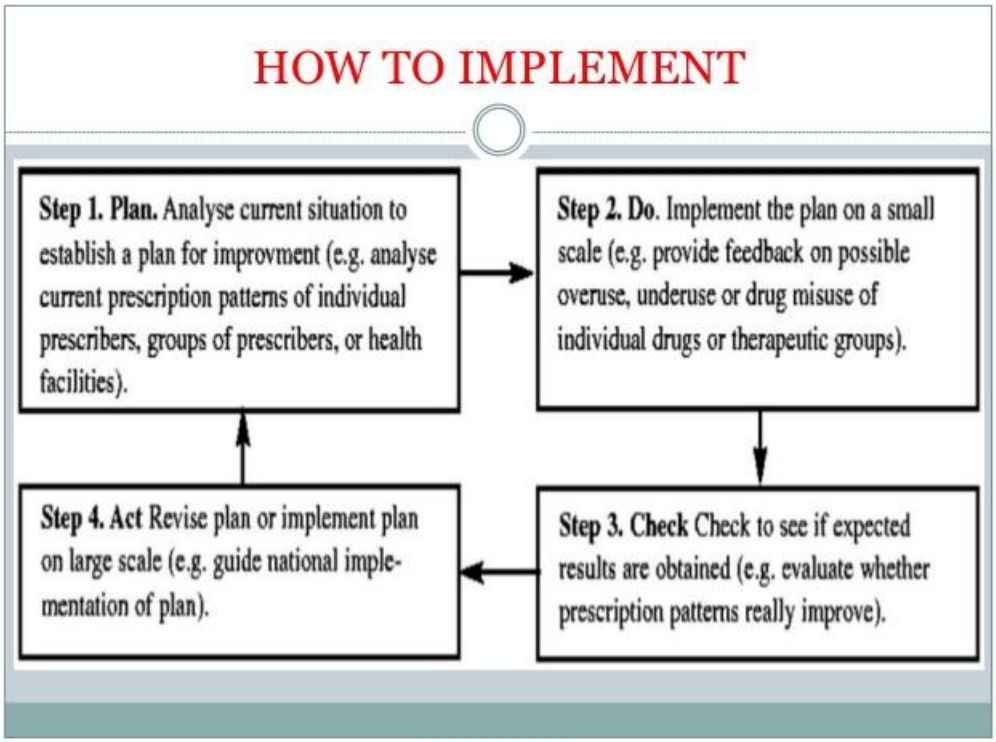

Figure 3: Implement of prescription auditing.

Parameters analyzed in prescription auditing

The parameters which has to analyzed in the process of prescription auditing are,

1. Patient demographics
   i. Patient name
   ii. Sex
   iii. Age
   iv. Body weight
   v. Date of prescription received
2. Clinical diagnosis
3. Department
4. Prescribing standards
   i. Dose
   ii. Dosage form
   iii. Generic name
   iv. Brand name
   v. Duration of treatment
   vi. Time of administration

5. Doctors name and signature

Demographic details (Superscription)

The superscription includes the date of prescribing; the name, address, weight, and age of the patient; and the Rx. The symbol "Rx" is said to be an abbreviation for the Latin word recipe, meaning "take" or "take thus," as a direction or order to a pharmacist, preceding the physician's "recipe" for preparing a medication1. The patient's name and address are needed on the prescription order to ensure that the correct medication goes to the exact patient. For the dose calculation, a patient's weight, age, or body surface area, also should be listed on the prescription.

Clinical diagnosis

A diagnosis made on the basis of medical signs and patient reported symptoms, rather than diagnostic tests. Clinical Diagnosis plays an essential part in the delivery of quality health care. The clinical diagnosis helps the pharmacist to check whether if there is any error in the prescription order written by the physician.

Department

Mentioning a department in a prescription by the physician helps the pharmacist to clarify any possible doubts in the prescription order. By considering the department in auditing researchers can get a clear view on the percentage of patients visited per department.

Prescribing standards

The prescribing standards include: Dose, Dosage form, Generic name, Brand name, Duration of treatment, Time of administration. Prescribing standards has to be tailed as per the prescribing guidelines which aids in rational prescribing. Poor handwriting is a well-known and preventable cause of dispensing errors. Accuracy and legibility are essential.[15]

Doctors Name and Signature

Prescriber identity, name, address and qualification. It requires that prescriptions for controlled substances include the name, address, and registration number of the physician1. Most of the prescriptions lacking the physician’s information are one of the drawback and chance to get medication errors.[16]

Audit parameters: Yes/ No/NA

- Name of patient
- Age
- OPD number
- Dose of drug
- Dosage of drug
- Route of drug
- Frequency / Time of administration
- Date
- Legible
- Known allergy documented
- Uniform location of treatment order
- Drug interaction, If Any
- Food drug interaction, If Any
- Signature of Doctor

CONCLUSION

The irrational prescribing, improper dispensing and patient use of medicine will lead to unnecessary expenditure for the patients. Many of the prescribing trends are a cause of concern and need attention. The value of such prescription audits in generating and testing hypothesis on inappropriate prescribing will definitely create an intervention to improve prescribing habits and ultimately patient care will be improved. The present study could serve as a frame work upon which further studies in prescription audit can be launched to investigate the scope for educational intervention and improvement in prescribing patterns. Prescription audit is an important tool to improve the quality of patient care. Data created on the morbidity pattern coupled with present practice of prescription will help in the generation of action plan also in order to improve the quality of care, and recommendations for changing the present prescribing practices. Comparing the current usage of drugs with the standard treatment guidelines will enhance the effectiveness of treatment and render it most cost effective.

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