Review Article **IJHP 2019, 4:18**

International Journal of Hospital Pharmacy
(ISSN:2574-0318)

ARTS AND SCIENCE OF PRESCRIBING

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ABSTRACT

Prescribing patient is a mammoth task. It is recommended that healthcare professionals who prescribe medications exercise critical thinking skills to ensure the safe and effective use of therapeutic agents. It should be endowed with communication skills, diagnostic skills, knowledge of medicines, an understanding of the principles of clinical methodology, consecutive risk and uncertainty. In fact, clinicians prescribe in varied situations, often in the absence of patient, and rational prescribing decisions must be based on knowledge interpreted in the light of many other factors.

Purpose of the study: Discussion and projection of drug prescribing among patients of both acute and chronic care. The pharmacists have a vital role to play which is thoroughly discussed.

Findings: Prescribing is not just a piece giving patient a piece of paper and advising him to follow instructions. Many factors and necessary considerations are lying beneath.

Materials and Methods: Research conducted a comprehensive year-round literature search, which included books, technical newsletters, newspapers, journals, and many other sources. Medicine and technical experts, pharma company executives and representatives were interviewed. Projections were based on estimates such as drug end users, providers or prescribers, general theories of rational use, implication and types of different prescribing methods.

Research limitations: Very few articles found in matters regarding along with a very less interest paid by general people to talk about medicine use, prescription, pharmacists in counseling therapy, ADRs and their management. It was very difficult to bring out facts of irrational prescribing or different prescribing policy by the providers cause prescription holding patients rarely co-operates in this.

Practical Implication: A good prescribing is the soul of patient compliance and safety along with well-being after a period of illness. Along with students, researchers and professionals of different background and disciplines, e.g. Pharmacists, doctors, nurses, hospital authorities, public representatives, policy makers and regulatory authorities have to acquire much from this article.

Social Implication: Along with healthcare facilities, patient compliance the soul of healthcare system where prerequisite is rational and appropriate prescribing. The article should contribute an integrated guideline for prescribing manner, pharmacist's role in rational prescribing and conveying necessary steps forward.

Keywords:
ADE, Patient package inserts (PPIs), Dosage Regimen, Patient Communication, Prescribing Errors

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How to cite this article:
AK MOHIUDDIN, ARTS AND SCIENCE OF PRESCRIBING.International Journal of Hospital Pharmacy, 2019,4:18.

eSciPub LLC, Houston, TX USA.
Website: http://escipub.com/

Introduction

Prescribers are legally and professionally accountable for their decisions. A true prescribing should reveal maximum drug efficiency, minimum errors and wastage, patient autonomy and consent. It should be based proper diagnosis, patient history, risk-benefit analysis and patient's ability to prescribing issues to follow. A secondary diagnosis with a poor prognosis, such as lung cancer, will severely limit the benefits of treating a primary one, such as hyper-cholesterolaemia. On the other hand, the excellent prognosis of influenza in a healthy adult limit the potential benefits of antiviral therapy.

Processing the prescription order upon receiving

The individual receiving the prescription should be trained to accept it in a professional manner and obtain the correct name, address, and other pertinent patient information. Patients having a prescription filled for the first time at a pharmacy may be asked to complete a brief health and medication history to establish a database in the pharmacy's computer for the patient. It is important to determine if the patient's medications are provided through insurance coverage and whether the patient wishes to wait, call back, or have the medication delivered (Ronda et.al, 2008).

Potential Directions for patients

- ✓ Pharmacists and physicians provide their patients with written directions outlining the proper use of the medication prescribed. Frequently, these directions include the best time to take the medication, the importance of adhering to the prescribed dosage schedule, what to do if a dose is missed, the permitted use of the medication with respect to food, drink, and/or other medications the patient may taking, as well as information about the drug itself.
- ✓ Certain manufacturers have prepared patient package inserts (PPIs) for specific products for issuance to patients. These present to the patient information regarding the usefulness of the medication as well as its side effects and potential hazards.
- ✓ The information is also available on computer software, allowing leaflets to be printed in the pharmacy as needed and with a compatible computer and standard line printer. Similar computer software programs are available from various other sources, designed to generate personalized patient-counseling information for use by the pharmacist in patient education.
- ✓ The advantages to having the name and strength of the drug identified on the prescription label include the facilitation of communication among the patient and the pharmacist and the physician and the rapid identification of the medication in times of accidental or purposeful overdose.
- ✓ When a generic drug product is dispensed, it is customary to include the manufacture of the product on the label as well. The date after which the medication will be sub-potent (expiration date) may be placed on the label based on information included on the original manufacturer's package.

Inappropriate or Irrational Prescribing

Good prescribing is sometimes defined as the lack of irrational prescribing. Prescribing can be described as irrational for many reasons:

• Poor choice of a medicine

• Polypharmacy or co-prescribing of interacting medicine

• Prescribing for a self-limiting condition

• Continuing to prescribe for a longer period than necessary

• Prescribing too low a dose of a medicine

• Prescribing without taking account of the patient's wishes (Session Guide).

Pharmacists as Prescribers and The Legal Framework

Evolution of non-medical prescribing -- Independent prescribing is defined as 'prescribing by a practitioner (doctor, dentist,

nurse, pharmacist) who is responsible and accountable for the assessment of patients with undiagnosed or diagnosed conditions and for decisions about the clinic management required including prescribing'. At the end of the 1990s, in line with the then UK government's desire to widen access to medicines by giving patients quicker access to medicines, improving access to service and making better use of the skills of health care professionals, the role of prescriber was proposed for other health care professionals. This change in prescribing to include nonmedical prescribers (pharmacists, nurses and optometrists) was developed following a further review (Clinical Governance Framework)

The prescribing process

- *Consultation*: The consultation is a fundamental part of the prescribing process and the prescriber needs to understand and utilize this in order to help them practice effectively. The five key stages of the consultation are*:*

- Initiating the session
- Gathering information
- Physical examination
- Explanation and planning
- Closing the session.

A broad range of practical skills are needed in the consultation:

1) *Interpersonal skills:* the ability to communicate and make relationships with patients.
2) *Reasoning skills:* the ability to gather appropriate information, interpret the information and then apply it both in diagnosis and management.
3) *Practical skills:* the ability to perform physical examinations and use clinical instruments.

- *Executing a safe and effective prescription order*: It requires communication of complete information to all intended readers. A complete order should contain, at a minimum:

i. Patient name
ii. Patient specific data
iii. Generic and brand name (ideally, both names should be provided; if only one name used, generic is preferred)
iv. Medication strength, in metric units by weight
v. Dosage form
vi. Amount to be dispensed, in metric units (terms such as bottle, tube or ampule should be avoided)
vii. Complete directions for use including route of administration, duration, dosing frequency, medication purpose, and number of authorized refills.

- *Dosing calculations*: A well-recognized cause of medication errors. Performing routine, independent cross-checking of dosing calculations are useful when verifying dosages for pediatric, geriatric, oncology, transplant, or other populations with special medication requirements. For verifying dosages, use of both mg/kg and mg/m2 (or other expressions as unit per weight or body surface area) in addition to actual dose calculated is recommended (Schwappach et.al, 2016).
- *Dosage standardization*: Another potential safety improvement, whenever possible as well as the use of commercially available dosage forms. This will require prescriber approval and cooperation. However, avoiding complex calculations is one way to avoid calculation errors. If transcription of medication orders is part of the health care organization's practice to transfer prescribing information to a medication administration record, similar guidelines and standards for evaluating standards, completeness, and accuracy should be put into place with a routine evaluation of practice compliance.
- *Communicating risks and benefits of treatment*: Explaining the risks and benefits of treatment in an effective manner is an essential skill for health care professionals. This ensures patient's consent to treatment is informed and that the patient has an opportunity to participate in shared decision

making about their treatment. A few related statements are added later part of this article.

- *Consulting the prescriber***:** It is in the additional role of managing medication therapy, in collaboration with prescribers, that pharmacists can now make a vital contribution to patient care. To do so, the role of the pharmacist needs to be redefined and re-orientated. The traditional relationship between the doctor as prescriber, and pharmacist as dispenser, is no longer appropriate to ensure safety, effectiveness and adherence to therapy. Pharmacists need to pay more attention to patient-centered, outcomes-focused care to optimize the safe and effective use of medicines. Dispensing is, and must remain, a responsibility of the pharmacy profession, but prescribing and dispensing should not be done by the same person. By taking direct responsibility for individual patients' medication-related needs, pharmacists can make a unique contribution to the outcome of medication therapy and to their patients' quality of life.
- *Management of ADEs*: Prescribing can be improved if prescribers have the necessary data to assure that decisions can be made (i.e., indications for use, potential for interactions, risks and benefits, monitoring concerns). The process of medication prescribing via computer order entry would greatly affect the rate of errors associated with ADEs. A computerized medication ordering system could provide alerts regarding specific prescribing concerns in the medication ordering process (e.g., identifying dose, allergy, drug-drug interactions). Having a routine approach to detect, intercept, and prevent these problems will reduce the potential for an adverse event to occur. Clinical information systems can also assist in reducing adverse drug events and medication errors by:

1) Increasing patient profile access and systematic screening of medication orders
2) Alerting medical staff of abnormal doses, medication interactions, or allergies (based on patient profile)
3) Generating 24-hour patient medication updates
4) Recording medication administration

- *Medication Review*: Reviewing all medications for appropriateness is good practice and also a systematic method to review the indication for use and monitoring plan in place for the patient. Another technique used to assure safe and effective prescribing practice is the use of a medication formulary. While physicians often consider a medication formulary as simply a method to control expenditures, formularies can be used as instructional and quality tools to assure that only agents that are safe, effective, and necessary for use are provided for patients under care. An organized formulary process comprises of a systematic peer review of medications for use and monitoring within a health system. Medications are typically evaluated for safety, effectiveness, policy implication, and practice requirements. Use of a formulary can assure that information is provided in a timely fashion, because the product has been thoroughly evaluated for use. *Potential Benefits of Medication review***:**

1) Improves the current and future management of the patient's medical condition;
2) Provides an opportunity to develop a shared understanding between the patient and the health care professional about medicines and their role in the patient's treatment;
3) Improves health outcomes through optimal medicines use;
4) Reduces adverse events related to medicines;
5) Provides an opportunity to empower the patient and carers to be actively involved in their care and treatment;
6) Reduces unwanted or unused medicines.

- Other Considerations:

i. *Use of Abbreviations*: While abbreviations might appear to be a time saver, their use can lead to confusion, misinterpretation, and increase the potential for error. Misplaced or missing decimal points also pose concerns. Recommendations for improving orders requiring fractions or decimal indications include adding a zero before a decimal point and eliminating trailing decimal points and zeros. Various organizations, including the Institute for Safe Medication Practices, have published lists of abbreviations and decimal point miscommunications that have been associated with medication errors and should not be used.

ii. *Preprinted Order Forms*: To reduce error potential, preprinted order forms have been suggested to reduce error potential. It is important to note that if preprinted orders are not carefully developed, they may actually induce errors. As standard orders, algorithms or preprinted guidelines are developed, all disciplines involved in the ordering process, should be involved in the development, review, and approval of these documents. Prescribing improvement efforts should include development of policies and procedures that support safe medication use and ordering. Practitioners should routinely be required to assess and document the need for and selecting the correct medication. Regimen selection should assure that specific, individual treatment goals are identified. Improvement efforts should also include attention to avoiding delay in treatment or in responding to a medication use concern, including inappropriate indication (or no clear treatment indication) and failure to provide preventive care or prophylactic treatment. Prescribing plans should include monitoring or follow up treatment.

iii. *Failure to Write Prescription Orders*: The use of verbal orders, electronic order transmission via facsimile machine, use of global prescription orders such as resume all previous orders provide many opportunities for miscommunication. Whenever possible, verbal orders should be avoided. Only specific personnel (e.g., physicians, pharmacists, nurses) should be allowed to dictate and receive verbal medication orders and only in approved circumstances. When used, verbal orders should be enunciated slowly and distinctly. Difficult medication names and instructions should be spelled out. Ambiguity should be clarified. The individual receiving the order should transcribe the order and then immediately read the information back to the prescriber. In the inpatient or long-term care setting, the prescriber should countersign and verify the verbal order as soon as possible. Many health care organizations now use facsimile transmissions for prescription order transmission. Streaked, blackened, or faded areas and phone line noise appearing as random markings are often present on facsimile transmissions. Careful inspection of the copy is necessary to evaluate if extraneous markings interfere with the actual order. Transmission of prescription orders in this manner still can contain illegible, ambiguous, or improper abbreviations. Failure to write a prescription order can also provide many opportunities for error. When medications are held or resumed or patient care is transferred to another location or provider, it is imperative that a complete review of medications is occurs. Simply stating resume all, hold all, or continue all previous medications is not acceptable practice.

Critical Issues of Patient Communication

It is important to communicate the risks and benefits of treatment in relation to medicines. This is because many medicines are used long term to treat or prevent chronic diseases, but we know they are often not taken as intended. Sometimes these medicines do not appear to have any appreciable beneficial effect on

patients' symptoms, for example medicines to treat hypertension. Most patients want to be involved in decisions about their treatment, and would like to be able to understand the risks of side effects versus the likely benefits of treatment, before they commit to the inconvenience of taking regular medication. An informed patient is more likely to be concordant with treatment, reducing waste of health care resources including professional time and the waste of medicines which are dispensed but not taken (FDA User Guide). *Communicating risk is not simple.* Many different dimensions and inherent uncertainties need to be taken into account, and patients' assessment of risk is primarily determined by emotions, beliefs and values, not facts. This is important, because patients and health care professionals may ascribe different values to the same level of risk. Health care professionals need to be able to discuss risks and benefits with patients in a context that would enable the patient to have the best chance of understanding those risks. It is also prudent to inform the patient that virtually all treatments are associated with some harm and that there is almost always a trade-off between benefit and harm. How health care professionals present risk and benefit can affect the patient's perception of risk. *Some important principles to follow when describing risks and benefit to patients:*

a. Patients' assessments of risk are primarily determined by emotions, not by facts
b. Communicate the trade-off between benefits and harms
c. Avoid purely descriptive terms of risk, for example ‘low risk’
d. Use a consistent denominator, for example 1 in 100, 5 in 100; not 1 in 100, 1 in 20
e. Use absolute numbers (not relative, or percentages)
f. Describe outcomes in both a negative and positive perspective

Factors that influence prescribing process

There are many different factors which affect use of drugs. If one were to broadly classify the factors, they could be divided in to: those deriving from patients, chemists’ shop, prescribers, the workplace the supply system, industry influences, cognitive biases (Table 1) regulation, drug information and misinformation (Schumock et.al 2004)

Table 1. Examples of types of cognitive biases that influence prescribing Type

Type of cognitive bias	Description
Novelty preference	The belief that the progress of science always results in improvements and that newer treatments are generally better than older treatments
Over optimism bias	Tendency of people to over-estimate the outcome of actions, events or personal attributes to a positive skew
Confirmation bias	Information that confirms one's already firmly held belief is given higher weight than refuting evidence
Mere exposure effect	More familiar ideas or objects are preferred or given greater weight in decision making
Loss aversion	To weigh the avoidance of loss more greatly than the pursuit of an equivalent gain
Illusory correlation	The tendency to perceive two events as causally related, when in fact the connection between them is coincidental or even non-existent

Managerial approaches to influence prescribing

In order to change prescribing practice, pharmacists need to be aware of how to use an adoption model-based approach to convey key

messages to the prescriber to help them change practice. One such model is known as AIDA. More sophisticated multifaceted educational interventions can also be effective at changing prescribing behavior but need to be flexible to meet the needs of individual clinicians. This sort of combination approach includes small group learning, audit and feedback, practical support to make changes in practice, and involvement and education of patients.

Table 2. AIDA adoption model for influencing prescribers

***A*wareness**	Make the prescriber aware of the issues, prescribing data and evidence for the need to change
***I*nterest**	Let the prescriber ask questions and find out more about the proposed change: what the benefits are, what the prescriber's concerns are
***D*ecision**	Help the prescriber come to a decision to make a change. How can the change be applied to their patients, what support is there to overcome the barriers to change, provide further information and training to support the change
***A*ction**	Action of making a change by the prescriber. Support this with simple reminders, patient decision support, feedback data and audit

Error Potential in the Prescribing Phase

The three most common forms of prescribing errors include dosing errors, prescribing medications to which the patient had an allergic history, and errors involving the prescribing of inappropriate dosage forms. In the examples listed, timely access and use of information is essential to avoid adverse drug events. Although not a panacea, use of a computerized medication order entry system can significantly contribute to the prevention of medication errors (Timothy, 2002). The type of health care information that is best suited for computerization includes:

- General information storage (e.g., patient or medication information, retrieval)
- Repetitive functions (e.g., dosage guidelines, medication names, allergy information)
- Complex processes that depend on reproducible results
- Items where legibility is essential
- Items that require timely attention
- Items where accuracy is vital

Recommendations for Prescribing Improvements

Many opportunities exist to improve the safety of the medication use process. The prescribing phase of the medication use process, however, encompasses the majority of medication errors that result in preventable ADEs. The knowledge that ADEs can be prevented compels organizations to identify the factors or system failures that contribute to the errors in the prescribing phase. Such factors identified in the prescribing phase include:

- ✓ Availability of medication information at time of prescribing
- ✓ Access to patient information at time of prescribing
- ✓ Availability of dosing information at time of prescribing
- ✓ Availability of allergy information at time of prescribing
- ✓ Accuracy or completeness of order by prescriber
- ✓ Legibility of handwriting
- ✓ Use of abbreviations
- ✓ Use of decimals in expressions of weight and measure
- ✓ Use of varied units of measure
- ✓ Medication name look-alikes or sound-alikes

The most important element of any safety measure is trained and competent people, not technology. The trick is to remember that technology can’t save the day. The system has to be built around the people. Highly trained and competent people (Table 3) bring to a task a quality not found in and technology.

Table 3. Overview of the competency framework for pharmacists

Competency area	Competency
Consultation	Clinical and pharmaceutical knowledge Establishing options Communicating with patients
Prescribing effectively	Prescribing safely Prescribing professionally Improving prescribing practice
Prescribing in context	Information in context The NHS in context The team and individual context

Supplementary prescribing

Supplementary prescribing is defined as a voluntary prescribing partnership between an independent prescriber (doctor or dentist) and a supplementary prescriber (nurse, pharmacist, chiropodists/podiatrists, physiotherapists, radiographers and optometrists) to implement an agreed patient-specific clinical management plan with the patient's agreement. This prescribing arrangement also requires information to be shared and recorded in a common patient file (Department of Health, 2005).

Off-label and unlicensed prescribing

For a medicine to be licensed for use in a specific country, the manufacturer must obtain a marketing authorization, formerly called the product license. This details the patients, conditions and purpose under which the medicine is licensed for use. Any medicine which does not have a marketing authorization for the specific country where it is prescribed is termed ‘unlicensed’. Unlicensed medicines prescribed include new medicines undergoing clinical trial, those licensed and imported from another country but not licensed in the country where they are to be used. It also includes ‘specials’ manufactured to meet a specific patient's needs or produced when two licensed medicines are mixed for administration. However, if a licensed medicine is prescribed outside that specified in the marketing authorization then this is described as ‘off-label’. This happens in practice, for example many medicines are not licensed for use in children but are prescribed for them. In addition, some established medicines are prescribed for conditions outside their marketing authorization, for example amitriptyline for neuropathic pain and azathioprine in Crohn's disease (Cuzzolin et.al 2006).

Potential advantages associated Computer Support

Computer support in the prescribing process is beneficial due to the fact that this process demands attention to detail related to the medication product, patient, and population characteristics, clinical information, and administrative issues. It is important to remember that practitioners receiving the information within the organization are still required to use the appropriate skills to determine the relevance of this information for the patient. Simply automating the prescriptive process does not in and of itself make it safer. Lessons have been learned in other domains regarding the impact and implications of technology. If one thinks technology can solve security problems, then the person doesn’t understand the problems and the technology. New technologies have enormous capacity, but what is seldom thought about is not how well it works, but how well it fails. Benefits of electronic prescriptions are:

1) Reducing or eliminating the errors associated with illegible handwriting;

2) Prescribers can receive on-screen prompts for drug-specific dosing information;
3) Information from the patient's medical record can be linked with information from the patient's prescription records;
4) Prescribers would be notified if a drug product is covered by the patient's insurance plan when the order is being generated rather than when it is presented at the pharmacy;
5) Refill requests can be expedited; and
6) Computers can facilitate data exchange between the physician and pharmacist allowing individuals to better manage their time and facilitate interactions with their patients (Catherine et.al 2010)

Conclusion

Prescribing is difficult. It requires a thorough knowledge and understanding of the pathophysiology of disease, the pharmacological properties of the relevant drugs, and the ways in which the two dovetails. No single intervention can be relied upon to improve prescribing, and a combination of interventions may be required to be taken as often as possible (learning should be lifelong). Special study modules, to be taken as required. Proper assessment in the final examination, to be taken once or twice. A national prescription form for hospitals, to be applied uniformly.

Acknowledgement

It's a great gratitude and honor to be a part of healthcare research and education. Pharmacists of all disciplines that I have conducted was very much helpful in discussing healthcare situations in Bangladesh, providing books, journals, newsletters and precious time. The greatest help was from my students who paid interest in my topic as class lecture and encouraged to write such article comprising handling prescription and rational prescribing. Despite a great scarcity of funding this purpose from any authority, the experience was good enough to carry on research.

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