Drug Information Services

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Abstract-There are a growing number of drugs and vast literature coming through every day. Clinicians are hard pressed to keep up with all the recent advents due to shortage of time, however, for safe and efficacious use of medicines, unbiased, up to date and objective information about the drugs is essential.

Medicines are now considered as active substances. Information obtained from manufacturers is liable to be biased, and in the present day of therapeutic and information explosion, a quick referral to a pharmacopoeia or formularies is hardly sufficient for adequate information on the vast number of drugs and dosage forms available in the market in all the different brand names.

The lack of adequate drug information due to limited availability of current literature, and poor documentation and dissemination of the little available information leads to an unbiased and current drug references which were not available in most clinical facilities and to officials and committees developing drug lists and making procurement decisions.

The irrational use of drugs are still in evidence as use of expired drugs, irrational combination of drugs, and overuse of antibiotics, Vitamins, herbal remedies, brand prescribing, retail shop prescribing and unethical dispensing. Such irrational practices, combined with lack of patient information on proper handling and use of drugs can lead to wastage of medicine as well as other serious consequences like adverse drug reactions and drug interactions.

1.INTRODUCTION

Drug information Knowledge of facts through reading, study, or practical experience on chemical substance that is used in Diagnosis, Prevention and treatment of a disease. It covers all types of information including objective and subjective information as well as information gathered by scientific observation or practical experience

[1]. Drug information service (DIS) is the service that encompasses the activities of specially trained individuals to provide accurate, unbiased, factual information, primarily in response to patient-oriented drug problems received from various members of the healthcare team

[2]. In the past, the number of drugs available was less and thus, the need for drug information was limited. But now, the scenario has come a long way with new modes of therapy and vast number of drug products being available. It is not humanly possible to remember such vast information on drugs. There has also been a great explosion in the number of biomedical journals published each year. Hence, it is very important to retrieve specific unbiased information.

[3]. A clinical pharmacist is professionally trained and legally competent to provide drug information, which is also a key component of his/her daily activities. In India, the concept of rational drug use is yet a long way to go. Lack of unbiased drug information and lack of time are some of the factors that makes the physicians unable to update their knowledge about drugs which have resulted in an increasing demand for independent and unbiased information about drugs for better patient care].

It is important, to periodically evaluate the mode of functioning and quality of the services provided by the center, so that necessary modifications can be made for better functioning. The drug information center is a part of the department of pharmacy practice, and is internationally recognized. The centre should well equipped with trained staff and a library consisting of textbooks, National and International journals, computer and Internet facilities along with electronic databases such as IDIS and MICROMEDEX. The centre should be managed by the faculty members and postgraduate students of the pharmacy practice department. The service should be provided between 8 A.M and 6 P.M on all days except Sundays and public holidays. The drug information centre caters to the needs of all health care professionals working in variousdepartments of the hospital. Drug information services can be accessed by telephone, intranet, direct access, and also during ward rounds. Drug information request forms are also available on-line, which are to

be duly filled and submitted for further processing of answer. The drug information queries are evaluated and answers are provided according to the modified systematic approach. The drug information requests and answers are documented and maintained in the drug information documentation files of the department Assessment and evaluation of drug information services were carried out in three steps.

The first step involved retrospective evaluation of drug information request and documentation forms for a period of 12 months. The evaluation was based on the following parameters such as professional status of the enquirer, specialty of practice, mode of receipt of query, purpose of enquiry, time frame to reply, category of question, and references used. Secondly, the quality of services provided was assessed from the receivers perspective through a questionnaire comprising questions, pertaining to awareness, utilization, opinion, and the quality of service provided by the centre. Questionnaire was given to 40 health care professionals, who agreed to give a feedback onthe service, and this included clinicians and postgraduate trainees of various units of the hospital where the clinical pharmacists were attending ward rounds.

The filled questionnaires were collected after 2 days from individual respondents. The third step involved the assessment of quality of drug information services from the provider's perspective by using the guidelines from the DSE/WHO seminar . According to these guidelines, the queries were categorized into judgmental and nonjudgmental types.A judgmental type of queries requires judgment, integration of new data with pre-existing knowledge and experience, and extensive searching of secondary and tertiary references and a primary literature review. Judgmental types of queries are often patient specific.

Nonjudgmental responses represent a lower degree of sophistication and do not require judgment. The aspects, which were considered during the evaluation phase, included effectiveness in obtaining the demographic data of the enquirer and collecting background information, level of understanding of the question, using the search strategy, evaluation of literature, and the response given by the provider. Queries after evaluation were scored from 1 to 5, 5 indicating that the information given was excellent; 4 - very good, 3 - good, 2 - adequate and 1 - indicating that the consultation was unacceptable for use.

The minimum acceptable level of rating was considered to be 3. During the study, a total of 20 queries were selected for evaluation - 10 each of the judgmental and nonjudgmental types. Two internal auditors who were well experienced in providing drug information service evaluated responses to these queries using the questionnaire. These queries were graded on the basis of the scores given by the authors.

2.SOURCES OF DRUG INFORMATION

Drugs: The overall amount of medical information is growing at an alarming rate, even the body of knowledge covering only drug information seems to be endless. There are vast amounts of data on drugs that are approved by the Food and Drug Administration (FDA), and on agents undergoing clinical investigation. The sources of information for drugs are:

- Primary Literature- Primary literature is comprised of original research that is written in the author(s) own words. It consists of research studies, case reports, editorials, and lettersto the editor.
- Secondary literature- The secondary literature is compiled by indexing and abstracting services that can be used to systematically locate various types of published literature. The indexing system usually provides bibliographic information indexed by topic and will allow the user to view a brief description of the information within most citations.

  Examples of secondary literature databases are PubMed (Medline), Embase, National Library of Medicine Gateway, International Pharmacy Abstracts, Scopus, and Toxline.
- Tertiary Literature- The information presented in tertiary literature is core knowledge established via primary literature or accepted as standard of practice within the medical community. Drug information contained in the tertiary literature is generally well- established information that is approved and accepted by the FDA (i.e. a FDA labelled indication) or well founded in the primary care literature.

  Tertiary references may be of textbooks on various drug or disease topics (e.g. Pharmacotherapy), compendia or online, full-text databases.

Health science libraries
Pharmacology And Drug Information Resources

- Drug Interaction Resources
- Medical And Pharmacy Therapeutics Resources
- Information On Drug Side Effects

3.DRUG INFORMATION ACTIVITIES BY A PHARMACIST

To be an effective provider of DI, the pharmacist must exercise excellent oral and written communication skills and be able to

1. Anticipate and evaluate the DI needs of patients and health care professionals;
2. Obtain appropriate and complete background information as described under the section Systematic Approach for Responding to Drug Information Requests;
3. Use a systematic approach to address DI needs by effectively searching, retrieving, and critically evaluating the literature (i.e., assessment of study design, statistics, bias, limitations, applicability); and
4. Appropriately synthesize, communicate, document, and apply pertinent information to the patient care situation.
5. Monitoring and assessing the clinical significance of medication safety alerts communicated by the FDA, drug manufacturers, and other sources.
6. Performing health outcome and comparative effectiveness analyses.
7. Coordinating investigational drug services, including participating on institutional review boards (IRBs), evaluating protocols, and providing DI to patients, caregivers, and health care professionals. 8. Managing drug shortages, including identifying alternative treatments, developing protocols for restrictive use, and addressing formulary concerns.
8. Developing clinical decision support tools such as order sets, dosing protocols, and order-entry alerts.
9. Maintaining DI and medication-use policy-related intranet resources.
10. Presenting or providing advanced DI education and training to inter professional and pharmacy students and residents.
11. Coordinating selection and purchase of pharmacy and institution-wide DI resources.
12. Participating in various fee-for-service projects (e.g., formulary support, database development, training programs) for clients.
13. Planning and delivering academic detailing programs.

Systematic Approach for Responding to Drug Information Requests A systematic approach for responding to DI requests was first introduced by Watanabe, et al. in 1975.12This approach has been modified and expanded over the years to ensure that all relevant.

The importance of gathering pertinent patient data and understanding the context of a question prior to answering a DI request is described in the literature.14-16 Of note, a full systematic approach may not be practical for all requests, especially for urgent clinical needs in the direct patient care setting. In addition, consideration should be given to the ethical and legal aspects of responding to DI requests, including patient privacy concerns.1 A systematic approach may be outlined as follows. Identify the requestor. In order to obtaincomplete information and develop a response with the appropriate perspective, consider the health literacy and professional background of the requestor. 2. Define the true question and information need. Identify the true question and information needed by asking probing questions of the requestor. For example, “Why is the question being asked?” and “Does the question pertain to a specific patient?” may help reveal important details of the truequestion.1 This kind of information helps in optimizing the search process and assessing theappropriate time frame of response need.

4.INFORMATION SOURCES ON DISEASES

Notifiable diseases- by law, some diseases are "notifiable", which means that a doctor should report them on

1.the basis of the symptoms alone, rather than waiting for laboratory confirmation. Laboratory reports - if a doctor sends a sample from a patient for testing, the laboratory can confirm what

2.germ (if any) is making the person sick. Clinician reporting - for some diseases of particular public health importance, doctors are asked to report key

3.items of information to ensure that appropriate public health action can be taken. Each source of

information provides a different perspective on the frequency and distribution (the epidemiology) of disease. Combining the information gathered from these different sources often gives a more complete and accurate picture of disease than is obtained by looking at the data from one source only.

5.COMPUTERIZED SERVICES

These information systems are organized to serve the needs of developed as well asdeveloping countries on co-operative basis as these are established to store recorded information and retrieve it expeditiously and provide free exchange of information among scientists in various countries. The major International information systems & services are INIS, AGRIS, INSPEC, BIOSIS, MEDLARS, MEDLINE etc. Computer- based products & services AVLINE (Audio-Visual Online)

- CANCERLIT (Cancer Literature)
- CATLINE (Catalogue Online
- CHEMLINE (Chemical Dictionary Online)
- TOXLINE (Toxicology information Online)
- SDILINE (Selective Dissemination of Information Online)
- SERLINE (Serials Online)

POPLINE (Population Information Online)
MEDLINE is a literature database of life sciences and biomedical information introduced in 1971. It includes medicine, nursing, pharmacy, dentistry, veterinary medicine & health care. It can be searchable via Pub Med & NLM‟s National Center for Biotechnology Information‟s Entrez system. MEDLINE uses Medical Subject Headings (MeSH) for information retrieval. Engines designed to search MEDLINE (such as PubMed &Entrez) generally use a Boolean expression combining MeSH terms, words in abstract and title of the article, author names, date of publication, etc. More than 6,000 of the world's leading biomedical journals are indexed in MEDLINE. Selection is based on the recommendations of a panel, the Literature Selection Technical Review Committee (LSTRC), based on scientific policy and scientific quality. PubMed is a free database comprises more than 22 million citations for biomedical literature from MEDLINE, life science journals, & other online books. Citations may include links to full- text content from PubMed Central & publisher websites. Available via the NCBI Entrez retrieval system. MedlinePlus is a free web service produced & maintained by NLM. Provides consumer health information for patients, families, & health care providers. Brings together information from the US. NLM, the National Institutes of Health (NIH), other US.govt.agencies & health related organizations.

6.DRUG INFORMATION ACTIVITIES

Drug information activities

1. Information retrieval using appropriate sources
2. Critical review, analysis and interpretation of the literature
3. Effective provision of verbal and written information to the public, patients and healthcare practitioners
4. Drug policy management e.g. drug selection, formulary management and drug use evaluation (DUE)
5. Adverse event management e.g. detection, evaluation and reporting of adverse drug reactions. Drug product problems and medication errors.

7.MEDICATION ERROR

Medicine cure infectious diseases, prevent problems from chronic diseases, and ease pain. But medicines can also cause harmful reactions if not used correctly. Errors can happen in the hospital, at the doctor's office, at the pharmacy, or at home Errors can be prevented by Knowing about medicines. Keeping a list of the names of the medicines Including over- the-counter medicines, vitamins, and supplements and herbs] Reading medicine labels and following the directions. Taking extra caution while giving medicines to children.

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 healthcare professional, patient, or consumer," according to the National Coordinating Council for Medication Error Reporting and Prevention. Medication errors can occur throughout the medication-use system. Such as, when prescribing a drug, upon entering information into a computer

system, when the drug is being prepared or dispensed, or when the drug is given to or taken by a patient. The U.S. Food and Drug Administration (FDA) receives more than 100,000 U.S. reports each year associated with a suspected medication error. FDA reviews the reports and classifies them to determine the cause and type of error. The reports come from drug manufacturers, and healthcare professionals and consumers through MedWatch, the Agency's safety information and adverse event reporting program. Serious harmful results of a medication error may include:

- Death
- Life threatening situation
- Hospitalization
- Disability
- Birth defect.

Looking for ways to reduce medication errorsFDA looks for ways to prevent medication errors. Before drugs are approved for marketing, FDA reviews the drug name, labeling, packaging, and product design toidentify and revise information that may contribute to medication errors. For example, FDA reviews:

- Proposed proprietary (brand) names to minimize confusion among drug names. With the help of simulated prescriptions and computerized models, FDA determines the acceptability of proposed proprietary names to minimize medication errors associated with product name confusion.
- Container labels to help healthcare providers and consumers select the right drug product. If a drug is made in multiple strengths – e.g., 5 mg, 10 mg, and 25 mg, – the labels of those three containers should be easy to differentiate. The label design may use different colors or identify the strength in large bold numbers and letters.
- Prescribing and patient information to ensure the directions for prescribing, preparing, anduse are clear and easy to read.

After drugs are approved for marketing in the United States, FDA monitors and evaluates medication error reports. FDA may require a manufacturer to revise the labels, labeling, packaging, product design or proprietary name to prevent medication errors. FDA may also issue communications alerting the public about a medication error safety issue, by way of Drug Safety Communications, Drug Safety Alerts, Medication Guides and Drug Safety Podcasts.

FDA collaborates with external stakeholders, regulators, patient safety organizations such as the Institute for Safe Medication Practices (ISMP), standard-setting organizations such as the U.S. Pharmacopeia, and researchers to understand the causes of medication errors, the effectiveness of interventions to prevent them, and to address broader safety issues that may contribute to medication errors.

Getting the right drug to the right patient

FDA also put into place rules requiring barcodes on certain drug and biological product labels. Barcodes allow healthcare professionals to use barcode scanning equipment to verify that the right drug -- in the right dose and right route of administration -- is being given to the right patientat the right time.

This system is intended to help reduce the number of medication errors that occur in hospitals and other healthcare settings. FDA has published several guidances to help manufacturers design their drug labels, labeling, packaging, and select drug names in a way to minimize or eliminate hazards that can contribute to medication errors. For example, in 2016, FDA issued a final guidance titled, Safety Considerations for Product Design to Minimize Medication Errors. To avoiderrors and encourage safe use of drugs, the guidance recommendations include:

- Tablets and other oral dosage forms should have distinct and legible imprint codes so healthcare providers and consumers can verify the drug product and strength.
- Oral syringes and other dosing devices co-packaged with a liquid oral dosage form should be appropriate for the doses to be measured. Dosing errors have been reported when an oral syringe is labeled in milligrams but the dose is prescribed in milliliters.
- The package design should protect the consumer against incorrect use. Medications appliedto the skin (topical) should not be packaged in containers that look like the containers usually associated with eye, ear, nasal, or oral products. Similar looking containers have resulted in people putting a topical product in the eye, ear, nose, and mouth.

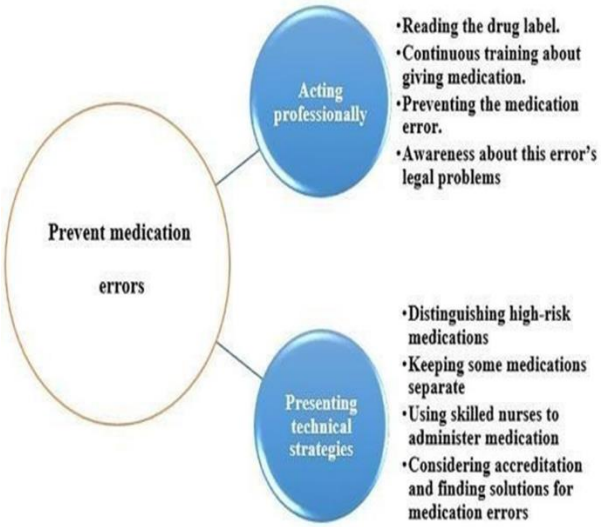
Over-the-counter and prescription drug labeling

According to a Harris Interactive Market Research Poll conducted for the National Council onPatient

Information and Education and released in January 2002, consumers tend to overlookimportant label information on over-the-counter (OTC) drugs. In response to that report, FDA now requires a standardized "Drug Facts" label on more than 100,000 OTC drug products.Modeled after the Nutrition Facts label on foods, Drug Facts helps consumers compare and selectOTC medicines, and follow instructions. The label clearly lists active ingredients, inactive ingredients, uses, warnings, dosage, directions, and other information, such as how to store the medicine. In 2006, FDA revised its rules for the content and format of prescribing information for prescription drug and biological products. The new look helps healthcare professionals find the information they need more easily and quickly. FDA also makes updated prescribing information available on the Web at Drugs@FDA.Consumers playan important role.

Consumers can also play an important role in reducing medication errors. Here are somedrug safety tips:

- Know the various risks and causes for medication errors. See ISMP's consumer web page, ConsumerMedSafety.org External Link Disclaimer, for helpful tools and resources to protect yourself from medication errors.
- Find out what drug you're taking and what it is for. Rather than simply letting the doctor write you a prescription and send you on your way, be sure to ask the nameof the drug and the purpose of the drug.
- Find out how to take the drug and make sure you understand the directions. Ask if the medicine needs to be kept in the refrigerator.
- Check the container's label every time you take a drug. This is especially important if you are taking several drugs because it will lower your risk of accidentally taking the wrong medicine.
- Keep drugs stored in their original containers. Many pills look alike, so keeping them in their original containers will help know the name of the drug and how to take them. If you are having trouble keeping multiple medications straight, ask your doctor or pharmacist about helpful aids.
- Keep an updated list of all medications taken for health reasons, including OTC drugs, supplements, medicinal herbs, and other substances. Give a copy of this list to your healthcare provider.
- Be aware of the risk of drug/drug or drug/food interactions.
- If in doubt or you have questions about your medication, ask your pharmacist or other healthcare provider.
- Report suspected medication errors to MedWatch.



8.APPROACHES TO PROVIDE DRUG INFORMATION

The steps involved in the modified systematic approach are discussed below. There are various approaches in providing drug information. The modified systemic approach‟ is most widely used for providing quality DI. DICs may use this system, or an adaptation of it, as a basis for responding to drug information queries. Requestor Demographics: Although the presentation of the initial question provides insight to the requestor's sophistication and knowledge regarding the subject matter, it is important to directly determine the requestor's position, training and anticipated knowledge so as to be able to provide the information in a language understandable to the requester. Background Questions: Examples of general background questions

Other background information should be specific for nature of the request Categorization of question: Categorization of the question is useful not only for the initial development of the search strategy, but also for the determination of resources. Once an ultimate

question is categorized, the development of a search strategy can be initiated. Search Strategy: The categorization of the question helps the resource selection process. Once resources have been selected, they are prioritized based on probability of containing the information or data desired. Data evaluation, analysis and synthesis: At this step, the information retrieved must be objectively critiqued. The analysis and synthesis of answer must be performed with consideration of background information obtained previously. Formulation and provision of response: If the literature includesconflicting data that must be presented to the requestor, the DI personnel may need to use a logical argument, which includes steps like present the competing view points or considerations, state assessment of literature or information reviewed and claim the superior view point, briefly disprove the major strengths and present the weaknesses of the inferior view point, repeat the final assessment in support of superior view point. The utilization of good verbal communication skills, from confident delivery to correct pronunciation of all terms, is imperative for ideal response provision.

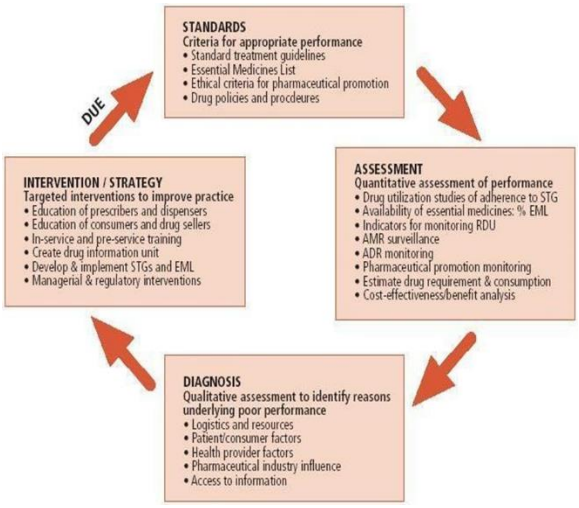
4.Follow up, follow through and documentation: Follow up is the process of verifying the appropriateness, correctness and completeness of a response following the communication. Appropriate documentation of all requests and consultations should be maintained and such records should contain sufficient data to enable statistical evaluation for purposes of quantifying workload and periodic quality assurance review and assessment. Records of patient-specific requests must be retrievable.

Systematic Approach to Answering Drug Information Requests Step 1: Obtain background information Before you can answer a drug information request, it is imperative to clearly understand the question and the circumstances surrounding the question. When this is done correctly, the literature search has direction and can be specific in terms of which resources toutilize. Complete background information enables an efficient and relevant answer to be provided in a timely fashion. Complete background information also ensures an appropriate and applicable response to the requestor. The book, Drug Information: A Guide for Pharmacists, suggests the following questions and factors to consider when formulating a response to a drug information request: General questions to consider before formulating a response How do you provide the requestor their answer? (i.e., what is their contact information?) How does the requestor want the information? (I.e. in person, in email, patient handout, etc.) Does the question pertain to a specific patient? Why is the question being asked? What is the background of the situation? Are the requestor's expectations understood? How soon do they want a response? How will the information be used? What has been done regarding the situation to date?Patient Factors to Consider o Demographics (e.g., name, age, height, weight, gender, etc.) o Diagnosis/Problem list o Allergies o Organ function o Chief complaint o History of present illness o Past medical history o Family history o Social history o Review of systems o Medications, including herbals o Physical findings o Laboratory results Disease Factors to Consider o Epidemiology o Etiology o Pathophysiology o Clinical findings o Diagnosis o Treatment o Prevention and control o Risk factors o Complications o Prognosis Medication Factors to Consider o interactions o Available Name of medication Availability Physiochemical properties Pharmacology and pharmacodynamics o Pharmacokinetics o Pharmacogenetics o Indications (both labeled and off- label) o Uses o Adverse effects Contraindications (including allergies) Effects of age, organsystem function, disease, pregnancy, etc. Effect on fertility, pregnancy, lactation Drug formulations and Administration route Dosage and schedule MonitoringCompatibility andstability Other Factors to Consider Setting Context Sequence and time frame of events.

Drug information activities

1. Information retrieval using appropriate sources
2. Critical review, analysis and interpretation of the literature
3. Effective provision of verbal and written information to the public, patients and healthcarepractitioners
4. Drug policy management e.g. drug selection, formulary management and drug useevaluation (DUE)
5. Adverse event management e.g. detection, evaluation and reporting of adverse drug reactions. Drug product problems and medication errors.

9.DRUG INFORMATION CENTRE



DIC refers to a facility specifically set aside for, and specializing in, the provision drug information. The main objective of a DIC in a hospital is to facilitate the practice of rational pharmacotherapy. Minimum requirements for running a DIC: DIC is defined by the World Health Organization (WHO) as an independent centre that is accessible to any health professional regarding all queries about drug. This definition, however, excludes DICs situated in a hospital or those which specialize in a specific area of drug information e.g. toxicology. DICs, in general, are service units committed to providing drug information as it relates to therapies, pharmaco economics, education and research programs. For proper establishment and proper functioning, a DIC must fulfil minimum requirements regarding resources, facilities, organization and budget. The DIC maintains current references for the easy accessibility of the information to the health care professionals. In addition to providing information, the centre also trains students on the use of various resources to answer the queries, which are received while they are in the wards as well as in the department. It also develops criteria/guidelines for the rational druguse by the health care professionals.

Apart from answering the queries on drug related issues, the DIC can also perform other roles such as publishing drug information bulletins, providing information on new drugs, providing support for Drug and Therapeutic Committees (DTCs) and drug formularies, coordinating adverse drug reaction reporting schemes, providing education and training, participating in ward rounds and organizing aspects of clinical trials. While responding to a query the drug information personnel must take several ethical issues into account. Some of the ethical issues needing consideration while answering queries are: patient privacy must be protected, professional ethics must be maintained, the patient -physician relationship must not be breached. In developed countries information flow and practice of DIS is satisfactory. In developing countries, though few DICs exist, the effectiveness of centres in providing DI is questionable due to various reasons. Some of them are lack of funds, lack of trained staff, limited availability of current literature, limited or no availability of research based periodic drugs and therapeutic information, poor documentation and dissemination of the little available information and poor or no information exchange services. As improper functioning results in provision of biased and limitedinformation, which can greatly contribute to the poor patient outcomes in terms of health and economics, it is essential that the services provided by DICs be of quality. DICs aims to achieve the quality use of medicines by providing and communicating timely, accurate, balanced and comprehensive information on drugs and their usage.

The objectives of quality improvement program are to identify key areas of drug information practice, establish indicators of quality for these key areas, establish minimum acceptable levels of performance for these indicators, review performance against indicators, identify opportunities for improvement and develop and implement plans for improvement. It is necessary to perform the QA program for the DICs periodically so as to assess their functioning.

Drug Information Center

1.Setup and equipment

The center is equipped with computer terminals, printed materials (current, periodicals, bound journal volumes, reference texts) and has access to Medline, the Internet andvarious other online drug and medical references.

The center maintains subscriptions to nationally recognized journals and texts of Pharmacy and Medicine.

Direct access to computerized on-line data searching, CD ROM databases and the World Wide Web are also available. (Table 1)

2.Staff, Student and Time

One full-time Director, one full-time Resident and six pharmacy students form the staff at the drug information center. This center also serves as a training site for undergraduate and postgraduate study in Pharmacy.

Drug information requests may be initiated in person, by phone, fax, e-mail or by mail. The center is accessible by telephone 24 hours a day.

1.Service activities

2.The staff answers questions on drug related matters, particularly to those related to safety of drug.

The doctors, Pharmacists and patients could visit the center in person to get information.

The literature searches are provided free of charge to all hospital faculty, clinicians, and pharmacy staff for patient specific issues and for research as well as teaching activities.

Those services, which are not related to the activities of the university are charged with a fee. The reimbursements for services are requested from organizations such as law firms, pharmaceutical companies and marketing firms.

The center is accessible to undergraduate or graduate students working on special projects or patient care activities but does not provide services for students working on class assignments or preparing for tests.

Since one of its aims is to promote physician-pharmacist-patient relationships it does not advertiseto the lay public.

General information is provided to patients for immediate information needed but they are strongly urged to consult with their treating physician.

The center also provides written information in the form of articles, news-letters and journal columns to encourage and inform health professionals on rational drug therapy.

An adverse drug reaction (ADR) monitoring and reporting program is in place which provides guidance for the monitoring, detection, reporting and evaluations of ADRs in the hospital. It also promotes ADR awareness and information dissemination to the medical, nursing and pharmacy staff. The data generated is used by the Pharmacy and Therapeutics Committee to ensure drug safety.

The center also participates in the ADR reporting program of Food & Drugs

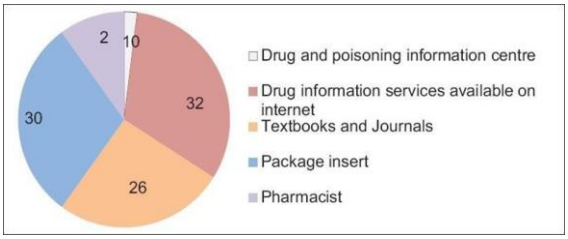
Administration (FDA) and has 'The Product Problem Reporting' system to ensure drug safety by providing guidance in the event of a defect in the quality of drugs (for example: color change in tablet or particulate matter in infusion fluid).

Evaluation Of Performance

Analyzing the results of the consults volume according to the request types, it was found that the most common request types were for general information about a drug, its identity, drug interaction or therapeutic use.

1.Statistics Report

In India, the Karnataka State Pharmacy Council established its Drug Information Center inAugust1997 to disseminate unbiased drug information to healthcare professionals. According to their performance, the center received 1002 queries for the period from



10.CONCLUSION

DIS is well advanced in developed countries like the United States and United Kingdom, but in developing countries, it is still a new concept. Lack of information is one of the major causes of irrational use of drugs leading to therapeutic failure and adverse drug reactions. It is difficult for any healthcare provider to be updated with increasing therapeutic and information explosion, to choose appropriate drug and to provide appropriate drug information to the patients. In the era of "evidence based medicine", the valuable role of DICs cannot be ignored. Therefore, more awareness program should be held frequently to promote and encourage the full utilization of the services.

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