RESEARCH ARTICLE

Development of "Drug Information Cards" - An Information Tool for Health Care Professionals

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ABSTRACT

To select and develop a Master List of drugs with reference to Tamil Nadu Medical Services Corporation (TNMSC) Essential Drug List (2011 – 12). To collect the Drug Information of the selected drugs from various standard authentic resources (mentioned in the source of data) and perform its validation. To design a sample Drug Card pattern according to the drug information collected. To incorporate and compile the drug cards. The essential drug list (2011-12) was obtained from the warehouse of the TNMSC office at Ooty and the drugs were segregated from the other contents of the essential drug list (2011- 2012). The content of the drug card was decided after thorough discussion with the guide. The contents of the drug cards included: Generic Name, Pharmacological and Therapeutic Classification, FDA Pregnancy Categories, Dosage Forms, Pharmacokinetics, Indications & Doses, Adverse Drug Reactions, Drug Interactions, Contraindications & Precautions and Notes. Various secondary & tertiary resources were used for collecting information on each drug. There were about 166 drugs under 22 therapeutic classes given in essential drug list of TNMSC (2011-12) after omitting the existence of drug appearing in more than one class. About 38.5 % secondary and61.5% tertiary resources were used in the process of developing these 'Drug Cards'. Apart from the TNMSC essential drug list 5 more drugs were added in the drug cards, since these drugs were prescribed frequently in the Government Headquarters Hospital, Ootacamund. Drug Information Cards for about 166 drugs were developed exclusively for the drugs mentioned in TNMSC essential drug list (2011 – 2012) from various authentic sources, as there is a need for the ready reference of these drugs in daily hospital ward rounds by the health care professionals. A future aspect in developing drug cards as per NLEM will be initiated.

KEYWORDS

Drug Cards, Health Care Professionals, Drug Information, Drug Flash Cards

INTRODUCTION

The provision of drug information is among the most fundamental responsibilities of pharmacists. The information may be either patient-specific or related to a group of patients, such as in the development of a therapeutic guideline, co-ordination of an adverse drug event reporting and analysis program, replication of an electronic newsletter, or updating a website.

The term drug information may have different meanings to different people depending on the context in which it is used. If asked to define this

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term, one could describe it as information in a reference or verbalized by an individual that pertains to medications. In many cases, individuals put this term in different contexts by associating it with other words that include:

- Specialist/ Practitioner/ Pharmacist/ Provider
- Centre/ Service/ Practice
- Functions/ Skills

The first group of words implies a specific individual, the second group implies a place, and the third implies activities and abilities of individuals. The term "Drug Information" will be used in these different contexts to describe the beginnings and evolution of this area of practice. Relative to current practice, the term medication information is used in place of drug information to convey the management and use of information on medication therapy and to signify the broader role that all pharmacists take in information provision.

Drug Informatics is another term used to describe the evolving roles of the medication information specialist. Drug Informatics emphasizes the use of technology as an integral tool in effectively organizing, analyzing, managing, and communicating information on medication use in patients.[1]

History of Drug Information

The term Drug Information arose in the early 1960s when used in conjunction with the word center and specialist. In 1962, the first drug information center was opened at the University of Kentucky Medical Center. An area separated from the pharmacy was dedicated to provide drug information. The center was to be "a source of selected, comprehensive drug information for staff physicians and dentists to evaluate and compare drugs" as well as provide for the drug information needs of nurses. An important role was to be a resource for the evaluation of adverse drug reactions.[2]

Several other drug information centers were established shortly thereafter. Different approaches to providing drug information services included decentralizing pharmacists in the hospital, offering a clinical consultation service, and providing services for a geographic area through a regional center. The first formal survey, conducted in 1973, identified 54 pharmacists – operated centers in the United States.[3]

To develop some perspective for the reader on why the development of drug information centers and specialist was important, consider 4 of the 15 summary points in a congressional review of a survey by the National Library of Medicine on The Nature and Magnitude of Drug Literature, published in 1963.

- "Drug Literature is vast and complex. The very problem of defining what constitutes the literature is difficult."
- "Drug Literature is growing rapidly in size. It is also increasingly complex, i.e., interdisciplinary and interprofessional in nature. Thus, drug information 'sprawls across' many professional journals of the most varied types."
- "Literature on clinical experience with drugs is sizable and is growing. Its effective use by the practitioner offers many difficulties."
- "Competent evaluation of masses of drug information is particularly necessary."[4]

Interestingly, these statements still seem applicable even today when given the figures that in 2008, PubMed, the most widely used service for biomedical information in the world, included over 18 million citations from over 5300 journals from MEDLINE and other Life Science journals.[5] This number does not consider the 17, 000 text books published annually in the biomedical field.[6] Training in computer and information technology was considered one of the 5 core areas of focus for health professionals education in an Institute of Medicine report published in April 2003. It is also one of the primary objectives identified by the American Society of Health-System Pharmacist (ASHP) to improve the practice of pharmacy in the health systems.[7] Listed in the ASHP 2015 initiatives is to "increase the extent to which health – system pharmacist actively apply evidence based

methods to the improvement of medication therapy".[8]

Evolution

It is useful to look at the evolution of drug information practice from the perspective of drug information centers and of practicing pharmacists. In 2004, one report describes the decline in the number of drug information centers nationally, with a number of drug information pharmacists and other personnel being the lowest in 30 years.[9–11]

In this survey, 151 institutions were identified as having an organized drug information center, which was defined as "a center that regularly accepts a broad scope of requests from health care professionals, regardless of the location or affiliation of those professionals". The mailing list was compiled from several sources (e.g. previously published directory, the Drug Topics Red Book list DICs).[10] A total of 81 centers returned a completed survey. Another source of drug information center locations, the 2008 Physician's Desk Reference, lists a total of 100 centers nationally. Calculating accurate numbers is difficult. The centers are identified for these 2 sources through various listings that have developed over the years, but no agency or organization is responsible for maintaining a list.[12]

Drug Information Resources

The quantity of drug information and medical literature available is growing at an astounding rate. The technology by which this information can be accessed is also improving exponentially. The introduction of smartphones & internet resources has radically changed the methods and technology by which information is accessed, but not the process of providing drug information.

There are 3 types of resources from which drug information can be obtained.

- Tertiary Resource
- Secondary Resource
- Primary Resource

Generally the best method to find information

includes a step wise approach moving first through tertiary (e.g.: textbooks, full-text databases, review articles), then secondary (e.g.: indexing or abstracting service), and finally primary (e.g.: clinical studies) resources.

The tertiary resources will provide the practitioner with general information needed to familiarize the reader with the topic. If the information obtained in the tertiary resources is not recent or comprehensive enough, a secondary database may be employed to direct the reader to review or primary literature articles that may provide more insight on the topic. Primary literature often provides the most recent and in-depth information about a topic, and allows the reader to analyze and critique the study methodology to determine if the conclusions are valid.[1] Some examples of the drug information resources are:

Table 1: Examples of Drug Information Resources[1]

Type of Resource	Examples
Tertiary	AHFS Drug Information, Clinical Pharmacology, Micromedex Health Care Evidence, Drug Facts & Comparisons, Drug Information Handbook, Handbook of Non – Prescription Drugs, Physicians' Desk Reference, USP Dictionary, Meyler's Side Effects of Drugs, American Drug Index, RED Book, Merck Index, USP/ NF, Natural Medicine Comprehensive Database, etc.
Secondary	Biological Abstracts/ BIOSIS Previews, Cancerlit, Cinahl, Cochrane Library, Embase, Google Scholar, Journal Watch, Lexisnexis, Medline, IDIS, etc.
Primary	Annals of Internal Medicine, Clinical Pharmacology and Therapeutics, Journal of American Medical Association, American Journal of Hospital Pharmacy, etc.

Table 2: List of Drug Information Centers in India[14]

Independent Drug Information Center	Hospital attached Drug Information Center with Clinical Services
CDMU Documentation Centre, Kolkata, West Bengal	Christian Medical College Hospital, Vellore, Tamil Nadu
Maharashtra State Pharmacy Council, Maharashtra	Drug Information Center, Victoria Hospital, Bangalore, Karnataka
Andhra Pradesh State Pharmacy Council, Andhra Pradesh	Karnataka Drug Information Center (KSPC), Karnataka
Karnataka State Pharmacy Council (KSPC), Bangalore, Karnataka	Bowring & Lady Curzon Hospital, Bangalore, Karnataka
JSS College of Pharmacy, Ootacamund, Tamil Nadu	Department of Pharmacy Practice, Chidambaram, Tamil Nadu
Tamil Nadu Pharma Information Center, Chennai, Tamil Nadu	Department of Pharmacy Practice, National Institute of Pharmaceutical Education & Research (NIPER), Chandigarh
	Jawaharlal Nehru Medical College Hospital (JNMSC), Belgaum, Karnataka
	JSS College of Pharmacy, Mysore, Karnataka
	JSS College of Pharmacy, Ootacamund, Tamil Nadu
	NRS Medical College & Hospital, Kolkata, West Bengal

The pharmacy students getting clinical pharmacy training and also providing pharmaceutical care services at Government District Headquarters Hospital, Ootacamund frequently come across the drugs enlisted in TNMSC's essential drug list. But there is no ready reference available exclusively for the drugs in TNMSC's essential drug list.

Health care professionals & the students participating in the ward rounds at hospital need to depend upon more than one resource to get information for a single drug. It is not feasible to carry all the books / resources during the ward rounds and it is time consuming to get information from different resources. Hence, to overcome these problems, we felt the need of designing the 'Drug Cards' to use as a concise & ready reference for the drugs enlisted in the current (2011-12) TNMSC essential drug list.

Drug Information Cards / Flash Cards

To provide the comprehensive information about the drugs, the 'Drug Information Cards' or otherwise known as 'Flash Cards' are being used by the health care professionals and students in developed countries.

These cards contain the name and class of the drug, a brief description, its indications, contraindications, precautions, common dosages, and routes of administration, etc. Only significant information about the drugs will be presented in these cards, not everyone in the drug information books. Such cards are available commercially both in the form of paper pack and electronic versions in developed countries. But the list of drugs available in such cards is different from what we use in day to day practice in our health care set up.[16]

The Department of Pharmacy Practice, JSS College of Pharmacy, Ootacamund is attached with the Government District Head Quarters Hospital, Ootacamund, a 420 bedded secondary care hospital where clinical pharmacy training is given to the pharmacy students and various pharmaceutical care services are also rendered. Tamil Nadu Medical Services Corporation (TNMSC) releases the essential drug list that is

used in Government hospitals at the state of Tamil Nadu. Since the pharmacy students and health care professionals handle the drugs listed by TNMSC, we felt the need for a comprehensive drug information resource tailor made for the TNMSC list of drugs. 'Drug Information Cards / Flash Cards' will be much useful format for the daily practice during ward rounds and providing patient care services.

In this background, we made an attempt to prepare the 'Drug Cards' as an information resource as per the TNMSC drug list by using standard secondary and tertiary drug information resources available.

Objectives

- To select and develop a Master List of drugs with reference to Tamil Nadu Medical Services Corporation (TNMSC) Essential Drug List (2011 – 12).

- To collect the Drug Information of the selected drugs from various standard authentic resources (mentioned in the source of data) and perform its validation.

- To design a sample Drug Card pattern according to the drug information collected.

- To incorporate and compile the drug cards.

MATERIAL AND METHODS

The essential drug list (2011-12) was obtained from the warehouse of the TNMSC office at Ootacamund and the drugs were segregated from the other contents of the book.

Components of Drug Cards

The individual drug entries were prepared to provide detailed information on all drugs in current TNMSC essential drug list that are being used at Government District Head Quarter Hospital, Ootacamund.

The components of drug cards were generic drug entries, pharmacological & therapeutic classification, FDA pregnancy categories, dosage forms, pharmacokinetic parameters, indications & dosages, adverse drug reactions, drug interactions, contraindications & precautions and notes.

Format of Drug Card

Pharmacological Classification	
Pharmacotherapeutic Classification	
Pregnancy Risk Category	
Pharmacokinetic Parameters	**Vd:** L/ kg; **t½:** h; **Cl:** ml/min.
Dosage Form	
Indications & Dose	
Adverse Drug Reaction	
Drug Interactions	
Notes	

Table 3: Resources used to collect Information

Type of Resource	Resource Used
Tertiary	AHFS Drug Information (American Hospital Formulary Services), 8th Edition.
	Pharmacist Drug Handbook, by ASHP (American Society of Health – System Pharmacist).
	Martindale – The Complete Drug Reference, 2004.
	Pediatric Pharmacopoeia, Royal Children's Hospital Melbourne, 13th Edition.
Secondary	PubMed
	CIMS
	http://www.drugs.com
	http://www.rxlist.com
	http://www.drugbank.ca
	MEDLINE
Primary	Nil

RESULTS

There are about 166 drugs under 22 therapeutic classes given in essential drug list of TNMSC (2011-12) after omitting the existence of drug name in more than one class. The drugs in table 4 exist in more than 1 therapeutic class.

Table 4: Repeated Drugs in different Therapeutic Class

Sl. No.	Drug Name	Therapeutic Class
1	Bupivacaine	Anesthetics
		Pre-Operative Medication
2	Povidone Iodine	Antifungal
		Dermatological Drugs
3	Valethamate	Antiemetics
		Oxytocics

About 61.5% tertiary, 38.5 % secondary and 0% primary resources were used in the process of making this 'Drug Information Cards' (Figure. 1).
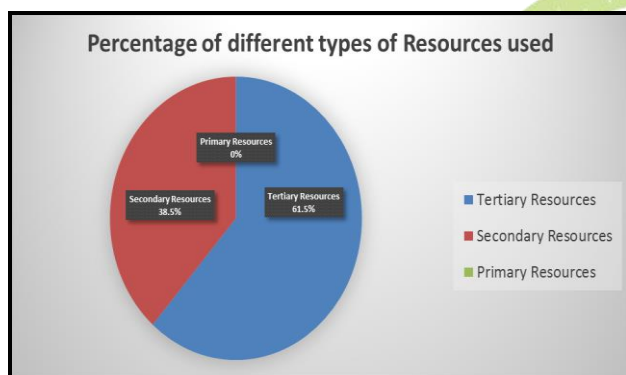

Figure 1: Different types of Resources used

Apart from the TNMSC essential drug list 5 more drugs were added in the drug cards, since these drugs were prescribed frequently in the Government Headquarters Hospital, Ootacamund. They are also used as alternatives for other drugs.

Table 5: Drugs not included in TNMSC

Sl. No.	Drugs	Therapeutic Class
1	Azelastine	Antiallergics & drug used in Anaphylaxis
2	Pantoprazole	Antacids & Antiulcer Drugs
3	Losartan	Cardiovascular Drugs
4	Hydrochlorthiazide	Diuretics
5	Glimipiride	Hormones & Other Endocrine Drugs

Out of 166 drugs, pharmacokinetic parameters of 6 drugs were not available, since it's not readily available in secondary & tertiary resources. In future it will be obtained from primary resources. The list of drugs for which pharmacokinetic parameters were not available are:

- Povidone Iodine
- Gamma Benzene Hexachloride
- Liquid Paraffin
- Folic Acid
- Magnesium Sulphate
- Sodium Bicarbonate

DISCUSSIONS

The drugs mentioned in the TNMSC (Tamil Nadu Medical Services Corporation) were the major interest of study. The total number of drugs for which drug cards were prepared is 166. These cards include the generic name of the drug, which according to WHO guidelines should be known to the physicians. The pregnancy risk category is included to have knowledge of the teratogenicity of the drugs. Many tertiary resources such as drug hand books do not include the pharmacokinetic parameters of the drugs. Moreover every clinical pharmacist should know the pharmacokinetic parameters before making clinical interventions. Many drug information sources do not include system wise adverse drug reactions, so an attempt was made to group the adverse drug reactions system wise. Pharmacological classification & Therapeutical classification was done to categorize the drugs pharmacologically & therapeutically. In this study, tertiary source has been used more to collect the information for the drugs. Tertiary was preferred more because books like AHFS, Martindale, etc. are more authentic.

CONCLUSION

The drug cards are made exclusively for the drugs mentioned in TNMSC (Tamil Nadu

Medical Services Corporation) book as there is a need for the ready reference of these drugs in daily hospital ward rounds by the health care professionals. A future aspect in developing drug cards as per NLEM will be initiated.

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