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ASSESSMENT OF DRUG INFORMATION SERVICE OF ADDIS ABABA UNIVERSITY DRUG INFORMATION CENTER

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hool of Public Health.

By: Yetimgeta Melkam (Bsc.)

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ASSESSMENT OF DRUG INFORMATION SERVICE OF ADDIS ABABA UNIVERSITY DRUG INFORMATION CENTER

By: Yetimgeta Melkamu (Bsc.)

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DEDICATION

This work is dedicated to my beloved son Eyobed Yetimgeta and my families whose encouragement and help gave me the strength to successfully finish this Masters in Health Informatics course.

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ACRONYMS

AAU	Addis Ababa University
AIDS	Acquired Immuno Deficiency Syndrome
DACA	Drug administration and Control Authority
DI	Drug Information
DIC	Drug Information Center
DIS	Drug Information Service
HIV	Human Immuno Deficiency Virus
M.Sc	Masters of Science
PFSA	Pharmaceutical Fund and Supply Agency
SHPA	Society of Hospital Pharmacists of Australia
SPSS	Statistical Package for Social Sciences
TASH	Tikur Anbessa Specialized Hospital
UK	United Kingdom
US	United States
USA	United State of America
WHO	World Health Organization

ABSTRACT

Background: Drug Information (DI) is the provision of written and/or verbal information or advice about drugs and drug therapy in response to a request from other healthcare providers, organizations, patients or other members of the public. In 2009 Addis Ababa University, school of pharmacy established the first role model DIC in the premises of Tikur Anbesa Specialized hospital.

Objective: To assess drug information center service utilization by healthcare professionals and to evaluate the performance of the Drug Information Center of Tikur Anbesa Specialized hospital through a retrospective document review of drug related enquiries and users' perspective

Method: A Cross sectional descriptive study using both qualitative and quantitative study methods was conducted in Tikur Anbesa Specialized Hospital, located in Addis Ababa from September 2011 to and January 2012. The sample size was determined by using single population proportion formula which is 422 including 10% of a non responses rate. Since the total population is less than 10,000 a population correction formula was used which make the sample size to be 285.

The quantitative data collection was carried out in two steps. First, a retrospective evaluation of the documented drug information requests and answers forms maintained in the drug information documentation files of the center. The evaluation was based on the parameters such as professional status of the enquirer, amount of queries received, places where query comes, mode of receipt of query, purpose of enquiry, time frame to reply, category of question and reference used. Secondly, the service provided was assessed from receivers' perspective through questionnaire comprising questions pertaining to awareness, utilization, and satisfaction level. The data collection tool contained four parts. The first and second part was designed to get socio-demographic information and awareness about DIC of AAU, respectively. Part three and four had questions related to service utilization and level of satisfaction on the service provided respectively. For the qualitative part of the study, data from the interview was collected directly by taking field notes and transformating them to narrative types of report.

Result: Of the total of 285 sampled health professionals 247 have responded to this study yielding a response rate of 87%. One hundred twenty seven (51.4%) of the health professionals have ever heard about the drug information center found in the premises of TASH. Of those who have heard about DIC, 58(45.6%) had history of at least one type of service utilization provided by the center. Regarding to their satisfaction level, 153 (62%) reported a high service (information) satisfaction level from the DIC. Retrospective analysis of the documented query also showed that the Drug Information Center of AAU received a total of 374 different types of queries during the period of May 2009 to August 2011 out of which 65.2 % of the queries (drug general information, drug availability on the market, adverse drug reaction, drug dosage ,etc) were received from governmental hospitals and health centers.

Conclusion: over all nearly half of the respondents were unaware of the existence of the services being provided by the drug information center of TASH. The service utilization practice among those who were aware of the drug information center was also found low. However, majority of the service users were satisfied by the service provided.

Recommendation: The Drug Information center has to work more on awareness creation among healthcare professionals by distributing materials such as stickers, posters and brochures. Moreover, the center has to establish its own website to post information about their center and services, provide links to related sites considered to be of acceptable quality, and as a convenient means of receiving and answering drug information questions.

1. INTRODUCTION

1.1 Background

Access to independent information is fundamental for the rational and effective use of drugs. Information must be available in a format suitable for health practitioners and relevant to current clinical practice (1). Drug Information (DI) is the provision of written and/or verbal information or advice about drugs and drug therapy in response to a request from other healthcare providers, organizations, committees, patients or members of the public. This may relate to specific patient or consist of general information promoting the safe and effective use of medications (2). World Health Organization (WHO) recognizes independent drug information centers as a core component of national programs to promote the rational use of drugs (3).

All countries require drug information support to optimize the use of pharmaceuticals. Internationally, there are many disparities in access to drugs and the knowledge needed to use them appropriately. There are significant deficiencies in the use of drugs even in countries with well developed regulatory authorities, local manufacture and sophisticated health delivery systems. In most countries the pharmaceutical market encourages the development and sale of drugs for profit. While this model has created many innovative therapies and efficient production processes its output does not necessarily correspond with overall health needs. For example, the inappropriate use of antimicrobials can lead to resistance and expenditure can be wasted on drugs to control diseases which could be better controlled by improvements in diet or lifestyle. Poor adherence to prescribed therapy is a major problem, particularly in chronic conditions. There is also a substantial use of herbal and traditional remedies in many countries. This raises issues of efficacy and safety especially when these therapies are combined with conventional drugs (4).

The supply of drugs to a community must be balanced by access to impartial information which supports national healthcare priorities. DI is essential to the use of drugs. Inappropriate use is a waste of precious resources and increases the risk of avoidable drug-related toxicity. Governments should recognize this requirement and provide financial support for organizations which offer independent drug information to healthcare workers and the general community (2).

Up to now, the number of novel drugs and dosage forms has been increasingly discovered and available worldwide, leading to the challenging and difficult task for the selection and use of current drugs and also drug delivery systems (5). Lack of unbiased drug information and lack of time are some factors that makes the health care professionals 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 (6). Drug Information Centers (DICs) support the functions of health care professionals to deliver high quality drug use. They focus resources and specialists staff to answer complex questions, provide education and training in drug information practices, and assists with other public health care initiatives (1).

Understanding the need to provide organized drug information to health care professionals as well as consumers, the AAU school of Pharmacy established the first role model DIC in the premises of Medical Faculty of AAU in 2009. The aim of this study is to evaluate the various drug information queries received, and the users' satisfactions on the service provide by the center for over a period of two years.

1.2 Statement of the problem

At present, there are more than 100,000 drug formulations Worldwide, For the provision of medicines information service in a paper or electronic format to consumers and health care professionals, it is essential to have the resources of unbiased drug information (8). The conventional method of obtaining drug information is through the medical representatives and product literature provided by the manufacturers, which may be incomplete or biased (9). Drugs occupy an important role in the health system and when appropriately utilized it is the most frequently cost effective therapeutic resource. However, situation such as products low quality, prescription mistakes and lack of patient orientation respecting to treatment could conduct to medication irrational use. Adverse effects, limited efficacy and pharmaco dependence are some of the consequence of this irrational use. For instance it is estimated that one third of half of all medicines are wasted with obvious negative impacts on the economy and on health (10).

Health care professionals are expected to manage a wide range of medical conditions for large number of patients. They usually use a variety of information resources to support their personal knowledge base. However, this accumulated knowledge is not enough to answer all questions arising during routine medical care of patient. Furthermore, when seeking information beyond

personal knowledge, health care professionals should resort to DICs (11). DICs can play an indispensable role in the promotion of rational drug concept and improvement of therapeutic outcomes by dissemination of unbiased and evidence based drug information.

Improper functioning of the drug information centre may contribute to poor patient outcomes in terms of health and economics due to provision of biased and limited drug information (12). To maintain consistency in the service provided and for better functioning of the centre, it is important to evaluate the functioning and the services provided by the centre at constant intervals (13). In addition, periodic evaluation of the drug information center can be beneficial in better dissemination of the existing medicine safety information, to ensure quality monitoring and enhance development and problem solving. Similarly, analyzing various drug information queries received by the center will help to assess the services provided and the extent of utilization. This will help to make necessary modification on the weakness and to preserve the strength. Therefore, we are interested to assess the overall performance of the DIC of AAU.

1.3 Rationale of the study

To find useful information about rational drug use in a timely efficient manner, it is important to know where to get appropriate information. The enormous drug products available worldwide and the complexity of current drug literature made the selection and use of correct drugs in appropriate manner is a challenging and difficult task. This in turn, motivates the health care practitioners and providers to seek new types of services from pharmacists who are specialists in the field of rational therapeutics (14). Understanding the need to provide organized drug information to health care professionals as well as consumers, the AAU, School of Pharmacy, established the first role model DIC in the premises of TASH in May, 2009 (7). But no assessment is made on its performance so far. Therefore, the current study attempts to present the overall performance of the DIC. Information obtained from this study could help to know the strength and drawbacks of the center in order to take corrective measures and improve the service for the future. Furthermore, the current study tried to answer the following research questions:

- What is the awareness of health professionals on drug information center located in Tikur Anbessa Specialized Hospital?
- What does service utilization pattern of health professionals look like towards the drug information center?
- Are health professionals satisfied on the service they get from the DIC?
- What does the drug information center performance look like?

2. LITERATURE REVIEW

2.1 Drug Information Service

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 [15]. 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 [8]. It is not humanly possible to remember such vast information on drugs. It has been estimated that each year, about 20,000 biomedical journals and 17,000 biomedical text books are published [16]. Hence, it is very important to retrieve specific unbiased drug information.

DICs are important institutions in health care system in promoting and providing technical and scientific information about drugs in an objective and timely manner. The WHO concept considers the availability of independent drug information sources as an inevitable part of the state drug policy. WHO, as well as European Union promote the establishment of independent DICs in their member states [17].

In 1962, in the United states , at the University of Kentucky Medical Centre, the first drug information centre was started which was intended to be utilized as a source of accurate, unbiased, selected, comprehensive drug information to cater to the needs of the healthcare team [18]. In Australia and the United Kingdom (UK), the first drug information centers were established in 1968 at the Royal Melbourne hospital, Victoria and in 1969 at the London hospital respectively [19]. In India, Rosemary Sharp, a missionary from UK, started the first drug information centre at Christian Medical College, Vellore in the early 1970s. This centre provides information on drugs to doctors, pharmacists, nurses and other personnel of various departments. Several other drug information centers were established in other places such as Canada, Zimbabwe, Sweden, Newziland , Hong Kong ,Thailand, etc. thereafter [20].

The School of Pharmacy, AAU, established the first role model DIC in Ethiopia in 2009 with support from the World Bank, US president's Emergency Plan for AIDS Relief, Howard

University and the American International Health Alliance's HIV/AIDS Twinning Center. The center is equipped with the latest drug information databases, reference books and other evidence-based resources necessary to provide health care professionals with unbiased, up-to-date information that can increase their knowledge and improve patient care (7).

Vijayakumer et al, in a study entitled 'Opinion on Drug Information Service in a Multi-Specialty Teaching Hospital' evaluated the various drug information queries received and the service provided by pharmacy practice department of Konaseema Institute of Medical Science. They have described that out 208 queries received, major 56(26.9%) from male medical ward. Maximum 82(39.4%) queries were from the physicians and seventy three (35%) of the queries were about the recent advances and the updating of information. It was also found in this study that mostly the mode of request was during ward rounds 85(40.9%).Most of the queries 126 (60.6%) were answered by written or print out format. Majority of the queries 195(93.8%) were answered directly to the enquirers through direct access and most of the queries 86(41.3%) were answered through books in the departments (6).

Result of the study 'Assessment and evaluation of drug information services provided in south Indian teaching hospital' by Beena G and Padma G, showed that most of the beneficiaries of the service were physicians(82%) and postgraduate students(16%) of the department of medicine. The analysis of the feedback questionnaires of this study also revealed most of the enquirers (92.5%) utilized the drug information service regularly and appreciated the quality of services provided by the center. Queries were received during ward rounds (70%) and also through telephone (20%), internet (2%) and by direct access (8%).The categories of questions asked were about dosage and administration (27%) and adverse reaction (24%), drug therapy (15%) and others (24).

Pradham S. evaluated the performance of the drug information center at the University of Kansas Medical Center, Kansas City, USA. A quantitative estimation was made on the service rendered over a period of 4 years (1994-97) regarding the consult volume, their monthly distribution, types of requests and requestors and their sites of location. In this study it was found that the center was well equipped and the performance for the above mentioned period showed a steady increase in the request volume as follows: 5060(1994),5609(1995),7299(1996) and 7848(1997).

All types of requestors , namely the pharmacist, doctors, nurses, patients and others , have increased their consultations during this period. More than half the requests in 1997 were made by pharmacists followed by physicians whose requests were approximately one-eighth of the consult volume. The study also revealed the center was commonly asked to provide general information about drugs and had the unique feature of community participation (18).

"The analysis of the performance of this center also revealed that it answered more than 5000 drug information calls in 1994 and that there is a steady increase in the number of calls by 55.1% in 1997. According to European survey (1992), the drug information centers are classified into three groups : Group I received between 0 and 2000 queries, Group II between 2500 and 5000 and there was only one center in Paris which answered more than 5000 calls in a year and placed in group III. Considering the consult volume , the DIC at Kansas University Medical Center may be placed in a Group III with high performance level, which is steadily increasing every year over a period of 4 years from 1994 to 1997" (18)

Ibrahim A. and Awang R. conducted a survey to measure user satisfaction with services provided by a Ministry of Health Drug Information Center in Sudan. Four hundred and twenty-three subjects were recruited from center records using a systematic random sampling technique. Subjects who consented were interviewed by telephone using a specially designed semi-structured questionnaire and descriptive as well as comparative analyses were carried out. It was found in the study majority of users surveyed (89.6%) had called the center from within Khartoum State and 10.4% of users had called from other states. Of the enquiries, 36.1% were from pharmacists, 29.5% from physicians, and 22.3% from laypersons. The vast majority (93.1%) of respondents were educated to degree level or higher. Approximately one fifth, one half, and one third of the users surveyed had consulted the center 5 times, 2–5 times, and once, respectively. More than 90% of users rated the services provided as good to excellent and 94.7% declared their probable intention to continue utilizing the center in the future. They have concluded the center succeeded in satisfying and retaining its users by providing an acceptable quality of service (30).

Marika K. et al, conducted a study entitled 'Utilization of a community pharmacy-operated national drug information call center in Finland'. They analyzed and described the utilization of

the center by focusing on calls concerning prescription drugs. Data were recorded for 2196 calls, 56% of which were drug-related. Of the drug-related calls, 79% were related to prescription drugs. The majority (83%) of these calls were therapeutic or pharmaceutical inquiries, with 26% concerning costs and reimbursements, 14% interactions, 14% dosages, and 11% adverse effects. Nervous system drugs (Anatomical Therapeutic Chemical [ATC] classification N), anti-infectives (J), and musculoskeletal drugs (M) accounted for 20%, 18%, and 13% of the calls, respectively. Nonsteroidal anti-inflammatory drugs (NSAID) (9% of the calls), antidepressants (6%), and penicillin (5%) were the most often inquired about ATC-subgroups. A majority (82%) of the callers were estimated to be between 20 and 60 years of age. The study concluded that concluded that consumers appear to have multiple unmet drug information needs (31).

2.2 Importance of drug information

Drug information is the process of providing information on the safe and effective use of therapeutic and diagnostic pharmaceuticals. The use of medicines has been motive of worry to society. It is estimated that between one third and a half of medicines used all over the world are wasted, with impacts on economy and health (17) .The introduction of new medications and the advancement in the knowledge respecting the already utilized ones has been accompanied by an increase in the quantity and complexity of information (15). Drug information is a key to preventing medication errors. Accurate and timely drug information to health care professionals is an important mechanism to promote safe and effective drug therapy (21). Besides, access to clinically relevant, up-to-date, user specific, independent, objective and unbiased drug information is essential for appropriate drug use which leads to enhanced quality of patient care and improve patient outcome (8).

Different levels of drug information are required by healthcare providers and recipients. Medical practitioners and pharmacists need access to the information required by regulatory authorities for new drugs. Healthcare workers who have limited prescribing authority require a subset of this information together with protocols for diagnosis and treatment. All health providers require information resources for therapeutic decision support, implementation and monitoring of outcomes. People receiving medication need instructions for use of prescribed and over-the-counter medicines. Additional information may be necessary for high-risk groups (e.g. pediatrics, geriatrics, pregnancy and breastfeeding) and in some diseases (e.g. diabetes, kidney

and liver dysfunction). Strategies to promote adherence include once-daily dosing, and drug selection and dosing to minimize adverse effects [4].

2.3 Sources of drug information

Drug information resources readily available at the point of care are increasingly becoming standard of practice. Access to drug information resources in health care systems and hospitals are considered a basic feature. These resources are typically found as a print, computerized software or online database present throughout various locations in the health care facility, including pharmacies and drug information centers. Although basic information about drugs is obtained through training in pharmacy profession, additional knowledge can be gained from various sources [12].

Sources of drug information are divided into four classes. These are: primary, secondary, tertiary and internet source. Primary resources are considered the raw material created and written by an individual, a team, or organization. Once published, this information serves as the basis for secondary sources, which professionally index such studies into a database. Tertiary sources are a compilation of the primary and secondary sources and tend to be factual in nature. Internet source are many biomedical and journal databases that are available free on the internet catering to various needs ranging from multispecialty databases (Medline and PubMed) to retrieval of specific biomedical literatures that focus on countries (IndMed), regions (Caribbean: Lilac), disease entities (cancer), specialties (PsychLit), evidence- based medicine (Bandolier) and randomized controlled trials (Cochrane) [16].

2.4 Approach to provide Drug Information

The provision of drug information can be initiated by the pharmacist or requested by other health care professionals, patients and their family members, or the general public. The process is similar, regardless of how a medication information question is generated (e.g., by the pharmacist or by another health professional) or the context in which the information will be used (e.g., in a newsletter or for solving a patient-specific problem) [2]. The pharmacist must not only accumulate and organize the literature but also objectively evaluate and apply the information from the literature to a particular patient or situation [22].

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 [12]. A systematic method can be outlined as follows: [23].

- **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 are requestor's name, location and affiliation (institution or practice), resources that the requestor already consulted, whether the request is patient specific or academics, patient diagnosis other medications and pertinent medical information, urgency of request (i.e. negotiate the time response). 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 includes conflicting 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.

- **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.

2.5 Requirements for running drug information Centers

DIC is defined by 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 (24).

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 fulfill minimum requirements regarding resources, facilities, organization and budget (25).

2.6 Types of Drug information centers

DIC can be attached to a hospital which is more beneficial than industry and community based (21).

Hospital based DIC: - are most often located in hospitals, usually in the pharmacy departments. The hospital-based DIC perform various activities including answering the in-house call, assist in formulary decision, participate in drug use evaluation, coordinate adverse drug reaction

reporting, publishing newsletter, provide in service education, assist in Pharmacy and Therapeutic (P&T) committee , oversee investigational drug activity [26].

Industry based DIC: - drug information service can be organized in pharmaceutical industry. With in the area of medical information services, the drug information pharmacists participate in typical type of activities such as answering drug information questions, reporting and monitoring adverse drug reactions, and providing information support to other departments. Pharmacist providing drug information service in pharmaceutical industry may also provide support for individuals responsible for drug formularies or participate in quality improvement efforts within the medication use process. In addition to providing written information on the drug products produced by the manufacturer, there are opportunities to provide additional information at pharmacy and therapeutic committees or state drug use review boards [15].

Community based DIC: One potential provider of this kind of services could be community pharmacies, especially large chains that have the resources to establish and run a drug information center. However, no internationally published studies exist about community pharmacy operated drug information centers [32].

2.7 The DIC of School of Pharmacy, Organization and Services

Medical care today is provided in an increasingly electronic, information reach environment. The vast array of online resources, products and services available suggests that a virtual library of these resources could and should be designed to provide instant answers and real-time solution for almost every conceivable health care information dilemma [15].

Established in May 2009, the School of Pharmacy, Addis Ababa University's Drug Information Center at TASH is a model center of excellence designed to help health and allied professionals and medical educators easily access critical information on medicines pharmacology, and clinical care [7].

With support from the World Bank, US president's Emergency Plan for AIDS Relief, technical assistance from Howard University and the American International Health Alliance's HIV/AIDS Twinning Center, Addis Ababa University, School of Pharmacy established the DIC, equipping it with the latest drug information databases, the necessary references and other evidence-based

resources necessary to provide health care professionals with unbiased, up-to-date information that can expand their knowledge and improve patient care (7).

The DIC envisions becoming a regional center of excellence in the provision of drug information, training, and related research. The DCS's mission is to educate students, stimulate research, help develop health care policy and disseminate medication and health information through practice of evidence-based medicine in a manner that strives for accuracy, completeness, and innovation for the improvement of patient outcomes. To that end, DIC's four key objectives are to: (27).

- Educate pharmacy students to serve as effective providers of medicines information;
- Provide specialized medicines and therapeutics to meet drug information needs of practitioners;
- Promote the practice of evidence-based medicine and rational use of medicines for optimizing patient outcomes; and
- Support drug research through the provision of up-to-date information, as well as exposing knowledge gaps and offering solution for closing them.

The DIC offers core service that fall into the following three categories :(27)

- **Teaching and Training-** the DIC serves as a practice site where pharmacy interns and students develop the hand on skills they need to provide information on drugs to practitioners and patient alike. The center organizes discussions and seminars on current trends in clinical pharmacology and applied therapeutics to keep health care professionals abreast of the latest developments in the medical and pharmaceutical sciences. The center also conducts practitioner assessments and organizes short-term trainings based on identified knowledge gaps and professional development needs.
- **Research-** the DIC supports pharmaceutical and clinical research by creating an environment where relevant information is readily accessible. Center staff also conducts research on drug use and related topics.
- **Information Service-** the DIC responds to queries on drug therapy for particular diseases and special populations, as well as on adverse drug reactions, drug interactions, pharmacodynamics, pharmacokinetics, pharmaco genetics, and the social use of drugs.

Resources available in the center:-

The DIC serves a broad community of health care professionals, including the pharmaceutical industry, health policy makers, academic departments, hospital administrators, researchers, and practicing clinicians by providing access to:

- Drug information databases
- Pharmaceutical and medical journals
- Latest editions of reference books and text books
- Physician and pharmacologist consultants

The DIC publishes periodic newsletters, and drug information alert, distributing these to health care professionals. The center also provides technical support to the TASH's Drug and Therapeutic Committee, helping prepare hospital formularies, standard treatment guidelines, and fulfilling other requests as needed. Queries may be posed via different modalities, including telephone, e-mail, fax or walk in [27].

OBJECTIVES OF THE STUDY

.1 General Objective

The general objective of the study is to assess drug information center service utilization of health professionals and to evaluate the performance of the Drug Information Center of TASH through a retrospective document review of drug related enquiries and users' perspective.

3.2 Specific Objectives

- To assess health professionals' awareness on the Drug Information Center of TASH,
- To assess service utilization of health professionals
- To describe their satisfaction level on the service provided by the center.
- To evaluate performance of the center through a retrospective document review of drug related enquiries.

4. METHODOLOGY

4.1 Study area and period

The study was conducted in Addis Ababa, Tikur Anbesa Specialized Hospital (TASH) between September 2011 and January 2012. TASH is the largest of all Hospitals in Ethiopia that provides a tertiary level medical care and service including a 24 hour emergency medical service. The hospital is administered by Addis Ababa University and also serves as the teaching hospital providing a pre-service training for about 300 medical and health science students and 350 post graduate students every year. It offers diagnosis and treatment for approximately 370,000-400,000 patients annually. The hospital has 800 beds, with 130 specialists, 50 non-teaching doctors and an emergency department with a capacity of managing about 80,000 patients a year [28]. The DIC located in this hospital provides relevant information to health care professionals, Faculty of the medical academia and consumer on evidence-based medicine on their request.

4.2 Study design

Both qualitative and quantitative study methods were used. Quantitative methods used a retrospective data analysis and self administered questionnaire. Qualitative method was also employed through key informant interviews to gather data that were not captured by the quantitative method.

4.3 Source population

The source population includes all health care providers of five major departments of TASH and documented drug information requests and response forms maintained in the drug information documentation files of the center. The staff of DIC was considered as a source population for the qualitative study.

4.4 Study population

Sampled health care providers (Physicians, Pharmacist, Nurses, Druggists) from five major departments of TASH and all documented drug information request and response forms maintained in the drug information documentation files of the center

Inclusion and exclusion criteria

Inclusion criteria

- Those professionals who were working in the hospitals during the study period .

Exclusion criteria

- Those who were not voluntary to participate and health care providers that were on leave during the time of data collection were excluded

4.5 Sample size and sampling procedure

Sample size (n) required for the quantitative study was calculated by using single proportion formula as follows:

$$n = \frac{z\alpha^2/2p\,(1-p)}{d^2}$$

Where: n= required sample size

p= the proportion of service provided by drug information center is assumed to be 50%

Zα/2= the value of Z in SND that corresponds to α level of 0.05= 1.96

D= margin of error between the sample and the population.

$$n = \frac{(1.96)^2\ 0.5(0.5)}{(0.05)^2} = 384$$

Considering a non response rate of 10% the sample size become 422. Since the total population is less than 10,000 a population correction formula was made and the total sample size calculated was 285.

Sampling Procedure

Among departments found in TASH, five departments were purposively selected based on their big size and easier logistical arrangements. Health professionals and workers found in the five major departments were first stratified based on their number (sample size). Secondly, the calculated sample size was proportionally allocated to each department based on the size of professional and worker in each department. Finally, departments were selected using simple random sampling techniques. If a sampled respondent is absent on the date of the survey, a second time visit was done, otherwise the next person was included in the survey. If two consecutive is the same, preferred category were selected, the next different category was taken. Besides, documented drug information requests and response forms maintained in the drug information documentation files of the center was entirely included in the study.

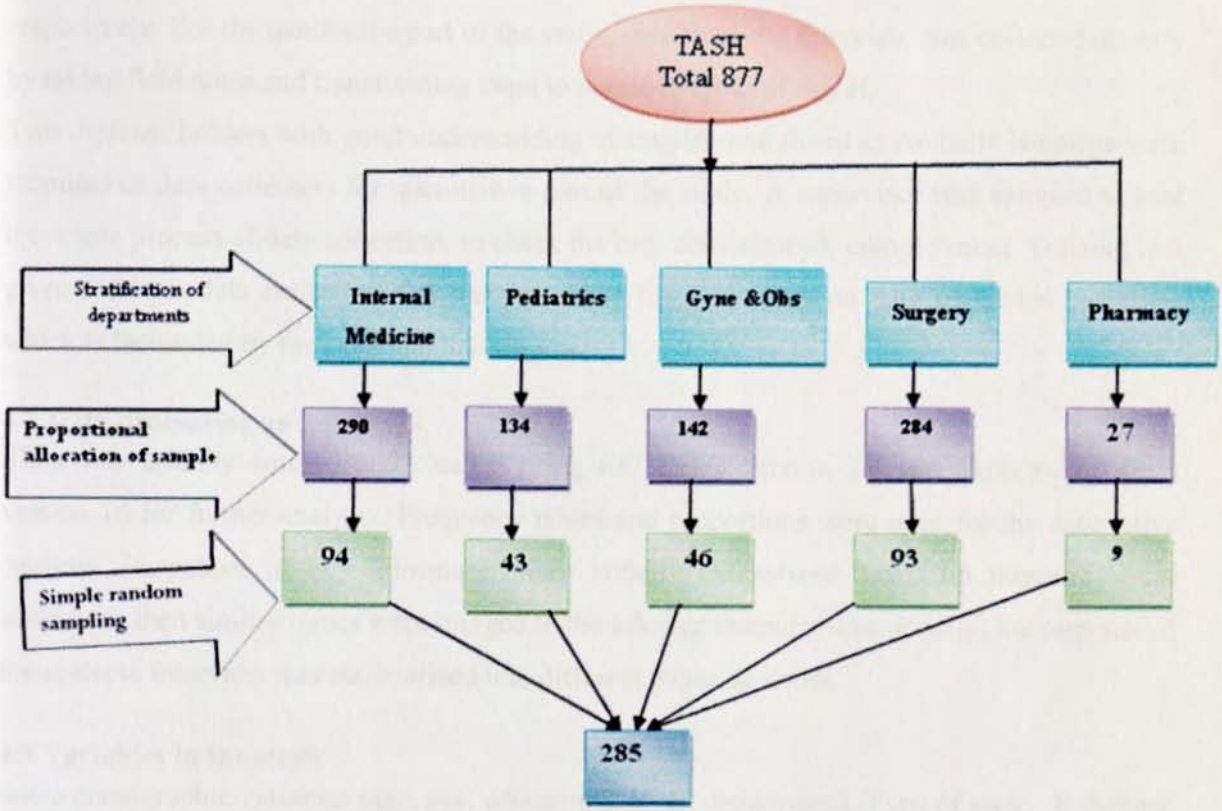


Figure 1: Schematic presentation of sampling procedure, TASH, Addis Ababa, January, 2012

4.6 Data collection procedure

The quantitative data collection was carried out in two steps. First, a retrospective evaluation of the documented drug information requests and answers forms maintained in the drug information documentation files of the center. The evaluation was based on the parameters such as professional status of the enquirer, amount of queries received, places where query comes, mode of receipt of query, purpose of enquiry, time frame to reply, category of question and reference used. Secondly, the service provided was assessed from receivers' perspective through questionnaire comprising questions pertaining to awareness, utilization, and satisfaction level. The data collection tool contained four parts. The first and second part was designed to get socio-demographic information and awareness about DIC of AAU, respectively. Part three and four had questions related to service utilization and level of satisfaction on the service provided

respectively. For the qualitative part of the study, data from the interview was collected directly by taking field notes and transforming them to narrative types of report.

Two diploma holders with good understanding of English and fluent in Amharic language were recruited as data collectors for quantitative part of the study. A supervisor was assigned to lead the whole process of data collection, to check the data consistency& completeness. Training was given for both data collectors and the supervisor for half a day on data collection technique which is facilitated by the principal investigator.

4.7 Data processing and analysis

Data was initially entered and cleaned using EPI INFO version 3.4 and exported to SPSS version 16 for further analysis. Frequency tables and proportions were used for the descriptive analysis. Responses of key informants were initially categorized based on thematic issues addressed; then similar issues were merged to the selected thematic area. Finally, the response of the in-depth interview was summarized into different thematic issues.

4.8 Variables in the study

Socio demographic variables (age, sex, educational level, department), Type of query, Reference used to answer the query, Mode of reply, Purpose of the query, Time frame to reply, Mode of recipient, Total number of record in years, Awareness status about DIC, History of DIC service utilization, Frequency of information use, Characteristics if enquiries, Characteristics of enquirers and User' satisfaction level of service provided by the DIC

4.9 Data quality management

To assure the quality of the data, the following steps have been undergone.

- The questionnaire was developed by reviewing relevant literatures on the subject to ensure reliability.
- The questionnaire was pre-tested in related public health care institutions (Paulos DIC model) and modified where necessary to ensure clarity and uniformity of understanding.
- Each completed questionnaire was checked immediately after return to ascertain all the questions have been answered consistently.
- Double data entry was done for 15% of the data

4.10 Ethical consideration

Prior to data collection ethical clearance was obtained from the Research and Ethics committee (REC) of the School of Public Health, AAU. Verbal consent was obtained before administering questionnaire and conducting interview of the selected participant to assure willingness. To ensure confidentiality filling of self administered questionnaire was done separately. The confidentiality was ensured throughout the process. Before administering data collectors were informed on the purpose and significances of the study. The information that respondents provided was completely kept confidential and used only for the research purpose. Each respondent had given full right to refuse to take part or to stop filling wholly or in part the questionnaire at any time during the study.

4.11 Dissemination of the result

The findings of the study will primarily be submitted to AAU as partial fulfillment of M.Sc. degree in Health Informatics. Furthermore, attempts will be made to present the findings in scientific conference and an effort will also be made to publish the finding in local and international journals.

4.12 Operational definitions

Drug: means any substance or mixture of substances used in the diagnosis, treatment, mitigation or prevention of a disease in man or animal.

Drug information (DI): DI is the knowledge of facts acquired through reading, study or practical experience, concerning any chemical substance intended for use in diagnosis, prevention or treatment of disease.

Drug Information Services (DIS): DIS encompasses the activities of specially trained individuals to provide accurate, unbiased, and factual information primarily given in response to patient oriented drug problems received from pharmacists, nurses, clinicians and other healthcare professionals.

Drug Information Centers (DICs): is an operational units that provides authenticate, unbiased drug information to healthcare professionals; provide tailor-made counseling and drug information to patients / consumers as well as monitor and document adverse drug reactions.

Query: Request of drug information by different healthcare professionals to DIC.

Healthcare professionals: In this particular study healthcare professional refers to physicians, nurses and pharmacist working in TASH.

5. RESULTS

5.1 Quantitative Study

5.1.1 Awareness, Service utilization and Satisfaction Level of Health Professionals on the Drug Information Center

5.1.1.1 Socio-demographic characteristics

Among the total respondents in this study, 247 responded to the questionnaire making a response rate of 86.6%.

The categories of Study participants comprised: physicians 104 (42.1%), Pharmacists 12 (4.9%), Nurse 129 (52.2%), and Druggists were 2 (0.8%). One hundred twenty six (51%) and 121 (49%) of the respondents were males and females respectively. The mean age of respondents was 32 (SD=8.11) years with a range of 21 to 60 years old (Table 1).

Table 1: Socio-demographic characteristics of respondents, Tikur Anbesa Specialized Hospital (TASH), Addis Ababa, January, 2012

Variables	Frequency (n=247)	Percentage
Respondent's Sex		
Male	126	51.0
Female	121	49.0
Age group (years)		
21-30	123	49.8
31-40	77	31.2
41-50	37	15,0
51-60	10	4.0
Professional back ground		
Physician	104	42.1
Pharmacist	12	4.9
Nurse	129	52.2
Druggist	2	0.8
Department(ward) of respondents		
Internal medicine	83	33.6
Pediatrics	40	16.2
Gynecology and Obstetrics	43	17.4
Surgery	72	29.1
Pharmacy	9	3.6

5.1.1.2 Awareness of health professionals on the Drug Information Center

To assess awareness on the existence of functional DIC, respondents were asked whether they had heard about the Drug Information Center and what types of services the center provided. Accordingly, more than half of the respondents (51.4%) said that they had heard of the DIC which is found at TASH (Figure 2).

Among those respondents who have said they knew about the DIC, 41.7% reported, published materials (brochure, bulletin and other publication) were their source of information about DIC.

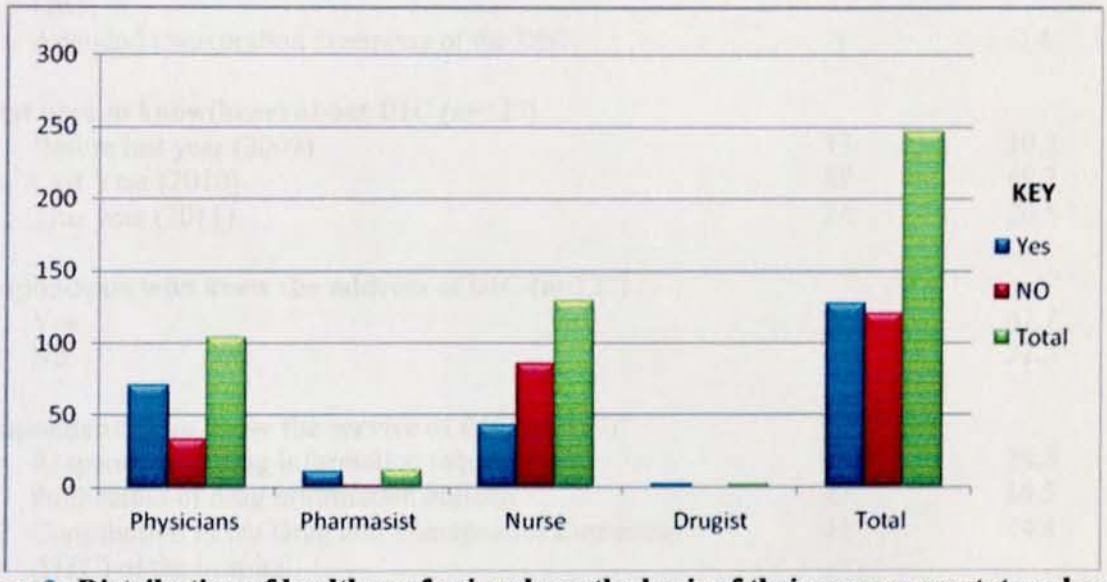


Figure 2: Distribution of health professionals on the basis of their awareness status about the DIC of TASH, Addis Ababa, January, 2012

Among those health professionals who reported they had information on DIC, only 13 (10.2%) said they had the information about DIC since its establishment in 2009. Moreover, 79 (62.2%) of the respondents reported that they knew the physical address of this center. Surprisingly almost all the respondents didn't know e-mail address or fax number of the center. Asked about the general services types being provided and working conditions of the center, vast majority of them (85%) have said, they think the center works five days in a week.

Table 2: Awareness of health professionals on services of the Drug Information Center (DIC) of Tikur Anbesa Specialized Hospital (TASH), Addis Ababa, January, 2012

Variables	Frequency	Percentage
Respondents who ever heard of DIC (n=247)		
Yes	127	51.4
No	120	48.6
Source of information about DIC (127)		
From the staff of DIC	25	19.7
From a colleague	46	36.2
From published materials (bulletin, brochure, etc) of DIC	53	41.7
Attended inauguration ceremony of the DIC	3	2.4
First time to know(hear) about DIC (n=127)		
Before last year (2009)	13	10.2
Last Year (2010)	88	69.3
This year (2011)	26	20.5
Respondents who knew the address of DIC (n=127)		
Yes	86	67.7
No	41	32.3
Respondents who knew the service of DIC (n=127)*		
Responding to drug information inquiries	103	36.3
Publication of drug information bulletin	47	16.5
Contribution in the Drug and Therapeutics Committee (DTC) of the hospital	41	14.4
Conducting educational programs/trainings on drugs and drug therapeutics	32	11.3
Attachment and visit sites for students	33	11.6
Staff of DIC attending morning session	13	4.6
Staff of DIC attending ward round	15	5.3
Knowledge of Respondents on working days of DIC in a week (n=127)		
one day	3	2.4
two days	2	1.6
three days	2	1.6
Four days	1	0.8
Five days	85	66.9
Seven days	7	5.1
I do not know	27	21.3

* Multiple response was possible

Amongst health professionals with awareness on existence of DIC in TASH, only 32 (29.1 %) of them were able to mention four and more than four types of the services which are currently being provided by the center while the rest majority (70.9%) only mentioned less than four of the of services provided by the center.

5.1.1.3 Service utilization level of health professionals from Drug Information Center

Currently the drug information center of TASH is providing various types of services for health professionals. Service utilization assessments on respondents, among those who are conscious about DIC, revealed only 58(45.6%) have history of utilization of at least one of the service provided by the center. On the other hand, irrespective of their awareness on the DIC services, majority of respondents 69(54.3%) claim no history of utilization of any of services provided by the center (Figure 3).

Respondents, those who are aware of DIC but no service utilization history, have also described their reason for not to utilize services. For this, "having no problem or challenge related with drug uses" was reasoned by 38(55%) respondents, 29(42%) of respondents described "lack of interest" while 2 (2.9%) said the center was closed at a time of need were their reason for not to utilize services from the DIC of TASH.

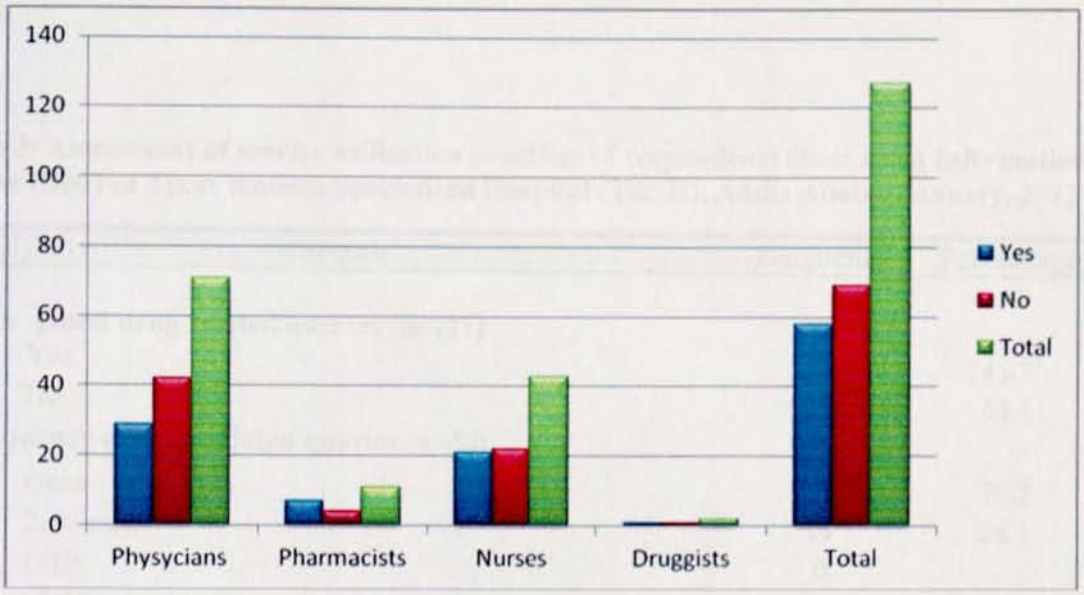


Figure 3: Distribution of respondents (who have awareness on DIC) based on their history of service utilization, TASH, Addis Ababa, January, 2012 January, 2012

Among respondents who had history of service utilization, 39.3% asked information about availability of drugs on market followed by 15 (17.9%) which is about information on drug dosage and administration. The most frequently (79.3%) method of query posing used was by telephone. However, only 1 query was posed by e-mail address of the drug information center (Table 3).

Table 3: Assessment of service utilization practices of respondents from Drug Information Center (DIC) of Tikur Anbesa Specialized Hospital (TASH), Addis Ababa, January, 2012

Variable	Frequency	Percentage
Ever posed drug related queries (n=127)		
Yes	58	45.7
No	69	54.3
Frequency of drug related queries (n=58)		
Once	41	70.7
2-5 times	14	24.1
6-10	0	
>10 times	3	5.2
Method of posing drug related queries (n=58)		
Telephone	46	79.3
Going there physically	10	17.2
Other	2	3.5
Categories of posed drug related queries (n=58)*		
Drug availability on market	33	39.3
Dosage/Administration	15	17.9
Adverse drug reaction and its management	12	14.3
Drug interaction	9	10.7
Therapeutic use	13	15.5
Pregnancy and lactation	2	2.4
Reason for not utilizing DIC services (n=69)**		
lack of interest	29	42.0
no question or challenge so far	38	55.1
center was not open at the time of need	2	2.9

* Response was possible among those who pose drug relate queries
** Respondents ever heard about DIC but no history of service utilization of the center

5.1.1.4 Perceived satisfaction level of health professionals on service provided by DIC

Perception of respondents on the service provision of the DIC showed that, one fourth of respondents got responses (information) within minutes. Similarly, among those who posed drug

related queries, 93.1% perceived the appropriateness of the information provided by the DIC. Few of them (6.7%) have explained their disagreement on the appropriateness of the information provided. Responding to their satisfaction level, 62% described a high satisfaction level on the services (information) they had from the DIC (Figure 4).

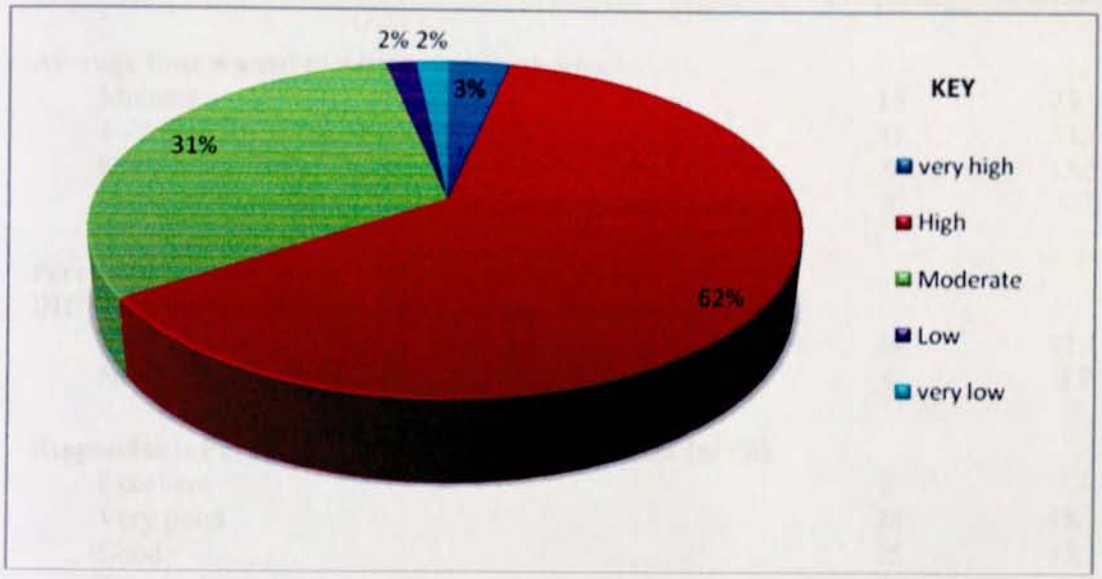


Figure 4: Perceived satisfaction level of health professionals on service provided by Drug Information Center of Tikur Anbesa Specialized Hospital (TASH), Addis Ababa, January, 2012

Twenty eight (48.3%) of the respondents have rated the performance of the DIC as it was very good while only 1 respondent rated the performance of DIC to be very poor. Among those respondents who gave a feedback whether or not the DIC need improvement on its services, 93 (43.7%) agreed that the DIC should work on the improvements of its service provisions. Out of those who gave suggestion on service areas for improvement, 66 (23.1%) strongly recommended that the DIC should develop its own online query posing service for the users *(Table 4)*.

5.1.2 Retrospective reviews of documented queries in Drug Information Center

5.1.2.1 Service utilization pattern from Drug Information Center (DIC)

The result of the retrospective analysis of the documented query showed that the Drug Information Center of AAU, in TASH received a total of 374 different types of queries during the period of May 2009 to August 2011. As depicted in Figure 5 below, the highest number 58.6% (219) of queries were received during the year 2010.

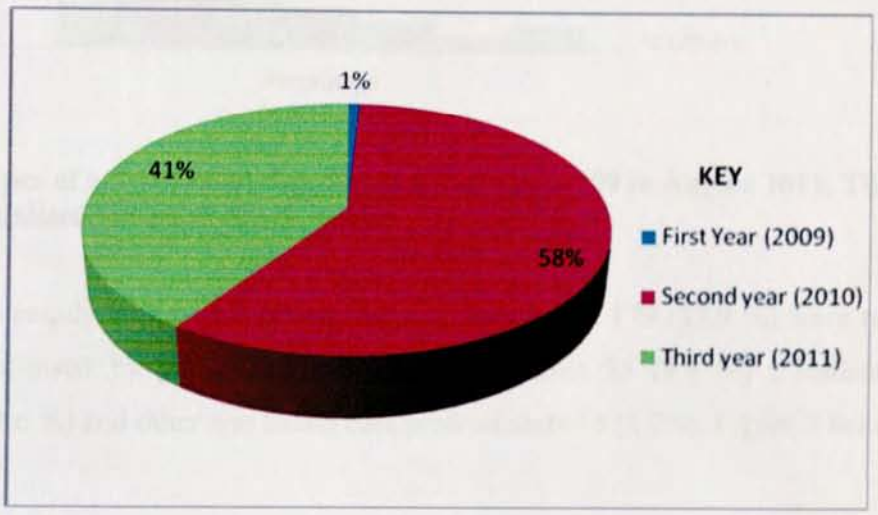


Figure 5: Number of queries received by the center during the period of May 2009 to August 2011, Tikur Anbesa Specialized Hospital, Addis Ababa

Two hundred forty-four (65.2 %) of the queries were received from governmental hospitals and health centers. Drug information queries were also obtained from other places such as drug whole sellers and importers 9.1% (34); private and public pharmacies 8.8 % (33); public and private teaching institutes (universities and colleges) 6.4 % (24); private hospitals and clinics 4.3 % (16); Drug Administration and Control Authority (DACA) and Pharmaceutical Fund and Supply Agency (PFSA) 2.4 % (9); and others 3.7% (14) *(Figure 6).*

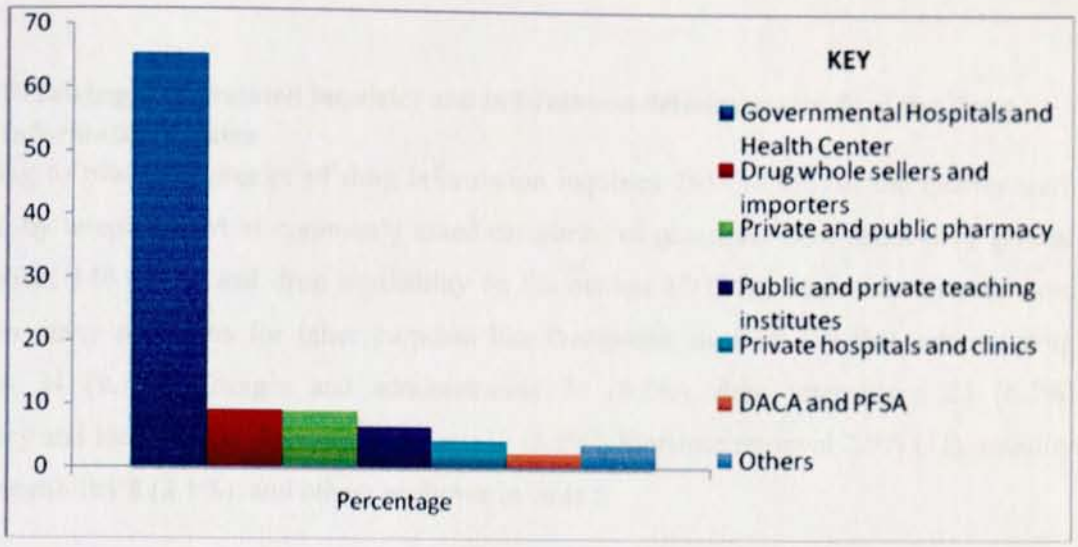


Figure 6: Types of enquirers during the period of May 2009 to August 2011, Tikur Anbesa Specialized Hospital, Addis Ababa

According to enquirers' categorizations, most of the queries 179 (47.9 %) were received from physicians followed by pharmacists 126 (37.7%), nurses 35 (9.4 %) , students 14(3.7%), druggists 6 (1.6 %) and other non health care professionals 14 (3.7%). Figure 2 below shows the details.

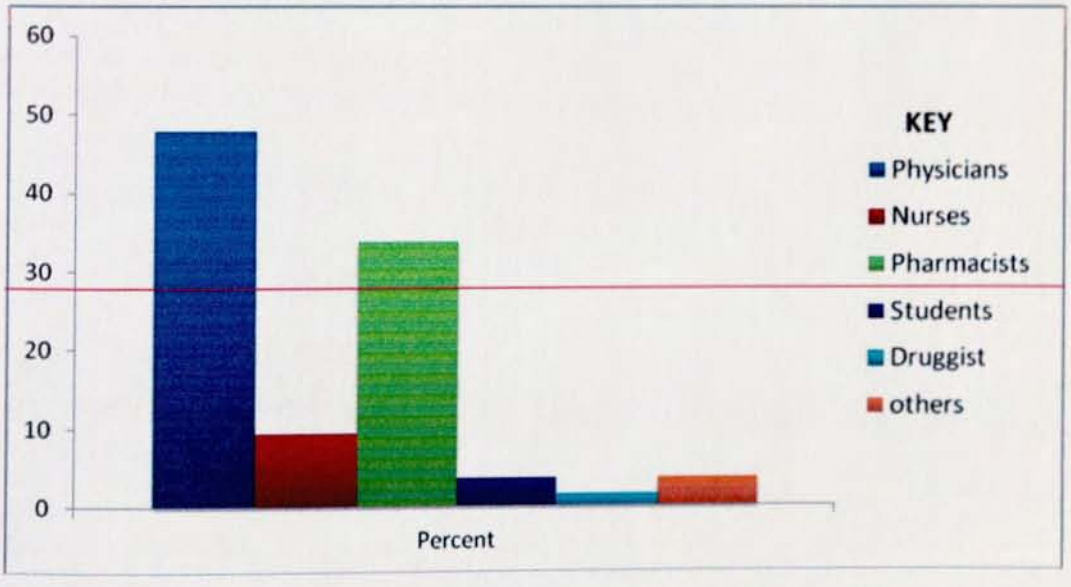


Figure 7: Professional back ground of enquirers during the period of May 2009 to August 2011, Tikur Anbesa Specialized Hospital, Addis Ababa

5.1.2.2 Receiving Drug related inquiries and information delivery methods of the Drug Information Center

Regarding to modes of receipt of drug information inquiries 295 (78.9%) of the queries were received by telephone. Most commonly asked categories of questions were about drug general information, 146 (39%) and drug availability on the market 45(12%). Moreover, queries were asked on many occasions for other purposes like therapeutic uses 39 (10.4%), adverse drug reactions 34 (9.1%), dosages and administration 31 (8.3%), drug interactions 23 (6.2%) pregnancy and lactation 22 (5.9%), toxicology 13 (3.5%), literature retrieval 2.9% (11), stability and compatibility 8 (2.1%), and others as shown in table 5.

With regard to resources used to answer the drug inquiries, the current study showed that Micromedex was the most commonly used resource with a frequency of 204 (54.5%) for answering the queries in this drug information center setting. Additionally, text books were employed in 41 (11.0%), Internet 44 (11.7%), Martindale 16 (4.3%), American Hospital Formulary System (AHFS) Drug Information 13 (3.5%), Facts and comparisons 7 (1.9%), Indentindex 4 (1.1%). Others like journal articles and telephone, which accounted for 45 (12%), were also utilized by the center as evidence based reference sources.

Table 5: Distribution of category of enquiries and reference used to answer queries, TASH, Addis Ababa, from May 2009-August 2011 (N=374)

Variable	Frequency	Percentage
Categories of enquiries		
General drug information	146	39.0
Drug availability and cost	45	12.0
Therapeutic use	39	10.4
Adverse drug reaction	34	9.1
Dosage or administration	31	8.3
Drug interaction	23	6.2
Pregnancy and lactation	22	5.9
Toxicology	13	3.5
Literature retrieval	11	2.9
Stability and compatibility	8	2.1
Product Identification	1	.3
Kinetics	1	.3
References used by DIC to answer queries		
Micromedex	204	54.5
Internet	44	11.7
Text books	41	11
Martindale	16	4.3
AHFS Drug Information	13	3.5
Facts and comparison	7	1.9
Indentindex	4	1.1
Others	45	12

5.2 Results from the qualitative study

Individual in-depth interview

An in-depth interview was conducted with the DIC director and working staff of the DIC at School of Pharmacy, AAU. They were asked about their qualification and position in the DIC, how they handle records in the center, resource and facilities of the center, time frame and mode of reply to the questions asked and other questions pertaining to the activities of the center.

Staffing and manpower

Regarding manpower, the center is staffed with one director and two full time pharmacists. Two of the staffs were trained to master's level and the other is a bachelor degree holder in pharmacy profession. They have been trained and familiarized with all resources relevant to the center's function. They also own computer based information systems skill to provide drug information to users. Computer set up and internet service is available in the center. The DIC accepts inquiries during working office hours (8:00 am – 5:00 pm) on all days except weekends and public holidays. Outside office hours appropriate arrangement can be made for the service with the staff of the center. Users can also leave their questions on the office telephone backed up by a radio pager set in the office outside office hours.

Record handling

Concerning the record handling, all questions received by the DIC were first recorded on standardized form. On this form, caller's full name, address, affiliation and their status were carefully documented. Besides, details of requests such as information related to product identification, drug availabilities on the market, adverse drug reactions, therapeutic uses, toxicity, stability and compatibility, pregnancy and lactation, dosages and administration, general drug information, and drug interactions were recorded as appropriate. In addition, responses given to each inquiry were also evidenced on standardized drug information response form. The sources used to answer the questions were also properly marked on the form for reference. Although the activities of the DIC were carefully documented, the system does not have its own database.

The time frame to give reply to the questions asked by the center users on the documented form was not indicated; however, it was understood from the in-depth interview that response time vary from a few minutes to several hours or days depending on the complexity of the question, urgency of the situation, and the nature of other questions being researched. In general, patient specific questions received the highest priority, followed by questions related to general patient care.

With regard to mode of reply, the DIC usually provides a useful print out response that addresses individual specific drug information needs. In some cases, verbal answers were provided to requests for information pertaining to drug use.

From the interview it was also understood that the center maintains a current collection of literature appropriate to the scope and nature of the services provided, including text books, core reference books, databases and other related drug information resource.

With regard to publications, the DIC of AAU has been publishing two newsletters namely "Drug Information Alert" and "Therapy Updates" periodically. On these publications, any drug related information is printed to assist the health care professionals who are continuously challenged by unavailability of adequate information. The information can be used to make informed decisions during the care of the patient. The periodicals are posted and circulated to those who are in need of it free of charge in TASH. From the interviews conducted, it was also recognized that the drug information center has not been a member of an International Register of Drug Information Services (IRDIS). IRDIS is the registering authority for drug information all over the world [21].

6. DISCUSSION

Evaluation of drug information centers has been widely performed either through the assessment of the process against pre-determined standard criteria, user satisfaction or the evaluation of clinical and economical out comes (6).

Hence, the current work was focused to describe types of service provided by the center and characters of enquiries so far made. This study also aimed to assess users' awareness, service utilization, as well as, users' satisfaction level of the service provided and to evaluate the performances of the drug information center from beneficiaries' perspective.

Awareness and service Utilization

Many studies indicated raised awareness and high service utilization practice among health professionals. Unlike other studies, analysis of respondents' feedback in this study revealed only 127 (51.4%) of the respondents were aware of the existences of the Drug Information Center at TASH, of which, not more than 58 (45.7%) reported their experience of service utilization from the center for at least once before this study.

A study done in South Indian teaching hospital showed, all of the respondents were aware of the existence of the drug information centre, among which, majority of them 92.5% have history of service utilization from the centre regularly (24).

Among 58 respondents, who reported their experiences of service utilization, majority (70.7%) have said they consulted the DIC for once, 14 (24.2%) about 2-5 times and the remaining only 3(5.2%) for greater than five times. In comparison, this can also be put side by side with the findings of the study done in former Sudan, in which, approximately one fifth, one half and one third of the surveyed had consulted the center for greater than 5, 2-5 times and once respectively (30).

This, low awareness level and service utilization from DIC of TASH, might be attributed to respondents poor information seeking behavior. Lacking activities to increase awareness of health professionals by the center may also account for that.

In this study, published materials of the DIC were mentioned by 53 (41.7%) of the respondents as their source of information to hear about the DIC for the first time. In similar study done at Sudan, majority (44.8%) of respondents have heard the information about their center from their colleagues, (16.2%) from newspaper and the remaining from one of the center's publication [30]. And this difference in replies from respondents may be from their occupational status or working condition.

Characteristics of enquirer

Evaluation of the characteristics of enquirer and enquiries in the last three years (May 2009 to August 2011) indicated that, 179 (47.9 %) queries were made by physicians followed by 126 (37.7%) pharmacists. Contrasting to this, in another study which is done in Sudan, most service users (29%) were observed to be pharmacists and there was a significant number 22.3% enquiries forwarded from lay persons, students and 4.5 % from others [30]. On the basis of this comparison, the DIC of TASH has been providing services for similar categories of health professionals and other segment of the community. Physicians used the service more often than any other healthcare professional groups in this study. This group had more chances to give drug information query request to the center may be due to the fact that they often needs detailed DI and is possibly more likely to treat complicated illness of a patients.

Regarding to respondents' methods to make enquiries to the center, most (79.3%) of respondents explained telephone was their method to pose their drug related enquiries. Only 1 respondent explained his experience of using e-mail for that purpose. This result was also supported by the finding from the retrospective reviews of documented queries (in the last three years period) in center, in which, 295 (78.9%) of the enquiries were received by telephone.

On similar study done in south India most queries were received during ward rounds (70%). Queries were also received through telephone (20%), intranet (2%), and (8%) was by direct access [24]. However, in this study, the number of queries received through e-mail is very less, which could be due to lack of awareness of such a facility by the enquirers and inaccessibility of internet service at work place.

Respondent, who have enquired drug related information, have also described types of enquiries they made. Amongst drug related information asked 33 (39.3%) were related to availability of drug on market, 15(17.9%) on drug dosage and administration and 12 (14.3%) on adverse reaction of drugs and its management were mentioned. On the other perspective of this study, reviews of documented enquiries revealed the most frequently asked information. Accordingly, 146 (39%) were general drug information, 45 (12%) on drug availability on the market and 39 (10.4%) were on therapeutic uses of drugs.

Other studies also indicated similar categories of questions. Similar results were also observed in the results of the study 'Review of a drug information service in an Indian teaching hospital' from which drug information queries received were most commonly related to administration and dosage followed by adverse drug reactions (8).

Also in a study done in Finland, of the total drug-related calls, 79% were related to prescription drugs (31). The majority (83%) of these calls were therapeutic or pharmaceutical inquiries, with 26% concerning costs and reimbursements, 14% interactions, 14% dosages, and 11% adverse effects. In this regard, similar concerns over drug related issues were observed across various studies including the present study.

Evaluation of rate of DIC performance from users' perspective

Pertaining the performance of this DICs, The European survey, classifies drug information centers into three Groups. In this classification, Group I DICs are those DICs which receive between 0 and 2000 queries, Group II between 2500 and 5000 and Group III which receives more than 5000 queries in a year (18).

In view of that, review of documents at DIC of TASH indicated that, the center had answered for 374 queries (for a period of 28 months, from May 2009 to August 2011), of which, the majority (58.6%) were performed during the year 2010. For this reason, it is categorized under Group I classification of the European survey which is considered as low performance level (18).

On the other perspective of this study, users, evaluation of the DIC showed, among surveyed 51.5 % rated the performance of the center as very good to excellent others 5.1 % respondents

agreed the performance of the center as poor or very poor. Consequently, 93 (43.7%) of respondents suggested various areas for improvements on which the DIC must act upon.

This result is comparable with the finding from South Indian teaching hospital. From that study, 26 (65%) of the respondents rated the performance of their drug information services as good, 9 (22.5%) as satisfactory and 5 (12.5%) suggested that the center requires improvement in its services [24].

Compared with the findings from the study of South Indian teaching hospital, decrease number of respondents who rated the performance of the DIC in the present study as Vary Good to Excellent and higher number of suggestions to the DIC of TASH, may indicate the need of much more efforts to make for improvements on the center's service provision.

7. STRENGTH AND LIMITATIONS OF THE STUDY

7.1 Strength of the study

- The study can serve as base line information for further study in the related area.
- Study has employed various study methods and data collection techniques

7.2 Limitation of the study .

- The study did not involve users of DIC other than TASH.
- Do not evaluate the clinical and economical outcomes of the DIC

8. CONCLUSION

The current study provided information relevant to the existing practice of drug information center established in the Tikru Anbessa Specialized Hospital and possibly the findings could serve as baseline information towards improving the service in the future.

The study revealed that half of the health professionals participated in the current study was unaware of the general services being provided by the drug information center (DIC).

Service utilization practice was also found low among those respondents who had heard about DIC. This is an area that one should look into.

Level of satisfaction of users of DIC towards getting appropriate information was found encouraging as majority of the respondents reported. The center showed a trend towards using electronic databases as a main resource. Micromedx and Internet remains the most useful drug information resource to answer queries received from various sectors in this drug information center setting.

Establishment of its website and developing database, use of current and updated drug information source and change of the physical address of the center are the major suggestions by the respondents. Performance of the drug information center is rated very good to excellent by majority of respondents. But as to the classification of European survey it is under group I category.

9. RECOMMENDATIONS

- The drug information center has to work more on awareness creation among healthcare professionals by distributing published materials such as stickers, posters and brochures that promotes the services being provided by the center.

- The center has to establish its own website to post information about their center and services, provide links to related sites considered to be of acceptable quality, and as a convenient means of receiving and answering drug information questions. (The Web Page prototype of the DIC proposed by the researcher is provided in Page 43-49)

- The drug information center has to improve the interest of health care professionals to use the service of the center by conducting series of lectures and trainings on matters related to drug use.

- The information service offered by the DIC has to be greatly facilitated by establishing its own electronic databases with computer assisted functioning. This would help the center to provide high quality drug related information during periods of major demand by its clients. Any required data can be easily extracted from the databases and information provided to previous enquiries can also be traced without difficulty. Moreover, this would enhance capacities of its staff to extend their services in variety of tasks such as recordkeeping, storage and retrieval of data.

- Accountability of less number of queries received by direct access (17.2%) could be due to the location of the DIC that is not easily feasible from the wards. Therefore, the DIC has to change the physical address of the center to attract the attention of health care professionals and increase their service utilization practice.

(Web Page Prototype)

Home Page

Welcome, Guest!

The Drug Information Center
@
Tikur Anbessa Specialized Hospital
Addis Ababa University

Home | Services | Profile | Contact Us |



Tel: +251-(011)-5545457
+251-(011)-5545459
Fax: +251-(011)-5545481
P.O.BOX: 9086
E-mail: dic@phar.aau.edu.et
Website: http://www.aau.edu.et

Welcome

The Drug Information Center (DIC) welcomes you warmly to visit this site and leave your comments or suggestions, if any.

DIC was established in May 2009 with the objective of educating students, stimulate research, help develop health care policy and disseminate medication and health information through the practice of evidence-based medicine in a manner that strives for accuracy, completeness, and innovation for the improvement of patient outcomes....[more]

Cheers all of our visitors and fans!!

Publications

[Therapy Updates]
[Drug Information Alert]

Links

[Ask a question]

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Service Page

Services

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vices

The DIC Offers core servicess that fall into the following three categories;

Teaching and Training



The DIC serves as a practice site where pharmacy interns and students develop the hands-on skills they need to provide information on Drug to practitioners and patients alike.The center organizes discussions and seminars on current trends in clinical pharmacology and applied therapeutics to keep health care professionals barest of the latest of the developments in the medical and pharmaceutical sciences. The center also conducts practitioner assessments and organizes short-term trainings based on the identified knowledge gaps and professional development needs.

Research

The DIC supports pharmaceutical and clinical research by creating an environment where relevant information is readily accessible. Center staff also conducts research on drug use and related topics.

Information service

The DIC responds to queries on drug therapy for particular diseases and special populations, as well as on adverse drug reaction, drug interactions, pharmacodynamics, pharmacokinetics, and the social use of drugs.

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Profile Page

Profile

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Welcome, Guest!

Profile



Brief History of DIC

The school of pharmacy, AAU, established the first role-model DIC in Ethiopia in 2009 with support from World Bank, US president's Emergency Plan for AIDS Relief, Howard University and American International Health Alliance's HIV/AIDS Twinning Center. The center is equipped with latest Drug information databases, Reference books and other evidence based resources to provide health care professionals with unbiased, up-to-date information that can increases their knowledge and improve patient care.

Location

The Center is located at Tikur Anbessa Specialized Hospital, Basement Room No. F-006 Addis Ababa, Ethiopia.

Mission

The DIC envisions becoming regional center of excellence in the provision of drug information, training and related research. The DIC's mission is to educate students, stimulate research, help develop health care policy and disseminate medication and health information trough the practice of evidence based medicine in a manner that strives for accuracy, completeness and innovation for the improvement of patient outcomes.

Objective

The DIC has the following Objectives;

1. *Educate pharmacy students to serve as effective providers of medicines information ;*
2. *Provide specialized information on medicines and therapeutics to meet the Drug information needs of practitioners;*
3. *Promote the practice of evidence-based medicine and rational use of medicines for optimizing patient outcomes; and*
4. *Support Drug research trough the provision of up-to-date information, as well as exposing knowledge gaps and offering solutions for closing them.*

Core Servicess

The DIC offers core services that fall in to the following three categories;

1. *Teaching and Trainning;*
2. *Research;*
3. *Information Services;*



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Contact Us Page

Contact US

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ntact Us

We are located at Tikur Anbessa Specialized Hospital, Basement Room No. F-006
Addis Ababa, Ethiopia

Telephone

Direct Lines::

+251-115-545457
+251-115-545459

Hospital Line:

+251-115-511211 (Ext. 173)

Fax:

+251-115-545481

P.O.Box:

9086
Drug Information Center
Tikur Anbessa Specialized Hospital
Addis Ababa, Ethiopia.

e-mail/web site:

e-mail: dic@phar.aau.edu.et
Web Site: http://www.aau.edu.et/

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Online Request Page



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The Drug Information Center
@
Tikur Anbessa Specialized Hospital
Addis Ababa University

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ug Information Service

nline Request Form

ll fields in **Bold** are required

irst ame | **Last Name**

ddress | **City**

elephone

rofession Pharmacist | Specify if Other

ffiliation AAU | Specify if Other Affiliatio

referred Method of Response

Email Phone Fax **(Please Supply Contact Details)**

equest Information

rtinent Patient Information *

Submit Details

Note: Please DO submit patient information that you feel may be lpful in answering the drug information request (such as patients age, ease states, or medications)
ue to HIPAA regulations please DO NOT submit patient identifying formation (such as patients name, birth date, hospital room mber,or medical record)

Disclaimer

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Disclaimer Page

Disclaimer

This service is intended to provide a supplemental drug information resource to health care professionals. this service is not intended to be a replacement for appropriate medical or pharmaceutical care to patients. please direct such health concerns and inquiries to the appropriate health care professional.

Every effort is taken to ensure the accuracy and timeliness of the information contained in this pages. However, in view of the possibility of human error or change in drug therapy information, Addis Ababa University, the staff of The Drug Information Center, and any other parties involved cannot offer any gurantee regarding the accuracy or completeness of this data.

The parties mentioned above also disclaim any responsibility for the errors, omissions or for the results or consequences obtained from the use of information provided by Addis Ababa University Drug Information Center. As a user of this service, you assume full responsibility for ensuring the appropriate use and reliance upon the information

Drug Information Response Page



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Tikur Anbessa Specialized Hospital
Addis Ababa University

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g Information Service

g Information Response

Drug Information Center, School of Pharmacy, AAU

Inquiry Date

hod of Response

il: **Fax**

ect

ences Used:

licromedex
HFS Drug Information
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Approved By:

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Annex I. Questionnaire

ADDIS ABABA UNIVERSITY GRADUATE STUDIES

SCHOOL OF INFORMATION SCIENCE AND PUBLIC HEALTH

(JOINT)

HEALTH INFORMATICS PROGRAM

Hello, My name is_____ and I am part of a team of people who are carrying out on the study entitled ***"Assessment of Drug Information Service of Addis Ababa University Drug Information Center"*** from Addis Ababa University as part of the requirements for the partial fulfillment of master's degree in health informatics.

The Addis Ababa University Drug Information Center (DIC) was established in May 2009 at Black Lion Hospital (BLH) as a model center of excellence designed to help health and allied professionals and medical educators to easily access critical information on medicines, pharmacology and clinical care.

The central aim of this survey is to assess the awareness, quality of the service and users' satisfactions on the service provided by the center so that necessary modifications can be made for better functioning in the future. Your genuine response to the questions set below is absolutely necessary for the study.

If you decide to participate in the survey it will take between 20-30 minutes to complete. Please read the statements and circle your responses. There is no right or wrong answer and this survey will be kept confidential. None of your answers will be available to anyone. Do not give your name. All the information you give will be kept private. Anyone who will not be willing to participate in the study will have the right to discontinue at any time in the process.

We thank you in advance for taking your time to answer the questions.

Are you willing to participate? 1. Yes 2. No

Name of data Collector _____ Name of Supervisor _____

Signature_____ Signature _____

Date_____ Date _____

No	Questions and filters	Possible answers	Code
	Part I: Scoio-demographic characteristics of respondents		
1	Your sex	1. Male 2. Female	
2	Age (years)	----------	
3	Current marital Status	1. Single 2. Married 3. Divorced 4. Widowed	
4	Highest education attained	1. Diploma 2. First Degree (Bachelor) 3. Second Degree (Masters) 4. MD (GP) 5. MD plus 6. Others, specify ------	
5	Professional background	1. Physician 2. Pharmacist 3. Nurse 4. Druggist 5. Others, specify ----------	
6	Department	1. Internal medicine 2. Pediatrics 3. Gynecology & Obstetrics 4. Surgery 5. Pharmacy	
7	Years of medical practice (state in full years)	----------	
	Part II: Awareness about the center		
8	Are you aware of the existence of drug information center at Tikur Anbesa Hospital?	1. Yes 2. No, **If no** go to Question no 16	
9	If yes to question 8, how did you come to know it?	1. From a media (newspaper, radio, TV) 2. From the staff of DIC 3. From a colleague 4. From materials published by the center (bulletin, brochure, etc) 5. Attended inauguration ceremony of the DIC 6. Others specify ----------	
10	If yes to question 8, when did you come to know it?	1. Before last year (2009) 2. Last year (2010) 3. This year (2011)	
11	If yes to question 8, do you know the address of the drug information center in the Tikur Anbesa Hospital?	1. Yes 2. No	

12	If yes to question 11, which of the address do you know? (More than one answer is possible) Physical address of the office Direct telephone line Extension telephone line Fax address E-mail address	Yes No 1 2 1 2 1 2 1 2 1 2	
13	If yes to question 8, for how many days in a week do you know/think the drug information center provide service?	------ days/week (use number 1-7)	
14	If yes to question 8, for how many hours in a day do you know/think the drug information center is operational?	--------- hours/day	
15	If yes to question 8, which of the following activities of the DIC do you know? (more than one answer is possible) Responding to drug information inquiries Publication of drug information bulletin Contribution in the Drug and Therapeutics Committee (DTC) of the hospital Conducting educational programs/trainings on drugs and drug therapeutics Attachment and visit sites for students Staff of DIC attending morning session Staff of DIC attending ward round Others, specify	Yes NO 1 2 1 2 1 2 1 2 1 2 1 2 1 2	
	Part III: General and service utilization question		
16	Have you ever faced drug related problem during your clinical practice?	1. Yes 2. No, **If no** go to question no 18	
17	If yes to question 16, which of the following measures do you usually take when you face such problems? (more than one answer is possible)	Yes No	

	I look for references	1 2	
	Ask colleagues	1 2	
	Call or go to drug information center.....	1 2	
	Use my knowledge and past experience.....	1 2	
	Others, specify ------	.....	
18	What is/are your usual source(s) for drug information? (More than one answer is possible)	Yes No	
	Text books	1 2	
	CD ROMs	1 2	
	Offline drug information data bases (UpToDate, DrugDex® etc).....	1 2	
	Internet based resources	1 2	
	Journals (Hard copy, electronic...).....	1 2	
	Standard Treatment Guideline (STGs)		
	Drug Formulary	1 2	
	Package insert	1 2	
	Others specify	----------	
19	In your opinion, how would drug information services help in clinical practice? (More than one answer is possible)	Yes No	
	Better patient care	1 2	
	Updating knowledge	1 2	
	Education/ Academic betterment	1 2	
	Others, specify.....	.....	
20	Have you ever posed any drug related queries to the DIC?	1. Yes 2. No, If no go to question no 28	
21	If yes to question 20, what type of information did you seek? (More than one answer is possible)	Yes No	
	Drug availability on market	1 2	
	Dosage/ Administration	1 2	
	Adverse drug reaction and its management	1 2	
	Drug interaction	1 2	
	Therapeutic use	1 2	
	Pregnancy and lactation	1 2	
	Others, specify.....	.....	

22	If yes to question 20, which of the following methods did you use to pose your query? (More than one answer is possible) By telephone By Fax By walk in to the center By e-mail Meeting with the staff of the DIC during the morning and round session Others, specify ----------	Yes / No 1 2 1 2 1 2 1 2 1 2	
23	If yes to question 20, how did you access the answers to your queries from the center? (More than one answer is possible) By telephone Printed copy By Fax By e-mail Physical discussion with the DIC staff Others, specify ----------	Yes / No 1 2 1 2 1 2 1 2 1 2 1 2	
24	If yes to question 20, how much average time did you wait to get answer for your queries?	1. Minutes 2. 1-3 hours 3. 1/2 a day 4. 1-3 days 5. >3 days 6. >a week	
25	If yes to question 20, have you received appropriate answer for your queries?	1. Yes 2. No	
26	If your answer to question 25 is No, the reason was (more than one answer is possible) The information was insufficient The information was outdated and not relevant The information was too extensive I did not get the information in time Others, specify.....	Yes / No 1 2 1 2 1 2 1 2	
27	If yes to question 20, how many times did you use the service so far?	1. Once 2. 2-5 times 3. 6-10 times 4. >10 times	

28	If you did not utilize the drug information service from the center so far, which of the following below is/are your reason (s)? (more than one answer is possible) Lack of awareness Lack of Interest I had no questions/challenges so far The center was not open at the time I needed drug information (weekends, holidays, etc) Others, specify	Yes / No 1 2 1 2 1 2 1 2	

Part IV Question on level of satisfaction

29	If you have used the services of the center, how would you rate your level of satisfaction with the service you got?	1. Very high 2. High 3. Moderate 4. Low 5. Very low	
30	How do you generally rate the performance of the existing drug information service of the AAU?	1. Excellent 2. Very good 3. Good 4. Poor 5. Very poor	
31	Do you think the drug information center of AAU has things to improve?	1. Yes 2. No 3. No comment	
32	If Yes, to question 31, indicate your area of improvement. (More than one answer is possible) 1. Prolonged working hours of the DIC 2. Well trained and sufficient staff for the DIC ..... 3. Online query posing service..... 4. Current and updated drug information sources..... 5. Change in physical address of the DIC office ..... 6. Others (specify)	Yes / No 1 2 1 2 1 2 1 2 1 2 _____	

Annex II. Drug Information Response Form

Drug Information Center, School of Pharmacy, AAU

With support provided by World Bank, AIHA-Twining Center and Howard University, USA

Drug Information Response Form

Ref#: _____ **Inquiry Date:** _____

To:

_____

Method of Response:

Email: _____ **Fax:** _____

Mail: _____

References Used:

☐ 1.Micromedex ☐ 2.AHFS Drug Information ☐ 3.Facts and Comparisons

☐ 4. Indentidex ☐ 5.Martindale ☐ 6.Packet Insert

☐ 7.Internet ☐ Other: _____

_____

_____

_____

Approved by: _____

SCHOOL OF PHARMACY, AAU
With the support provided by World Bank, AIHA-Twinning Center and Howard University, USA
Addis Ababa University, Faculty of Medicine
Basement Room Number F-006
Phone: +251 115-54-5457/59
Fax: +251 115-54-5481
Email: dic@phar.aau.edu.et

Drug
nation Center,

Drug Information Request Form Date 18/02/2010

Please FAX completed request form to: +251-115-54-5481 goal is to respond within 3 business days.

Requestor's Contact Information Items marked with an asterisk (*) are required.

Full Name:

Address: *

City: *

Telephone: * **Fax**

Email:

Affiliation

☐ AAU ☐ **Pharmacy** ☐ Hospital

☐ **Other Organization** _____

Requestor's Status* (Required – please check one)

☐ **Pharmacist** ☐ Physician

☐ Nurse ☐ Family Nurse Practitioner

☐ Dentist ☐ Physician's Assistant

☐ OT/PT ☐ Industry

☐ Patient Consumer

☐ Other (*Please specify if other* _____)

Request/Question:

Can combined oral contraceptives be used in a patient with irregular menstrual cycle with smenorrheal and help her to conceive?

tinent Patient Information:

Age: 30 **Gender:** F **Height:** _____ **Weight:** _____

Allergies: No allergy history

Diagnosis/Disease State(s): Irregular menstrual cycle with dysmenorrheal.
Current Medications: unknown

Type of Request:

- ☐ Product Identification
- ☐ Dosage/Administration
- ☐ General Information
- ☐ Drug Availability
- ☐ Adverse Drug Reaction
- ☐ Drug Interactions
- ☐ **Therapeutic Use**
- ☐ Literature Retrieval
- ☐ Pregnancy/Lactation
- ☐ Abuse/Addiction
- ☐ Toxicology
- ☐ Cost
- ☐ Kinetics
- ☐ Investigational Drug
- ☐ Stability/Compatibility
- ☐ other (specify below)

Other:

Preferred Method of Response

- ☐ Email
- ☐ **Phone**
- ☐ Fax

* Note: Please **DO** submit patient information that you feel may be helpful in answering the drug information request (such as patient's age, disease states, or medication

DRUG INFORMATION CENTER, SCHOOL OF PHARMACY, AAU

With the support provided by World Bank, AIHA-Twinning Center and Howard University, USA

Address: Addis Ababa University, Faculty of Medicine
Phone: 011-554-5457/59

Fax: 011-254-5489
dic@phar.aau.edu.et
Basement Room Number F-006

Hours of Operation: Monday - Friday:
8:00 a.m. to 12:00 p.m. & 1:30 p.m. to 5:30 p.m.
The DIC observes the university's holiday schedule.

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Addis Ababa University, Faculty of Medicine
Basement Room Number F-006
Phone: +251 115-54-5457/59
Fax: +251 115-54-5481
Email: dic@phar.aau.edu.et

Drug
nation Center,

Disclaimer:

This service is intended to provide a *supplemental drug information resource* to health care ssionals. This service is not intended to be a replacement for appropriate medical or pharmaceutical to patients. Please direct such health concerns and inquiries to the appropriate health care ssional.

Every effort is taken to ensure the accuracy and timeliness of the information contained in these . However, in view of the possibility of human error or change in drug therapy information, Addis a University, the staff of the Drug Information Center, and any other parties involved cannot offer uarantee regarding the accuracy or completeness of this data.

The parties mentioned above also disclai n any responsibility for the errors, omissions or for the results nsequences obtained fr m the use of inform ation provided by Addis Ababa University Drug Information r. A a user of this service, you assume ful responsibility for ensuring the appropriate use and reliance the information.

Annex IV. Sample Publication I

Drug Information Alert

Volume 1 Issue 10
08 December 2010

A Publication of the Drug Information Center @ the Black Lion Hospital
School of Pharmacy, Addis Ababa University

New WHO Guidelines for Preventing TB in Patients with HIV

Contributed by: Ephrem Abebe, Director, Drug Information Center

Isoniazid Preventive Therapy (IPT):

- Isoniazid preventive therapy (IPT) is one of the key interventions recommended by the WHO to prevent TB in patients living with HIV.
- Utilization of IPT remains very low worldwide
- All children and adults living with HIV including pregnant and those receiving ART should receive IPT.
- IPT should be provided for 6 to 36 months or as a life long treatment in settings with high HIV and TB prevalence
- Current evidence does not show increased incidence of resistance to isoniazid by mycobacteria

Contact the Drug Information Center for drug related queries:

We are available at :

Telephone:

Direct line:

+251 (0)115545457

+251 (0)115545459

Hospital Extension Line: 173

Fax:

+251 (0)115545481

Email:

dic@phar.aau.edu.et

Black Lion Hospital Building, Basement, Room No. F006

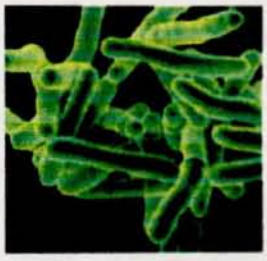
To prevent tuberculosis infection, all patients with HIV should receive isoniazid preventive therapy (IPT), according to new guidelines from the World Health Organization (WHO).

The new WHO guidelines, issued on the commemoration of this year's World AIDS Day (01 December, 2010) are based on new scientific evidence that update the previous 1998 policy on IPT. They recommend that HIV-infected patients receive isoniazid for at least 6 months. For patients living in areas with high TB prevalence, treatment should last 36 months or possibly for one's lifetime. Patients with HIV exhibiting symptoms of TB should be evaluated for active TB and other diseases.

HIV is the strongest risk factor for developing tuberculosis (TB) disease in those with latent or new Mycobacterium tuberculosis infection. The risk of developing TB is between 20 and 37 times greater in people living with HIV than among those who do not have HIV infection. TB is responsible for more than a quarter of deaths in people living with HIV. In some communities, up to 80% of people with TB test positive for HIV.

> Isoniazid should be provided for six to 36 months, or as a life-long treatment in settings with high HIV and TB prevalence.

IPT is one of the key interventions recommended by WHO in 1998 to reduce the burden of TB in people living with HIV, yet implementation of IPT has been very low. Only 85,000 (or 0.2%) of all people living with HIV worldwide were reported to have received it in 2009.



Picture: Scanning electron micrograph of *Mycobacterium tuberculosis*

Key recommendations in the new guideline are as follows:

- All children and adults living with HIV, including pregnant women and those receiving antiretroviral treatment, should receive isoniazid prevention therapy.
- Isoniazid should be provided for six to 36 months, or as a life-long treatment in settings with high HIV and TB prevalence.
- People living with HIV who may have TB symptoms should be further screened for active TB or other conditions so that they are able to access the appropriate treatments.
- Misconceptions that may contribute to the low uptake of isoniazid therapy are also addressed in the new guidelines. For example, concern that using isoniazid without other TB medications causes resistance to the medicine was not found to be supported by any scientific evidence. These and other clarifications featured in the guidelines should clear the way for greater access to the preventive therapy for millions of people living with HIV.

The WHO guideline group, along with global TB and HIV stakeholders, also identified key research gaps that need to be addressed in the future. Among these, some are:

- Development of new point-of-care testing to identify active TB, Latent Tuberculosis Infection (LTBI) and those not infected with M. tuberculosis;
- The use of TST testing in people living with HIV and receiving ART, with a particular emphasis on the frequency of performing TST to determine immune reconstitution and/or boosting in those who were initially TST negative.
- Optimal duration, safety, efficacy and cost-effectiveness of IPT alone or in conjunction with ART in reducing the risk of active TB, compared to ART alone among people living with HIV, particularly under program conditions.
- Co-formulation as a fixed-dose combination of isoniazid and vitamin B6 with co-trimoxazole, and with antiretrovirals, and evaluation of the efficacy and effectiveness of such fixed-dose combinations.

Full document can be accessed on the WHO website on the following link (http://whqlibdoc.who.int/publications/2011/9789241500708_eng.pdf) **OR** contact the Drug Information Center @ Black Lion Hospital if you wish to receive a copy.

References:

1. New WHO guidelines: TB prevention for people with HIV. Available at: http://www.who.int/mediacentre/news/releases/2010/wad_20101201/en/index.html. [cited 02 Dec 2010]
2. Guidelines for intensified tuberculosis case-finding and isoniazid preventive therapy for people living with HIV in resource-constrained settings. Available at: http://www.who.int/hiv/pub/tb/9789241500708/en/index.html. [Cited 02 Dec 2010]

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School of Pharmacy, Addis Ababa University

SULFA ALLERGY AND CROSS-SENSITIVITY

By: Teshale Mekonnen, Drug Information Pharmacist
Editor: Ephrem Abebe, Director, Drug Information Center

In this issue we address the following questions:

- ***What is a 'sulfa' allergy?***
- ***If a patient is allergic to sulfonamide antimicrobials, should cross-sensitivity with other sulfur-containing medications be a concern?***

The term 'drug allergy' describes immune system reactions to medications. 'Sulfa allergy' is a general term used to describe an allergy to sulfonamide antimicrobials. Approximately 3% of the general population have an allergy to sulfonamide antimicrobials, while incidence among the HIV-infected population is estimated to be 60%. This can be problematic because sulfamethoxazole/trimethoprim is first-line therapy for preventing and treating opportunistic infections such as pneumocystis jiroveci pneumonia in HIV patients.

Patients with sulfonamide hypersensitivity reactions usually present with fever and maculopapular rash approximately **7 to 14 days after initiation** of **sulfonamide therapy**. More serious and life-threatening reactions like Stevens-Johnson Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN) occur rarely (10 cases per 1 million persons annually). Patients who have had a prior reaction to an antimicrobial drug have a 10-fold greater risk of having a reaction to another antimicrobial, even when structurally unrelated.

Sulfonamides are chemical structures that include a sulfur dioxide and nitrogen moiety **(SO(2)NH(2))** directly attached to a benzene ring. Many drug classes have agents that contain a sulfonamide structure. The presence or absence of an aromatic amine at the N4 position distinguishes the sulfonamides into two groups: **aromatic amines** and **nonaromatic amine**.

Sulfonamide antimicrobials contain an aromatic amine (NH2) at the N4 position and a 5- or 6-member aromatic heterocyclic ring with one or more nitrogens at the N1 position. These characteristics are absent in the other sulfonamide drug classes.

It has been theorized that the aromatic amine group at the N4 position plays an important role in sulfonamide-induced hypersensitivity reactions. During hepatic metabolism, the aromatic amine group is oxidized to form a reactive hydroxylamine metabolite, which acts as a hapten.

Other classes of sulfonamides do not undergo the same metabolic pathways as the sulfonamide antimicrobials, which explains the rationale for cross-allergenicity among the sulfonamide antimicrobials, but not to the other sulfonamide drug classes.

An allergy to sulfonamide antimicrobials DOES NOT imply an allergy to sulfur-containing compounds.

Although the incidence of sulfonamide cross-allergenicity between drug classes remains low, and scientific evidence provides a rationale for



Drug induced skin reaction

the low incidence, ***the manufacturer's product information sheets among various sulfonamide agents may cause confusion for healthcare providers and patients.***

A retrospective study of Britain's General Practice Research Database showed that patients with a history of allergy to a sulfonamide antimicrobial had a greater risk of having an allergic reaction to other sulfonamide drug classes than did patients who had used a sulfonamide antimicrobial without an allergic reaction, but the increased risk appeared not to be related to cross-reactivity.

Conclusion

Patients who report a sulfa allergy are generally referring to a previous hypersensitivity reaction to a sulfonamide antimicrobial like sulfamethoxazole, sulfacetamide, or sulfadiazine, which contains a reactive aromatic amine at the N4 position. An allergy to sulfonamide antimicrobials does not indicate an allergy to compounds containing sulfur, inorganic sulfate, or sulfites. The incidence of cross-allergenicity between classes of sulfonamides is low, probably due to the structural differences and different metabolic pathways of the different classes. Healthcare providers

The greater risk for patients with a history of allergy to a sulfonamide antibiotic is related more to a propensity to hypersensitivity than to cross-reactivity to sulfonamides.

and patients should be aware of the low incidence and likelihood of cross-allergenicity between sulfonamide

Benefits and risks for the individual patient must be weighed before a specific sulfonamide-containing agent is ruled out of therapy.

antimicrobials and other sulfonamide drug classes as well as the symptoms of allergic reactions.

References:

1. Strom B, Schinnar R, Apter AJ, et al. Absence of cross-reactivity between sulfonamide antibiotics and sulfonamide nonantibiotics. N Engl J Med 2003; 349(17):1628-1635.
2. Tilles SA. Practical issues in the management of hypersensitivity reactions: sulfonamides. South Med J 2001; 94(8):817-824.
3. MICROMEDEX® Healthcare Series, Thomson Reuters, Greenwood Village, Colorado (Edition expires 12/2010)

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nicrobials (e.g. sul-
amide, sulfadiazine,
ethoxazole)

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UT AROMATIC AMINES:

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Therapy Updates

A quarterly publication of the Drug Information Center, Addis Ababa University School of Pharmacy

30 March 2011 Volume 1, I

this issue:

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ew Superbug	2
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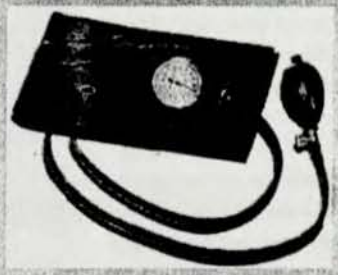
ocoming Events:

aining:

- A primer on adverse drug reaction (ADR) and ADR reporting for medical studnets

Basic skills in drug information for pharmacy students

Intensive Blood Pressure Control Not Justified in High-risk Diabetics



Current guidelines suggest that lower blood pressure (BP) is associated lower cardiovascular risk. In the Action to Control Cardiovascular Risk Diabetes (ACCORD) pressure study, a total of 4733 high-risk diabetic patients (mean age, 62; 48% women; glycosylated hemoglobin, ≥7.5%; systolic blood pressure [SBP], 130–180 mm Hg) who were taking ≤3 antihypertensive medications and had no proteinuria were enrolled. Pati were assigned to intensive BP control (target SBP, <120 mm Hg) or stan BP control (target SBP, <140 mm Hg).

Mean follow-up was 4.7 years. Mean systolic and diastolic BP levels at baseline were 139 mm Hg and 76 mm Hg, respectively. At 1 year, average SBP levels were 119 mm Hg in th intensive-care group and 134 mm Hg in the standard-care group. The lower BP in the intensive-care group v achieved by prescribing more drugs in every antihypertensive clas.; the mean number of medications at 1 ye was 3.4 in the intensive group and 2.1 in the standard-care group.

At 5 years, the rate of adverse cardiovascular events was 1.9% per year in the intensive-care group and in 2. per year in the standard-care group (hazard ratio, 0.88; P=0.2). Death rates were similar in the two groups. secondary analysis was strongly positive, except that stroke incidence was significantly lower in the intensive care group than in the standard-care group (0.32% vs. 0.53%).

The intensive-care group had a higher rate of serious adverse events, with more decrements in renal functio and more episodes of syncope, bradycardia, hyperkalemia, and hypotension. Overall, 3.3% of the intensive-c group had adverse events attributed to the medications, compared with 1.3% of the standard-care group.

The authors comment that the study indicated that intensive blood pressure control (to levels lower than th currently recommended by guidelines) should not be used in high-risk diabetic patients. The findings howeve leave open the question about what the optimal BP target is for these patients. The overall event rate was lo in both groups, showing what can be achieved with good contemporary treatment strategies.

Reference:

The ACCORD Study Group. Effects of intensive blood-pressure control in type 2 diabetes mellitus. N Engl J Med 2010; 362:1575-85.

New Resources at the DIC @ Black Lion Hospit

- **Guide to Intravenous Medication Compatibility**
  Poster suitable for use in clinics, classrooms, training centers, and other medical settings
- **Pocket Guide to Intravenous Medication Compatibility**
  Companion to poster meant for convenient, easy access individual use within a clinical setting

Annex:

ADDIS ABABA UNIVERSITY
College of Health Sciences
School of Public Health
Ethical Clearance Form

Version 01.Nov.2010

Date: /03/10/11/
Ref.No. SPH/ /04

Project number /0069/

Date of approval (D/M/Y) /25/02/11/	
Project Title: : "Assessment of Drug Information Service of Addis Ababa university Drug Information Center"	
Name of PI Yetimegeta Melkamu	**Phone Number**
Institution	**School of Public Health**
Department	
Decision of Research and Ethics Committee:	☑ Approved ☐ Approved with Recommendation ☐ Resubmission ☐ Disapproved
Valid until	**May 1, 2011 - Oct 1, 2011**

Dean, School of Public Health

Signature

Date /03/10/11/

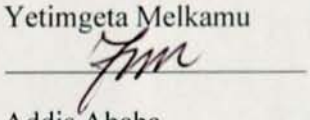
Dean's Office
School of Public Health
A.A.U. College

Annex VII. Interview Guide

1. When was the DIC founded? What is its function?
2. How is the center managed?
3. How many staff does it have? What is their qualification?
4. What is the resource and facilities of the DIC?
5. How do you handle your records?
6. Do you have a website?
7. What major challenges and opportunities are there related to the service provided?
8. Is the DIC a member of International register of Drug Information Service?
9. Do you have any publication?
10. What is your mode of reply to the questions asked to the center?

DECLARATION

I, the undersigned declare that this thesis is my original work and has not been presented for a Degree in this or other university and all sources of materials has been fully acknowledged.

Name:	Yetimgeta Melkamu
Signature:	
Place:	Addis Ababa
Date of submission	13/02/2012