THE CONCEPTS OF DRUG UTILIZATION STUDY

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ABSTRACT

Drug Utilization study is very important topic to evaluate rational drug prescribing. Aspire of the Drug utilization studies (DUS) is to appraise factors related to the prescribing, dispensing, administering and taking of medication. Drug utilization studies aim to evaluate factors related to the prescribing, dispensing, administering and taking of medication, and its associated events (either beneficial or adverse). Since the early 1960’s the interest in Drug Utilization Studies has been increasing, first with market-only purposes, then for evaluating the quality of medical prescription and comparing patterns of use of specific drugs. The ultimate purposes of drug utilization studies are to contribute to the optimal quality of drug therapy by identifying, documenting, analyzing problems in drug utilization and monitoring the consequences of interventions. Different types of drug utilization studies can be conducted and various methods can be used. The increasing importance of drug utilization studies as a valuable investigation resource in pharmacoepidemiology has been bridging it with other health related areas, such as public health, pharmacovigilance, pharmacoeconomics, eco-pharmacovigilance or pharmacogenetics.

KEY WORDS: Drug Utilization Study, Pharmacoepidemiology, Data sources, Type of DUS.
INTRODUCTION

Drug utilization research is an important part of pharmacoepidemiology as it describes the Prescribing style, extent and exposure of drug. In general, Drug Utilization studies are defined as prescription, dispensing, marketing, distribution and use of drugs in a society. Drug utilization research was defined by WHO in 1977 as the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences. Since then, a number of other terms have come into use and it is important to understand the interrelationships of the different domains. Epidemiology has been defined as the study of the distribution and determinants of health related states and events in the population, and the application of this study to control of health problems [1-5].

Drug may play an important role in improving human health and promoting well-being. However to produce the desired effects, they have to be safe and efficacious and have to be used rationally. Drugs use is complex process. The boost in the marketing of new drug, wide variation in the pattern of drug prescribing and consumption growing concern about the delayed adverse effects, increasing concerns regarding the cost of drug and volume of prescription, all contribute to the increasing importance of DUS. Studies on drug utilization focus on the factors related to prescribing, dispensing, and administering of medication, its beneficial adverse effects.

Pharmacoepidemiology applies epidemiological methods to studies of the clinical use of drugs in populations. A modern definition of pharmacoepidemiology is: “the study of the use and effects/sideeffects of drugs in large numbers of people with the purpose of supporting the rational and cost-effective use of drugs in the population thereby improving health outcomes”

Together, drug utilization research and pharmacoepidemiology may provide insights into the following aspects of drug use and drug prescribing.

Pattern of use
This covers the extent and profiles of drug use and the trends in drug use and costs over time.

Quality of use
This is determined using audits to compare actual use to national prescription guidelines or local drug formularies. Indices of quality of drug use may include the choice of drug (compliance with recommended assortment), drug cost (compliance with budgetary recommendations), drug dosage (awareness of inter individual variations in dose
requirements and age-dependence), awareness of drug interactions and adverse drug reactions, and the proportion of patients who are aware of or unaware of the costs and benefits of the treatment.

**Determinants of use**
These include user characteristics (e.g. socio-demographic parameters and attitudes towards drugs), prescriber characteristics (e.g. specialty, education and factors influencing therapeutic decisions) and drug characteristics (e.g. therapeutic properties and affordability).

**Outcomes of use**
These are the health outcomes (i.e. the benefits and adverse effects) and the economic consequences [6-10].

**Scope of Drug Utilization Studies**
Drug utilization studies may include descriptive epidemiological approaches to the study of drug utilization, but also the assessment of how drug utilization relates to the effects of drug use, beneficial or adverse. The research in this field aims to analyze the present state and the developmental trends, of drug usage at various levels of the health care system, whether national, regional, local or institutional. Drug utilization studies may evaluate drug use at a population level, according to age, sex, social class, morbidity, among other characteristics. These studies are useful to provide denominators to calculate rates of reported adverse drug reactions, to monitor the utilization of drugs from therapeutic categories where particular problems can be anticipated (e.g., narcotic analgesics, hypnotics and sedatives, and other psychotropic drugs), to monitor the effects of informational and regulatory activities (e.g., adverse events alerts, monitoring urgent safety restrictions). Drug utilization data may be used to produce crude estimates of disease prevalence (e.g., cardiovascular disease, anti-diabetic drugs, to plan drug importation, production, and distribution, and to estimate drug expenditures. The characterization of drug utilization may be extended linking prescription data to the reasons for the drug prescribing. They include the concept of appropriateness, that must be assessed relative to indication for treatment, concomitant diseases (that might contraindicate or interfere with chosen therapy) and the use of other drugs (interactions). Therefore they can document the extent of inappropriate prescribing of drugs (e.g. antibiotics, NSAIDs) and even the associated adverse clinical, ecological, and economic consequences. Moreover, they can also explore the percentage of drugs that adhere to the evidence-based recommendations in place for its indications [11-13].
Aims of Drug Utilization Research
The principal aim of drug utilization research is to facilitate the rational use of drugs in population. For the individual patient, the rational use of a drug implies the prescription of a well-documented drug at an optimal dose, together with the correct information, at an affordable price. Without knowledge of how drugs are being prescribed and used, it is difficult to initiate a discussion on rational drug use or to suggest measures to improve prescribing habits. Information on the past performance of prescribers is the linchpin of any auditing system. Drug utilization research in itself does not necessarily provide answers, but it contributes to rational drug use \(^{(1,2,14)}\).

Objectives
1. Description of patterns of drug use in specific population
2. Identification and definition of likely problem
3. General Analysis of the problem
4. Establishment of decision on problem solving
5. Assessment of the effects of the action taken

Important of Drug Utilization Studies
1. More and more new drugs introduced in the market
2. Wide variation in the patterns of drug prescribing and consumption
3. Concern about delayed ADRs
4. Increase drug cost

Types of Drug Utilization Studies
Drug Utilization studies can be qualitative or quantitative

Qualitative
DUS studies are multidisciplinary operations which collect, organize, analyze and report information on actual drug use. They usually examine use of specific drugs or specific conditions. Qualitative DUS include the concept of criteria. Criteria are predetermined elements against which aspect of the quality, medical necessity and appropriateness of medical care may be compared. Drug use criteria may be based upon indications for use, dose, dosing frequency and duration of therapy. Qualitative studies assess the appropriateness of drug utilization and generally link prescribing data to reasons (indications) for prescribing. Such studies are referred to as drug utilization review or drug utilization Evaluation.
The process is a “therapeutic audit” based on defined criteria and has the purpose of improving the quality of therapeutic care.

**Uses of Qualitative DUS**
1. To study appropriateness of drug usage for Indication, Daily dose and length of therapy.
2. To assess clinical efficacy of most common sold drug.

**Quantitative**
It is the study to quantify current state and trend of drug use. DUS involve the collection, organization and display of estimates or measurements of drug use. This information is generally used for making purchase decisions or preparing drug budgets. But data from quantitative drug use studies are generally considered suggestive, not conclusive with respect to quality of drug use. It is possible to combine both quantitative and qualitative DU studies, which will yield information about pattern and amount of drug use as well as quality of drug use \(^{15-22}\).

**Uses of quantitative drug utilization studies**
1. To estimate drug utilization in population by demographic characteristic
2. Used as denominators to calculate rates of ADRs
3. To monitor specific therapeutic categories and effects of regulatory activities
4. Markers for crude estimates of disease prevalence
5. To plan importation, production and distribution
6. To estimate drug expenditure

**Design of Study**
Various research methods are used in DUS. Observational research methods are more commonly used. Cross-sectional studies, where drug use is examined at a single point in time are useful. Also the pre and post design where drug use is examined before and after interventions to improve prescribing is another commonly used observational method. Prospective, Concurrent or Retrospective DUS may also be used depending upon the

**Timing of data collection**

**Prospective DUS**
Involve evaluating a patient’s planned drug therapy before a medication is administered.
Concurrent DUS are performed during the course of treatment and involve the ongoing monitoring of drug therapy. It involves consideration of laboratory test results and other monitoring data when appropriate.

Retrospective DUS Involve review of drug therapy after the patient has completed a course of therapy. The patient’s medication sheet, daily progress notes, nursing observations, pathology/biochemistry results and therapeutic monitoring results are screened to determine whether drug therapy met predetermined criteria. The main advantage of this method is that prescribers and others are unaware of data collection and results may therefore be less biased. Another advantage is ease of data collection, as records are assessed at the data collector’s convenience. A disadvantage is that some information may be unclear or missing and that reviewed patients do not gain immediate benefit, as interventions are delayed until the intervention phase [21-27].

Sources Of Data For Dus
A. Surveys
1. IMS America provides: National Prescription Audit—measures the prescription volume that moves out of pharmacies into consumers
2. National Disease and Therapeutic Index – Represents up to 92 primary specialties grouped into 27 specialty groups
3. Mail Order Prescription Audit – measures the level of prescriptions dispensed from non-government mail-order pharmacy services via US Postal Service, United Parcel Service
4. US Department of Health and Human Services
5. National Health Care Expenditure Survey
6. National Health Ambulatory Care
7. National Ambulatory Medical Care Surveys (NAMCS)

B. Computerized database
a) Not diagnosis-linked
1. Drug sales
2. Drug movement at drug distribution channel level
3. Pharmaceutical or medical billing data
4. Samples of prescriptions
b) Diagnosis-linked
1. Drug & morbidity data included

C. Non Diagnosis Data Bases
1. National Prescription Audit for drug distribution
2. US Pharmaceutical Market (drugstores, drug distribution)
3. Medicaid Management Information Systems (billing data)
4. Saskatchewan Health Plan
5. UK Prescription Pricing Authority (billing data)
6. Spain’s Drug Data Bank (NIH) (billing data)
7. J) Denmark’s Pharmacoepidemiologic Prescription Database of the County of North
8. Jutland

D. Diagnosis Linked Data Bases
1. National Disease and Therapeutic Index
2. Kaiser Permanente Medical Plan
3. Group Health Cooperative of Puget Sound
4. COMPASS: Health Information Designs, Inc
5. Sweden’s Community of Tierp
6. Center for Primary Care Research
7. University of Uppsala, Sweden

Prescription Error in Hospital
2. Errors of Omission
3. Physician ignorance on drug costs
4. Failure to review medication orders
5. Inability to keep update drug information
6. Lack of communication between physicians and pharmacists

Scope In Future
The study of drug utilization studies is emerging field. Drug utilization studies have been having an increasing importance in pharmacoepidemiology by means of bridging more closely to other areas.
Pharmacovigilance
Pharmacovigilance plans require extend safety knowledge, in order to investigate potential drug-drug interactions and signal detection of adverse drug reactions. Drug utilization data can be used to perform screening for patients who may be at increased risk for drug-induced illnesses, often by use of concomitant drugs, abuse or overuse of drugs. It is also important to evaluate the paediatric population, since many medicines prescribed for children are given surveillance of natural non-registered products, such as herbal medicines in the general population is also needed.

Pharmacoeconomics
Drug utilization reviews can be used for the improvement of medical care and cost-containment, and are useful for measuring or comparing the economic impact of drug use in the population. By identifying adherence to guidelines in the current use of medicines, it is possible to reduce drugs expenditure and improve the allocation of the limited resources available, when the chosen drugs are not usually the most cost-effective.

Eco Pharmacovigilance
Pharmaceuticals are environment pollutants. It is important to observe the differences in national and international patterns of drug utilization in order to address and minimize the environmental impact of pharmaceuticals whilst continuing to deliver patient benefit.

Pharmacogenetics
Trying to assess genetic mechanisms related to drug safety issues is also a challenge for drug utilization studies, while comparing consumers’ characteristics and linking it to the benefit and risk of drugs.

Public health
Many studies have been conducted to change prescribing behavior. Several studies have demonstrated the efficacy of face-to-face methods in improving drug prescribing by identifying physicians who were prescribing drugs assessed as inappropriate and targeting for educational or information activities. However, drug utilization review programs as well as definition to what degree and which determinants of inappropriate prescribing are susceptible to modification and what might be an appropriate mix of interventions to achieve optimal impact merit further rigorous study.
Teaching Of Rational Drug Use

The performance of teacher could be failure if the teaching of pharmacology is measured by the rational use of drug. There are several places in the world where drug policy registration has not been based on rational drug evaluation. There are nowadays, provision of Health Care are clearly invitation to irrational drug use. The academic world of pharmacology is different from real world of clinical practice. When teaching the use of drug, one must refer to them by their generic name. It is only possible if the student learn pharmacology rather than commercial name. Teaching rational prescribing practices provide preliminary reflections on the teaching of Health Care professionals [31,32,33,34,35].

CONCLUSION

Drug utilization research can increase our understanding of how drugs are being used. DUS estimate the numbers of patients exposed to specified drugs within a given time period, describe the extent of drug use at a certain moment and/or in a certain area, estimate to what extent drugs are properly used, overused or underused. It can determine the pattern or profile of drug use cost effectiveness of therapy and the extent to which alternative drugs are being used to treat particular conditions. It can be used to compare the observed patterns of drug use for the treatment of a certain disease with current recommendations or guidelines.DUS also bring to light the number of case reports about a drug problem or adverse effects can be related to the number of patients exposed to the drug to assess the potential magnitude of the problem. Drug utilization research may also enable us to assess whether interventions intended to improve drug use are needed and if implemented whether have had the desired impact. Thus, Drug utilization data can be a great source of fed back to prescribers, policy makers and regulatory bodies

REFERENCES


