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Role of Pharmacist in Evidence-Based Medicine

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ABSTRACT

Evidence-based medicine (EBM) is an approach used by medical practitioners to optimize clinical decision-making by using the evidence from published results of properly conducted research. EBM is practiced to provide a stronger scientific base for clinical practice and to provide consistent, efficient, effective, safe and quality medical care to patients. Various study designs used in EBM are meta-analyses, systematic reviews, randomized controlled trials, cohort studies, case-control studies, case series, editorials and expert opinions, *in vivo* studies and *in vitro* studies. Evidence-based pharmacy improves the role of pharmacist in healthcare practice by emphasizing on a pharmacist-patient relationship and active involvement in the treatment procedure. Proper application of EBM promotes rational medication use.

INTRODUCTION

Evidence-based medicine (EBM) is the practice of individual patient care by using the evidence of extensive published research. EBM classifies published data based on its worth by considering meta-analyses, systematic reviews and randomized trials and provides a suitable recommendation for the physician. The National Library of Medicine (NLM) introduced the EBM as a medical subject heading (MeSH) to PubMed in 1997 and broadly defined it as medical practice with the aim to improve and evaluate patient care requiring the judicious integration of best research evidence with the patient data to make decisions about medical care

^[1]. It helps physicians make proper diagnosis, devise testing plan, select best possible treatment and method to prevent diseases, as well as develop guidelines for large groups of populations affected by the same disease ^[2].

Sackett et al. defined EBM in 1996 as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient. It means integrating individual clinical expertise with the best available external clinical evidence from systematic research." It is the most frequently used definition of EBM ^[3,4].

Eddy first used the term "evidence-based" in 1980s. He published numerous papers in Journal of the American Medical Association in early 1990s and developed guidelines and policies for evidence-based practice. The term is broadly used and can refer to anything from performing a meta-analysis of published research, to promote randomized clinical trials, to a personal incline toward critical evaluation ^[5]. Guidelines can be used in any part of medical practice like performing diagnostic tests, how and when a therapy must be started and how long patients must be under observation after a surgery/procedure ^[6,7].

Purpose of EBM

EBM is practiced to provide a stronger scientific base for clinical practice and to provide consistent, efficient, effective, safe and quality medical care to patients ^[5,8]. Increasing health care costs prevent the access of quality healthcare to many sections of society. Improper medical care (overuse, underuse and misuse) practices lead to development of various factors like drug resistance. Many epidemiological studies highlighted the variations in local medical practices and have confirmed huge differences depending on where the patient receives treatment ^[9,10]. Epidemiologists have stressed on a single solution to evaluate the scientific basis of treatments and provide population-based recommendations for professional standards of therapy ^[11,12].

EBM is comprised of a simple three step process which includes retrieval, evaluation and synthesizing the evidence based on statistical analysis; summarizing the benefits and risks; and determining the appropriateness of the medical intervention ^[13].

Healthcare professionals need to be updated with latest practices and must adopt EBM for their regular practice. Evidence-based pharmacy practice will improve the professional and technical skills of the pharmacist and provides a better patient care. It needs requires a proper education and training. Clinical pharmacists need to be trained on employing the EBM in patient care. Special training on principles of research, literature review and evidence based practice is very necessary to practice the evidence based pharmacy efficiently.

Studies have shown that EBM can be successfully used in therapy recommendations for patients suffering from multiple sclerosis ^[14], post-traumatic stress disorder (PTSD) ^[15-17], pulmonary hypertension ^[18], thyroid disorders ^[19], stroke ^[20], diabetes ^[21], rhinitis ^[22], cervical cancer ^[23], atrial fibrillation, etc. ^[24]. It is successfully implemented in various dental researches ^[25-27], nursing education ^[28], cancer chemotherapy trials ^[29], antibiotics ^[30,31] and NSAIDS ^[32] to detect adverse reactions ^[33-36]. EBM also acts as a useful tool in smoking cessation ^[37], suicide prevention ^[38], weight loss ^[39] and alcohol de-addiction programs ^[40,41].

Evidence-Based Pharmacy

Traditional pharmacy practice is usually a drug-oriented service primarily focusing on dispensing prescription/over the counter medications ^[42-44]. But evidence-based pharmacy improves the role of pharmacist in healthcare practice by emphasizing on a pharmacist-patient relationship and active involvement in the treatment procedure. It promotes rational medication use ^[45,46]. Pharmacist must be abreast with latest developments in treatment protocols, dosage adjustments, selection of alternatives and preventive therapies ^[47]. The pharmacists need to be trained with the skills in patient assessment, developing patient-specific care plan, patient education and counseling ^[48]. Evidence based practice is a highly useful tool for detecting and reporting adverse drug reactions ^[49,50]. Evidence-based pharmacy helps to prevent polypharmacy and promote medication compliance to geriatric patients ^[51].

Levels of Evidence

The healthcare professional needs to consider the data obtained from various sources before arriving at a final decision. The evidences gathered from variable sources provide varying levels of evidence. Various study designs used in order of importance and strength of the evidence are meta-analyses, systematic reviews, randomized controlled trials, cohort studies, case-control studies, case series, editorials and expert opinions, in vivo (animal) studies and in vitro studies [1,9,10]. These methods are explained in brief below

- **Meta-analysis:** It is the result of an extensive search of published medical research, selecting the data from valid, randomized controlled trials related to the selected topic. It uses complex statistical methods to pool the results of various studies and includes inclusion and exclusion criteria for every selected study [52].
- **Systematic Reviews:** These are similar to meta-analyses and provide solution to a clinical question by an extensive search from existing literature. They are generally provided by The Cochrane Library [52].
- **Randomized Controlled Trials:** These are experimental, prospective clinical studies conducted on human subjects. The subjects are randomly allotted to control group (receive placebo or no treatment) and experimental group (receive treatment). The trial can be a single blind or double blind study to prevent study bias.
- **Cohort Studies:** These are observational studies unlike randomized controlled clinical studies. Large groups of populations are studied over a period of time to know the effect of health condition or the exposure to a pollutant, etc. They are not randomized. Cohort studies can either be prospective or retrospective. A prospective study follows the enrolled subjects into the future and it can be expensive in cases the subjects are lost to follow up. A retrospective study collects data from patient's previous records. It is cheaper compared to prospective study but the data may be incomplete or biased [8].
- **Case-Control Studies:** These are observational, retrospective studies similar to cohort studies. They are performed in study subjects suffering from a condition to determine if exposure to something in the past has caused the same condition and to estimate the level of exposure.
- **Case Series:** It is report describing many individual cases in a single study subject. They are extremely useful in case of rare or unusual diseases.
- **Editorials and Expert Opinions:** They are based on experience of the editor or the expert providing the advice. They are considered as weak evidence as they have no statistical significance.
- **In vivo studies:** In vivo animal studies are used in preclinical research but the results in animal studies do not always reflect the same in human studies. Hence they are not usually preferred in EBM.
- **In vitro studies:** These are studies performed in controlled laboratory setting with cells or biological molecules in culture media or solution simulating biological fluids.

Evaluating the Evidence

PICO (population, intervention, comparison and outcomes) model is generally followed when answering a clinical question [1].

- **Population** - patients' characteristics, disorder or problem of interest,
- **Intervention** - the intervention, diagnosis, treatment or prognosis is being considered,
- **Comparison** - any alternate therapies available
- **Outcomes** - the final desired outcome.

Sometimes the time taken to arrive at the final decision or conclusion is also taken into picture. This modifies the PICO as PICOT model [53].

It is of utmost importance to use the evidence from well-designed studies with a large population size and clear inclusion and exclusion criteria. The study must preferably have a control group clearly defined end point. The study methods used must be relevant to the clinical question under examination. The control and experimental groups must be closely matched. The study used as evidence must be free of bias. All randomized controlled clinical trials should be double-blinded to avoid any possible bias. The statistical tool applied must be relevant to the study [54,55].

The databases used for collection of evidence must be reliable, accurate, provide timely information and must be updated frequently [56]. It is important to use reputed quality databases like PubMed,

Micromedex, etc. [57,58]. The selected database must preferably answer a wide range of clinical questions and must contain information about FDA-approved drugs, drugs under trials, traditional and alternate medications and non-prescription drugs [59]. Use of modern techniques like computerized prescription generation tools, computerized physician order entry and medication administration system will help resolve the complications the evidence generation [60].

Role of Pharmacist in EBM

Many community pharmacists in developing and underdeveloped countries restrict their role only to dispensing medicines to patients. Proper pharmaceutical care and evidence-based pharmaceutical care is a new concept for most of these pharmacists [61,62]. Lack of proper training, time and access to resources are the major barriers that impede pharmacists from employing evidence-based practice [56,63,64].

EBM helps to promote the rational use of medications making sure that patients receive the right medicine in the right dose for the right diagnosis at the right time at the lowest possible cost suitable to their individual requirements [65,66]. Pharmacist has a major role in this regard. Hospital/Community pharmacist is crucial in dispensing the medication prescribed the physician to the patient. At times, a clinical pharmacist may be asked questions by physicians, nursing personnel and patients regarding drug information [67,68]. Hence, the pharmacist must have a vast knowledge about various drugs, their interactions and adverse effects, proper dosage and must have good communication skills [69-71]. It is advisable to have a proper awareness of newer medical conditions, their diagnosis, prognosis and prevention, etc. [72-74]. Pharmacist must educate the patient about the proper usage of drugs while dispensing. Misinformation can be fatal to the health of the patient.

Proper guidelines must be developed in every country for the implementation of evidence-based practice [75-79]. Regular training and workshops on the advanced treatment practices, usage of latest drug information databases help in improving the pharmacist knowledge [80-84]. Many studies have suggested that proper EBM training improved the pharmacist knowledge and decision making process. Query/Problem based pharmacotherapy courses promote the active participation of pharmacist in the healthcare process [85-91].

CONCLUSION

EBM and evidence-based pharmaceutical care play a major role in promoting rational medication use and decision making. EBM helps in detection of adverse drug reactions, drug-drug interactions and can be of great use to answer clinical queries Healthcare professionals must employ EBM in their regular practice. Every country must develop proper guidelines to promote the implementation of EBM. Clinical and community pharmacists must be trained well with the latest developments in the therapeutic practices.

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