Importance of Evidence Based Medicine for Public Health

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Abstract

Over the last two or three decades, "evidence-based medicine" (EBM) has become something more like a buzz phrase. The concept of evidence-based medicine has been comprehensively discussed and opposed, accepted and rejected, understood and misunderstood in the extensive and broad scientific and non-scientific context. so there are many who appreciate the benefits offered by EBM but many are on the opposite side. EBM has become an important character for the practice of modern public health. EBM acts as a bridge between population health strategies and clinical research. Through highlighting the integration of different aspects such as the best available scientific evidence, community values (patient values), and practitioner expertise, EBM helps to generate equitable, efficient, and effective health interventions. The objective of this chapter is to highlight the primary role of EBM in shaping different public health decisions and the formulation of novel approaches such as EBPH. The aim of this chapter is to identify the challenges of EBM, its misuses and role in providing health care.

Keywords: Evidence-based medicine, Public health, Decision making, Evidence, Evidence-based public health.

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Introduction

David Sackett was the first in the field to define evidence-based medicine (EBM) as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients." EBM can also be described as it uses scientific evidence that is precisely obtained (in contrast with the unscientific experience with the chance of bias) as the decision-making process of the most knowledgeable physician also influenced due to his recent encounter with the patients. The bias can be overcome if the physician has the ability to understand the outcomes of controlled, large, and objective clinical studies which are the basis of different treatment strategies. So this approach is called evidence-based medicine (Kasper et al., 2008). The concept of evidence-based medicine first originated in the 19th century and was defined as the use of recent, best scientific evidence to make decisions for treatment of every single patient. The term EBM explains the explicit, conscientious, judicious, and reasonable use of the recently available evidence in making decisions related to the care of every single patient (Masic et al., 2008). EBM was proposed at first as a "new technique to teaching the practice of medicine" and it was focused on the development of teaching skills for the purpose of searching, appraising, interpreting and finally applying outcomes of scientific research and this approach called critical appraisal skills (Tang & Griffiths, 2009). EBM highlights the significance of the outcomes of the large clinical trials in developing treatment strategies for individual patients. The application of EBM also demands novel skills of the physician. These novel skills include literature searches frequently and efficiently and analytical use of established rules of evidence for the evaluation of clinical literature (Guyatt et al., 1992). EBM was quickly recognized as a matter of interest by the public health professionals. This is due to the fact that evidence used in EBM draws on epidemiological evidence and not the laboratory evidence or clinical basis. The method of collecting and appraising evidence is one of the central skills of the public health professionals (Aveyard, 1997).

History of Evidence-based Medicine

At first EBM was proposed as an innovative approach to teaching clinical medicine, recently the activities in EBM are majorly focused on teaching critical appraisal skills to physicians (Guyatt et al., 1992; Sackett, 1998; Binns & Lee, 2001; Leung, 2001). Five steps were proposed for teaching EBM including:

1. the need of information convert into an answerable question,
2. to answer that question, track down the best evidence,
3. critically appraising that evidence to check its impact, validity, and applicability,
4. integration of critical appraisal with clinical expertise of physician and unique values, biology, and circumstances of the patient,
5. evaluation of the efficiency and effectiveness in the execution of the steps 1 to 4 and finding out ways to improve them (Sackett, 1998).

The step 4 which states the use of evidence into practice (evidence-based decisions) is the core concept of the practice of EBM. Critical

appraisal is a preparatory step and the excellent example of that is the Cochrane Collaboration. Cochrane Collaboration is an international effort which helps the physician and decision makers to identify, appraise, summarize, and finally disseminate research evidence in a collective way. This helps the physician and decision makers to make evidence-based decisions. The focus on critical appraisal skills divert the attention from basic practice of EBM and also results in the ignorance of other important methods of visualizing the true potential of EBM. In 1996, the concept of EBM was rephrased as the contentious, judicious, and explicit use of recently best available evidence in making decisions regarding care of individual patients (Sackett et al., 1996). The shift in the concept from teaching method to a novel practice model, has opened the gates of new and more effective opportunities to get evidence into practice. EBM has been indiscriminately and narrowly restricted to clinical medicine by the middle of 1990s. The situation would be surprising if the principle of EBM could not be practiced to all the fields of health care including public health and health policies. As a matter of fact, the use of evidence from randomized controlled trials of human patients for the assessment and approval of the new drugs is absolutely an evidence based approach, as this approach was used at societal level before 1992 when the concept of EBM was first proposed. After the concept of EBM, the concept of evidence-based health care was proposed which uses the concepts of EBM to practice and make decisions for communities and populations (Gray, 2001; Tang & Li, 2023). In general, the concepts of evidence-based care of individuals and evidence-based decision making for a population should be included in the EBM. The evidence-based care for individuals also called more appropriately as evidence-based clinical practice while evidence-based decision making is generally known as evidence-based health care which includes policy making and evidence-based public health and all other forms which based on evidence-based decision making for population, including evidence-based practice guidelines and evidence-based approval of new drugs.

Challenges to EBM

Developing countries are slowly accepting the advances in science, medical research and technology. Besides this improvement, researchers are still in trouble and face several challenges. One of these challenges is evidence synthesis, as it is not operated in the developing countries at a level that has been observed in developed countries (Bonita et al., 2013; Magodoro et al., 2016). According to the opinion of experts in health metrics, the estimates reported in many studies worldwide are not distributed evenly which indicates that such estimates are mostly results of research and data which are collected in high income countries, and molded to fit into low and middle income countries. As a result, these estimates are not generally the exact reflection of the research and data obtained from the developing nations (Byass et al., 2014). Sometimes, various scientific evidence may be misleading and not efficient enough to influence appropriate decisions and this happens because of the inherent challenges in the collection and synthesis of the evidence (Josefsson et al., 2012). The main challenges faced by the developing countries in the evidence synthesis are discussed below.

Data Collection

It has been shown in many reports that the research studies regarding different health issues in developing countries does not follow the international standards (Aisanov et al., 2012). This situation is usually attributed to the lack of proper skills and knowledge about the medical condition of the patients, with researchers ultimately applying substandard guidelines while conducting research (Aisanov et al., 2012). Such as, it has been seen in many published reports that the symptoms of Chronic obstructive pulmonary disease (COPD) overlap with many other obstructive airway diseases which ultimately complicate the case determination during different epidemiological surveys (Adeloye et al., 2015). Results of some clinical studies indicate that patients having bronchial inflammation and obstruction may present with the signs and symptoms of asthma, emphysema, and chronic bronchitis (Menezes et al., 2004; Musafiri et al., 2011; Adeloye et al., 2015; Lal et al., 2015). So the collection and analysis of information in such cases may be not possible in the absence of standard guidelines. An efficiently conducted EBM should make it sure that the selected studies should be in accordance with standard case definitions, survey guidelines and sampling techniques. The criteria for the quality, inclusion and exclusion should be justified, explicit, and predefined and the problems regarding inter-observer variations should be well handled.

Restricted Evidence Base

Another major concern in various low and middle income countries is that the systems related to the registration and health management information are not fully working and also not established completely to provide the information and data needed (Byass et al., 2014). For example, the health management information systems in Africa are virtually absent (Byass et al., 2014). In the previous two decades, the subtle increases in the hospital, population and registry based studies which have been conducted in various parts of Africa, the main hurdle in the further research is the incompleteness of the data from these studies and ultimately hinder the policy decision making (Opare et al., 2013; Adeloye, 2015). It has been shown in emerging evidence that the routine health service records give more accurate information which is important for the estimation of burden of disease in comparison to various epidemiological surveys but these routine health service records should be actively registered, monitored, and evaluated. Besides this, population based studies are considered as the hallmark of many systematic reviews, particularly based on the cautious efforts by the researchers who are intended to answer a particular research question with almost no contribution of these routine health service records. In many developing countries, the population based studies are also limited. Such as, present reviews have identified that there are only ten countries in Africa which have conducted research and published findings on COPD. The research was mainly conducted in some selected populations and occupational settings, and the case definitions in these settings were particularly based on the observed respiratory symptoms rather than the standard diagnostic guideline (Mehrotra et al., 2009; Musafiri et al., 2011; Van Gemert et al., 2011; Adeloye et al., 2015).

Misuses of EBM and Health Care

Analogous to nuclear fission, EBM can be a powerful tool when used properly and can be very dangerous when not used appropriately. The term evidence-based leads to many guidelines and recommendations that are not clearly linked to the fundamental evidence base and also

do not truly represent the outcomes of a critical and systemic appraisal of the particular evidence. It appears that sometimes using this term precludes the need to explain the quality of primary evidence, the extent of effects, and the application of the outcomes or results in the context, preferences, and values of the patients. The situation is problematic due the EBM era has coexisted with an increase in the for-profit funding of research. The researchers funded by an industry for their research, may conclude the results in the favor of that particular industry as compared to the not-for-profit funding (Als-Nielsen et al., 2003). Several problems faced due to the industry funding include surrogate outcomes, use of improper control interventions, reporting and publication bias, and misleading presentations and descriptions of findings of the research which ultimately corrupt the evidence base (Montori & Guyatt, 2007). Assuming that the peer reviewers, medical editors, and topic experts have become very much familiar with the principle of the EBM, many unsophisticated users of the medical literature trust these corrupted research reports and commend for their application in practice. Several medical schools and training programs are distancing themselves from teaching the principles of careful evidence appraisal to focus on the implementation of the evidence. This is done to provide high-quality, low-cost, and safe care (in other words Accreditation Council for Graduate Medical Education capabilities of system-based practice and practice based learning (Montori & Guyatt, 2008). However, deserting the appropriate skepticism related to the effectiveness of these innovations may result in great investments in improvement of quality, safety, and efficiency activities which may fail to yield the expected benefits.

Evidence-based Disease Control and Health Promotion

The slow and long march towards the practice of EBM started approximately a century ago after the publication of the Flexner report regarding Medical Education in the United States and Canada (Flexner, 1910) and the speed of the march has escalated recently (Mendelson & Carino, 2005). In the development of evidence-based practice guidelines, the main role is played by government health organizations, health care quality improvement organizations, voluntary health associations, professional societies for health care, and several insurers and payers and they also promote their adoption to evidence-based practice (Guyatt et al., 2000; Sackett et al., 2000; Maibach et al., 2006). Another movement towards the practice of evidence-based public health has appeared recently which also includes development of evidence-based disease prevention practice guidelines (Brownson et al. 2018). Evidence-based disease prevention practice guidelines (the development of prevention literature mainly based on the general criteria to comprehend the level of evidence) (Fenton & Badgett, 2007) are the logical pinnacle of the health community's investment in the research regarding prevention which ultimately provide a logic for the decision making at local, state, and national levels. The example of the most prominent guidelines in the United States include Guide to Community Prevention Services also called the Community Guide and the Guide to Clinical Prevention Services (Zaza et al., 2005), other examples from the less developed countries include Third Joint Task Force of the European and Other Societies (Nishtar, 2002; De Backer et al., 2003). The major roles played by these guidelines include shaping public health decisions and disease prevention programming decisions such as decisions made by community organizations, employers, and potentially events consumers, particularly beyond the limits of the public health system (Briss et al., 2004).

Evidence-based Public Health

Evidence- based public health (EBPH) can be described as the application of tenets of EBM to the field of public health (Pettman et al., 2012). The concept of evidence-based public health was first proposed as a practice model that constructs upon the success of EBM. Both EBM and EBPH models work through the use of systematic data, information, and scientific principles, as a result EBM enhances clinical care while on the other hand EBPH improves population health (Kohatsu et al., 2004). The primary drivers of the policies and decisions in public health are crises, public opinions and political concerns (Greenberg, 1992; Institute of Medicine, 2003). A new more evidence-based approach to public health has been presented by several researchers which is primarily based on the advances of EBM (Brownson et al., 2009). The concept of EBPH was further explored (16) and characterized as the development, implementation, and evaluation of the different programs of public health while using the principles of implementation, and evaluation of the different programs of the public health while using the principles of scientific reasoning (Brownson et al., 2018). A framework was also designed to use the concept of EBPH into practice by many practitioners of public health (Brownson et al., 2018). The term public health is defined as what we do as a society collectively to assure the conditions in which humans can be healthy (Tulchinsky & Varavikova, 2010). While agreeing with this broad vision, the 2002 Institute of Medicine report, The Future of the Public's Health in the 21st Century, highlights that public health is not only confined to government, " the efforts, science, art, and approaches exploited by all private and public sectors and civil society to confirm, protect, maintain, improve, and promote the health of people" (Tulchinsky & Varavikova, 2010). The main factor which influences the significance of any public health approach or intervention for example EBPH, is either the intervention achieved the desired outcomes such as improved quality of life, reduced mortality, and decreased risk factor prevalence, or simply enhanced the adoption of a healthy lifestyle. Similar methodologic and ethical constraints which prevent the rigorous examination of the effectiveness of EBM also influence the effectiveness of EBPH (Heller & Page, 2002). There has been a significant transformation in the practice of medicine due to the application of EBM as it provides methodologies to find out and improve the science base and ultimately improving clinical decisions (Heller & Page, 2002). The success of EBM opens the way to adopt evidence-based approaches in different fields such as EBPH and, same as the EBM, the field of EBPH continues to grow with reference to practice and methods.

Conclusion

Evidence-Based Medicine plays a vital role in achieving equitable, effective, and sustainable public health. EBM helps in developing effective interventions to ensure they fulfill the needs of the population. With all the health challenges such as chronic diseases and pandemics, EBM provides a way to produce effective population health outcomes, improved decision making, and strong health care systems. To improve the potential of EBM practice, there is a need for collaboration between interdisciplinary research to enhance public health. To overcome the challenges of the chronic diseases, epidemics, pandemics, threat of infectious diseases, and other health related issues, there is a need to improve the evidence quality by enhancing the data collation in developing countries. The full potential of EBM in public health can be obtained by bridging the gap between research and practice. This will enhance the quality of health care systems, policy making and driving new approaches such as evidence-based public health.

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