Evidence-Based Medicine and the Theory of Knowledge

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Evidence-based medicine suggests a broad definition of evidence: any empirical observation or report of a symptom or mental state constitutes potential evidence, whether systematically collected or not. Thus, the unsystematic observations of individual clinicians constitute a source of evidence, a patient's report of feeling tiredness or pain would represent a second source of evidence, physiologic experiments constitute another source, and clinical trial results constitute a fourth.

CLAIMS SHOULD CONSIDER ALL OF THE MOST CREDIBLE EVIDENCE

Most philosophers contend that the concept of evidence is inseparable from the concept of justification (ie, what is justified or reasonable to believe depends entirely on the trustworthiness of one's evidence). This view is known as evidentialism. Frequently, however, evidence is inconsistent (ie, points to different conclusions). Under these circumstances, people tend to select evidence that favors their particular views, which often vary, sometimes markedly.

Evidence-based medicine, while acknowledging that interpretation of evidence is inevitably subjective, is consistent with philosophical views that endorse a central role of evidence as the basis of generating agreement among rational observers. Philosophers also have found that the pursuit of truth is best accomplished by examining the totality of evidence rather than selecting evidence that favors a particular view. This position is a core principle of EBM, denoted herein as the first principle of EBM (Box 3-1).

Evidence-based medicine espouses the view that the extent to which we believe in a proposition should be directly related to the confidence we can place in the relevant evidence. Evidence is more believable if it is generated by rigorous scientific studies. Thus, we should hold only those beliefs based on evidence obtained by credible processes, a view known as reliabilism.

BOX 3-1
Epistemologic Principles of Evidence-Based Medicine

1. The pursuit of truth is best accomplished by examining the totality of evidence, rather than by selecting a limited sample of evidence, which is at risk of being unrepresentative and will certainly be less precise than the totality.
2. Not all evidence is equal, and a set of principles can identify more vs less trustworthy evidence.
3. Evidence is necessary but not sufficient. Clinical decision making requires the application of values and preferences.
This begs the question of how we recognize rigorous studies (i.e., what determines the confidence we can place in the evidence). Evidence-based medicine has a detailed answer to this question and in supplying that answer assumes a link between evidence in which we can be confident and "truth." This provides the philosophical basis for the second principle of EBM: not all evidence is equal (Box 3-1). In this book, we offer guidance for determining more vs less credible evidence (see Chapter 2, What Is Evidence-Based Medicine? and Chapter 23, Understanding and Applying the Results of a Systematic Review and Meta-analysis).

EMPIRICAL EVIDENCE VS THEORY

One of the central and recurring tensions in the theory of knowledge is whether science should permit only observations of the observable world or, in addition, place value on theoretical constructs. The prominence of EBM in contemporary clinical practice and education has been achieved by an insistence on adherence to standards of credible evidence. The medical literature is replete with the disastrous consequences of acting on apparently compelling but in fact untrustworthy research findings (see Chapter 11.2, Surprising Results of Randomized Trials). The insistence in evidence-based medicine on obtaining rigorous observations in real-life clinical situations is consistent with the views of those who would ignore theory and attend solely to empirical observations.

This characterization is, however, an oversimplification. Evidence-based medicine makes use of theoretical constructs, but it demands rigorous testing of the proposed theories. That is, in EBM, the role of theory is not to describe the world but to accurately predict empirical observations.

Thus, EBM not only promotes skepticism of theoretical constructs but also encourages skepticism about the results of empirical observations with no plausible theoretical basis. This book has many examples of situations in which, once robust and trustworthy evidence is available, the prevailing theory of the day is quickly discarded. For instance, compelling theory and observational studies suggested the benefits of antioxidant vitamins for reducing the risk of both cancer and cardiovascular events—an idea appropriately discarded by most clinicians as soon as sufficiently large and rigorously conducted randomized trials showed no benefit. On the other hand, results from homeopathy trials are viewed with skepticism in part due to judgments regarding the implausibility of homeopathic theory, illustrating that theory has a role in EBM reasoning.

These brief epistemologic considerations demonstrate that EBM draws on all major traditions of philosophical theories of scientific evidence. Evidence-based medicine, however, is not a scientific or philosophical theory of knowledge. Rather, EBM is designed as a structure for optimal clinical practice. This brings us to the third EBM principle: to improve the process of problem solving and decision making for individual patients and for populations, evidence is necessary but not sufficient (Box 3-1).

EVIDENCE IS NECESSARY BUT NOT SUFFICIENT FOR CLINICAL DECISION MAKING

As highlighted above, EBM has emerged as a result of our hunger for evidence or information to guide problem solving and decision making. Evidence-based medicine, however, distinguishes "conclusions" from "decisions." Conclusions are judged by the truthfulness under formalized inferential assumptions, whereas decisions deal with consequences of specific actions in specific circumstances. Humans process the possible consequences of actions at the level of emotions and cognitive or analytical appraisal. Modern cognitive science proposes that our decision making is governed by dual processes that consist of type 1 processes (which are intuitive, automatic, fast, narrative, experimental, and affect based) and type 2 processes (which are analytical, slow, verbal, and deliberative and support formal logical and probabilistic analyses).

Our ultimate choices depend on the interaction of type 1 and type 2 decision-making processes. This is the reason that, for example, 2 patients who develop severe pneumococcal pneumonia in the
setting of terminal cancer dominated by chronic pain and low quality of life may make different health care decisions. Aware that evidence leaves us confident that treatment reduces morbidity and mortality from pneumococcal pneumonia, 1 patient may choose antibiotics. The other, however, may decide to forego treatment because she has come to terms with her terminal condition, resolved her personal affairs, and wishes to receive palliative care. Both decisions are likely to require careful reflection, including discussion with loved ones.

CONCLUSIONS

Because EBM proposes specific associations among theory, evidence, and knowledge, the theoretical basis of EBM can be understood as a system of acquiring and evaluating evidence to gain knowledge. Evidence-based medicine, however, does not propose a theory of medical knowledge or have a rigorous epistemological stance. With these considerations in mind, EBM can be defined from an epistemological point of view as a set of principles and methods to ensure that population-based policies and individual decisions are consistent with all the most credible evidence while relying on both type 1 and type 2 cognitive processes to weigh the trade-offs involved in alternative courses of action.

References


