What Does It Really Take to Evaluate Complementary and Alternative Medicine Therapies?

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Introduction
For several years I have given a lecture to the second year medical students at my institution on the subject of evaluating complementary and alternative medicine (CAM) therapies. One approach I have taken is to present a fictional account of a patient with cancer who seeks homeopathic treatment in lieu of conventional therapy. During the lecture, I give a basic general outline of homeopathic treatment emphasizing the marked disconnect between its premises and those of the biological and physical sciences that undergird conventional medicine. I also posit that the efficacy of the particular homeopathic treatment relevant to the case presentation is said to lack any scientific support. On the other hand, I also critically examine evidence-based medicine’s (EBM’s) gold standard, the randomized clinical trial, pointing out its limitations as a means of discerning the true efficacy of a given therapy. Before concluding the lecture I invite students to indicate whether or not they would support the patient’s quest for homeopathic cancer treatment. It is remarkable how many of the students, immersed in the study of the medical sciences as they are, nevertheless are supportive of this venture.

Why were so many of my students supportive of this example of non-evidence-based medicine? The answer is not easy to confirm and is likely multifactorial. However, I have explored the question in order to better understand the educational needs of my students. Perhaps my students responded as they did because they were relatively early in their medical studies or because they lacked clinical experience or because the case was a hypothetical one. While all these explanations are possible, they are unlikely to have contributed greatly. After all, the students had been studying science for years before they entered medical school. Also, any abstraction from reality fostered by their clinical naiveté and the artifice of the case would surely have been overcome by their life experience, given how popular CAM is among the lay public. Alternatively, the students’ critical appraisal of the proposed treatment might have been blunted because they had been presented a stream of biased, uncritical endorsements of CAM in their medical school curriculum. This explanation would align with the mordant allegations made by Marcus and McCullough in their critique of U.S. medical school CAM curricula. However, my institution’s curriculum addresses CAM very minimally. Furthermore, even if my own presentation were not as balanced as I would like to think, it is unlikely that the fifty-minute lecture would have been sufficient to undercut the students’ confidence in the scientific method and to woo them to support a treatment that was presented as unsupported by scientific evidence. No, more likely, they had entered their medical education already predisposed to endorsing such treatments, in spite of their previous scientific education. In the rest of this essay, I will seek to show that such predisposition is plausible and that it has implications for medical educators.
Homeopathy and the National Health Service

I have found the debate about whether homeopathy is worth including among the services provided in the British National Health Service (NHS) instructive. A meta-analysis by Shang and associates on the evidence base for homeopathy, when published in the Lancet in 2005, was touted by some as settling the case against homeopathy.²,³ This meta-analysis contradicted the positive findings of the previously predominant meta-analysis by Linde and colleagues.⁴ Yet, the issue is far from settled as a recently published paper makes clear.⁵ The author, Ng, defends homeopathy's inclusion in the NHS even while conceding that in March 2009 one of the primary care trusts within the NHS chose not to cover it any longer. What is instructive is to observe how a priori presuppositions play so prominent a role on both sides of the debate. Ng flaunts established EBM dogma that views evidence from case reports and anecdotes as inferior in quality to clinical trials. His reason for doing so betrays the priority of values that he assumes:

"Arguably, a positive patient experience is what matters most....Data on patient popularity and patient-reported benefits...support the provision of homeopathy in the NHS."⁵

Baum and Ernst, widely published critics of homeopathy, are unabashed about their presuppositions:

"...in the parallel universe of homeopathy, life, as we know it, would be inconceivable....To have an open mind about homeopathy or similarly implausible forms of alternative medicine...is therefore not an option....We should start from the premise that homeopathy cannot work and that positive evidence reflects publication bias or design flaws until proved otherwise."⁶

The point of these excerpts, that one's fundamental presuppositions about reality make all the difference in both the pursuit and the evaluation of scientific investigation, is echoed poignantly by another British editorialist:

"Are the results of placebo controlled trials in homoeopathy convincing?...How seriously clinicians take these findings depends on their prior beliefs. If you cannot conceive of highly diluted solutions with undetectable drug concentrations having a biological effect, then no matter how well designed the trial or robust the meta-analysis, a positive result will not change your view. If you are less concerned about the integrity of our model of the universe...than (sic) the overall positive result of the trials makes it easier to take homeopathy seriously....Randomized controlled trials may be efficient arbiters of clinical effectiveness, but they are not particularly good for resolving philosophical disputes."⁷

Philosophy and EBM

However, philosophical dispute is exactly what characterizes the criticism, even from within the scientific medical community, that EBM is unfit for evaluating CAM. Tonelli and Callahan, in their 2001 paper argue that the method used to evaluate a therapy must match the conceptual framework underlying the therapy.⁸ Since certain CAM therapies are highly individualized and are often based on conceptions of illness and health that are not amenable to scientific explanation, EBM is not the best way to assess them. And when Sehon and Stanley attempted to restore the credibility of EBM they did so in philosophical terms by asserting that what EBM needed was to adopt a richer philosophical framework.⁹ While agreeing with Tonelli and Callahan about the need for a coherent theoretical basis for evaluating empirical data, Sehon and Stanley object to CAM's theory of disease being used as this base. They maintain, "If we are judging the effectiveness of alternative medicinal therapies, then we evaluate the evidence in light of the theory about disease that we believe to be true." Once again, we bump into fundamental presuppositions about reality.

Implications for Medical Education

How then must I equip my students to make wise decisions regarding CAM therapies? Medical students will be ill-equipped if they are not given tools with which to examine the fundamental presuppositions that underlie both the proposed therapies and the means by which they are evaluated. It would not be sufficient if they learned the hierarchy of evidence inherent to EBM or how to apply its methods of critical analysis to scientific studies evaluating CAM therapies. On the other hand, if they learned about homeopathy from the viewpoint of its proponents, this approach too would fall short of adequately equipping them to critically evaluate homeopathy therapies. Even adopting both approaches would be insufficient. Is that not precisely the strategy that has yielded the current impasse? No, my students, after learning about CAM therapies and how to evaluate them by