

Virtual Mentor

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CLINICAL CASE

“CAM” Education in Medical Schools—A Critical Opportunity Missed

Commentary by Kimball C. Atwood, MD

Sophia was a second-year medical student at a highly regarded institution, and the day’s classes were dedicated to introducing complementary and alternative medicine (CAM). During the day, students rotated through different rooms to observe presentations about biofeedback hypnosis, holistic chiropractics, traditional Chinese medicine, yoga, and energy medicine.

Sophia was intrigued but expected a critical overview of CAM—published papers that would lend credence to these practices, or the perspective of physicians who deal with the patients seeking them. She was surprised to find that this was not how it was presented. CAM practitioners were given an unrestricted platform to promote their methods and neither they nor the medical school faculty provided disclaimers. The biofeedback hypnotist insisted that his therapies were “as effective as any science.” And the Chinese medicine practitioner said, “When the flow of qi is disrupted it can cause diseases like cancer. Acupuncture adjusts this flow.”

Afterwards, as her classmates were spilling into the hallway, Sophia spotted one of her friends and pulled him aside. “Hey, Michael, what do you think of that session? Wasn’t it kind of...unsettling?”

“What do you mean?” He asked.

“I mean... ‘qi?’ Seriously? I can’t believe they would teach this kind of thing here.”

“I get that you’re a skeptic, but I would appreciate it if you wouldn’t belittle Chinese medicine. Qi is widely accepted as legitimate. Of course, it’s a concept that I wouldn’t expect anyone who hasn’t grown up in the culture to appreciate. But 5,000 years of Chinese history—which is hard to argue against—lends credibility to traditional Chinese medicine. For example, red yeast rice has been used by the Chinese for 1,200 years, and guess what—now Western medicine uses it to treat high cholesterol in patients who can’t take statins. So keep an open mind before you disregard an entire school of thought.”

“Michael, I’m sorry if I sounded disrespectful; that really wasn’t my intention. And you’re right—red yeast rice is a perfect example of how a traditional medicine can successfully become part of an established modern therapy. But it only did so with the support of valid evidence—through appropriately peer-reviewed, controlled, and randomized clinical trials.”

“But Sophia, who are you to decide what constitutes ‘evidence?’ Many of these medical therapies are holistic and represent a way of life. It’s impossible to subject that kind of complexity to controlled trials.”

“Perhaps. But if they can’t be tested scientifically, then these ‘ways of life’ shouldn’t be actively promoted. Evidence is important, and the only way to get as close to it as possible is via the scientific method. It is the only tool available to us that systematically removes emotion and bias. Without it claims like those made by CAM practitioners cannot be objectively evaluated. I’m not saying that alternative remedies don’t have value, but to equate them with peer-reviewed, evidence-based therapies is misleading and potentially lethal.”

Michael chewed on his bottom lip. He understood what Sophia was getting at, but he still felt there were many therapies that could not truly be tested by evidence-based medicine. Should we simply discourage all of those practices? Did strict science really have a monopoly on truth? Or were there other legitimate forms of evidence?

Commentary

The clinical case illustrates a problem common to “complementary and alternative medicine” (CAM) courses in U.S. medical schools: they are uncritical and promotional [1-3]. This is unfortunate because the topic offers an ideal opportunity to discuss scientific skepticism, other critical thinking skills, accurate information, the history of medicine, medical practice ethics, human studies ethics, and linguistic integrity—all of which are basic to professionalism and excellence in modern medicine.

History, Language, and Integrity in Medical Education

Such courses are frequently based on the American Medical Student Association’s (AMSA) *Education Development for Complementary and Alternative Medicine (EDCAM) initiative: A National Curriculum For Medical Students* [4]. The EDCAM project was funded in 2002 by the National Center for Complementary and Alternative Medicine (NCCAM), which, concurrently, funded CAM teaching programs at several medical schools [5, 6]. From the EDCAM “Background and Overview”:

One hundred years ago...doctors and healers co-existing in the practice of medicine [were] more focused on clinical outcome than mechanism of action.

Over the past century...the mechanism of action of a treatment has often overshadowed patient preferences, cultural issues, and the biopsychosocial model of patient care, which are more emphasized in older medical systems.

Complementary and alternative medicines (CAM) in the U.S. are defined by general terms of exclusion...

Their exclusion...has labeled them as “alternative.” In the UK, where they are used in combination with drug-based medicines, they are called “complementary.” Healers who treat the patient and the disease process as mind-body-spirit call their work “holistic.” Recently, MDs trained in allopathic medicine who want to bring in other modalities...use “integrative” medicine. Several misnomers also exist in the terminology. Traditional...is also used to refer to allopathic medicine by Americocentric persons. Western medicine is also a misnomer, as homeopathy, osteopathy, and native American medicines were developed in the West, but the term is used to refer to allopathic medicine [7].

To EDCAM, the place of “alternative medicine” in modern health care would seem to be a matter of politics: a struggle over power, dominance, centrism, privileging, and exclusion. Plausibility is apparently irrelevant (except insofar as plausibility is itself a form of privileging); modern treatments are drug-based rather than holistic; modern medicine devalues patient preferences, cultural issues, and the biopsychosocial model; biomedicine is more concerned with mechanisms of action than with clinical outcomes. Such postmodern deconstructions are not limited to the musings of EDCAM authors [8].

In reality, the emergence of modern medicine and its discarding of prescientific myths were the result of scientific discoveries [9]. Medical schools might use the topic of CAM to discuss how the numerical method of Pierre Louis led to the downfall of bloodletting, or how the bacteriology of Koch, Pasteur, and Lister combined with the clinical observations of Holmes, Semmelweis, Snow, and others to explain the contagions that had plagued humankind throughout history and to drastically reduce the dangers of surgery and childbirth.

When I was in medical school in the 1970s, it was common to hear students complain that basic sciences were irrelevant to medical practice. CAM offers an opportunity to demonstrate how truly relevant they are, because it was the discovery of such principles as chemical thermodynamics and Avogadro’s number and the development of the basic medical sciences, that refuted vitalism, homeopathy, humoral theory, miasma theory, the doctrine of signatures, and other prescientific myths that persist today as CAM beliefs.

The EDCAM passage is full of its own misnomers: “allopathic” was coined circa 1800 by Samuel Hahnemann, the inventor of homeopathy, to highlight the difference between his idea that “like cures like” and the approach of contemporary “regular” European medicine, which, as he saw it, “supressed symptoms by opposition.” The term was not accurate even at the time, and certainly does not describe modern medicine [10]. “Holistic healers” are largely innocent of human biology [11]. “Integrative” boasts properties that it did not create (“patient-centered” care, preventive medicine [12]) and makes a promise that it can’t keep: to “combine the best of conventional and complementary medicine” [13].

Modern medicine is “Western” only in the trivial sense that its historical roots were found in Europe and North America. It is distinguished by its reliance on science. The principles of biology, chemistry, anatomy, physiology, and pharmacology do not vary according to location, nor does the capacity of science to follow evidence wherever it may lead, whether to new discoveries or to discrediting long-held opinions. Many of those discoveries—statins, for example (see below)—have been made in non-Western settings. Modern medicine is thus universally applicable. It is no more Western, in any important medical or scientific way, than the physics of Einstein was Jewish.

The biopsychosocial model was first proposed not by “older medical systems,” but in 1977 by the academic psychiatrist George Engel, who thereby demonstrated that it is within the capacity of modern medicine to recognize the benefits of a holistic—in the accurate sense of the term—approach to medical care [14]. “Complementary” and “alternative” are themselves euphemisms, designed not by those who would exclude them but by their apologists, to distract from less flattering adjectives [15]. An honest term for most practices covered by the term CAM would be “implausible medical claims.”

Learned Skepticism: An Equal-Opportunity Belittler of Prescientific Myths

Logical fallacies, including the appeal to tradition (“Five thousand years of Chinese history”), are common in CAM advocacy. Astrology is far older than acupuncture, but astrology is not valid. Others fallacies illustrated in the case scenario are the *ad populum* (“qi is widely accepted as legitimate”), the straw man (Michael appears to accuse Sophia of belittling Chinese culture, people, or history when she was doing nothing of the sort), the argument from ignorance and the argument from authority (“a concept that I wouldn’t expect anyone who hasn’t grown up in the culture to appreciate”), special pleading (“It’s impossible to subject that kind of complexity to controlled trials”), the *ad hominem* (“who are you to decide what constitutes evidence?”), and the *tu quoque* (“keep an open mind before you disregard...”).

The medical school classroom should seek to foster a rigorous, skeptical habit of mind [16-18]. Qi cannot, by dint of its Chinese pedigree, claim immunity from scientific scrutiny. Nor is such scrutiny even concerned with that pedigree: what makes qi unworthy of being taken seriously in science or medicine is that it is undetectable, unmeasurable, and unfalsifiable. The same can be said for many other beliefs found in CAM, no matter their geographical or ethnic origins: the human energy field, craniosacral rhythms, chakras, the four humors, chiropractic subluxations, vitalism, psychokinesis, *similia similibus curantur*, water memory, homunculi represented on the eyes, ears, and feet, and more. A scientific dismissal of qi no more belittles Chinese culture or people than a dismissal of humoral theory belittles European culture or people.

The term “Chinese medicine” is itself misleading, because medicine in China today is, overwhelmingly, modern. Even prescientific Chinese medicine, as the term usually implies, was not one thing or even a few things; it was many, disparate ideas

and treatments—as would be expected for such a long history and such a large geographical area [19]. There was substantial foreign influence, particularly from India and Greece [20]. “Traditional Chinese medicine” is a term invented in the People’s Republic of China only a few decades ago [21]. It refers to a variety of ideas and practices that resemble some found in Chinese history, but that during the 1950s and ’60s were forced—not by science or logic but by governmental fiat—into an unprecedented, standardized collection.

Pharmacognosy, Statins, and Red Yeast Rice

That many useful drugs have been and will continue to be derived from natural sources, exactly as biology would predict, is widely known. This has little to do with the recent political phenomenon known as “CAM,” whose champions have, in fact, frustrated such endeavors [22]. Statins were found by a purposeful search in soil microbes for inhibitors of cholesterol synthesis, much as streptomycin had been discovered in a search for antibiotics three decades earlier [23, 24]. Statins were eventually found in several fungi; the fungus associated with red yeast rice was one, but not the first, and traditional medicinal uses of red yeast rice appear to have had no bearing on the discovery. The promotion of a supplement as an alternative to pharmaceutical-grade statins, however, is fraught with hazards common to crude preparations: widely varying doses of active ingredients, and adulteration with naturally occurring toxins [25].

There is evidence that red yeast rice extracts capable of lowering cholesterol levels may be tolerated by patients who have experienced statin-associated myalgias from single agents [26]. If so, it might be due to the dose of lovastatin (the major active ingredient) in such extracts being lower than the usual prescribed dose, which would be unremarkable. On the other hand, it may be that the variety of monacolins (statins) in red yeast rice can reduce cholesterol with fewer side effects, which would be an important discovery. All of this will need to be determined by scientific means. This is pharmacognosy, not CAM [27].

Science, Evidence-Based Medicine, and Skepticism

Sophia is correct that whatever specific value there may be in an untested treatment can only be demonstrated through scientific evaluation. There are not “other legitimate forms of evidence.” The preponderance of evidence shows that the effects of CAM treatments, with the exceptions of a few biological substances, are not distinguishable from those of placebos [28, 29].

Ironically, evidence-based medicine (EBM) has often given CAM more credibility than science warrants. Recent reviews by the Cochrane Collaboration have called for randomized controlled trials (RCTs) of treatments that other scientific evidence has long put to rest, such as laetrile, chelation for atherosclerotic cardiovascular disease, therapeutic touch, and homeopathy [30-34]. Studying these topics would present medical educators with opportunity to discuss concepts of general interest in medicine, including what constitutes scientific evidence, the EBM levels-of-evidence

scheme, the purpose of the RCT, frequentist vs. Bayesian inference, why people believe that ineffective treatments work, and human studies ethics [35-39].

Such a discussion might also consider parapsychology: the study of clairvoyance, ESP, psychokinesis (telekinesis), precognition, remote viewing, communicating with the dead, and more. The field is more associated with CAM than most medical faculty appreciate (therapeutic touch, Reiki, distant healing, applied kinesiology, and external qigong are examples of psychokinesis) and has been subjected to trials for far longer than have CAM methods [40, 41]. Parapsychology, like CAM, has at best yielded equivocal, inconsistent results; yet it persists as a *pathological science* [42].

The history of parapsychology demonstrates that academic researchers are often not up to the task of evaluating bizarre claims. In 1978 the magician James Randi, famous for having debunked psychic spoon bender Uri Geller on the Johnny Carson Show, arranged for a pair of teenage magicians, who were particularly adept at spoon bending, to pose as psychics and present themselves for testing at a parapsychology lab at Washington University in St. Louis. Over a 3-year period the two were easily able to convince their hosts, including a physics professor, that they possessed paranormal powers [43]. Prior to the hoax, Randi had written the physicist, offering advice on how to control for trickery, only to be ignored.

History is repeating itself. David Eisenberg, director of CAM research and education at Harvard, recounted his amazement at watching a “qigong master” direct his “external qi” to light a light bulb. Eisenberg called for studies in American laboratories and wrote, “the suggestion that Chinese medical authorities would consciously dupe the Western scientific community is absurd” [44]. Yet James Randi exposed similar qigong feats as conjuring tricks, and Eisenberg had himself been duped by demonstrations of “acupuncture anesthesia” [45, 46].

David Katz, Yale’s representative on the steering committee of the Consortium of Academic Health Centers for Integrative Medicine, told me that he keeps an open mind about “strange powers that are beyond our understanding” in part because he saw a mentalist perform fork bending [47, 48]. Dr. Katz was unaware that he had witnessed a magic trick. Psychologist Gary Schwartz of the University of Arizona, the principal investigator (PI) of the NCCAM-sponsored Center for Frontier Medicine in Biofield Science, claims to have demonstrated scientifically that mediums, including John Edward, can communicate with the dead [49-51]. Victor Sierpina, the PI of the NCCAM-funded Curriculum in Alternative Therapies at the University of Texas Medical Branch at Galveston, published a book review in the *Journal of the American Medical Association* touting “the scientific evidence of the effects of nonlocal mind”—psychokinesis—as a treatment for an auto crash victim [52].

All four of the schools just mentioned are recipients of numerous NCCAM educational or research grants [53]. Is it any wonder that students are scratching their heads?

Conclusion: Medical Practice Ethics and Educational Ethics

Few articles address the ethics of medical doctors' prescribing or referring patients for CAM. One article argues that when the evidence is sufficient, the physician should recommend CAM, citing treatments that are either not CAM ("relaxation training for improving anxiety and decreasing pain"; "psychotherapy, group therapy, relaxation, and imagery for improving the quality of life in patients with breast cancer") or are not adequately supported by evidence (acupuncture for the nausea of chemotherapy) [54].

Another article considers the "broad principles...acknowledged to underlie medical ethics: Autonomy, Nonmaleficence, Beneficence, and Justice." It concludes: "Yes, patients have needs that are not being served by mainstream medicine, but these needs do not include being subjected to bogus tests, claims, and treatments" [55].

Elsewhere I've discussed the relevant excerpts from two widely accepted medical practice ethics treatises, including the *AMA Code of Medical Ethics*, concluding:

[There is] an obligation to patients and an obligation to honesty and integrity, which in turn is either explicitly or implicitly linked to science...

[It is] unethical for physicians to offer implausible treatments, to refer patients to others for implausible treatments, or, if asked, to fail to inform patients of the implausible nature of such treatments.

[It is] unethical to administer a placebo without the patient's informed consent, or to mislead patients about the reasons that implausible treatments make some people feel better. Thus it is dishonest to recommend acupuncture or homeopathy in a disguised attempt to elicit a placebo effect [56].

Those points may be debatable, but they deserve discussion in any medical school CAM presentation.

From the *AMA Principles of Medical Ethics*:

V. A physician shall continue to study, apply, and advance scientific knowledge, maintain a commitment to medical education, make relevant information available to patients, colleagues, and the public [57].

The clinical case presented here, the AMSA EDCAM modules, and the preponderance of other evidence demonstrate that violating this principle is the norm for CAM education in American medical schools. Marcus and McCullough, the authors of the most recent article reporting this state of affairs, concluded:

The flawed curricula presented by integrative medicine programs constitute an educational failure on the part of health professions schools and AMSA....

By tolerating this situation, health professions schools are not meeting their ethical obligations to learners, patients, or society [1].

CAM offers an opportunity to discuss numerous issues that are both fascinating and fundamental to medical education and professionalism. That opportunity is being squandered.

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