

# RHODE ISLAND MEDICAL JOURNAL



SPECIAL SECTION

## INTEGRATIVE MEDICINE

GUEST EDITORS: ELIZABETH KO, MD; FRED J. SCHIFFMAN, MD

MARCH 2016

VOLUME 99 • NUMBER 3

ISSN 2327-2228

# RHODE ISLAND MEDICAL JOURNAL



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A woman practices Tai Chi outside. Credit: Mariann Seriff, Graves Fowler Creative; Courtesy: National Center for Complementary and Integrative Health.

Circa 1820 print by Japanese artist Eisen Ikeda shows the mask of a mythological figure, a dish of incense, a bonsai tree, and other articles. Credit: Library of Congress

Meditation origins and traditions video. Courtesy: National Center for Complementary and Integrative Health. <https://nccih.nih.gov/news/multimedia/video/meditation-origins-traditions>

A doctor and a patient sit to review and discuss a folder of Time to Talk campaign materials. Credit: Matthew Lester, Courtesy: National Center for Complementary and Integrative Health.

Yoga instructor demonstrates a lunge pose. Credit: Bob Stockfield, Courtesy: National Center for Complementary and Integrative Health.

## Introduction to the Principles of Integrative Medicine (IM)

GUEST EDITORS

ELIZABETH KO, MD

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While there are many definitions of health, the definition by the World Health Organization in 1948 is widely endorsed:

“...a state of complete physical, mental and social well-being, and not merely the absence of disease.”

Although medical advances have saved and improved the lives of millions, medicine has primarily focused on addressing the immediate events of disease, with less emphasis on the underlying factors that contribute to illness. The widespread use of this definition supports how the perception of health is gradually shifting from health as “absence-of-disease” to a much more all-encompassing idea of prevention and wellness.

The interest in lower cost, effective, holistic, evidence-based approaches to prevention and treatment of disease is growing. In 2007, nearly two of five Americans reported use of therapies such as massage, yoga, meditation and supplements.<sup>1</sup> Such therapies accounted for \$34 billion in out-of-pocket expenditures.<sup>2</sup> This interest is growing along with, and fueled by, the growth in knowledge about the relationship between health and the more intangible elements of the healing process. Some of these practices are based on experiences of cultures over time, some based on evolving scientific theories, some based on little more than speculation. Regardless, each compels an inquiry of what is lacking in the conventional healthcare system that prompts so many to turn elsewhere for healing. The challenge remains to determine which models and approaches to healthcare, conventional or alternative, might best integrate the science and achieve the outcomes that patients and providers desire.

The Arizona Center for Integrative Medicine, established by Andrew Weil, MD, in 1994, defines integrative medicine as healing-oriented medicine that takes account of the whole person, including all aspects of lifestyle.<sup>3</sup> Patients and practitioner are partners in the healing process, which uses both conventional and alternative methods to facilitate the body's innate healing response. All factors that influence health, wellness and disease are taken into consideration, including mind, spirit and community. Good medicine is based on good science, which is inquiry-driven and open to new paradigms. The most effective, least invasive interventions should be used whenever possible.

The Institute of Medicine (IOM), in their report on Integrative Medicine and the Health of the Public Summit, identified care coordination as a major and growing need for those with and without chronic disease. Five chronic conditions – diabetes, heart disease, asthma, hypertension and depression – account for more than half of all U.S. health expenditures.<sup>4</sup> Most of these conditions can be adequately managed although only 55 percent of the most recommended clinical

preventive services are actually delivered.<sup>5</sup> For this reason, care coordination that emphasizes wellness and prevention remains the hallmark of integrative medicine.

Harvey Fineberg, MD, president of IOM, states that there are five critical dimensions to integrative medicine:<sup>6</sup>

- **Broad definition of health:** Health is more than the absence of disease; it is a state of physical, emotional and social well-being.
- **Wide range of interventions:** Integrative medicine explores the spectrum of healing, from prevention to treatment to recovery.
- **Coordination of care:** Emphasizes coordination across all providers, caregivers and institutions.
- **Patient-centered care:** Services are provided for and around the individual patient.
- **Variety of modalities:** Integrative medicine is open to not just usual care, but to unconventional modalities that help patients manage, maintain and restore health.

In this special section of the *Rhode Island Medical Journal*, we explore several ideas and opinions that contributors believe will contribute to the achievement of the WHO's definition of health. The challenge remains to create a seamless engagement by patients and providers of the full range of physical, emotional, social and psychological factors known to be effective and necessary for the achievement of optimal health.

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# Making Whole: Applying the Principles of Integrative Medicine to Medical Education

GRACE CHOW, MD; KEVIN T. LIOU, MD; ROBERT C. HEFFRON, MD

## ABSTRACT

In the past few decades, the public's use of complementary and alternative medicine (CAM) has steadily increased. The term "integrative medicine" is often used to refer to the combination of CAM with conventional medicine. Many medical schools have incorporated didactic content on CAM and/or integrative medicine into their curricula. A frequently cited rationale for these course offerings is that medical students ought to be taught the basics of CAM in order to counsel patients on safe, effective therapeutic options. Schools have also offered these courses to meet the needs of students who are interested in incorporating CAM into future practices. In this article, the authors suggest that the core principles of integrative medicine – holistic worldview, centrality of the doctor-patient relationship, emphasis on wellness, and inclusiveness – are aligned with the goals of contemporary medical education and serve a critical function in the development of effective, humanistic physicians.

**KEYWORDS:** complementary alternative medicine, integrative medicine, medical education

## INTRODUCTION

In the past decade, the public's use of complementary and alternative medicine (CAM) has steadily increased.<sup>1</sup> The National Center for Complementary and Integrative Health (NCCIH) was established to conduct scientific research on CAM, to train researchers, and to distribute authoritative information about CAM to health professionals and the public.<sup>2</sup> As part of this mission, NCCIH created an educational initiative entitled "Complementary and Alternative Medicine (CAM) Education Project Grant" whose central aim was to support the incorporation of CAM-related content into medical school curricula.<sup>3</sup> The initiative's longer-term goal was to promote the integration of CAM and conventional medicine within an interdisciplinary healthcare system.<sup>3</sup>

The term "integrative medicine" is often used to refer to the combination of best practices from CAM and conventional medicine, but there continues to be a lively debate surrounding the definition of integrative medicine and its role in medical training.<sup>3</sup> A recent study found that 66 out of 130 medical schools include CAM and/or integrative

medicine in their curricula.<sup>4</sup> A frequently cited rationale for these course offerings is that medical students ought to be taught the basics of CAM in order to counsel patients on safe, effective therapeutic options.<sup>5</sup> In addition, schools have offered these courses to meet the needs of students who are interested in incorporating CAM into their future practices. Given the public's and health professionals' growing interest in CAM, it makes sense to equip medical students with CAM-related knowledge and skills. However, the rationale for incorporating integrative medicine into medical curricula extends beyond these goals.

Bell et al. argue that integrative medicine is more than simply the combination of CAM with conventional medicine:

Integrative medicine is a comprehensive, primary care system that emphasizes wellness and healing of the whole person (bio–psycho–socio–spiritual dimensions) as major goals, above and beyond suppression of a specific somatic disease... [T]he patient and integrative practitioner are partners in the effort to develop and implement a comprehensive treatment plan for issues that extend far beyond the immediate chief complaint... Truly integrative medicine draws from conventional and alternative techniques to facilitate healing and to empower the patient because healing is believed to originate within the patient rather than from the physician.<sup>6</sup>

These core principles of integrative medicine – holistic worldview, centrality of the doctor-patient relationship, emphasis on wellness and healing, and inclusiveness – are aligned with the goals of contemporary medical education<sup>7,8</sup> and are relevant to the training of all medical students, regardless of their interest in practicing CAM. This article describes how the principles of integrative medicine may serve a critical educational function in the development of effective, humanistic physicians.

## Holistic Worldview

Although integrative medicine is a relatively modern field, its philosophical foundations are derived from traditional medical systems (e.g. traditional Chinese medicine, homeopathy, and Ayurvedic medicine), which treat the whole patient as an "intact, complex, dynamic system."<sup>6</sup> Many CAM systems share an emphasis on "looking for patterns of dysfunction that manifest throughout the individual rather than isolated problems in separate bodily subsystems."<sup>6</sup> A practitioner of traditional Chinese medicine (TCM), for example,

may search for symptoms (e.g. anxiety, sleeplessness), signs, (e.g. tongue appearance, cold limbs), and medical history (relationships, spiritual life) that a conventional physician might not consider when diagnosing patients with a chief complaint of stomach pain. Thus, the TCM practitioner may distinguish several patterns of disharmony – each treated differently – while the conventional physician may diagnose only one pathological mechanism (e.g. peptic ulcer disease).<sup>9</sup>

Because of their tendency to view human beings as complex systems that are more than the sum of their parts, TCM and other CAM systems are said to embrace a “holistic” worldview; that is, each medical problem (e.g. stomach pain) can only be understood in relation to the whole person.<sup>6,8</sup> This worldview resonates with George Engel’s biopsychosocial model for medicine, in which he called for physicians to take into account not only the biology of disease, but also its psychological and societal consequences.<sup>10</sup>

Developed decades ago, the biopsychosocial model continues to shape medical practice and education today. The arts and humanities are increasingly being used in medical schools as a means for students to explore the human dimensions of illness.<sup>11</sup> For example, the field of narrative medicine aims to help physicians refocus on the patient’s story and appreciate the “singular, irreplicable, and incommensurable” aspects of the illness experience. “What... is *different* about this disease as it manifests itself in this particular patient? What...is unique about this patient as a host of this disease?”<sup>12</sup> These are common questions for integrative practitioners to ask as they formulate an individualized treatment plan. Introducing students to this holistic approach can help them become more cognizant of the biopsychosocial dimensions of medical practice.

Integrative medicine also provides students with a practical framework to fit together the various dimensions of patients’ lives. More importantly, this framework leaves room for patients’ individuality to be factored into diagnosis, assessment and treatment plans. Such patient-centered approaches have the potential to not only improve clinical outcomes, but also to build more effective, supportive doctor-patient relationships.

### Centrality of Doctor-Patient Relationship

A central tenet of integrative medicine is that a healthy doctor-patient relationship is vital to the healing process. Integrative medicine envisions patients and doctors as equal partners in the medical decision-making and treatment process.<sup>6,8</sup> This patient-centered approach is consistent with conventional medicine’s shift away from a paternalistic model of medicine towards one that is more collaborative.<sup>13</sup>

While it respects the power of conventional biomedicine, integrative medicine also attempts to facilitate the body’s own healing response. In this model, patients are expected to be active participants in their health because the source of healing is believed to come from within themselves. Thus, physicians should act not only as care providers, but also

as motivators and teachers who guide patients on healthy lifestyle practices.

Because physicians are expected to serve as effective role models, the concept of physician self-care is central to integrative medicine. This issue is especially relevant in light of recent physician suicides and mounting evidence of physicians’ poor health habits.<sup>14</sup> Educators have long recognized that stress in medical school has detrimental effects on students’ health, and in recent years, there has been a growing movement to create student wellness programs.<sup>15</sup> The CAM practices encompassed within integrative medicine offer a wide range of self-care tools (e.g. mind-body techniques, yoga, tai chi, and nutrition) that students can incorporate into personal wellness programs and later teach to future patients.

Recent changes to the health-care system have placed larger emphasis on behavior modification (e.g. smoking cessation, diet) as a form of intervention.<sup>8</sup> Such changes will require meaningful patient-physician relationships, an area where integrative medicine has much to offer.

### Emphasis on Wellness and Healing

In the 19th century, two French scientists – Pasteur and Béchamp – put forth competing theories about the nature of illness. Pasteur posited that external pathogens (“germs”) were the cause of all disease. Béchamp proposed that the internal terrain (“host”) was the most important factor in the pathogenic process and that pathogens only caused disease if the health of the host was compromised.

For decades, the worldview of conventional medicine was based on Pasteur’s germ theory of disease, driven in part by the success of antibiotics in fighting disease. However, in light of recent health reforms that emphasize prevention and wellness,<sup>16</sup> the tide has shifted towards Béchamp’s approach, which focuses on the cultivation of a healthy terrain through lifestyle practices rather than on the elimination of pathogens. These changes have been most relevant in the management of chronic disease, such as heart disease and diabetes, but can also be extended to the field of oncology. Rather than focusing exclusively on the destruction of “germs” (i.e. tumor cells) through chemo-radiation and surgery, oncologists are now exploring immunotherapies, which optimize the internal terrain and stimulate the host’s own immune system to fight cancer.

This shift towards a more host-oriented approach aligns closely with the orientation of integrative medicine, whose view of health is consistent with the World Health Organization’s definition: “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.”<sup>17</sup> Conventional medicine has traditionally focused on the latter half of the above definition. In contrast, many of the CAM systems have emphasized the cultivation of inner balance and harmony.<sup>9</sup> Rather than treating a disease after it has already developed, a TCM practitioner will use acupuncture and herbs to correct imbalances and also prescribe individualized diets and lifestyle practices

to supplement a patient's constitutional vulnerabilities, preventing disease from occurring.<sup>9</sup> With its vast arsenal of self-care resources, integrative medicine can prepare students for these recent healthcare changes that have placed a larger premium on prevention and wellness.

### Inclusiveness

At its core, integrative medicine is an inclusive paradigm that rejects the notion of an "alternative" medicine by proposing that all safe and efficacious healing modalities have a place in the physician's toolkit. It asks practitioners to recognize the benefits and limitations of conventional medicine while being open to other evidence-based approaches that may be more effective for certain conditions. The inclusiveness and openness of the integrative model provides a useful context for developing two other important skills in medical education: cultural sensitivity and inter-professional teamwork.

Due to the ever-changing demographic patterns in the United States and the growing recognition of culture as a key factor in determining health outcomes, cultural competency is now widely considered a core competency in medical training.<sup>18</sup> Beliefs about the causes and treatment of disease are strongly influenced by one's cultural and religious backgrounds. Differences in doctors' and patients' belief systems may result in conflict.<sup>12</sup> Because many CAM systems grew out of ancient traditions, exposure to integrative medicine practices can help students view health and illness through the lens of other cultures. It also promotes cultural humility by helping students realize that conventional medicine may not have all the solutions.<sup>7</sup> Most importantly, the very existence of the integrative model serves as an important reminder that there is room within the medical paradigm for a diverse range of voices and perspectives.<sup>6-8</sup>

Cultural sensitivity and humility is also a crucial component of teamwork.<sup>19</sup> Integrative medicine is inherently a collaborative field. The existence of various licensed professions within CAM presents unique opportunities for inter-professional education.<sup>19</sup> By learning from different CAM practitioners, students can develop collaborative skills that are necessary to work effectively with other healthcare professionals.<sup>7</sup>

These types of inter-professional skills are becoming increasingly important as the healthcare system becomes more team-based and multi-disciplinary.<sup>16</sup> The patient-centered medical home (PCMH), for example, is a coordinated, team-based model that has shown promise in improving clinical decision-making and health outcomes.<sup>20</sup> Integrative medicine, which shares many of the features of PCMH, can prepare students for these emerging healthcare trends.

### SUMMARY

Over the years, conventional biomedicine has been responsible for various breakthroughs in medical care, from

antibiotics to organ transplants. Conventional medicine excels at taking apart complex systems and studying the individual components. Its strength, however, is also a potential weakness. The reductionistic approach of conventional medicine has produced a fragmented healthcare system, in which patients are shuffled from one specialist to another. Often times, medical care is directed at small pieces of the patient's problem, rather than the whole person.

Integrative medicine fights against this reductionistic tendency and provides a framework for putting the pieces back together. This paradigm challenges physicians to view patients as whole individuals and to weave the various dimensions of their lives into a holistic picture. This comprehensive approach engenders meaningful doctor-patient relationships and promotes wellness and healing. By recognizing that the whole is more than the sum of the parts, integrative medicine also embraces diversity and welcomes new perspectives, which is especially important in today's team-based healthcare system and culturally diverse landscape.

In short, integrative medicine embodies humanistic values that all physicians should possess. It should have a place in contemporary medical education. One of the central aims of medicine is to heal, which literally means "to make whole." This is the very essence of integrative medicine – to synthesize the disconnected fragments of a person, and a healthcare system, into a new, meaningful whole.

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# Yoga for Depression and Anxiety: A Review of Published Research and Implications for Healthcare Providers

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## ABSTRACT

There is increasing interest in the use of yoga as way to manage or treat depression and anxiety. Yoga is affordable, appealing, and accessible for many people, and there are plausible cognitive/affective and biologic mechanisms by which yoga could have a positive impact on depression and anxiety. There is indeed preliminary evidence that yoga may be helpful for these problems, and there are several ongoing larger-scale randomized clinical trials. The current evidence base is strongest for yoga as efficacious in reducing symptoms of unipolar depression. However, there may be risks to engaging in yoga as well. Healthcare providers can help patients evaluate whether a particular community-based yoga class is helpful and safe for them.

**KEYWORDS:** yoga, depression, anxiety

## INTRODUCTION

Over the past few years, patients, clinicians, researchers, and yoga practitioners have shown increasing interest in the use of yoga as a way to manage or treat depression and anxiety. Yoga is a discipline and practice with origins in India. In the United States, most people practice *hatha* yoga, which includes physical postures (*asanas*) and can include breath control and practices (*pranayama*) and meditation (*dhyana*). There are many different styles of hatha yoga – for example, *Vinyasa* or *Iyengar*. Hatha yoga classes can vary in numerous ways: some classes may involve flowing from one posture to another; others may be more focused on alignment and holding postures. Classes can range from very vigorous and aerobic in nature to very gentle. In some classes, teachers may focus on teaching mindfulness. That is, teachers may instruct yoga students to focus on breathing and bodily sensations in a non-judgmental way as the students move or hold postures.

Yoga might be appealing to people who struggle with depression and anxiety for many reasons. It is affordable and readily accessible in many areas. In addition to the fact there are many yoga classes in the community, yoga students can also use instructional DVDs and books to practice at home. There are modified classes for people with special concerns,

such as pregnant women. Yoga may also alleviate physical pain,<sup>1</sup> a common comorbidity among people with depression or anxiety. Yoga can easily be used in combination with traditional mental health treatments. Finally, some people may like the fact that yoga focuses on promoting good mental and physical health, and is not focused on correcting a deficit or treating poor health.

## MECHANISMS BY WHICH YOGA MAY IMPROVE DEPRESSION AND ANXIETY

There are many possible mechanisms by which yoga might have an impact on depression or anxiety. We highlight two types of mechanisms here: cognitive/affective and biologic.

First, in a yoga class, a student may be directed to direct his/her attention to present-moment thoughts, feelings, and body sensations in a non-judgmental way. This practice of mindfulness, when extended into everyday life, may help one to focus on current experience, rather than ruminating on the past or worrying about the future. Further, the emphasis on a non-judgmental approach may help to decrease self-criticism. Learning to attend to current experience, including current thoughts and feelings, can also teach one that thoughts and feelings are transient mental events, and that negative (and positive) feelings will fluctuate and change. Mindfulness-based therapies have a demonstrated impact on depression and anxiety symptoms.<sup>2</sup>

Yoga-based practices may serve to regulate the autonomic nervous system. Autonomic nervous system dysfunction is associated with depression<sup>3</sup> and anxiety.<sup>4</sup> Yoga practices may modify underactivity of the parasympathetic nervous system (PNS) and GABA systems in part through stimulation of the vagus nerves, which are the primary peripheral pathway of the PNS. There is some research to suggest that yoga does indeed increase PNS activity and increase GABA levels in the thalamus, and that these increases are correlated with improved mood.<sup>5</sup> Researchers have also hypothesized yoga may have a positive impact on related biologic pathways. Yoga may reduce hypothalamic-pituitary-adrenal axis activation, although evidence to date is inconsistent.<sup>6</sup> Finally, there is some evidence yoga may serve to decrease inflammation (e.g.,<sup>7</sup>). Change in these biologic pathways may affect the underlying pathophysiology of depression and anxiety.



## REVIEW OF CLINICAL TRIALS OF YOGA FOR DEPRESSION AND ANXIETY

**Unipolar depression.** A recent meta-analysis of 12 randomized controlled trials (RCTs) of yoga for clinical depression reported yoga was significantly better than usual care, relaxation exercises, or aerobic exercise in decreasing depressive symptoms.<sup>8</sup> Studies have also shown that hatha yoga can improve mood symptoms occurring in the context of medical problems. Meta-analyses of RCTs have reported that yoga is associated with large reductions in depression and anxiety in cancer patients,<sup>9</sup> and has a significant impact on depression (and pain) associated with fibromyalgia.<sup>10</sup> Yoga may also be useful for prenatal depression.<sup>11</sup>

**Bipolar disorder.** We were unable to find any randomized clinical trials of yoga for bipolar disorder. We have published anecdotal evidence that yoga can be helpful for some symptoms of bipolar disorder.<sup>12</sup>

**Anxiety and anxiety disorders.** There are very few studies of yoga for specific anxiety disorders. Two separate single-arm trials of yoga interventions as adjunctive treatments for people with generalized anxiety disorder showed improvements in anxiety symptoms over time.<sup>13,14</sup> Among a small group of people with “anxiety complaints,” yoga, relative to a wait-list control, was associated with lower anxiety after 1 month of practice.<sup>15</sup> There is a larger-scale randomized clinical trial of yoga vs. cognitive behavioral therapy vs. an educational control group currently underway (see [clinicaltrials.gov](http://clinicaltrials.gov)).

Promising data on the effects of yoga on anxiety also comes from studies of yoga versus a control group in healthy individuals (without psychiatric disorders) or in individuals with a particular medical problem. These data are encouraging. For example, as mentioned above, a meta-analysis showed that yoga was superior to control groups in reducing anxiety for people with cancer.<sup>9</sup> Yoga was also shown to be superior to a health education control group in reducing anxiety (and increasing quit rates) for women trying to quit smoking.<sup>16</sup>

**Post-Traumatic Stress Disorder.** There is significant interest in yoga for PTSD, although relatively few RCTs have been published. In a recently published RCT, 64 women with PTSD were randomly assigned to yoga or a health education class. At study endpoint, significantly fewer women assigned to the yoga group met criteria for PTSD.<sup>17</sup> A small RCT with 21 male military veterans showed that that a breathing-based yoga intervention was associated with larger decreases in PTSD symptoms than a wait-list control group.<sup>18</sup> In contrast, another RCT included 38 women with PTSD who were randomized to Kripalu yoga vs. an assessment control, and both groups showed decreases in PTSD symptoms. However, the study was likely underpowered to detect statistically significant differences.<sup>19</sup> Finally, in a non-randomized study, Descilo and colleagues<sup>20</sup> compared tsunami survivors with elevated PTSD symptoms who received a yoga breathing intervention vs. a wait-list control, and found significant decreases in PTSD symptoms for the yoga group relative to the control group. There are

also several trials of yoga for PTSD in veterans currently underway (see [clinicaltrials.gov](http://clinicaltrials.gov)). Thus, the existing literature on yoga for PTSD is encouraging, but not definitive.

## LIMITATIONS OF EXISTING RESEARCH

As can be seen by this literature review, with the possible exception of unipolar depression, there are relatively few scientific studies evaluating the impact that yoga may have on symptoms of mood, anxiety disorders, and PTSD. Further adding to the difficulty of making conclusions from this literature, there are important differences between studies, and many studies suffer from methodologic limitations. We highlight a few key issues here. First, the style of yoga varies significantly between study interventions – with different emphasis placed on how gentle vs. vigorous the practice is and the degree to which pranayama, meditation, and mindfulness are emphasized. Some of the yoga interventions described above were not hatha yoga – i.e., they were primarily focused on pranayama and not at all focused on asana practice. Second, yoga interventions also differ in “dosage”: i.e., the length of classes, the number of classes per week, and the degree to which home practice is encouraged. Third, trials employ a variety of control groups, ranging from a relatively weak control groups (i.e., no treatment) to stronger control groups (i.e., physical activity or another type of class that controls for time and attention). Fourth, many studies do not include an assessment of the key outcome measure (e.g., depression or anxiety symptoms) performed by an evaluator who is blind to treatment assignment.

## IMPLICATIONS FOR HEALTHCARE PROVIDERS

We provide recommendations for healthcare providers in light of the current level of evidence of yoga for depression and anxiety. It is possible that an individual with a mood or anxiety disorder will be interested in trying yoga. A healthcare provider might advise his/her patient that there are many different styles of yoga in the community, and that the patient may want to try a class for a few weeks, evaluate whether the class seems to be comfortable and helpful, and, if not, consider trying a different class. If the patient is not physically fit, it is wise to start with a “gentle” or “beginner’s” yoga class. Classes that emphasize mindfulness practices may be particularly helpful for people with depression or anxiety. Although there is no formal licensure for yoga teachers, yoga teachers who are Registered Yoga Teachers (RYTs) with the Yoga Alliance have gone through a formal training program approved by the Yoga Alliance. Thus, the patient may want to choose a class taught by a RYT.

Although yoga may be beneficial, the patient and healthcare provider should be aware of possible risks of engaging in yoga. In studies described above, investigators often did not report on a systematic assessment of adverse events, and thus there is very little data available on possible risks

of yoga participation. However, in a survey study of people with bipolar disorder who practiced yoga, potential risks cited included: practices such as rapid breathing or extended meditation possibly leading to symptom exacerbation (mania or depression), physical injury, and negative comparison to other students.<sup>12</sup> Other possible risks include dehydration resulting from the combination of a heated room and psychotropic medications, or strong negative psychological reactions (such as panic attacks, flashbacks, or hallucinations) to extended meditation sessions. When choosing a class, a patient will want to be mindful of his/ her own vulnerabilities and risks, including risks associated with psychotropic medications.

## CONCLUSION

In sum, there is preliminary evidence that yoga may be helpful for depression, anxiety, or PTSD. The evidence is strongest for unipolar depression. Healthcare providers can help patients evaluate whether a given community-based yoga class is helpful and safe for them.

For further reading and suggestions for practice, see *Yoga for Depression: A Compassionate Guide to Relieve Suffering Through Yoga* by Amy Weintraub (Harmony Books, 2003).

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## Teaching Doctors-in-Training About Nutrition: Where Are We Going in 2016?

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### ABSTRACT

Atherosclerotic cardiovascular disease (ASCVD) is the leading cause of preventable death in the U.S., and its public health and economic burdens are rising. There is substantial evidence that dietary factors significantly reduce ASCVD-related morbidity and mortality, and that Americans, including those with established ASCVD, adhere poorly to cardio-protective diet patterns. Despite this, there continues to be a large gap in nutrition education during medical school and post-graduate training, leaving physicians poorly prepared to counsel patients on diet, nutrition, and related behavior change. The result is a massive missed opportunity to improve cardiovascular disease prevention at the health system level. However, recent calls for change by stakeholder groups, and a surprising new experiential learning model, suggest this may be changing.

**KEYWORDS:** nutrition education, graduate medical education, culinary medicine, cardiovascular disease prevention

### ABUNDANT DATA SUPPORT DIET CHANGES TO REDUCE ASCVD RISK

Data from numerous lines of evidence over the past half century have shown that dietary factors impact cardiovascular morbidity and mortality, and various mechanisms are involved, including effects on blood lipids, blood pressure, body weight, inflammation, insulin sensitivity, endothelial function, platelet function, and other mechanisms.<sup>1</sup> In the last 15 years, randomized trials have shown that a combination of diet changes may produce large effects on cardiovascular outcomes. In the 2001 Lyon Diet Heart Study, post-myocardial patients randomized to a Mediterranean diet supplemented with plant and marine omega-3-fatty acids demonstrated marked reductions in the rate of cardiac death and recurrent non-fatal infarction at 46 months compared to those assigned to usual diet advice (1.24 per hundred patients per year vs. 4.07 per hundred patients per year).<sup>2</sup> In the 2006 PREDIMED trial, subjects free of cardiovascular disease at entry and randomized to a Mediterranean diet supplemented with extra virgin olive oil or with nuts showed 15.5 % and 44.8% relative risk reductions in

stroke, respectively, compared to those randomized to a control diet.<sup>3</sup> Based on these and other data, the 2013 American Heart Association/American College of Cardiology (AHA/ACC) Guideline on Lifestyle Management to Reduce Cardiovascular Risk made class I and II recommendations for diet change that included increased intake of fruits, vegetables, whole grains, low-fat dairy products, poultry, oily fish, legumes, nuts and non-tropical oils, and reduced consumption of sweets, sugar-sweetened beverages and red meats.<sup>4</sup> Although there are some differences, the guideline-recommended diet changes are food-based (vs. nutrient-based) and aligned with a Mediterranean diet pattern.

### ADHERENCE TO CARDIO-PROTECTIVE DIETS IS POOR IN THE U.S.

Despite the large evidence base supporting diet interventions for the primary and secondary prevention of ASCVD, the typical American diet has remained poor. In fact, of the seven cardiovascular health metrics established by the American Heart Association in 2010, goal achievement has been lowest in the area of diet adherence.<sup>5</sup> In addition, more than one-third of adults are obese and increased intake of sugar-sweetened beverages and foods has been identified as a contributor.<sup>6</sup> Even among those with established coronary disease (CHD), data show low adherence to recommended diet changes. A 2008 survey study by Ma et al showed that subjects diagnosed with CHD a year prior met only 12.4% and 7.8% of the recommended intake of vegetables and fruits, respectively, and had higher than recommended intakes of trans-fats.<sup>7</sup> Similarly, in the cross-cultural Prospective Urban Rural Epidemiology (PURE) study, only 39% of more than 7,500 subjects with a history of CHD or stroke reported adherence to healthy diets as assessed via the Alternative Healthy Eating Index.<sup>8</sup>

### THE NUTRITION TRAINING GAP IS LARGE

Despite recommendations by the National Academy of Sciences in 1985 that at least 25 hours of nutrition education be provided during the 4 years of medical school training, a 2010 survey showed that little more than one-quarter of medical schools offered a nutrition course, and the average number of nutrition education hours in 2008 was under twenty.<sup>9-10</sup> Moreover, survey data show that most nutrition

training during medical school remains didactic-based, with little to no experiential or problem-based learning. This is unfortunate because recent reforms in medical school curricula would appear to provide ample opportunity to vertically integrate the principles of diet, nutrition and behavior change over the 4 years of training.

Nutrition education during post-graduate training is similarly inadequate: few requirements exist, and there is little to no reinforcement of principles learned during medical school, nor opportunities for competency-building across the domains established by the Accreditation Council for Graduate Medication Education (ACGME), i.e., medical knowledge, patient care, practice-based learning, systems-based practice, communication skills and professionalism.

The reasons for the low prioritization of nutrition in medical training likely include a lesser focus on disease prevention and management compared to technologically advanced acute and chronic treatments, both in outpatient or inpatient settings; earlier perceptions of nutrition as less evidence-based than other sciences; and lack of core nutrition faculty, and funded research, within medical institutions.

Against this background, it is not surprising that data show physicians perceive significant barriers to effective diet counseling of patients, including lack of time, knowledge and resources, and have low confidence in their ability to effect diet change.<sup>11</sup> These gaps, in knowledge, competencies, confidence and practice, translate to a massive missed opportunity to optimize cardiovascular health at the health system level.

## NEW CALLS TO ACTION, AND NEW NUTRITION EDUCATION MODELS

Fortunately, the nutrition training gap may be closing. The nutrition-science evidence base has grown rapidly over the last several decades. Cardiovascular disease prevention and health promotion have now been prioritized by policy makers and payers. Also, the fact that clinicians lack competencies for translating diet and lifestyle knowledge to patients has been well publicized, leading to calls to action from various stakeholders.

The most vocal of these have been nutrition leaders who, in 2014, published an extensive summary of current training in nutrition education in the *American Journal of Clinical Nutrition*. In it, they outlined the history of governmental and non-governmental activities aimed at improving nutrition education during medical training, and called for reforms of medical school curricula to increase exposure to nutrition.<sup>12</sup> Similarly, In 2015, the *Journal of Parenteral and Enteral Nutrition* also questioned the current status of nutrition training in Graduate Medical Education after a survey of 72 ACGME program directors in a variety of medical specialties showed that only 26% of programs had formal nutrition education curricula, and these varied substantially in length and form.<sup>13</sup> The American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) has since created a Task

Force on Postgraduate Medical Education in Nutrition to identify ways to close the gaps.<sup>13</sup> Similarly, the ACC has recommended that cardiovascular training programs provide nutrition education pertinent to treating obesity and its associated risks in its 2015 Core Cardiology Training Statement (COCATS 4) on cardiovascular disease prevention.<sup>14</sup>

In response to these and other calls for change, some residency training programs have begun to incorporate formal nutrition training into graduate medical education. The University of North Carolina at Chapel Hill has developed an open-access, web-based Nutrition in Medicine program targeting medical students and residents, reportedly in use by a number of residency programs.<sup>15</sup> Innovative partnerships between medical and culinary schools, most notably Johnson and Wales, also have led to the development of experiential nutrition learning activities. Dubbed 'culinary medicine,' these new electives and courses are now in place in at least 10 medical schools (including Brown University's Alpert Medical School) and one residency program in the U.S. They aim to teach medical students and trainees the relationship between food components and health, how to distinguish between healthier vs. unhealthier diet components, and practical aspects of healthy food sourcing and preparation. Students and trainees take part in workshops and live cooking demonstrations that teach the differences between whole vs. refined grains and saturated vs. unsaturated fats, and how to prepare tasteful meals with healthier macronutrient and sodium contents. The goal: impart food knowledge and skills that will translate to teachable moments at the bedside and in the clinic. This translational aspect of not only teaching the science of nutrition and the effects of dietary components on health outcomes, but providing experiential learning, is being utilized in the area of public health nutrition as well. A similar culinary medicine partnership between the Harvard School of Public Health and the Culinary Institute of America, that teaches food and cooking skills to practicing clinicians, has shown promising early outcomes.<sup>16</sup>

## CONCLUSION

In conclusion, the economic and health burdens from cardiovascular disease are large and growing, and payers and other stakeholders have called for an increased focus on disease prevention and health promotion, including by health systems. Although robust evidence supports diet change to improve cardiovascular outcomes, physicians have been inadequately trained to impart this knowledge to patients and families. However, calls for better nutrition education during medical school and training are being heard. New web-based curricula are being developed and used. Also, unlikely partnerships between medical and culinary schools are moving nutrition education out of the classroom and into the kitchen, possibly the perfect place to blend together the related fields of nutrition science, behavioral medicine and the culinary arts.

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## On Patients, Bonsai, and Orangutans: The Value of Mindfulness in the Practice of Medicine

ELIZABETH TOLL, MD; JOSHUA ORABONE, MD, MPH

In 2008, I (JO) met an elderly gentleman selling tiny trees at a roadside stand, a chance encounter that sparked a change in how I see the world and live within it. I began to learn about bonsai, the Japanese art form that literally means “tree in a dish.” Initially I thought it would be fun to grow a miniature tree, but as I acquired the knowledge and tools to care for my plant, I wondered, “How can one little tree be so complicated?” This was years before I became a resident with patients of my own. Now I care for fifty bonsai and many patients. Both have taught me about nature, patience, and mindfulness. As it turns out, trees and patients are not so very different.

My patients and trees come in all ages and sizes. Young patients and trees have one set of needs, while adolescents, adults, and ancients have others. My patients and trees come from all over the world. In addition to their physical differences, they know different climates and diets and communicate distinctively. Both embody lifetimes of stories – of love and neglect, peace and strife, sunny weather and lightning strikes. How they prosper, or sicken, has everything to do with these experiences. Good care must consider all these factors, not to mention the practitioner’s own agenda.

I have had many hobbies. I’ve collected coins and raised tropical fish. I’ve followed sports teams. Legions of action figures gather dust in my childhood bedroom. Bonsai is different. It is a practice.

How does a hobby differ from a practice? Hobbies are leisure pursuits providing enjoyment and escape. A practice involves studying an activity from multiple perspectives, including one’s mind, body, and emotions with unconscious integration of all these areas. Mastery requires energy and discipline, yet paradoxically yields flexibility and calm.

Mindfulness is quite the rage these days: meditation, yoga, stress reduction. Proponents cite a wide variety of beneficiaries, ranging from quarreling preschoolers<sup>1</sup> to sufferers of irritable bowel syndrome,<sup>2,3,4</sup> chronic pain,<sup>5</sup> mental illness,<sup>6</sup> and physician burnout,<sup>7</sup> to note a few. Research demonstrates mindfulness to improve acceptance,<sup>8</sup> calm, and empathy.<sup>9</sup>

Perhaps mindfulness is having its moment because so many folks, including physicians, are living lives that are anything but. Drivers chug coffee and text. Teens do algebra while watching feature films and instagramming their friends. Physicians and staff deliver patient care amidst minefields of high-maintenance electronic medical records,

administrative hurdles, and smart phone intrusions. Technology designed to simplify life and connect people falls short, adding complexity and increasing isolation.

In medicine and beyond many suffer overwhelm and scatter from the attention deficit disorder of technology. This may be the appeal of mindfulness. It teaches people to slow down and focus on this moment, right here, right now, and nothing else. At its very best, medicine is a mindful practice, in spite of countless current trends. Cultivating mindfulness in any setting sows these skills throughout work and life.

Mindfulness draws on ancient meditative practices of the East, including Buddhism. Practitioners learn to focus on this moment through awareness of breathing, a stepping stone to noticing the many sensory signals we constantly receive. There are physical sensations, like a tense muscle or itchy elbow, as well as visual, auditory, tactile, olfactory, gustatory, and intuitive ones. Pings arrive continuously from all these fronts. So do waves of thought and emotion, not just from this instant, but also the future (“Will I meet that deadline?”) and past (“They were so irritating!”). Stop for a moment. Observe your breathing. What else do you see, hear, feel, taste, smell, and intuit? Note thoughts and feelings rolling through. An astonishing amount of data continuously streams into our experience radars.

High-octane living mandates we ignore most of this input in the name of productivity. Who can notice every breath, sensation, idea, and emotion when we need to understand yesterday, plan next week, and figure out dinner? Ironically, while ruminating on the past and future, we miss the cornucopia of this moment, the only time and place we can truly be.

Mindfulness teaches “bare attention,” noticing each morsel of input as it floats through, not in order to respond to it, but rather to cultivate focus, openness, curiosity, observation, acceptance, and non-judgment.<sup>10</sup> Create a simple moment of mindfulness. Close your eyes and strive to breathe with an attitude of focus, openness, curiosity, observation, acceptance, and non-judgment (hereafter “attitude”). You may ask, “Am I supposed to breathe through my nose or mouth?” or, “Should my belly fill as I inhale or exhale?” Note “supposed to” and “should.” You are bringing in judgment, as though there is a right or wrong way to breathe. Let that judgment go, and return to your breathing and attitude. You may feel, “This is frustrating!” An emotion has snuck in. That’s fine. Notice it. Return to your breathing and attitude.

Next come thoughts like, “Shoot! I forgot to answer that email!” and “Will there be traffic on the way home?” Note them, and return to your breathing and attitude. Your nose is itching. That’s ok. Notice it. Return to your breathing and attitude. An inner voice chides, “Pay attention! How can breathing be this confusing?” Judgment is back. (Physicians are expert at scolding themselves.<sup>11</sup>) Observe all this. Let it go. Return to your breathing and attitude.

Mindfulness starts with breathing. When thoughts, feelings, or sensations intrude, simply note them and let them float through like puffy clouds, returning to this moment and this breath. Acknowledge honking horns, cooking smells, distracting thoughts, or uncomfortable emotions and allow them to pass through. You have climbed aboard the asymptote of experiencing the totality of a single moment while doing nothing with that experience.

Interestingly, from the earliest days of medical training, physicians learn the same mindful approach – focus, openness, curiosity, observation, acceptance, and non-judgment – as the foundation of the patient-doctor relationship. We practice giving full attention to a patient, listening actively, being curious, suspending judgment, asking open-ended questions, receiving answers, and refining information with supple inquiry. We absorb and reflect on the emotions and thoughts of patients and ourselves. Later we layer scientific knowledge and clinical experience onto these bedrock healing skills.

Mastery in medicine comes when we connect with a patient, interview with emotional intelligence, complete a through exam, and tap into evidence-based medicine, memory of this patient, and experiences with comparable patients. We develop a differential, devise a care plan, consider contingencies, and communicate our impressions to the patient at the right educational level with empathy, realism, and hope. Vigilant practice yields the breadth, flexibility, and calm emerging from years of mindful doctoring. This is not a job, nor a hobby, but a conscious practice. Mastery means setting aside all other responsibilities and connections and being fully present with this patient and this concern. Each encounter is endlessly complicated, requiring bare attention.

And so it is with little trees. I (JO) need to think about the container, soil, water, sun, and nutrients. I must consider seasons, sending some bonsai into the dark and cold for dormancy and exposing others to heat and humidity to approximate their habitats. I must weigh how interventions like pruning, trimming, repotting, or wiring will impact growth. When done too aggressively, or impatiently, I have defeated my plans and distorted, injured, and even killed the very trees I’ve tried to nurture. As in medicine, the outcomes of today’s decisions may not be obvious for months or years, and important lessons emerge from the school of painful mistakes. I imagine a tree in the future, yet it’s impossible to know how it will grow. In balancing the trees’ needs and my goals, I often choose to do nothing but watch and wait. Some days I feel I have delivered the best care when I’ve done the least and spent the visit observing and “listening.” Leaving

a tree alone allows my unconscious mind to develop a care plan. One day, later on, I return, and the next step is clear.

The trees have taught me to take this wait and watch approach with my patients. Doing nothing, or rather doing *No Thing*, can be a sound policy in medicine,<sup>12,13</sup> too, especially when one has no idea what is going on with a patient, often when health and life collide. These maladies improve only when patients and caregivers consider both realms. When doctors treat their own anxious imperatives to do *Some Thing* they can cause harm, while a tincture of time and open ears and eyes may reveal a solution for the patient.

I (JO) used to feel I’d shortchanged my patients when visits ended without prescriptions or definite plans, until they started thanking me for helpful care. Being genuine, present, curious, and willing to do *No Thing* allows patients to vent and share perplexing symptoms, thereby decreasing pain and loneliness. Like trees, patients can take months and years to reveal important clues about symptoms like trauma, substance use, and hidden fears. Watching and waiting, and hanging in there, allows patients to communicate slowly and quietly, like trees. One day the right intervention appears. Better yet, patients declare readiness for one path or another, uncovering their own capacities for problem solving and healing.

Medical trainees assume knowledge will package neatly. The patient will have a problem. There will be a solution. It’s disconcerting to learn how many grey areas like human interaction, decision-making, and risk juggling permeate practice. Tolerating uncertainty and moving ahead is a huge part of medicine, seldom addressed throughout training.

Mindfulness helps manage such uncertainty and confusion. Buddhists speak of the “monkey mind,” those thoughts (and emotions and physical sensations) that divert us from this moment. They resemble monkeys swinging freely without focus or connection. We all host these creatures and their antics. The more readily we acknowledge monkey thoughts, feelings, and sensations without attending to them, the more easily they can pass through without disturbance.

Mindful moments in medicine are similarly interrupted. The medical monkey can feel like a massive orangutan crashing through, grabbing attention from patients to overstuffed schedules, EMR foibles, insurance annoyances, meaningful use, corporate compliance, and the bottom line, to name but a few of this beast’s favorite branches and leaves. While mindful medical considerations converge to help patients, orangutan thoughts yank us into a dense forest of demands and hassles that fracture their care. It’s challenging to let the orangutan pass through. Sometimes we even invite it into the room by sharing our stresses and frustrations with patients.

The bonsai monkey is a chattering little trickster, appearing in many guises, especially impatience. It urges me to clip here, tie there, and make a cut before studying a tree. “Hurry!” it whispers, preventing me from sitting still and making decisions in concert with a tree’s natural cycle.

Understanding these simians is important. They slow us

down and deplete us. They draw us away from our mission – be that breathing, connecting with a patient, or sizing up a bonsai. They complicate our lives. Today's walk is diminished by self-rebuke about missing the gym yesterday. Fear of failing the Boards increases anxiety, not knowledge or preparation. No patient encounter is enhanced when a physician complains about an EMR. Mindful practice reveals how much energy goes toward thinking, feeling, and being elsewhere, especially the lands of tomorrow's worry and yesterday's regret. Being here and now allows full engagement in life.

Releasing the monkeys frees us to enter a calmer place, sometimes called "the zone." The zone comes in many versions, all affording a level of absorption deep enough to relinquish daily concerns and get lost in an activity.<sup>14</sup> Stillness emerges while engaging all faculties. Some find this through quiet activities like fishing, rocking a baby, watching a fire, praying, or creating. Others achieve stillness through motion, like running, drumming, skateboarding, or working on a car. The common threads are focus, engagement, and internal calm.

People describe feeling lost, and found, and removed from time in the zone. They feel peaceful, but energized. They don't care what others think. In fact, they love themselves. They speak of having access to the totality of their experience and a merging of its parts. To paraphrase one surgeon, "There's work, and then there's operating. That's not work, it's what I love, and I get lost in it. I emerge from each case refreshed."<sup>14</sup> The same thing happens when one really connects with a patient, exchanging woes and pain for hopes and care while tapping into our finest selves.

With bonsai, I (JO) move from one tree to the next, getting lost in stepping back, observing, and imagining. Hours pass. Because many interventions take months or years to play out I must harbor optimism and employ all my senses, including intuition.

The trees have helped me bring a similar approach to my patients. I talk with a toddler's parents about setting limits, yet none of us will see the fruits of our labor for several years. My smoking intervention must be engaging, not preachy or nonchalant. In discussing end of life care I must meld medical reality with this patient's unique coordinates. Most of all, I must listen to my patients, because, like the little trees, no matter how hard I work to imagine the world from their perspectives, ultimately, it will be the patient who experiences the impact of the practitioner. And the practice.

### Acknowledgments

For Takako "Bubs" Huang with love and admiration on the occasion of your 96th birthday (ET), and for Sarah, with love and thanks for supporting me and all our little trees (JO).

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