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REVIEW ARTICLE

## Current Approaches to Yoga in U.S. Medical Schools: Scoping Review of the Literature

Sakura Horiuchi, BS,<sup>1</sup> Yael Flusberg, C-IAYT, E-RYT 500, MS,<sup>2</sup> Christine Tara Peterson, PhD,<sup>3</sup> Paul J. Mills, PhD,<sup>3</sup> Deepak Chopra, MD,<sup>3</sup> and Mikhail Kogan, MD<sup>1,2</sup>

### Abstract

**Background:** Yoga is described as a system of physical and mental practices originating from India that connects mind, body, and spirit with techniques such as physical exercises, breathing, and meditation to promote health and well-being. Medical students experience an immense amount of stress that unfortunately continues throughout their residency and careers. Yoga represents a tool to reduce stress and support medical student resilience.

**Objective:** This study aims to evaluate the current approaches to yoga in U.S. medical schools.

**Methods:** A scoping literature review was conducted using search terms such as “medical school,” “medical student,” “medical education,” “yoga,” “asana,” “pranayama,” and “mindfulness.” The primary aim of the review was to examine if U.S. medical schools offer accessible yoga to medical students and the characteristics of those yoga programs.

**Results:** The search yielded 1313 primary articles. All titles and abstracts were screened for eligibility. Duplicate articles were removed, and 156 articles were reviewed independently by two authors. A total of eight articles met all the criteria. Yoga is offered in medical schools through three main models: recreational, research, and educational. All of the studies indicated various positive effects on medical students from these yoga programs, including in psychological states, perceived stress, and scores on medical knowledge assessments.

**Conclusions:** Yoga aligns well with the objectives of medical education by combining physician resiliency, mindfulness, and education that can ultimately serve patients. Greater opportunities should be created to engage medical students in yoga through the length of their entire undergraduate and graduate medical training.

**Keywords:** yoga, education, integrative medicine, mindfulness, health education

### Introduction

YOGA ORIGINATED IN India over 5000 years ago. Yoga can be described as a system of physical and mental exercises to practice a mind, body, and spiritual connection to

promote health and well-being.<sup>1</sup> In addition, numerous studies demonstrate how yoga can help reduce stress and increase mindfulness.<sup>2</sup> In the 2017 National Health Interview Survey conducted by Centers for Disease Control and Prevention’s National Center for Health Statistics, yoga was a

<sup>1</sup>Department of Medicine, George Washington University School of Medicine and Health Sciences (GW SMHS), Washington, DC, USA.

<sup>2</sup>Department of Medicine, George Washington Center for Integrative Medicine, Washington, DC, USA.

<sup>3</sup>Department of Family Medicine and Public Health, Center of Excellence for Research and Training in Integrative Health, University of California, San Diego, School of Medicine, La Jolla, CA, USA.

commonly used complementary health approach, surpassing methods such as meditation or chiropractic care.<sup>3</sup> In addition, from 2012 to 2017 there was a reported increase in the use of yoga from 9.5% to 14.3%, making it one of the fastest growing fields in complementary and alternative medicine (CAM).<sup>3</sup>

Yoga represents a tool for professionals exposed to high levels of stress. For example, medical students report higher levels of perceived stress compared with their same-age counterparts.<sup>4</sup> High levels of medical school stress are associated with increased rates of depression, decreased academic performance, burnout, and a decline in overall health and wellness.<sup>4</sup> Burnout is especially common in medical students and professionals and is defined as a syndrome that results from “chronic workplace stress that has not been successfully managed.”<sup>5</sup>

Studies demonstrate an overall prevalence of burnout ranging from 45% to 71% in medical students suggesting that physician burnout begins in medical school.<sup>6–8</sup> Rotenstein et al. in 2016 found that the prevalence of depression among medical students 27.2% (range 9.3%–55.9%) and suicide ideation was 11.1% (range 7.4%–24.2%).<sup>9</sup> An even more concerning finding is that among the medical students screening positive for depression, only 15.7% sought professional treatment, suggesting that students are left alone to manage their mental health.<sup>9</sup>

Interventions currently being used for stress management in medical education include meditation, mindfulness-based stress reduction (MBSR), educational discussion, changes in the curriculum and grading system, among others.<sup>10</sup> Studies demonstrate that interventions such as mindfulness and stress-management interventions include positive effects such as decrease rates of depression and anxiety, increase empathy, increase knowledge of integrative therapies for counseling, and greater use of positive coping skills.<sup>11,12</sup>

A recent review suggests that yoga interventions across broad categories of health care students are associated with reduced stress, anxiety, and depression. Despite such findings, however, there remains mixed evidence and heterogeneity across such interventions and thus there remains the need to further examine the effects of yoga specifically through rigorous research methods. This is especially true given the continued high rates of medical student mental health morbidity, indicating the need for practices that support medical student wellness and resiliency.

Since the submission of this article in May 2021, Ciezar-Andersen et al. have published a study looking at the yoga interventions for helping health professionals and students.<sup>13</sup> The systematic review found that yoga interventions in health care professionals and students were most associated with reduced stress, anxiety, depression, and musculoskeletal pain.<sup>13</sup> The study supports the positive impact of yoga for medical professionals and students specifically. This study offers a greater insight on the approaches to yoga in medical schools.

Compared with the study by Ciezar-Andersen et al., this study aims to focus on medical students in U.S. medical schools as the specific target population. In addition, although evidence exists that yoga can reduce stress for medical students there is little known about how medical schools offer or do not offer yoga to medical students through a systems-based approach for student stress reduction and wellness. This literature review aims to review the

current approaches to yoga in U.S. medical schools for the medical student population. It explores whether yoga is present in U.S. medical schools for students and if so, the characteristics of those yoga programs.

## Methods

### Search strategy

A computerized search following PRISMA guidelines for scoping reviews was conducted by one independent investigator (S.H.) with help from the Himmelfarb Health Sciences Library librarian. Four electronic databases were searched, including PubMed, SCOPUS, CINAHL, and AMED (Allied and Complementary Medicine). Categories of terms searched included were searched as (“medical school” OR “medical student” OR “medical education”) AND (“yoga” OR “asana” OR “pranayama” OR “mindfulness”). MeSH/Keywords were Schools, Medical; Students, Medical; Education, Medical; Yoga; and Mindfulness. Included studies were published between 1998 and 2020.

1998 was determined as the start year for selecting the articles because it is after David Eisenberg’s report on the prevalence of integrative medicine in the United States,<sup>14</sup> but also the year of when the prevalence of CAM in medical school education specifically was first published.<sup>15</sup> Before the Dr. Eisenberg’s study, yoga was not discussed in medical school education. Furthermore, in 1998 Shapiro et al. first studied the effects of MBSR on medical students.<sup>16</sup> Therefore, 1998 is a time that includes the earliest reports of integrative medicine and medical students in the context of medical education in the United States. The literature search was conducted between May 25, 2020 and July 25, 2020.

### Eligibility criteria

Studies that included U.S. medical students doing yoga in the context of U.S. medical schools published from 1998 to 2020 were considered for inclusion in this study. This study included allopathic medical schools licensed by the Liaison Committee of Medical Education and osteopathic medical schools. However, the focus of the research is to highlight approaches to yoga in the United States. Published full-text studies that included MBSR courses where yoga was one of the components explicitly studied were included. Some of the studies’ focus was mindfulness, but still examined yoga as a component. These studies were still included as yoga was evaluated. Studies that investigated pranayama were included.

However, if the MBSR study did not specifically evaluate yoga, the study was excluded. The authors excluded duplicate studies, expert opinions, summaries of existing evidence, and non-English literature. Studies that assessed only curriculum and not student experience were excluded. In addition, studies that surveyed student attitudes about yoga but not the effects of yoga were excluded. If needed, additional information for any study program was sought from medical school websites and blogs.

### Study selection and data extraction

One independent reviewer (S.H.) screened titles and abstracts for eligibility for inclusion following PRISMA guidelines for scoping reviews. Subsequently, two reviewers

(S.H. and M.K.) independently reviewed full texts of all studies that passed the first screening phase. If there were any disagreements as to the inclusion of a study, a mutual decision was made through discussion and by reviewing the full article again.

Of the included full-text articles, the authors extracted data based on general characteristics of the studies such as published year, medical school location, sample size, response rate, model, intervention, and study design. A summary of findings and notes of the study’s main influence were also noted. Studies were screened and evaluated using Covidence,<sup>17</sup> a systematic review management program. The data were extracted and summarized in an Excel spreadsheet. Overall, the study design followed the PRISMA guideline for scoping reviews.<sup>18</sup> This study did not require Institutional Review Board (IRB) approval since the study was a review of the literature.

**Results**

The initial search yielded 1313 primary articles. A full-text review was then performed on the articles by two authors (S.H. and M.K.) independently. After application of filtering methods, eight articles met the inclusion criteria. A flowchart of the scoping review process is shown in Figure 1.

All of the studies focused on medical students at a medical school in the United States.<sup>16,19–24</sup> There were 672 participants in total across seven studies with one study that did not report number of participants due to the nature of it being a literature review. Eighty-nine percent of the participants were specifically U.S. medical students. The rest of the participants included medical students, premedical students, residents, and dental students but did not clarify the number of each specific student type. Six articles were studies evaluating the effects of a yoga program for medical students. Two articles described an institution’s process of integrating yoga into a cocurricular medical school course.

Generally, courses were held over 6–11 weeks, meeting once or twice weekly for 1–1.5 h (6/8 studies). One study was based off of completing 140 h, including contact hours, laboratories, and lectures. Majority of the studies gathered data using a pre- and postcourse survey (6/8). One study performed a literature review, and another study reported an institutional experience. Response rates ranged from 79.4% to 97%. Response rates were not indicated in three out of

eight studies, and the response rate was not relevant in one study. Yoga was found to be offered in medical schools through three main models: recreational, research, and educational (Fig. 2). Majority of the studies (6/8) involved yoga using the research model, while the minority (2/8) involved yoga using the educational model.

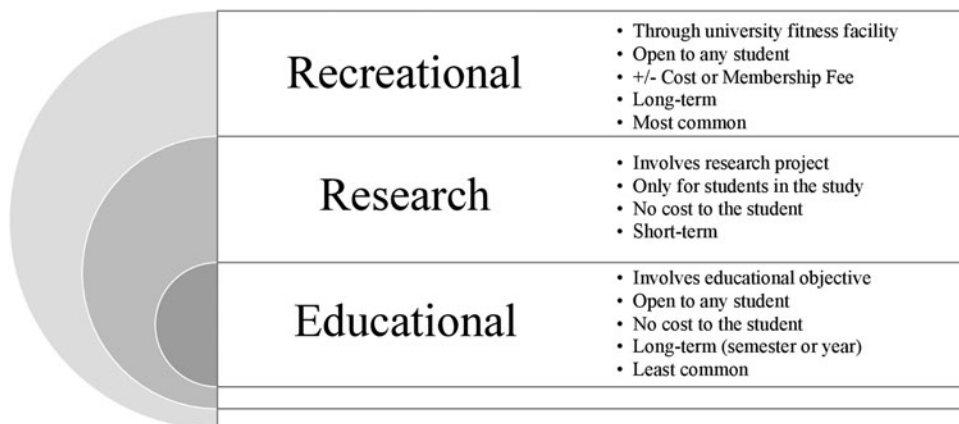
Studies found that there were statistically significant increases in self-regulation and self-compassion.<sup>19,23</sup> Other studies found that there was significant improvement in mood states and reported significantly lower psychological distress compared with controls<sup>20</sup> while another study found a statistically significant reduction in perceived stress after the program and an improvement in feelings of peace, focus, and endurance.<sup>25</sup> McCulloch et al. found that an educational yoga intervention significantly improved the post-test scores of the class material topics.<sup>24</sup> Other study results and further details are described in Table 1.

The recreational model offers yoga to students and faculty through a fitness facility as an exercise option. Many medical schools in the United States have started to offer yoga to medical students through their fitness facilities or through a wellness organization. The research model incorporates yoga into a specific elective course where yoga is offered free of cost to participants in a research study. Boston University Medical is an example of this and has offered yoga through an elective course where medical students enrolled in the course have access to free weekly yoga courses while asked to complete surveys for a research study.<sup>19</sup>

In the educational model, the least common among medical schools, yoga is part of an educational objective. In 2017, Penn Medicine offered Yoganatomy, an optional yoga class designed to complement the full three-semester pre-clinical course of gross anatomy. The ultimate goal was to offer yoga to students as a resource for stress management, but also intentionally drew connections between the yoga poses and anatomy from their preclinical curriculum. Wayne State University School of Medicine (WSU SOM) is another example and created Yoga Therapy as a cocurricular program in medical schools.<sup>22</sup>

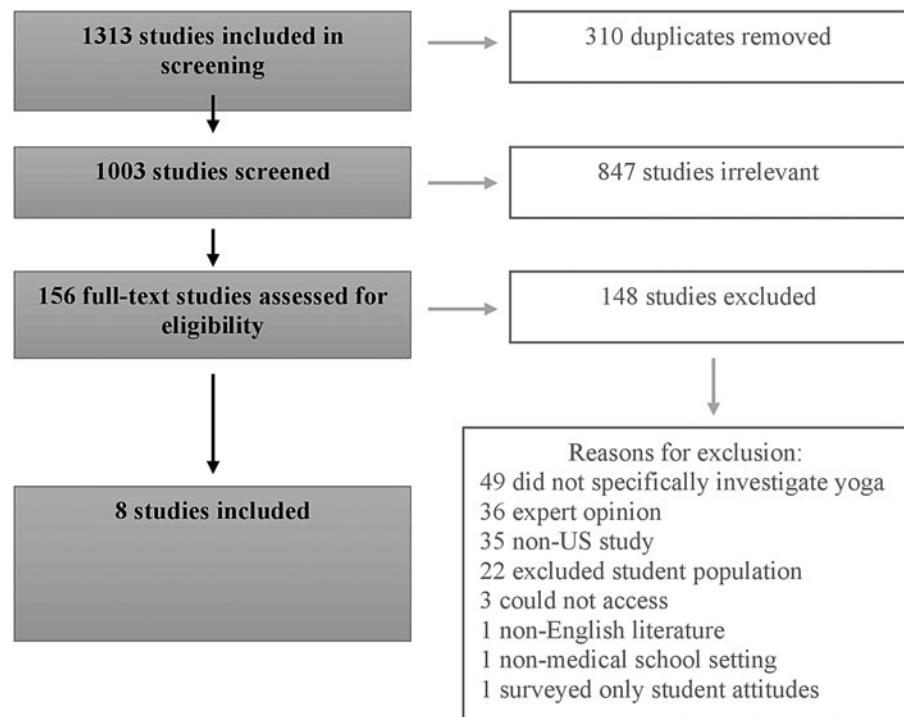
**Discussion**

Increasing evidence suggests that yoga can serve as a tool for managing stress and increasing mindfulness for medical students.<sup>11–13,25–30</sup> Although yoga is a common form of



**FIG. 1.** Process of screening and reviewing the literature.

**FIG. 2.** Three models of yoga in medical schools.



complementary health in the United States, the study findings suggest many medical schools exist with limited yoga available for students. Penn Medicine and WSU SOM serves as an example of how aspects of yoga incorporated into medical education. By understanding the current review indicated various positive effects on medical approaches to yoga in medical education, medical schools can be better equipped to support their student physicians. In addition, future physicians are better prepared to work with patients who use yoga as therapy.

Limitations to this study include that scoping reviews do not formally evaluate the quality of the evidence. In addition, scoping reviews support broad searches, thus specific focused research topics can be limited. The authors note too that there are many different types of yoga included in this review (Iyengar, Ashtanga, Vinyasa, Bikram, etc.), which may have different effects on medical professionals. The authors understand that while yoga practices do vary, this points out that there are many opportunities to find what types of yoga practices best compliment the needs of medical students.

Studies have examined the effects of yoga on medical students' stress, anxiety, and somatic responses, with the current evidence indicating that yoga can be an effective intervention for stress for medical students.<sup>11–13,25–30</sup> In 2019, for example, Singh et al. examined the effects of yoga in the form of pranayama on medical student visual reaction time and anxiety.<sup>26</sup> They found a decrease in visual reaction times, suggesting faster cognitive processing capability, and reduced anxiety inventory scores in the groups with the yoga intervention.<sup>26</sup> Similarly, Prasad studied medical students' stress levels after 6 weeks of yoga and meditation.<sup>25</sup> They found that there was a statistically significant reduction in perceived stress and a significant improvement in feelings of peace, focus, and endurance.

At Mount Sinai School of Medicine, McCulloch et al. studied the effects of teaching musculoskeletal anatomy through the functional practice of yoga and pilates.<sup>24</sup> They found that the educational yoga intervention significantly improved post-test scores of the class.

It is important to understand how yoga decreases stress to appreciate its potential positive effects on the medical community. Increased mindfulness, interoceptive awareness, spiritual well-being, self-compassion, and self-control are five mechanisms thought to explain how yoga decreases stress. Park et al. studied the effects of the five psychosocial mechanisms on perceived stress and stress reactivity and reported that stress reactivity significantly decreased across all mechanisms.<sup>31</sup> In addition, the study demonstrated that except for self-compassion, all psychosocial mechanisms increased from baseline to postintervention, suggesting that yoga serves as a psychosocial spiritual resource for stress reduction and resiliency. Although yoga is increasingly becoming more utilized in the medical setting, use of yoga in medical schools is limited.

The existing evidence can be organized into three distinct models of yoga in medical schools as depicted in Figure 2. Yoga research remains underrepresented and additional studies investigating clinical utility and mechanistic bases as well as educational models featuring yoga are needed. The most common way yoga is available to medical students is through the university fitness facility through the recreational model. Strengths to this model of yoga in medical school is that the classes are open to every medical student year-round and provides an opportunity to practice yoga. Weaknesses may include a membership cost, not having standardized process for choosing a teacher (i.e., 200-Registered Yoga Teacher or not), and the wide variability in quality of courses across schools.

TABLE 1. STUDIES ON THE CURRENT APPROACHES TO YOGA IN U.S. MEDICAL SCHOOLS

Author (ref. no.)	Article (year)	Location, medical school	Sample size and response rate	Model	Intervention	Study design	Summary of findings	Notes
Bond et al. <sup>19</sup>	Embodied Health: the Effects of a Mind-Body Course for Medical Students (2013)	U.S., Boston University School of Medicine	27 first- and second-year students were evaluated through survey. Response rate was 88.9% (24/27).	Research	The course entailed 11 weeks of 1.5-h weekly classes. Each class consisted of 1 h of deep breathing, meditation, and yoga, and 30 min of a neuroscience lecture.	The study design was a pre- and postcourse survey. The same students were sent to the start of the course and another survey sent a week after completion of the course. The survey consisted of four scales: Jefferson Scale of Physician Empathy, Cohen's PSS, Self-Regulation Questionnaire, and SCS.	The mind-body course had a statistically significant increase in student self-regulation and self-compassion. Although not statistically significant, there was an increase in empathy and decrease in stress.	This study indicates yoga as an intervention to increase emotional states and resiliency in U.S. medical students.
Rosenzweig et al. <sup>20</sup>	Mindfulness-Based Stress Reduction Lowers Psychological Distress in Medical Students (2003)	U.S., Jefferson Medical College	From 1996 to 2000, 140 second-year students participated in a MBSR training course. 162 students were the control group and participated in an educational seminar about complementary and alternative medicine. The response rate was 95% (133/140) for the MBSR group.	Research	The MBSR course entailed 10 weeks of 1.5-h weekly classes. Each class consisted of meditations, hatha yoga, and guided imagery.	The study design was a pre- and postcourse survey. The survey consisted of the POMS, POMS measured 6 affective states: Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor-Activity, Fatigue-Inertia, and Confusion-Bewilderment. From the POMS data, the TMD score was obtained.	The MBSR participants scored significantly lower in TMD at the end of the course. Significant decreases were also observed on the Tension-Anxiety and Bewilderment scales. A significant increase was found on the Vigor-Activity scale. Overall, students in the MBSR group reported significant improvement in mood states and reported significantly lower psychological distress compared with controls.	This study demonstrates that weekly yoga through a MBSR course is an effective stress management intervention for U.S. medical students.

(continued)

TABLE 1. (CONTINUED)

<i>Author (ref. no.)</i>	<i>Article (year)</i>	<i>Location, medical school</i>	<i>Sample size and response rate</i>	<i>Model</i>	<i>Intervention</i>	<i>Study design</i>	<i>Summary of findings</i>	<i>Notes</i>
Dobkin and Hutchinson <sup>21</sup>	Teaching Mindfulness in Medical School: Where Are We Now and Where Are We Going? (2013)	Canada <sup>a</sup> , various school studies were considered	14 health professional schools were evaluated including medical students, residents, and dental students.	Research	N/A	The study design was a literature review of 14 health professional schools. The role of Mindfulness in medical students was evaluated. The Mindfulness programs analyzed included yoga as a component.	MBSR programs have varied formats in teaching mindfulness. Characteristics of the programs include lectures, short-term workshops, and long-term weekly programs. Students who completed the programs did report decreased psychological distress and an improved quality of life.	This study describes the characteristics of current MBSR programs, where a main practice includes yoga. Programs that include yoga show promise in positively effects for medical students.
Shapiro et al. <sup>16</sup>	Effects of MBSR on Medical and Premedical Students (1998)	U.S., University of Arizona College of Medicine—Tucson	73 participants (premedical and medical students) were evaluated, and the response rate was 97% for the intervention group.	Research	8-week mindfulness-based intervention or control group. The MBSR class consisted of sitting meditation, body scan, and Hatha yoga.	The study design was a pre- and postcourse assessment. The postcourse questionnaire was coordinated with an examination period to measure the effects of the intervention during a stress period. The questionnaires measured empathy, psychological distress, depression, state and trait anxiety, and spirituality using the five tools, respectively: Empathy Construct Rating Scale, The Hopkins Symptom Checklist 90, Likert Scale, the State-Trait Anxiety Inventory, the Index of Core Spiritual Experiences.	Participation in the MBSR program can reduce self-reported anxiety, reduce reports of overall psychological distress, increase empathy levels, and increase scores of measures of spiritual experiences.	This study indicates that a short-term stress reduction intervention involving yoga can be beneficial for premedical and medical students. The findings document the effectiveness of mindfulness training through yoga to enhance student well-being.

(continued)

TABLE 1. (CONTINUED)

Author (ref. no.)	Article (year)	Location, medical school	Sample size and response rate	Model	Intervention	Study design	Summary of findings	Notes
Zador et al. <sup>22</sup>	The Path from Yoga Therapy in a Medical School to a School of Yoga Therapy in an Integrative Medicine Department (2015)	U.S., Wayne State University School of Medicine	From 2013 to 2015, 32 first- and second-year medical students participated in the program. There was a limit of 16 students per year. Response rate was not indicated in the study.	Educational	Initially there was a twice a week, 1-h yoga practice sponsored by the American Medical Student Association. Then the program was expanded to a more robust program experience that included didactic lectures, yoga practice, and clinical field experience. In 2013–2014, there were 6 didactic sessions. The following year had 4 sessions.	The study describes Wayne State University's experience establishing yoga therapy programs in the medical school, hospital departments for employees, and hospital as therapy. Data were gathered through qualitative evaluations after the completion of the didactic sessions.	The program was popular and well-accepted by the medical students. Each year, all the student positions were filled to maximum capacity. The evaluations indicated that students found the program educationally valuable while considering yoga therapy as a clinical healing option. After the student program, interest grew to expand the yoga therapy program into the hospital system as well.	The study describes the experience of a medical school integrating yoga therapy education as a for-credit cocurricular program. Furthermore, it demonstrates how medical student interest can breed a program that further is of interest to the larger health care community and system.
Prasad et al. <sup>25</sup>	Medical Students' Stress Levels and Sense of Well Being after Six Weeks of Yoga and Meditation (2016)	U.S., Weill Cornell Medical School	34 first-through-third-year medical students were evaluated, and the response rate was 79.4% (27/34).	Research	The program entailed 6 weeks of 1-h biweekly Hatha yoga class. Each class consisted of 40 min of asanas (postures), 10 min of pranayama (breathing), and 10 min of meditation. Students completed 12 h total.	The study design was a pre- and postcourse questionnaire. Participants were asked to complete a Physical Activity Questionnaire, PSS Survey, and Self-Assessment Survey.	There was a statistically significant reduction in perceived stress after the program. Self-assessment survey results showed a significant improvement in feelings of peace, focus, and endurance. In addition, there were effects in positive emotions and satisfaction.	This study demonstrates that a short-term yoga intervention can be an effective intervention for medical student stress and well-being.

(continued)

TABLE 1. (CONTINUED)

Author (ref. no.)	Article (year)	Location, medical school	Sample size and response rate	Model	Intervention	Study design	Summary of findings	Notes
Eroglu et al. <sup>23</sup>	Abridged Mindfulness Intervention to Support Wellness in First-Year Medical Students (2014)	U.S., SUNY Downstate School of Medicine	30 first-year medical students were randomly assigned to the intervention while another 30 students were assigned to the control group. 29 study student and 30 control students completed the 8-week program. The response rate was not indicated in the study.	Research	The MBSR course entailed 8 weeks of 75 min weekly group instruction with a half-day retreat in the last week. The course taught experiential practices including yoga and a cognitive curriculum to understand stress and reactivity. The control group did not receive any intervention during the 8-week period.	The study design was a pre- and postcourse assessment. Participants were surveyed three times: before the intervention, at the conclusion, and 6 months after the intervention. Assessments were made using the PSS, the SCS and the RS.	The MBSR participants has a significant increase in self-compassion scores at the conclusion of the course and 6 months out. Perceived stress scores significantly decreased at the conclusion, but not after 6 months. The resiliency score did not demonstrate a significant difference after the intervention. However, the score was significantly correlated with both self-compassion and resiliency.	This study demonstrates that a short-term yoga intervention can have positive effects on medical student self-compassion and perceived stress. In addition, with less effects seen 6 months after the intervention—the study supports the need for a consistent and regular yoga intervention.
McCulloch et al. <sup>24</sup>	Living AnatoME: Teaching and Learning Musculoskeletal Anatomy Through Yoga and Pilates (2010)	U.S., Mount Sinai School of Medicine	144 first-year medical students were evaluated, and the response rate was not indicated in the study.	Educational	The course entailed a total of ~140 contact hours, lectures, and laboratories. The course taught anatomy through the functional practice of yoga. All participants completed the traditional musculoskeletal gross anatomy curriculum before the LA sessions. The LA course consisted of six 1.5-h classes on yoga and Pilates exercises specific to musculoskeletal anatomy.	The study design was a pre- and postcourse assessment (objective) and survey (subjective). The pre- and postcourse assessments were taken home, closed-book online examinations to gauge knowledge on the material taught in class. Tested topics were lower limb, upper limb, muscle function, innervation, palpation, and clinical correlate. Each assessment included 20 class material questions and 5 questions to serve as controls.	The study found that the educational yoga intervention significantly improved the post-test scores of the class while the control questions did not.	This study is an example of integrating yoga into the medical curriculum. It is a clear model of yoga as a cocurricular component. Furthermore, the study findings demonstrate that integrating yoga can be a beneficial educational approach.

<sup>23</sup>Included in the study because although it was a non-U.S. study, the study evaluated U.S. medical students.

CAM, complementary and alternative medicine; LA, Living AnatoME; MBSR, mindfulness-based stress reduction; POMS, profile of mood states; PSS, perceived stress scale; RS, resilience scale; SCS, self-compassion scale; TMD, total mood disturbance.



The research model, the second most common, offers free yoga through an elective course for research purposes. Strengths to this model include that yoga is offered as a resource free of charge, gathers data-driven evidence that may increase support for yoga in the future, and the smaller class sizes with this approach offers more personalized instruction from the instructor. However, a weakness to this model is that yoga is only offered to few cohorts of students in short-term, which is not a sustainable resource.

The third model, the least common, is that bridges yoga and medical education. A strength to this approach is that it offers an active way of applying medical education through a different perspective outside the classroom while engaging in the benefits of yoga. As a medical student, it is important to learn medicine through different perspectives and approaches. It is equally as important to practice skills of resiliency, yoga being one. The authors argue the educational model is an approach to provide both. Still, weaknesses to this model may include lack of resources, teachers, school support, and the need for an established supporting organization or department. The educational model is the ideal model for combining the benefits of yoga with the educational objectives of medical school.

The Mahatma Gandhi Medical College & Research Centre of Sri Balaji Vidyapeeth (SBV) in Pondicherry, India is an example of a medical school that integrates yoga into medical education using an institutionalized version of the educational model. Since 2015, SBV medical students have been exposed to yoga as a practice and philosophy starting early in their medical school experience.<sup>32</sup> Dr. Ananda Bhvanani has been an essential leader in these efforts and has shared (personal communication) his experience and perspective on the process of introducing yoga into the health care system. Medical students participate in yoga starting during school orientation and throughout their years in the program. An aim of the program is to expose students to yoga in the context of medicine, which at a minimum gives the future physicians the knowledge to decide if yoga could be a useful adjunctive therapy for their patients.

Although the cultural and medical system differences between India and the United States should be acknowledged, this model serves to learn from one country's success in integrating yoga into their modern medical system. In the United States, yoga is being used in hospitals, cancer centers, nursing homes, and other health care facilities as adjunct therapy. Yoga is particularly gaining momentum in the fields of pain and cancer as it provides a biopsychosocial perspective to support the whole person.

Future directions for approaches to yoga in U.S. medical schools include studying the effects of a more longitudinal sustainable yoga program through a medical school-supported infrastructure. The Liaison Committee on Medical Education is an accreditation organization that reviews medical schools for quality assurance to meet established standards.<sup>33</sup> Currently, there is a subsection named 12.3 Personal Counseling/Well-Being Programs under Standard 12: Medical Student Health Services, Personal Counseling, and Financial Aid Services. In the future, efforts should be made for the well-being programs to include specific yoga components such as mind-body practices as part of the curriculum.<sup>33</sup>

As part of this curriculum, assessments of knowledge, skills, attitudes, and impact may be through self-reflection assignments, small group discussions, basic multiple-choice quizzes, and pre- and postsurveys. Future analyses may focus on evaluating the long-term effects of implementing such programs. Specifically, long-term quantitative studies examining quality of life and physician burnout may shed light on the usefulness of implementing more yoga programs through the educational model. This study highlights the need for greater institutional support to organize a structured yoga course for students. Thus, surveying U.S. medical schools and institutional perceptions about yoga may serve as one way to better understand the climate for growth.

A comprehensive elective course has the potential to address the triad of supporting medical student resiliency, increasing access to yoga, and teaching about the therapeutic applications of yoga. The three models of yoga as recreational, research, and educational serve different purposes. However, from the perspective of medical students, the authors urge medical schools to create more opportunities for yoga through the educational model as it combines the benefits of yoga for student wellness while also stimulating learning and exposure. Greater opportunities for incorporating yoga into the formal medical curriculum from a construct of student well-being or anatomy education, such as in the form of elective coursework, should be developed.

## Conclusion

As yoga continues to gain momentum in the United States, there is an opportunity to engage academic health centers into incorporating therapeutic yoga into education and research. With proven benefits, it can serve as a tool to support student wellness and a way to apply medical education in a different scope. Recreational, research, and educational are three models to which yoga is approached in U.S. medical schools. More opportunities should be created to engage medical students in yoga through the educational model. The educational model is an ideal model for combining the benefits of yoga with the educational objectives of medical school. Experiential learning gives future physicians an edge as educators and advocates for yoga as therapy.

In other words, the educational model enriches the learning process as it allows students to practice what they preach. Research on the benefits of these types of programs is lacking and clearly needed. Ultimately, providing yoga to medical students is a way to support holistic wellness during the years of training and to cultivate mindful resilient physicians with the potential to provide higher quality patient care. The authors believe that yoga in health care education can serve as a major wellness tool for building future clinicians' resilience, decreasing chances of physician burnout, and helping to shift the U.S. health care system to a whole person health model.

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Address correspondence to:

*Mikhail Kogan, MD*

*Department of Medicine*

*George Washington Center for Integrative Medicine*

*908 New Hampshire Avenue NW #200*

*Washington, DC 20037*

*USA*

*E-mail: mkogan@gwcim.com*