

Promoting Resilience in Medicine: The Effects of a Mind–Body Medicine Elective to Improve Medical Student Well-being

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Michelle K Williams, BS¹, Irene M Estores, MD², and Lisa J Merlo, PhD, MPE¹ 

Abstract

Background: Poor mental health is common among medical students. In response, some medical schools have implemented wellness interventions. The University of Florida College of Medicine recently introduced a mind–body medicine elective, Promoting Resilience in Medicine (PRIME), based on the Georgetown University School of Medicine course. PRIME teaches meditation techniques including mindfulness, biofeedback, art, and journaling in a faculty-facilitated small group setting.

Methods: First- and second-year medical students (N = 24) who participated in the 11-week elective (3 cohorts over 2 years) completed anonymous surveys regarding their experiences. Measures included the Freiberg Mindfulness Inventory (FMI), Perceived Stress Scale-10 item (PSS-10), and a series of multiple-choice and free-response questions developed for this study. The study was approved by the University of Florida Institutional Review Board.

Results: Among students with available pre- and posttest scores, the average PSS-10 score at pretest was 14.4 (SD = 6.17, range = 3–26) and at posttest was 14.2 (SD = 4.17, range = 8–22), suggesting no change in perceived stress. However, average scores on the FMI improved from 34.4 (SD = 6.10, range = 24–47) at pretest to 41.8 (SD = 4.81, range = 33–49) at posttest. The overwhelming majority of participants (95.8%) described the course as “definitely” worth it. The greatest improvements were noted in mindfulness, relationships with peers, and having a safe place in medical school to receive support. Learning mindfulness/meditation skills and increasing social support were noted as the primary factors impacting student well-being.

Conclusion: A mind–body medicine elective course may be a practical method to improve medical student well-being and improve ability to care for patients. Future studies should include follow-up testing to determine if benefits are sustained over time. In addition, more work is needed to understand the cost–benefit of providing instruction in mind–body medicine techniques to all medical students.

Keywords

mindfulness, meditation, medical education, wellness, support group

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Introduction

Although medical students begin school with mental health profiles similar to or even better than their peers, their well-being declines dramatically once in school.¹ Burnout is reportedly experienced by 41% to 75% of medical students^{1–5} and is associated with increased alcohol use⁶ and decreased empathy and professional climate scores.⁷ Across countries, poor mental health is common among medical students, with studies showing at least 1 in 4 medical students experience depression^{8–16} and 25% to 85% experience

anxiety.^{10,13,15–17} Given that medical school appears to cause negative changes to medical student well-being,

¹Department of Psychiatry, University of Florida, Gainesville, Florida

²Department of General Internal Medicine, University of Florida, Gainesville, Florida

Corresponding Author:

Lisa J Merlo, McKnight Brain Institute, PO Box 100256, Gainesville, FL 32610, USA.

Email: lmerlo@ufl.edu



steps must be taken to examine what can be done to promote resilience among this vulnerable population.

Meditation is a mind–body practice that improves core psychological capacities¹⁸ and can help individuals better manage psychological distress, depression, and anxiety.¹⁹ The practice of meditation has been shown to physically change regions of the brain,²⁰ improving information-processing and emotion-regulation abilities.^{18,19} Observed reductions in gray-matter density correlate with reductions in perceived stress, suggesting that meditation is a viable intervention and prevention strategy for medical student distress.¹⁸ Indeed, some medical schools have already begun to incorporate mind–body techniques and tools (ie, meditation, biofeedback, guided imagery) into their curricula.²¹

Results of published program evaluations suggest significant benefit. For example, one German university implemented an 8-week mind–body medicine-based stress reduction program for health profession students. Upon course completion, measured improvements were noted in health-related quality of life, perception of stress and stress levels, and behavioral reactions.²² The Saint Louis University School of Medicine added a wellness program that included resilience and mindfulness training into their curriculum and observed associated decreases in stress, anxiety, and depression among their students.²³ Similarly, after Georgetown University School of Medicine introduced an elective course in mind–body medicine, students reported a decrease in perceived stress and increase in mindfulness and concern for the well-being of others.²⁴

One hypothesis is that these programs exert beneficial effects on students by teaching techniques centered around increasing resilience, which has been identified as the single greatest predictor of low psychological distress,²⁵ but anecdotal evidence suggests that the interpersonal connections, group cohesion, and faculty role-modeling involved in these interventions may also provide important benefit. More research was needed to assess this possibility. Importantly, the evidence does suggest that school-led initiatives may be more likely to impact medical student well-being, as medical students are less likely than the general population to seek care on their own, even for a serious medical problem.²

The University of Florida College of Medicine (UFCOM) introduced a mind–body medicine elective for medical students in the Spring of 2017. The course, called Promoting Resilience in Medicine (PRIME), was modeled after and utilized the curriculum developed at the Georgetown University School of Medicine, which introduces students to various mind–body medicine techniques such as meditation, biofeedback, visual art, and journal writing. As at Georgetown, students at UFCOM met in small groups (9–11 students) with 2

facilitators, for 2 hours a week, for 11 weeks. Each session began with a 5-minute ritual to shift focus to the course objectives, followed by a 45-minute check-in to reflect on their recent life experiences and to practice active, generous listening. Each week, a new mind–body medicine technique was introduced, practiced, and discussed before the closing ritual was performed. The course was open to first- and second-year medical students, with a goal of promoting self-awareness, self-care, and adaptive coping to support students in becoming better health care providers. This study used both qualitative and quantitative analyses to examine the impact of participation in this elective mind–body medicine course. To build on previous work, particular attention was paid to student views regarding the mechanisms of action in improving their well-being and the ideal method of course delivery to maximize impact.

Methods

Participants

First- and second-year medical students participating in the course, PRIME, during the Spring of 2017 (2 cohorts) or Spring 2018 (1 cohort) were invited to participate in this study. All students chose to participate. One student did not complete the course due to initiating a medical leave of absence during the semester, so this student's posttest responses are not included in the study. Of the 24 participants who completed the study, 29.2% were male and 70.8% were female. No other identifying information was collected, in order to preserve student anonymity.

Measures

Perceived Stress Scale-10 Item. The Perceived Stress Scale (PSS-10) is a 10-item tool designed to assess how different situations affect individuals' feelings and perceived stress.²⁶ An example item is "In the last month, how often have you felt nervous or stressed?" Items are rated on a 5-point scale ranging from 0 = "never" to 4 = "very often." The PSS has demonstrated good psychometric properties.²⁷

Freiburg Mindfulness Inventory. The Freiburg Mindfulness Inventory (FMI) is a 14-item measure to assess mindfulness. Items are rated on a 4-point scale ranging from 1 = "rarely" to 4 = "almost always."²⁸ A sample item is "I am open to the experience of the present moment." The FMI has demonstrated good reliability (Cronbach's $\alpha = .86$) and concurrent validity.²⁸

Student perceptions of course participation. For this study, a series of multiple-choice questions were developed to

assess student satisfaction with the course content and structure as well as to examine students' self-reported changes in their functioning, relationships, and general well-being following participation in the course. Students rated these items on a 5-point scale ranging from 1 = "significantly worse" to 5 = "significantly better." In addition, free response questions allowed students to provide feedback regarding their experiences with the course and suggestions for improvement.

Procedures

Students completed the FMI and PSS-10 questionnaires on their first and last days of the course. Items assessing student experiences with the PRIME course were completed only on the last day. Each survey was assigned an ID number to preserve the anonymity of the students. Before beginning the survey, students were given a form explaining that participation was voluntary, anonymous, and that they had the right to withdraw from the study at any time. Pretest surveys for 1 section of the Spring 2017 course ($n = 8$) were misplaced by the course instructors and are not included in the study results. The estimated time requirement to complete the surveys was 10 minutes for the pretest questionnaires and 30 minutes for the posttest questionnaires. Students were given time to complete the questionnaires during class and received a \$20 Starbucks gift card for participation. This study was approved by the University of Florida Institutional Review Board.

Data Analysis

Quantitative data were analyzed using SPSS version 23, with descriptive statistics calculated for variables of interest. Qualitative data were analyzed using thematic analysis. In the Results section, representative student quotes are included to illustrate the themes. The participant ID number is listed in brackets following each quote. Some quotes were edited very slightly to fix grammatical mistakes and improve readability.

Results

Self-Assessment

Students with pretest scores available ($n = 17$) reported a mean score of 14.4 ($SD = 6.17$, range = 3–26) on the PSS-10. Following completion of the course, the average PSS-10 postcourse scores for this subset of students was 14.2 ($SD = 4.17$, range = 8–22), suggesting that levels of perceived stress associated with the first year of medical school did not change over the course of the semester. When considering the total sample of students ($n = 24$), the average PSS-10 score at postcourse was 14.6 ($SD = 3.79$, range = 8–22).

By contrast, the students with pretest scores available ($n = 17$) scored an average of 34.4 ($SD = 6.10$, range = 24–47) on the FMI at pretest and improved their mindfulness scores over the course of the semester. By the end of the course, the average FMI postcourse scores for the subset of students with pretest scores was 41.8 ($SD = 4.81$, range = 33–49). Self-reported scores on the FMI for the full sample ($n = 24$) averaged 41.5 ($SD = 5.0$, range = 33–50).

Benefits of the Course

As seen in Table 1, students acknowledged improvement across multiple areas of their lives associated with participation in PRIME, including their overall stress level, school-life balance, relationships, connection to the medical school, and degree of loneliness. Students reported that the course "brought a much needed sense of balance to this semester," [14] allowing them to "feel less stressed" [16] and have a place to "talk about stress with other students (and faculty, on more of an even footing)" [12]. The greatest improvements were reported in their relationships with medical student peers, experience of mindfulness, and access to a safe environment. The course, described as "a place where I could come and feel comfortable being myself" [3], allowed students to "learn/practice strategies others have shared with respect to remaining mindful/resilient" [5].

Indeed, 95.8% of participants reported that they would "definitely" recommend participating in the course to their peers, with the remaining 4.2% responding "probably." Two of the most cited reasons included gaining a support group (eg, "This has been my primary support group. It has helped me achieve my goals of staying rested and improving physical wellness" [6]) and the opportunity to learn new skills (eg, "I think it would be beneficial to everyone to give mindfulness and meditation and these other techniques a shot. Also, many do not realize the stress they are under until they even begin these sessions" [7]). Some described the experience as transformative in their lives; for example

I have been able to deal with my anxiety and pessimism so much better. I have had so much more self-acceptance and self-awareness. I have learnt better ways to cope with my stress and disappointments. I have also [engaged in] more physical activity; this group has really changed my life. [3]

Time Investment

An overwhelming 95.8% of participants indicated the time investment for participation in PRIME was "definitely" worth it and the remaining 4.2% said it

Table 1. Changes in Feeling/Performance After Participation in the PRIME Course Compared to Before the Course.

	Minimum	Maximum	Mean	Standard Deviation
Overall level of stress	2	5	4.21	.89
Average amount of sleep per week	2	5	3.54	.83
Quality of sleep	3	5	3.63	.77
Amount of exercise each week	2	5	3.67	.82
Ability to manage time effectively	3	5	3.83	.70
Level of "burnout"	2	5	3.92	1.0
Attention/ability to focus	2	5	3.79	.78
Academic performance	2	5	3.50	.83
Making time for self-care	2	5	4.42	.72
Degree of loneliness	3	5	4.13	.80
Experience of "mindfulness"	4	5	4.58	.50
Family relationships	3	5	3.46	.66
Relationships with friends outside of UFCOM	2	5	3.38	.71
Relationships with UFCOM medical student peers	3	5	4.46	.59
Relationships with UFCOM faculty	3	5	4.04	.71
School-life "balance"	2	5	4.04	.83
Commitment to career in medicine	3	5	3.87	.82
Feeling connected to UFCOM	3	5	4.22	.67
Having a safe environment	4	5	4.87	.34

Abbreviation: UFCOM, University of Florida College of Medicine.

1 = Significantly worse; 2 = Slightly worse; 3 = No change; 4 = Slightly improved; 5 = Significantly improved.

was "probably" worth it. Despite the added work, they described it as helping them manage their other responsibilities; for example

This was a class that I actually looked forward to attending. It was a breath of fresh air in the midst of hard science classes. It helped keep me going and take care of myself even as classes got much harder. [8]

The majority (75%) of participants felt that the time commitment for the course (ie, 11 sessions of 2 h each) was "just right," though the remaining 25% felt it was not quite enough time. Students estimated spending between 16 and 35 hours dedicated to the course (mode = 22 h), with all those who preferred more time reporting spending 22 hours or less dedicated to the course. Notably, despite the heavy demands of medical school, none of the students reported that the elective was too much of a time commitment. To the contrary, students reported that the course helped them "feel less guilty about prioritizing things like sleep, exercise and meditation" [15].

Attendance Requirements

Most students (66.7%) did not believe attendance at individual class sessions should be optional for those who enrolled in the class. Those in favor of mandatory attendance noted that optional attendance would make it tempting for students to prioritize other activities, even

if this was not in their best interest (eg, "If optional, it may be easier to say that studies are more pressing" [10]). Several noted that they were often grateful that they attended class, even/especially on weeks they felt ambivalent about attending (eg, "I think the best sessions were the ones I didn't want to go to, so it's important to have some pressure to go" [19] and "There were times when I felt like I didn't have time to make it to class, but since it was mandatory I had to anyways. And after the session I was so happy that I came and felt so much better after, so I feel like it shouldn't be an option" [3]). Those who thought that attendance should be optional (16.7%) described the possibility of the course being able to reach a larger audience (eg, "If it will bring more people to these sessions, any session for any amount of time, do it. They need it" [2]) and the potential benefits of attending even a few sessions (eg, "I think any exposure students can get is beneficial. Maybe have some students required for credit but be open to others? Don't want to disrupt 'safe space,' though" [14]). Finally, 16.7% of students were unsure if it would be best to make class sessions optional (eg, "I can see pros and cons to both required and optional" [1]). Although most students were in favor of keeping the session attendance mandatory, 79.2% of participants reported that they would still have attended every session, even if attendance was optional.

When considering the overall course and its place in the required versus elective curriculum, participant responses were more variable. For example, 33.3% of

participants thought the course should “probably not” be mandatory for all first-year medical students and 25% replied “definitely not.” The primary reason was that voluntary participation was viewed as important to achieving the benefits (eg, “You have to be in the right mindset to ‘buy in’ to the mentality. Also, the trust in the group is built on the fact that we all chose to be here” [1] and “If it was mandatory, I’m afraid people would close themselves off to all that they could learn before they even started” [21]). Another reason was the concern that some students may become resentful (eg, “I think that forcing people to come would foster resentment and counting down the minutes” [20]) and potentially spoil the experience for the rest of the class (eg, “People who don’t want to do it who are forced might create a hostile environment for meditations” [11]). Meanwhile, 16.7% thought that the course should “probably” be mandatory because “students would see a great benefit and be healthier physically and mentally overall” [15], while another 25% were undecided. As a compromise, one participant suggested making certain elements of the course mandatory (eg, “I think some of the activities should be mandatory like introductory meditating, but an entire course for everyone might be too much” [16]). It is noteworthy that an introductory experiential session on mindfulness/meditation is already included in the required curriculum.

Commitment to Continued Skill Development

Most students (58.3%) reported practicing the mind-body techniques at least most days of the week. This includes 16.7% of students who reported incorporating the skills that they learned into a daily practice and 41.7% who practiced at least 4 days per week. Of the remaining participants, 25% practiced a few days each week and 16.7% practiced once a week. All students indicated plans to continue in the elective advanced course in mind-body medicine the following semester, with 45.8% saying “probably” and 54.2% declaring they “definitely” would. Students explained that there was still much to learn (eg, “The tools and practices are lifelong, and I know I will benefit from deeper/broader exploration” [5]) and that they needed the course to help them continue healthy practices (eg, “I need it. What this course does is both part of me and good for me. I don’t want to lose sight of the importance of my wellness and self-care” [2]). Other students noted concerns about making time for the course amid the added responsibilities of the second-year curriculum (eg, “I very much enjoyed this class so I would love to do it again, but I am worried about [the] stress of 2nd year” [16]).

Reasons for Enrolling in the Course

The main reason students reported for enrolling in the course was to receive the benefits of mindfulness practice (eg, “I liked the idea of a longitudinal program that teaches mindfulness and health-promoting practices that will directly impact my ability to remain resilient in a demanding profession” [5]). Some students with prior mindfulness experience described a desire to further cultivate their practice (eg, “I have previously used meditation to maintain my balance and was eager to learn new techniques. I hope to use my skills to encourage others to seek out mindfulness” [14]). Other students enrolled to learn new coping strategies and techniques for stress management (eg, “I felt I couldn’t cope with my stress last semester in a healthy way” [19]) and prevent further struggles (eg, “I knew before starting medical school, I had some emotional and mental issues I needed to find better ways to cope with. These issues sky-rocketed during the constant stress of medical school so I knew I need[ed] to include some medical and natural ways and lifestyle changes to take care of them” [3]). Several students also noted that resilience is an important trait for physicians to develop (eg, “I believe self-care and mindfulness are extremely important to maintain health. I wanted to better myself and learn to help my future patients live more healthfully and happily in the present moment” [16]).

Overall Impact

Students generally described the course as a respite from their hectic schedules (eg, “A time of peace and safety in a newly chaotic life” [14]) that gave them an opportunity to reflect on their medical school experiences (eg, “It helped me realize I am not alone in my struggles and gave me a safe outlet to share how I was doing” [17]). Others noted that it gave them a “better understanding that self-care is important” [18] and encouraged them to invest time in their own well-being (eg, “This course helped me a lot this semester. Though classes got harder, I think this course helped me performance-wise by making sure that I made time for myself and didn’t burn out completely” [8]). They described personal growth resulting from the course (eg, “[It] challenged me in ways I did not expect to be challenged—but certainly needed” [2] and “It has helped me serve as a more balanced medical student, partner, sister, daughter, and friend. I am better able to use my mind as a thermostat, making adjustments throughout the day as my mood changes and I experience things beyond my control” [4]). Many students also reported improvements in their coping ability and self-esteem (eg, “I am better able to manage stress. I am able to focus and prioritize my schoolwork much better, so I am more on-track with

school. As a person, I am more in touch with my emotions and don't avoid them. I am also kinder to myself" [7] and "I appreciate my strengths more and am less hard on myself. More time is devoted to self-care" [14]).

Impact on Medical Training

Finally, the majority of students reported feeling that the course prepared them to teach future patients about wellness (eg, "I want to be a physician who takes care of every aspect of the health of those I care for. Mental health is a vital part of overall well-being. I can teach these skills to my patients" [22]), and many remarked that it would help them take better care of both themselves and their patients (eg, "100% changed my overall outlook on what it means to be mindful, and gave me the tools to take better care of myself. I know for a fact that if I care for myself then I can actually care for others much, much better" [24]). Several students described developing a more holistic view of health (eg, "It made me much more open to the value of alternative and integrative medicine" [24]), and more confidence in their career choice (eg, "It has assured me that I have a place, calling, and future in medicine" [2] and "It has showed me that this is where I want to be. Before PRIME I was doubting my choice and I think this course really helped remind me what's important" [19]).

All students reported a positive change in their attitude toward the medical school community (eg, "It has helped me to feel supported in a career in medicine" [13] and "It's cool to know that there are faculty that care about the mental health of medical students. This definitely has positively changed my perspective on medicine, especially medical education" [22]) and their peers (eg, "It has reassured me that I am normal in going through personal struggles occasionally. It also helps to know that there are such wonderful people in my class" [20]). Several noted that course participation made medical school more manageable (eg, "Med school is less scary and feels much more manageable" [23] and "I think it has made me more peaceful and more able to roll with the punches med school throws at me" [21]). With regard to peer relations, students reported that the course helped them "connect with classmates I wouldn't have otherwise" [9]). They described feeling less isolated (eg, "It helped me to realize that my classmates are feeling similar feelings to my own, and normalized a lot of the first-year struggles that many of us wouldn't normally talk about" [17]), more supported/connected (eg, "[It] gave me a family" [10]), and better able to support others in return (eg, "Honestly, I am able to care for friends better because I am less consumed with my own stress or emotions. I am surprisingly more selfless by practicing more self-care" [7]).

Discussion

The results of this study demonstrate significant perceived benefit for medical students who participate in an elective small-group course in mind-body medicine. All participants described the class as worthwhile and noted personal improvements in mindfulness, making time for self-care, and having a safe place within medical school. These results are consistent with other studies, which found participation in mind-body medicine electives to be very valuable,²⁹ and to improve mindfulness,^{22,29,30} provide a safe environment,^{31,32} and encourage self-care.³¹ Another potential benefit is helping students become better future physicians, as the practices taught in the course (eg, meditation, journal writing, biofeedback) have been shown to increase empathy in healthcare students,³³ and self-reflection/mindfulness is known to positively impact both individual well-being and clinical skills.^{33,34}

The findings also provide valuable new information regarding the mechanisms that may be driving improvements in medical student well-being. Contrary to previous research,³⁵ in the present study, students' perceived stress scores did not change following participation in the course. At pretest (mean PSS-10 $M = 14.1$) and after course participation (PSS-10 $M = 14.6$), the medical students displayed perceived stress scores that were stable, though lower than the average score observed among medical students in prior research (PSS-10 $M = 20.2$).³³ Medical school is widely recognized as a stressful experience, with significant workload, high-stakes testing, exposure to issues of mortality, substantial financial burden, and so on. However, the results of this study suggest that efforts to minimize the stress associated with medical school may be less important than efforts to increase student resilience through improvements in mindfulness and social support.

Students listed the support group and skill development that participation in the PRIME course offered as their main reasons for recommending the course to other students. Social support has demonstrated a positive influence on medical students' coping reservoir and resilience,^{36,37} and studies have noted that a lack of support is associated with poor mental health.^{4,38} Furthermore, students began the course with an average mindfulness score of 34.4 on the FMI; almost exactly equivalent to the general population mean score of 34.5.²⁸ Following participation in the course, they improved to an average of 41.5 on the FMI, which was similar to the postcourse participation results for medical students in the mind-body medicine class at Georgetown School of Medicine (FMI $M = 40.0$),³⁵ and higher than the average score in a study of individuals who had recently completed participation in a mindfulness retreat (ie, $M = 37.2$).²⁸ Previous studies have demonstrated that mindfulness

techniques can improve psychological well-being in areas such as stress management^{29,39–41} and anxiety.^{23,40}

Given the potential benefits of participation in this course to promote medical student well-being, it is important to examine potential barriers to widespread dissemination. First, in previous research,³² students noted that making a mindfulness course mandatory seemed contradictory, and the current results were consistent with this finding. Although students strongly recommended participating in the course, the majority did not think it should be made mandatory for all students due to concerns about fostering feelings of resentment rather than support, which would likely negate the expected benefit of participation and might “poison” the supportive atmosphere of the group. Second, Kotter et al.⁴² previously identified perceived lack of time as a barrier to medical student participation in a mindfulness intervention, and other studies have acknowledged that the time demands of the medical school curriculum can negatively affect participation in activities that help prevent stress and burnout.^{37,43} However, in this study, no participants reported concerns that the course took up too much time for those who wanted to participate. To the contrary, 75% felt that it was just the right amount of time and 25% thought that it was not quite enough time. Those who believed it was not enough time also estimated a lower investment of time in the course, which may reflect lower levels of practice outside of scheduled class sessions. Previous research assessing impact of participation in a mindfulness-based stress reduction program found that participants engaged in formal home practices on an average of 4.79 days a week, and that the extent of their practice correlated with scores on mindfulness and well-being.⁴⁴ Thus, ensuring adequate time for a mind–body medicine course is likely important. This relates to a third barrier, which is perceived lack of time for additional course content in the overly-packed medical school curriculum at most schools. Maintaining the “elective” nature of the course may be necessary for this reason. Fortunately, although increased time devoted to participation in a mind–body medicine course is associated with practicing those skills more frequently,⁴⁵ students have demonstrated the ability to maintain their practices even when they were unable to attend a class session.⁴⁶ This further supports the value of offering the course for interested students to attend.

Limitations

The results of this study should be interpreted within the context of some limitations. First, only a small number of students enrolled in and completed the PRIME elective over the 2 years of the study, which resulted in a small sample size. Furthermore, all participants were

medical students who were self-selected based on interest/motivation to participate in the elective. This limits the ability of this study to extrapolate its findings beyond this group of individuals, and it cannot be assumed that all medical students would respond to this course in the same way. In addition, pretest data were not available to compare with postparticipation results on the FMI and PSS-10 for all students, somewhat limiting the ability to interpret observed scores on these measures. Finally, all data were based on self-report. It is possible that students overestimated the impact of course participation; however, given that the outcome variables of interest primarily relate to self-perceived well-being, this may be of limited concern.

Conclusion

This study suggests that participation in an elective mind–body medicine course can positively impact medical student well-being, with particular improvements in coping skills, perceived support, and decreased isolation. Despite a significant time investment, students found participation in the course to be highly valuable and would strongly recommend participation to their peers. As a result, medical schools should consider how to offer a similar course within their curricula. Future studies should include follow-up testing to determine if benefits are sustained over time. In addition, more work is needed to understand the cost–benefit of providing instruction in mind–body medicine techniques to all medical students.

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ORCID iD

Lisa J Merlo  <https://orcid.org/0000-0003-3613-7853>

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