



Online Training in Mind-Body Therapies: Different Doses, Long-term Outcomes

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Abstract

Background. There is a high rate of burnout among health professionals, driving diverse attempts to promote resilience and well-being to counter this trend. The purpose of this project was to assess the dose-response relationship between the number of hours of online mind-body skills training for health professionals and relevant outcomes a year later. **Methods.** Among 1438 registrants for online training (including up to 12 hours of training on mind-body practices) between December 2013 and November 2015, we analyzed responses from the first 10% who responded to an anonymous online survey between December 1, 2015 and February 1, 2016. Questions included the type and frequency of mind-body practice in the past 30 days and whether the online training had any impact on personal life or professional practice. Standardized measures were used to assess stress, mindfulness, confidence in providing compassionate care, and burnout. **Results.** The 149 respondents represented a variety of ages and health professions; 55% completed one or more mind-body training modules an average of 14 months previously. Most (78%) engaged in one or more mind-body practices in the 30 days before the survey; 79% reported changes in self-care and 71% reported changes in the care of others as a result of participating. Increasing number of hours of training were significantly associated with practicing mind-body skills more frequently; increasing practice frequency was associated with less stress and burnout, which were associated with missing less work. Greater practice frequency was also associated with improvements in stress, mindfulness, and resilience, which were associated with increased confidence in providing compassionate care. **Conclusion.** Online training in mind-body therapies is associated with changes in self-reported behavior one year later; increasing doses of training are associated with more frequent practice which is associated with less stress, burnout, and missing work, and higher levels of mindfulness, resilience, and confidence in providing compassionate care. Additional studies are needed to compare mind-body skills training with other interventions designed to improve resilience and compassion while decreasing burnout in health professionals.

Keywords

education, interprofessional, meditation, stress, burnout, self-efficacy, compassion

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Stress, burnout, and depression are increasingly reported by health professionals.^{1,2} Burnout is associated with significant personal morbidity (such as substance abuse, suicide, and symptoms such as headache and insomnia), impaired professional behavior (poor communication, higher error rates), and high costs to employers and society.³⁻⁷ Despite attempts to address stress by offering on-site counseling services, support groups, retreats, and education about the importance of sleep and other self-care behaviors, rates of burnout and depression continue to rise; for example, the rate of burnout now hovers around 50% of physicians.^{1,2} Several professional groups, including the American Academy of Pediatrics and the Accreditation Council for Graduate Medical Education have

called for more systematic approaches to addressing stress and burnout.^{8,9} A 2016 systematic review and meta-analysis of interventions aimed at preventing and reducing physician

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burnout by West and colleagues¹⁰ at Mayo Clinic suggests that both organizational strategies (such as reducing duty hours) and individual-focused strategies (such as stress management and mindfulness training) can effectively address this problem.

General training in mind-body practices might offer a broad, personalized approach to reducing burnout and building resilience. Research in medical trainees supports a conceptual model linking higher mindfulness and self-compassion with higher levels of resilience and lower rates of burnout.^{11,12} Several studies suggest that training in mind-body practices offers promise for reducing burnout.¹³⁻¹⁵

Because in-person training is costly and inconvenient, we previously assessed the immediate and 12-week impact of online training in mind-body practices for diverse health professionals, finding that such training is both feasible and associated with improved stress, mindfulness, and resilience.¹⁶⁻¹⁹ Others have also demonstrated that online mind-body training for health professionals is feasible and has positive short-term benefits.^{20,21} However, questions remain about the longer term impact of online training in mind-body skills. We wished to answer 3 questions in a long-term follow-up of a cohort of participants enrolled in our online training programs: (1) Do participants in online mind-body skills training report any changes in their personal self-care or professional behavior 1 year later? (2) Is there a relationship between the number of hours of training and subsequent frequency of mind-body practice year later? (3) Is there a relationship between the frequency of mind-body practice and stress, burnout, and missing work, and mindfulness, resilience, and confidence in providing compassionate care? We also wanted to test and expand our conceptual model for training, that is, that stress is a risk factor for burnout, which in turn, is associated with an increased risk of missing work and that mindfulness and resilience promote confidence in compassionate care.

Methods

Design

To answer these questions, we took advantage of a natural experiment at the Ohio State University as we offered free, elective online training in integrative therapies to students, faculty, and staff between December 1, 2013 and November 30, 2015.

Participants

Participants were eligible if they enrolled in and completed one or more online modules in an elective online course for health professionals offered through the Ohio State University's Center for Integrative Health and Wellness. As we were unable to offer any financial incentive for completion, and a 10% sample offered an adequate sample size for answering the study question, the analysis was conducted for the first 10% who completed the anonymous online posttraining survey between December 1, 2015 and January 31, 2016.

Interventions

The online courses during this period were (1) Herbs and Dietary Supplements (HDS) Across the Lifespan or (2) Mind-Body Skills Training for Resilience, Effectiveness, and Mindfulness (MBST). As per institutional policy, both courses were offered free of charge to health professionals and trainees at our university; others were charged a nominal fee. There was no course credit, no required minimum number of units, and no deadline for completing either course.^{16,22} The HDS course opened for enrollment in December, 2013 and offered up to 14 hours of online training; the MBST course opened in May, 2014 and offered up to 12 hours of online training. Course content and format have been described previously.^{16,22-26}

Dose

Doses were calculated based on the number of modules the courses' websites recorded for each participant rather than relying on participants' memories about module completion. Each module was approved for one hour of Continuing Medical Education credit. Among those who only completed modules for the Herbs and Dietary supplements course, the number of Mind-Body modules was counted as 0. For those who completed modules in both courses, the dose for this study was counted only as the number of modules completed in the MBST course (up to a total of 12).

Measures

Information regarding participant gender, trainee status, university affiliation, and health profession was collected at registration. Data on age, ethnicity, and race was collected in the survey. The survey was initially sent in December, 2015 with reminder requests sent every 2 weeks through mid-January. For ease of calculation, the time since completing the course was arbitrarily set as the registration date; the vast majority of participants completed all the modules they ever completed within 8 weeks of the time they registered.

Mind-Body Practice. The questionnaire included 3 questions on mind-body practices in the past 30 days: (1) type and number of mind-body practices used, (2) frequency of mind-body practice (from never to daily), and (3) length of practice (from 0 to >60 minutes daily). The primary outcome was considered frequency of practice.

The 3 specific negative outcomes were stress, burnout, and days missed from work in the 30 days prior to the survey.

Stress was measured with Cohen's 10-item Perceived Stress Scale (PSS), which has been used in multiple studies of health professionals, the general population, and clinical samples. It has good internal reliability and external validity; scores improve with mindfulness training.²⁷⁻³³

Burnout was assessed using the 7-item Mayo Clinic Physician Well-Being Index (PWBI); answers are simple yes (=1) and no (=0) in which scores of 4 or higher are associated with physician distress and have significant correlations with fatigue, poor mental quality of life, career satisfaction, and self-reported medical errors.^{34,35}

Absenteeism—We also asked about how many nonholiday, nonvacation days had been missed from work in the past 30 days.

The 3 specific positive study outcomes were mindfulness, resilience, and confidence in providing compassionate care to others.

Mindfulness was assessed using the 10-item Cognitive and Affective Mindfulness Scale—Revised (CAMS-R); the CAMS-R has good

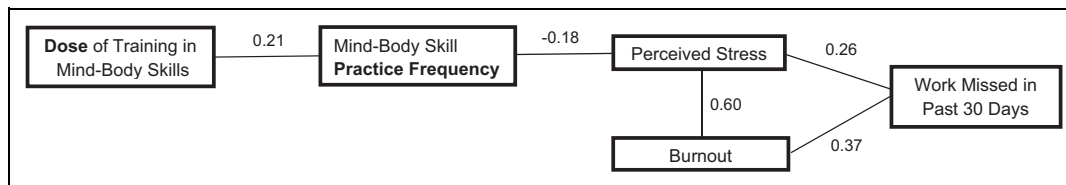


Figure 1. Logic model showing correlations between dose of training and work missed. All numbers represent Spearman rank-order rho values, and all are significant at $P < .05$.

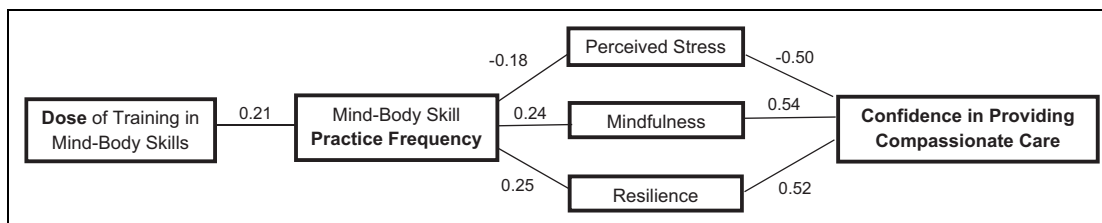


Figure 2. Logic model showing correlations between dose of training and confidence in providing compassionate care. All numbers represent Spearman rank-order rho values, and all are significant at $P < .05$.

internal consistency and scores are significantly correlated with longer measures of mindfulness, well-being, clarity of feelings, adaptive regulation, and cognitive flexibility.³⁶⁻³⁸

Resilience was assessed using Smith's 6-item Brief Resilience Scale (BRS); this scale has been tested in both student and clinical populations and measures a unitary factor correlated with coping and health, and is inversely related to anxiety, depression, negative affect, and physical symptoms.³⁹

Compassion was assessed using the Confidence in providing Compassionate Care scale (CCCS, 10 items, maximum score 100); the CCCS has good internal reliability and correlates in expected directions with standardized measures of mindfulness, empathy, and resilience.⁴⁰

Statistical Analysis

Survey data were downloaded from SurveyMonkey into a Microsoft Excel (Office 365, Version 15.0.4753.1003) and exported to R (Version 3.2.2; The R Foundation for Statistical Computing) for analysis. Using email addresses, survey data was matched to previously collected registration data about module completion, profession, and trainee status. Identifiers were discarded prior to subsequent analysis. Descriptive statistics were used to characterize participants. Fisher's exact tests were used to determine whether demographic or professional characteristics were associated with study outcomes. Because several variables, including dose of training, were not normally distributed, Spearman's rank-order test was used to calculate correlations for the conceptual models. To simplify the analysis, we tested 2 conceptual models—one focusing on negative outcomes (stress, burnout, and missing work) and one focusing on positive outcomes (mindfulness, resilience, and confidence in providing compassionate care). These relationships are displayed in Figures 1 and 2.

Results

Of the 149 participants who completed the survey by February 1, 2016, most (81%) were affiliated with our academic health center. Participants included a variety of health professionals including nurses (38%), physicians (21%), and others (30%)

Table 1. Online Training: Participant Characteristics (N = 149).

Characteristic	n (%)
Age, years	
18-34	30 (20)
35-54	66 (44)
55-74	52 (35)
Sex	
Male	30 (20)
Race	
Caucasian/White	119 (80)
Ethnicity	
Hispanic or Latino	5 (3)
Ohio State University Affiliated	
Yes	121 (81)
Trainee	
Yes	17 (11)
Months since registration	
Mean \pm SD	14 \pm 7
Median (interquartile range)	16 (9-21)
Health profession	
Nurses	56 (38)
Physicians (MD/DO/PA)	31 (21)
Social workers and psychologists	7 (5)
Dietitians	6 (4)
Researcher	5 (3)
Other	44 (30)
Dose (modules completed)	
Mean (SD) ^a	5 (5)
Median (interquartile range) ^a	2 (1-12)
Made behavior changes as a result of training	
Self-care	109 (79)
Care of others	97 (71)

^aAmong participants who completed ≥ 1 module; 45% completed 0 modules.

such as radiology and laboratory technicians, occupational, physical, and respiratory therapists, unit clerks, and others (Table 1). An average of 14 months had elapsed between dates

Table 2. Participants' Mind-Body Practices in 30 Days Prior to Survey (N = 149).

	n (%) ^a
Type of mind-body practice	
None	33 (22)
Gratitude, loving-kindness, compassion, positive or sacred word meditation	68 (46)
Mindfulness meditation	66 (44)
Focused-attention meditation or relaxation response	46 (40)
Tai chi, yoga, or walking meditation	45 (30)
Number of Mind-Body Practices	
Mean (SD)	2 (1)
Median (interquartile range)	2 (1-3)
Frequency of mind-body practice, ^b days	
0	25 (17)
1-5	40 (27)
6-10	23 (15)
11-15	17 (11)
16-20	11 (7)
21-25	7 (5)
26-30	26 (17)

^aParticipants could specify more than 1 mind-body skills practice; percentages may total more than 100.

^bRefers to frequency in the past 30 days.

for course registration and survey completion. Respondents completed an average of 5 modules (Table 1). There were no significant differences in the number of modules completed by age, gender, race, ethnicity, or affiliation with the Ohio State University.

Most participants reported changes in personal or professional behavior as a result of taking the training. For example, 79% reported that they had made changes in their self-care as, and 71% reported that they had made changes in caring for others as a result of their online training (Table 1).

Most participants (78%) reported engaging in one or more mind-body practices in the 30 days prior to the follow-up survey (Table 2). The most common type of mind-body practice was a heart-centered practice such as meditation focusing on gratitude, loving-kindness, or compassion (46% of participants). Participants reported engaging in an average of 2 mind-body practices in the 30 days prior to the survey, and while 44% reported practicing less than weekly, about 40% reported practicing 10 or more days in the previous month (Table 2).

Table 3 shows correlations between study variables. As expected, mindfulness and resilience were strongly correlated with each other. Both were strongly negatively correlated with perceived stress. Higher levels of both resilience and mindfulness were also associated with lower levels of burnout.

Furthermore, the dose of training was significantly associated with the recent frequency of engaging in mind-body practices. In turn, the frequency of mind-body practice was negatively associated with perceived stress, which was strongly correlated with burnout. Both stress and burnout were significantly associated with the number of days of work missed. On the positive side, the frequency of engaging in mind-body

practices was significantly associated with both resilience and mindfulness, both of which were strongly associated with confidence in providing compassionate care. These relationships are illustrated in Figures 1 and 2.

Discussion

This study evaluated the dose-effect relationship of online training in mind-body skills for diverse health professionals. At an average of more than 1 year after completing an average of 5 hours of online training, most participants reported that the training was associated with behavior change affecting their self-care (79%) and care of others (71%). Most (78%) reported engaging in one or more mind-body practices in the 30 days prior to the survey, most often those practices that intentionally generate a positive emotion such as gratitude or compassion. Higher doses of training were associated with greater frequency of engaging in mind-body practices, which, in turn, were associated with lower negative outcomes and higher positive outcomes.

These findings both confirm and extend our previous findings. We confirmed our earlier observation that mindfulness and resilience are strongly correlated with each other, positively associated with confidence in providing compassionate care, and protective against burnout in a variety of health professionals.^{11,12,41} In fact, these earlier observations led us to evaluate a practical intervention aimed at improving mindfulness and resilience, online mind-body skills training, which our subsequent work suggested can lead to short-term improvements in stress and confidence in providing compassionate care in health care students, residents, and practicing clinicians.¹⁶⁻¹⁹ This has important implications for patient care since more mindful clinicians provide more patient-centered care; Dobkin et al⁴² showed that mindfulness training improved clinician's mindfulness and well-being, and that patients perceived that more mindful clinicians provided more patient-centered care.

The results of this study extend earlier research in 3 ways. First, we now demonstrate that the relationship between mind-body skills training and variables of interest that we found immediately and 12 weeks after training appears to be stable for at least 12 months after training.^{17,19,43,44} This is consistent with the study by Amutio et al⁴⁵ who reported in their 10-month follow-up study after 8 weeks of mindfulness training that effect sizes for improvements in mindfulness and burnout increased over time, suggesting continued and increasing improvements as physicians persistently practiced their new mindfulness skills. Second, we were able to take advantage of a natural experiment of an ongoing cohort of health professionals engaged in elective online training to begin to examine the dose-effect relationships between training and important variables. Although little research has evaluated the dose-response effect of mind-body training, a growing body of research suggests both psychological and physiological differences between novice and experienced meditators⁴⁶⁻⁴⁸; therefore, studies on different doses and types of training may yield important, clinically relevant information for advice about

Table 3. Correlations Between Measures of Resilience, Mindfulness, Confidence in Providing Compassionate Care, Stress, and Burnout (Rho Values, Spearman Rank-Order Correlation).

	Dose of Mind-Body Training	Frequency of Practice	Mindfulness	Resilience	Compassionate Care	Stress	Burnout	Work Missed
Dose of training (No. of modules)	—	0.21 ^a	0.10	0.08	0.17	-0.20 ^a	-0.15	-0.16
Frequency of practice	0.21 ^a	—	0.24 ^a	0.25 ^a	0.28 ^a	-0.18 ^a	-0.03	0.20 ^a
Mindfulness (CAMS-R)	0.10	0.24 ^a	—	0.73 ^a	0.54 ^a	-0.67 ^a	-0.37 ^a	-0.11
Resilience (BRS)	0.08	0.25 ^a	0.73 ^a	—	0.52 ^a	-0.70 ^a	-0.42 ^a	-0.10
Confidence in Compassionate Care Scale (CCCS)	0.17	0.28 ^a	0.54 ^a	0.52 ^a	—	-0.50*	-0.22*	0.01
Perceived Stress Scale (PSS)	-0.20 ^a	-0.18 ^a	-0.67 ^a	-0.70 ^a	-0.50 ^a	—	0.60 ^a	0.26 ^a
Burnout/Physicians Well-Being Scale (PWBI)	-0.15	-0.03	-0.37 ^a	-0.42 ^a	-0.22 ^a	0.60 ^a	—	0.37 ^a
Work missed (WVM)	-0.16	0.20 ^a	-0.11	-0.10	0.01	0.26 ^a	0.37 ^a	—

Abbreviations: BRS, Brief Resilience Scale; CAMS-R, Cognitive and Affective Mindfulness Scale–Revised.

^a $P < .05$ (all values in boldface are $P < .05$).

personalized training programs. Future studies can also explore how to encourage those who practice infrequently to practice more frequently. Third, we evaluated new variables in our models, frequency of mind-body practice and amount of work missed. Previous research has linked greater mindfulness to less burnout in health professionals,^{15,33,45,49,50} and other studies have demonstrated a relationship between burnout and absenteeism,⁵¹ but to our knowledge, this is the first report linking dose of mind-body training to frequency of mind-body practice, stress, burnout, and missing work, that is, connecting the dots between mind-body skills training and downstream effects mediated by practice, such as burnout, missing work, and confidence in providing compassionate care. As the costs of burnout, including absenteeism, rise, employers, training programs, and professionals are likely to seek cost-effective approaches like online mind-body skills training to address this challenge.⁵²

Limitations

This study was conducted in one academic institution in the Midwest; additional studies are needed in community samples in other locations to enhance generalizability. This study was conducted as an educational evaluation and did not routinely collect survey data at baseline, so we could not examine changes over time that might inform inferences about the impact of the curriculum itself. It is possible that there was self-selection in the dose of training (“preaching to the choir”, ie, that clinicians who were more mindful and less stressed engaged in more training modules and practiced mind-body skills more frequently even before the training). Our earlier pilot study found that those who enrolled in a mind-body skills training program were similar to those who enrolled in a similar course about herbs and dietary supplements.²³ However, self-selection, particularly with regard to the self-selected “dose” of training remains a source of potential bias in a non-randomized study. Self-selection may also have occurred with the inclusion of only the first 10% of respondents; however, since these respondents included a broad range of engagement with the course (from 0 to 12 modules), we cannot determine the

direction of a potential self-selection bias. Although we collected outcome data immediately after training and 12 weeks after training, we do not have intermediate data from 6 and 9 months after training to determine the trajectory of the training’s impact on learners.^{16–18} We observed statistically significant correlations in expected directions, but correlations do not prove causation; it is possible that those who were less stressed, more confident, and less burned out were more prone to engage in mind-body practices. Future studies should collect baseline data and randomly allocate learners to different doses of training to reduce the risk of bias and increase rigor. Prospective studies, including an “intention to treat” analysis, are necessary to address questions about the impact of mind-body training on downstream outcomes such as the quality of care. We used some self-report measures such as self-reported behavior change and absenteeism in the past 30 days; future studies will benefit from use of objective measures of absenteeism from human resources databases. Future studies may also benefit from more rigorous analytical strategies, including mediation analysis rather than simple correlations.

Conclusion

Despite these limitations, this study suggests that online mind-body skills training affect self-reported personal and professional behavior that persist for at least 1 year after training. Increasing doses of training are associated with increased frequency of mind-body practice, which, in turn, are associated with decreased levels of negative outcomes such as stress, burnout, and missing work, and increased levels of positive outcomes such as mindfulness, resilience, and confidence in providing compassionate care. Future prospective, controlled randomized trials are needed to compare the cost-effectiveness of online training with other interventions to improve clinicians’ compassion, decrease burnout, and improve the quality of care.

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Data collection for this project occurred at the Ohio State University, and data analysis was conducted at the Center for Integrative Health and Wellness at the Ohio State University.

Author Contributions

KJK conceptualized the study, the intervention, and the analysis, drafted the manuscript, revised the manuscript, and approved the final manuscript. NR conducted data analysis, drafted the figures and tables, edited and approved the final manuscript. GG advised on data analysis, drafted the figures, and approved the final manuscript. JDM assisted in participant recruitment, reviewed and edited the manuscript, and approved the final version.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical Approval

This project was approved by the Ohio State University Office of Research Institutional Review Board (approval number 2013 B0611).

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