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Association of an Educational Program in Mindful Communication With Burnout, Empathy, and Attitudes Among Primary Care Physicians

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PRIMARY CARE PHYSICIANS RE-port alarming levels of professional and personal distress. Up to 60% of practicing physicians report symptoms of *burnout*,[1-4] defined as emotional exhaustion, depersonalization (treating patients as objects), and low sense of accomplishment. Physician burnout has been linked to poorer quality of care, including patient dissatisfaction, increased medical errors, and lawsuits and decreased ability to express empathy.[2,5-7] Substance abuse, automobile accidents, stress-related health problems, and marital and family discord are among the personal consequences reported.[4,8-10] Burnout can occur early in the medical educational process. Nearly half of all third-year medical students report burnout[2,11] and there are strong associations between medical student burnout and suicidal ideation.[12]

For editorial comment see p 1338.

CME available online at www.jamaarchivescme.com and questions on p 1374.

Context Primary care physicians report high levels of distress, which is linked to burnout, attrition, and poorer quality of care. Programs to reduce burnout before it results in impairment are rare; data on these programs are scarce.

Objective To determine whether an intensive educational program in mindfulness, communication, and self-awareness is associated with improvement in primary care physicians' well-being, psychological distress, burnout, and capacity for relating to patients.

Design, Setting, and Participants Before-and-after study of 70 primary care physicians in Rochester, New York, in a continuing medical education (CME) course in 2007-2008. The course included mindfulness meditation, self-awareness exercises, narratives about meaningful clinical experiences, appreciative interviews, didactic material, and discussion. An 8-week intensive phase (2.5 h/wk, 7-hour retreat) was followed by a 10-month maintenance phase (2.5 h/mo).

Main Outcome Measures Mindfulness (2 subscales), burnout (3 subscales), empathy (3 subscales), psychosocial orientation, personality (5 factors), and mood (6 subscales) measured at baseline and at 2, 12, and 15 months.

Results Over the course of the program and follow-up, participants demonstrated improvements in mindfulness (raw score, 45.2 to 54.1; raw score change [Δ], 8.9; 95% confidence interval [CI], 7.0 to 10.8); burnout (emotional exhaustion, 26.8 to 20.0; $\Delta=-6.8$; 95% CI, −4.8 to −8.8; depersonalization, 8.4 to 5.9; $\Delta=-2.5$; 95% CI, −1.4 to −3.6; and personal accomplishment, 40.2 to 42.6; $\Delta=2.4$; 95% CI, 1.2 to 3.6); empathy (116.6 to 121.2; $\Delta=4.6$; 95% CI, 2.2 to 7.0); physician belief scale (76.7 to 72.6; $\Delta=-4.1$; 95% CI, −1.8 to −6.4); total mood disturbance (33.2 to 16.1; $\Delta=-17.1$; 95% CI, −11 to −23.2), and personality (conscientiousness, 6.5 to 6.8; $\Delta=0.3$; 95% CI, 0.1 to 5 and emotional stability, 6.1 to 6.6; $\Delta=0.5$; 95% CI, 0.3 to 0.7). Improvements in mindfulness were correlated with improvements in total mood disturbance ($r=-0.39$, $P<.001$), perspective taking subscale of physician empathy ($r=0.31$, $P<.001$), burnout (emotional exhaustion and personal accomplishment subscales, $r=-0.32$ and 0.33, respectively; $P<.001$), and personality factors (conscientiousness and emotional stability, $r=0.29$ and 0.25, respectively; $P<.001$).

Conclusions Participation in a mindful communication program was associated with short-term and sustained improvements in well-being and attitudes associated with patient-centered care. Because before-and-after designs limit inferences about intervention effects, these findings warrant randomized trials involving a variety of practicing physicians.

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The consequences of burnout among practicing physicians include not only poorer quality of life and lower quality of care but also a decline in the sta-

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bility of the physician workforce.[13] There has been a major decrease in the percentage of graduates entering careers in primary care in the last 20 years, with reasons related to burnout and poor quality of life.[14-16] This trend, coupled with attrition among currently practicing physicians, have already had a significant effect on patient access to primary care services.[17,18] Replacing physicians who leave practice is expensive: estimates are $250 000 or more per physician.[13,19] Even though the problem of burnout in physicians has been recognized for years, there have been few programs targeting burnout before it leads to personal or professional impairment and very little data exist about their effectiveness.[20]

Burnout may be related to lack of a sense of control and loss of meaning.[20] In an investigation of internists, the capacity of "being present" with their patients[21] correlated more strongly with finding meaning in their work than diagnostic and therapeutic triumphs. This quality of being present for the physicians included an understanding of their patients as not merely objects of care but as unique and fellow humans and an awareness of the patients' (and their own) emotions, often brought out during challenging clinical encounters.

One proposed approach to addressing loss of meaning and lack of control in practice life is developing greater *mindfulness*[4]—the quality of being fully present and attentive in the moment during everyday activities.[22-24] To test this hypothesis we designed a continuing medical education (CME) course to improve physician well-being. The program aims to enhance the physician-patient relationship through reflective practices that help the practitioner explore the domains of control and meaning in the clinical encounter. The course is based on 3 techniques: mindfulness meditation, narrative medicine, and appreciative inquiry.[25,26] Mindfulness meditation is a secular contemplative practice focusing on cultivating an individual's attention and awareness skills. Both narrative medicine and ap-

preciative inquiry involve focusing attention and awareness through telling of, listening to, and reflecting on personal stories. We hypothesized that intensive training in attention, awareness, and communication skills would increase physician well-being, reduce psychological distress and burnout, and promote positive changes in physicians' capacity to relate to patients as indicated by increased empathy and patient-centered orientation to care.

METHODS

Study Population

All primary care physicians in the Greater Rochester, New York, community (N=871) were invited to participate in the program through a series of mailed and electronic communications from the Monroe County Medical Society to individual physicians and local health care organizations, with follow-up telephone calls from the investigators. Physicians with current active practices of family medicine, general internal medicine, pediatrics, or combined internal medicine and pediatrics with revenues through the community-wide Rochester Individual Practice Association (RIPA) of more than $20 000 were eligible for consideration as study participants (n=642). The study proposal was reviewed by the University of Rochester Research Subjects Review Board and determined that it met Federal and University criteria for exemption. Physicians who participated received an information sheet describing their voluntary participation in the study, per the requirement for exempt studies. Participants were offered the course at no charge and received CME credits for participating and $250 for the completion of 5 surveys.

Intervention

The intervention consisted of an intensive phase (8 weekly 2.5-hour sessions, plus an all-day [7-hour] session between the sixth and seventh weekly session) and a maintenance phase (10 monthly 2.5-hour sessions following the eighth weekly session). The all-day session was structured as a silent

retreat in which participants were asked to engage in guided silent mindfulness practices for an entire day at a retreat center. The full curriculum is available from the authors. During each weekly session, participants engaged in the following 4 training components:

Didactic Material. Each session began with a 15-minute didactic presentation of that week's theme. Topics included awareness of thoughts and feelings, perceptual biases and filters, dealing with pleasant and unpleasant events, managing conflict, preventing burnout, reflecting on meaningful experiences in practice, setting boundaries, examining attraction to patients, exploring self-care, being with suffering, and examining end-of-life care. These themes framed and provided the rationale for the experiential exercises that comprised the majority of the session time.

Formal Mindfulness Meditation. The term *mindfulness* refers to a quality of awareness that includes the ability to pay attention in a particular way: on purpose, in the present moment, and nonjudgmentally.[27] Mindfulness includes the capacity for lowering one's own reactivity to challenging experiences; the ability to notice, observe, and experience bodily sensations, thoughts, and feelings even though they may be unpleasant; acting with awareness and attention (not being on autopilot); and focusing on experience, not on the labels or judgments applied to them. Through guided experiential meditation exercises, participants practiced 4 methods for cultivating intrapersonal self-awareness[23]: (1) *the body scan:* guiding the participant in noticing bodily sensations and the cognitive and emotional reactions to the sensations without attempting to change the sensations themselves; (2) *sitting meditation:* guided silent meditation bringing awareness to the thoughts, feelings, and sensations experienced; (3) *walking meditation:* slow, deliberate, and attentive walking while bringing awareness to the experience; and (4) *mindful movement:* including yoga-type exercises guided in a manner that allows the participant to slowly and methodically ex-

Table 1. Didactic and Narrative and Appreciative Inquiry Themes

Didactic Topic	Write or Tell a Brief Story About...
Awareness of pleasant or unpleasant sensations, feelings, or thoughts	A pleasant or an unpleasant experience during clinical work and its effect on the patient-physician relationship
Perceptual biases and filters	A surprising clinical experience (an experience that differed significantly from what you expected)
Burnout	An experience of noticing and responding to your own emotional exhaustion, depersonalization, and low sense of personal accomplishment
Meaning in medicine	A clinical encounter that was meaningful to you; what made it meaningful, what personal capacities did you have that contributed to the meaning
Boundaries or conflict management	A time when you effectively said, "No!" or set a clear boundary in clinical practice and still maintained a healing relationship
Attraction in the clinical encounter	A time when you were aware of attraction toward a patient and its influence on the dynamics of the physician-patient relationship
Self-care	A time when you faced choices about caring for yourself as opposed to caring for others
Being with suffering or end-of-life care	A clinical encounter involving being present to suffering: sadness, pain, uncertainty, end-of-life, and the awareness of your role as physician

plore the sensory, emotional, and cognitive realms of the experience.

Narrative and Appreciative Inquiry Exercises. Methods from narrative medicine[28] and appreciative inquiry[25,29] were used to foster interpersonal self-awareness: awareness of relationships and communication. In each session participants were asked to write brief stories about personal experiences in medical practice focusing on that week's theme (**TABLE 1**). In addition to discussing challenges they experience in clinical practice, participants used appreciative inquiry techniques to explore ways in which they successfully worked through difficult clinical situations and to identify personal qualities that promoted their successes. Appreciative inquiry proposes that analysis and reinforcement of positive experiences are more likely to change behavior in desired directions than an exploration of negative experiences or deficiencies. The participants shared their narratives in pairs and small groups. Equally important as telling stories was listening to others' stories. Listeners were instructed to listen with the intention of understanding the other's experience, avoid interruptions, focus questions to deepen understanding of the storyteller's experience, resist comparing their own experience with that of the storyteller, and refrain from interpreting or judging the reported experiences.

Discussion. In larger group discussion participants shared their experiences of the formal mindfulness meditation practices and the narrative-appreciative inquiry exchanges. They discussed the effects of the mindfulness practices, the narrative writing, and the appreciative inquiry conversations on their sense of meaning in the practice of medicine as well as in other aspects of their lives.

Outcome Measures

Participants completed 5 sets of self-administered surveys. The first survey was completed at the time of registration (a mean of 37 days before the start of the program); the second survey, at the beginning of the first session; the third survey, at the conclusion of the eighth weekly session (8-week survey); the fourth survey, at the conclusion of the last (10th) monthly session (12-month survey); and the fifth survey, 3 months after the program ended (15-month survey). The survey set included the following measures:

The 2-Factor Mindfulness Scale,[30,31] in which mindfulness is conceptualized as a multifaceted attribute relating to one's inner experience (thoughts, perceptions, sensations, and feelings). In or-

der to reduce respondent burden and in discussion with the scale's developer, we used the 2 factors that were validated at the time of the study (observe and nonreact) and that appeared most relevant to clinical practice, showed change with mindfulness practice, discriminated between mediators and nonmeditators, and correlated with personality variables (openness) and psychological well-being.[30,31] The 2-factor scale contains 15 items that are rated on a 5-level Likert scale with anchors from "never or rarely true" to "very often or always true" (range, 15-75). The Observe subscale is an 8-item instrument that measures "Observing/noticing/attending to perceptions/thoughts/feelings" (range, 8-40). The Nonreact subscale is a 7-item instrument that measures the ability to "step back," "pause," and "recover" and "let go" when facing "distressing thoughts or images" (range, 7-35).

The Maslach Burnout Inventory[32] is a 22-item instrument widely used and validated in samples of health care personnel, including primary care physicians,[32,33] that is rated on a 7-level Likert scale with anchors from "never," "a few times a year," "once a month," "a few times a month," "once a week," "a few times a week," to "every day." There are 3 subscales: the emotional exhaustion subscale has 9 items (range, 0-54), the depersonalization (treating people as objects) subscale has 5 items (range 0–30), and the (sense of) personal accomplishment subscale has 8 items (range 0–48). There is no total burnout score calculated; rather, the authors of the scale define any score more than 26 on the emotional exhaustion subscale, more than 9 on the depersonalization subscale, or less than 34 on the personal accomplishment subscale as representing burnout.[10]

The Jefferson Scale of Physician Empathy,[34-36] is a 20-item instrument widely used and validated among health professionals and trainees that uses a 7-level Likert scale with anchors from "strongly disagree" to "strongly agree" (range, 20-140). It measures 3 dimensions of empathy: perspective-taking (10 items, range, 10-70), compassionate care (8

items, range, 8-56), and standing in the patient's shoes (eg, understanding the patient's experience, 2 items, range, 2-14).

The Physician Belief Scale,[37] is a 32-item validated measure of physicians' beliefs about psychosocial aspects of patient care that uses a 5-level Likert scale with anchors that range from "disagree strongly" to "agree strongly." Scores range from 32 (maximum psychosocial orientation) to 160 (minimum psychosocial orientation, reflecting the belief that psychosocial issues are not part of a physician's role).

The Mini-markers of the Big Five Factor Structure[38] personality scale consists of a validated set of 40 adjective markers of the 5 major personality dimensions: extraversion (energy, activity, sociability, and positive mood), agreeableness (trust, warmth, caring, and cooperation), conscientiousness (diligence, reliability, and organization), emotional stability (reflecting emotional equanimity), and openness (interest in aesthetic and novel experiences). Each adjective is rated on a 9-level Likert with anchors that range from "extremely inaccurate" to "extremely accurate." There are 8 adjectives for each dimension; the range for each dimension is from 1 to72. The Cronbach α internal consistency reliability estimate for each dimension ranges from 0.76 to 0.90, averaging 0.83.

The Profile of Mood States (POMS)[39] is a 65-item widely used instrument to assess 6 mood states, each rated on a 5-level Likert scale with anchors that range from "not at all" to "extremely": tension-anxiety (9 items; range, 0-36), anger-hostility (12 items; range, 0-48), confusion-bewilderment (7 items; range, 0-28), depression-dejection (15 items; range, 0-60), fatigue-inertia (7 items; range, 0-28), and vigor-activity (8 items; range, 0-32, reverse-scored). There are 7 nonscored items on the scale. The POMS also assesses a global affective state, yielding a total mood disturbance score by summing the scores on the 6 mood states (with vigor-activity negatively weighted; range, 0-232). The adult normative mean (SD)

scores for men are total, 14.8 (32.7); tension, 7.1 (5.8); depression, 7.5 (9.2); anger, 7.1 (7.3); vigor, 19.8 (6.8); fatigue, 7.3 (5.7); and confusion, 5.6 (4.1). For women, mean (SD) scores are total, 20.3 (33.1); tension, 8.2 (6.0); depression, 8.5 (9.4); anger, 8.0 (7.5); vigor, 18.9 (6.5); fatigue, 8.7 (6.1); and confusion, 5.8 (4.6).[40] The POMS has been validated in numerous adult populations and has been used in studies of other mindfulness-based interventions,[41] empathy,[42] and burnout[43] in educational settings.

Statistical Analysis

Linear mixed-effects models[44] were used to model change in outcomes while accounting for the nesting of repeated measures within individuals. Mixed-effects models incorporate all available information across all measurement points to increase efficiency. They provide consistent estimates even when missing data are tied to observed factors. Levels of each factor at measurement 1 (baseline, at enrollment) were contrasted with measurements 2 (immediately before the intervention), 3 (at the end of the 8-week intensive phase), 4 (at the end of the 10-month maintenance phase), and 5 (3 months after completion of the intervention). This permitted examining whether the constructs showed stability in the absence of intervention during a within-individual control period,[45] then track both the extent to which they changed after the intervention and the extent to which these changes persisted.

The critical P value for considering change significant was determined using the false discovery rate, a multiple test correction accounting for correlated tests that is more powerful and that balances type I and II error better than Bonferoni or other family-wise error rate corrections.[46] The false discovery rate represents the proportion of incorrectly rejected null hypotheses out of all rejected null hypotheses. The significance level identified set by a false discovery rate for the primary outcomes analysis was 0.0053. For the analysis of correlations between change

in mindfulness and change in other outcomes the false discovery rate was 0.0013. The magnitude of changes for all variables was computed to standardized mean differences (Cohen d measure of effect size), which express change in standard deviation units. Values of 0.2 have been suggested as being small; 0.5, medium; and 0.8, large differences.[47,48] Power analysis indicated that under assumptions of 20% attrition, an α of .05, and moderately strong correlations (0.8) within assessments during preintervention period and later within the postintervention period, the study enrollment of 70 resulted in an 80% power to detect a standardized mean difference of 0.35.

Change scores were computed for each measure and the association of change in mindfulness with change in burnout, empathy, and other outcomes was examined using Pearson correlations. Although not definitive evidence that mindfulness changes are a mechanism for changes in other measures, correlated changes are necessary (but not sufficient) evidence for such a mechanism. Sensitivity analyses used cluster bootstrapped standard errors.[49] Stata SE 10 (StataCorp LP, College Station, Texas), and SAS statistical software version 9.1 (SAS Institute Inc, Cary, North Carolina) for all analyses.

RESULTS

Of the 70 persons enrolled, 60 (86%) individuals completed survey 1; 68 (97%), survey 2; 59 (84%), survey 3; 56 (80%), survey 4; and 51 (73%), survey 5.

Participant demographics are shown in **TABLE 2**. Of 70 physicians who agreed to participate, 60 completed baseline measures and 68 participated in at least 1 session. The mean (SD) number of hours attended for all 70 participants was 33.6 (10.5) out of a total of 52 hours. The participants differed from nonparticipants in sex and specialty distribution, location of practice, and years in practice.

TABLE 3 shows the outcomes scores at each assessment point compared with baseline. At 15 months, mindfulness

Table 2. Characteristics of Participating vs Nonparticipating Primary Care Physicians[a]

	Participants (n = 70)	Nonparticipants (n = 572)	P Value[b]
Sex[c]			
Male	38 (54)	352 (62)	.05
Female	32 (46)	179 (31)	
Specialty			
Internal medicine	34 (49)	293 (51)	.001
Family medicine	29 (41)	134 (23)	
Pediatrics	7 (10)	145 (25)	
Care area[d]			
Rural	3 (4)	163 (29)	<.001
Suburban	48 (71)	389 (68)	
Urban	17 (25)	20 (3)	
Experience			
Years in practice, mean (SD)	15.9 (8.0)	18.7 (10.8)	.04

[a] Data are presented as No. (%) except as noted. Percentages may not sum to 100 due to rounding.
[b] Comparisons for sex, specialty, and care area are based on χ^2 tests; for years in practice, independent samples *t* tests.
[c] Information not available for 41 nonparticipants.
[d] Information not available for 2 participants.

scores showed the largest effect sizes (1.12 for the total; 95% CI, 0.86-1.38; 1.03 for observe; 95% CI, 0.77-1.28; and 0.88 for nonreact; 95% CI, 0.63-1.13; *P* value for each <.001). The Maslach Burnout Inventory showed improvements across all 3 subscales, with medium effect sizes for emotional exhaustion (0.62; 95% CI, 0.42-0.82) depersonalization (0.45; 95% CI, 0.24-0.66), and personal accomplishment (0.44; 95% CI, 0.19-0.68; *P* < .001). Total empathy improved (effect size, 0.45; 95% CI, 0.24-0.66; *P* < .001), with standing in the patient's shoes (effect size, 0.36; 95% CI, 0.11-0.60; *P* = .003), and perspective taking (effect size, 0.38; 95% CI, 0.16-0.60, *P* = .001) demonstrating significant positive changes. The physician belief scale improved significantly (effect size, 0.37; 95% CI, 0.14-0.59; *P* = .001) suggesting a shift toward greater value placed on understanding the patient's emotional and social life in addition to disease-related factors. The Profile of Mood States showed moderate effect sizes in the total score (0.69; 95% CI, 0.43-0.95) and the depression (0.55; 95% CI, 0.29-0.81), anger (0.76; 95% CI, 0.48-1.05), and fatigue subscales (0.81; 95% CI, 0.51-1.11; all at *P* < .001), and a smaller effect size with vigor (0.42; 95% CI, 0.17-0.66, *P* < .001). The effect size for personality traits of conscientiousness

(0.29; 95% CI, 0.13-0.45) and emotional stability (0.45, 95% CI, 0.25-0.66, *P* < .001) showed small to moderate improvements.

Improvements in mindfulness were moderately correlated with decreases in total mood disturbance (*r* = −0.39, *P* < .001), especially decreases on the tension, depression, vigor, and fatigue subscales. They were also moderately correlated with decreases in the emotional exhaustion subscale of burnout (*r* = −0.32, *P* < .001), and with increases in the burnout subscale of personal accomplishment (*r* = 0.33, *P* < .001) and the personality dimensions of conscientiousness (*r* = 0.29, *P* < .001) and emotional stability (*r* = 0.25, *P* < .001). Improvements in mindfulness were correlated with increases in the perspective taking subscale of physician empathy (*r* = 0.31, *P* < .001). **TABLE 4** shows the correlations between changes in mindfulness and changes in other outcomes.

Cluster bootstrapped analyses revealed an identical pattern of results, with the exception that personal accomplishments at survey 3 (*P* = .025) and total empathy at survey 4 (*P* = .012) did not achieve significance based on the false discovery rate. The findings were unchanged when the analyses were repeated using the pre-intervention survey as the baseline measure.

COMMENT

Our study demonstrated that primary care physicians participating in a CME program that focused on self-awareness experienced improved personal well-being, including burnout (emotional exhaustion, depersonalization, and personal accomplishment) and improved mood (total and depression, vigor, tension, anger, and fatigue). They also experienced positive changes in empathy and psychosocial beliefs, both indicators of a patient-centered orientation to medical care that has been associated with patient-centered behaviors such as attending to the patient's experience of illness and its psychosocial context and promoting patient participation in care.[50,51] Furthermore, these patient-centered behaviors have been associated with improved patient trust,[52] appropriate prescribing,[53] reduction in health care disparities,[54] and lower heath care costs.[55]

For most measures, similar degrees of improvement were seen after the 8-week intensive intervention, at the conclusion of the monthly maintenance phase, and 3 months beyond completion of the program. Several short-term improvements did not persist (physician empathy: compassionate care; profile of mood states: tension and confusion; and personality factors: extraversion, agreeableness, and openness) although 5 improvements developed over the long term that were not apparent at 8 weeks (burnout: depersonalization; profile of mood states: depression and fatigue; and personality: conscientiousness and emotional stability).

Mindfulness-based interventions are increasingly frequent in health professions education[24,28,41,56-59,61-65] and have demonstrated improvements in anxiety and mood disturbances in medical and premedical students,[65] as well as reductions in burnout among a selected group of family medicine residents.[66] One randomized controlled study of health professionals demonstrated that an 8-week mindfulness-based stress reduction program may be effective for

Table 3. Outcomes Scores at Each Assessment Point With Comparisons to Baseline[a]

Subscale	Baseline	Preintervention	8 Week	12 Month	15 Month	Standardized Mean Difference of Change From Baseline to 15 mo (95% CI)
Maslach Burnout Scale[b]						
Emotional exhaustion	26.8 (24.1 to 29.6)	27.8 (25.1 to 30.5)	23.7 (21.0 to 26.5)[c]	20.0 (17.2 to 22.8)[c]	20.0 (17.2 to 22.9)[c]	0.62 (0.42 to 0.82)
P value		.34	.003[c]	<.001[c]	<.001[c]	
Depersonalization	8.4 (7.1 to 9.7)	8.6 (7.3 to 9.9)	7.6 (6.3 to 8.9)	5.9 (4.5 to 7.2)[c]	5.9 (4.5 to 7.2)[c]	0.45 (0.24 to 0.66)
P value		.68	.15	<.001[c]	<.001[c]	
Personal accomplishment	40.2 (38.9 to 41.6)	41.2 (39.8 to 42.5)	42.0 (40.6 to 43.4)[c,d]	42.7 (41.3 to 44.1)[b]	42.6 (41.2 to 44.1)[c]	0.44 (0.19 to 0.68)
P value		.14	.006[c]	<.001[c]	<.001[c]	
Jefferson Scale of Physician Empathy						
Total empathy	116.6 (114.2 to 118.9)	117.2 (114.9 to 119.5)	120.6 (118.2 to 123.0)[c]	121.4 (119.0 to 123.8)[c,d]	121.2 (118.7 to 123.8)[c]	0.45 (0.24 to 0.66)
P value		.54	<.001[c]	<.001[c]	<.001[c]	
Compassionate care	48.6 (47.5 to 49.7)	49.2 (48.2 to 50.3)	49.8 (48.7 to 50.9)	50.4 (49.3 to 51.5)[c]	50.0 (48.8 to 51.1)	0.30 (0.04 to 0.57)
P value		.3	.03	.003[c]	.02	
Perspective taking	57.1 (55.6 to 58.6)	57.1 (55.7 to 58.6)	59.1 (57.6 to 60.6)[c]	59.7 (58.2 to 61.2)[c]	59.5 (58.0 to 61.1)[c]	0.38 (0.16 to 0.60)
P value		.99	.003[c]	<.002[c]	.001[c]	
Standing in patient's shoes	10.9 (10.4 to 11.5)	10.8 (10.3 to 11.3)	11.7 (11.1 to 12.2)[c]	11.4 (10.9 to 11.9)	11.7 (11.2 to 12.3)[c]	0.36 (0.11 to 0.60)
P value		.66	.005[c]	.07	.003[c]	
Physician Belief Scale	76.7 (74.0 to 79.0)	77.9 (75.2 to 80.6)	72.7 (70.0 to 75.5)[c]	69.9 (67.1 to 72.7)[c]	72.6 (69.7 to 75.4)[c]	0.37 (0.14 to 0.59)
P value		.31	.001[c]	<.001[c]	.001[c]	
Baer mindfulness scale						
Total mindfulness	45.2 (43.3 to 47.1)	46.3 (44.5 to 48.2)	52.9 (51.0 to 54.8)[c]	55.0 (53.0 to 56.9)[c]	54.1 (52.0 to 56.1)[c]	1.12 (0.86 to 1.38)
P value		.27	<.001[c]	<.001[c]	<.001[c]	
Observe	25.6 (24.4 to 26.8)	26.7 (25.5 to 27.8)	30.6 (29.4 to 31.8)[c]	31.1 (29.8 to 32.3)[c]	30.7 (29.4 to 32.0)[c]	1.03 (0.77 to 1.28)
P value		.07	<.001[c]	<.001[c]	<.001[c]	
Nonreact	19.7 (18.7 to 20.7)	20.1 (19.1 to 21.1)	22.9 (21.8 to 23.9)[c]	23.9 (22.9 to 24.9)[c]	23.4 (22.3 to 24.4)[c]	0.88 (0.63 to 1.13)
P value		.45	<.001[c]	<.001[c]	<.001[c]	
Profile of Mood States						
Total mood disturbance	33.2 (26.8 to 39.5)	32.6 (26.5 to 38.6)	20.9 (14.5 to 27.2)[c]	11.0 (4.5 to 17.4)[c]	16.1 (9.5 to 22.7)[c]	0.69 (0.43 to 0.95)
P value		.84	<.001[c]	<.001[c]	<.001[c]	
Tension	15.1 (13.4 to 16.8)	15.9 (14.3 to 17.5)	12.4 (10.7 to 14.1)	9.9 (8.1 to 11.5)[c]	12.4 (10.6 to 14.2)	0.41 (0.10 to 0.72)
P value		.42	.009	<.001[c]	.01	
Depression	9.1 (7.3 to 10.9)	8.3 (6.5 to 10.0)	7.5 (5.7 to 9.3)	5.0 (3.2 to 6.9)[c]	5.4 (3.5 to 7.3)[c]	0.55 (0.29 to 0.81)
P value		.30	.06	<.001[c]	<.001[c]	
Anger	6.6 (5.4 to 7.8)	5.0 (3.9 to 6.2)	3.6 (2.4 to 4.9)[c]	2.9 (1.7 to 4.2)[c]	3.0 (1.7 to 4.3)[c]	0.76 (0.48 to 1.05)
P value		.01	<.001[c]	<.001[c]	<.001[c]	
Vigor	14.6 (13.0 to 16.3)	13.5 (12.0 to 15.1)	16.9 (15.4 to 18.6)[c]	18.4 (16.8 to 20.0)[c]	17.5 (15.8 to 19.1)[c]	0.42 (0.17 to 0.66)
P value		.13	.003[c]	<.001[c]	<.001[c]	
Fatigue	8.4 (7.2 to 9.5)	7.9 (6.8 to 9.0)	6.2 (5.0 to 7.3)	4.6 (3.4 to 5.8)[c]	4.6 (3.4 to 5.8)[c]	0.81 (0.51 to 1.11)
P value		.46	.001	<.001[c]	<.001[c]	
Confusion	8.7 (7.6 to 9.8)	9.0 (8.0 to 10.1)	8.2 (7.1 to 9.3)	6.7 (5.8 to 8.0)[c]	8.2 (7.0 to 9.3)	0.12 (−0.18 to 0.41)
P value		.53	.49	.004[c]	.44	
Big 5 personality Mini-markers						
Extraversion	5.7 (5.4 to 6.0)	5.7 (5.4 to 6.0)	5.9 (5.6 to 6.2)	6.0 (5.7 to 6.4)[c]	5.9 (5.6 to 6.2)	0.14 (0.00 to 0.29)
P value		0.83	.07	<.001[c]	.04	
Agreeableness	7.3 (7.1 to 7.6)	7.4 (7.1 to 7.6)	7.5 (7.3 to 7.7)	7.7 (7.4 to 7.9)[c]	7.5 (7.3 to 7.7)	0.18 (−0.01 to 0.37)
P value		.83	.02	<.001[c]	.05	
Conscientiousness	6.5 (6.2 to 6.7)	6.4 (6.1 to 6.6)	6.6 (6.3 to 6.8)	6.7 (6.5 to 7.0)[c]	6.8 (6.5 to 7.0)[c]	0.29 (0.13 to 0.45)
P value		.34	.21	.002[c]	<.001[c]	
Emotional stability	6.1 (5.8 to 6.3)	6.0 (5.8 to 6.3)	6.3 (6.1 to 6.6)	6.5 (6.3 to 6.8)[c]	6.6 (6.3 to 6.9)[c]	0.45 (0.25 to 0.66)
P value		.67	.03	<.001[c]	<.001[c]	
Openness	6.8 (6.6 to 7.1)	7.0 (6.7 to 7.2)	7.1 (6.8 to 7.3)	7.1 (6.8 to 7.4)[c]	7.0 (6.7 to 7.3)	0.12 (−0.03 to 0.28)
P value		.25	.02	.004[c]	.14	

Abbreviation: CI, confidence interval.
[a]See the "Methods" section for definitions of anchors and ranges for each scale. P values compare mean at each time point to the baseline values.
[b]According to convention, a score of more than 26 on the emotional exhaustion subscale, a score of more than 9 on the depersonalization subscale, or a score of less than 34 on the personal accomplishment subscale is considered an indicator of professional burnout for medical professionals.
[c]Means are significantly different from baseline value by false discovery rate of .0053.
[d]In sensitivity analyses bootstrapping standard errors, nonsignificant by false discovery rate (P=.025 for personal accomplishments and .012 for empathy).

reducing stress and improving quality of life and self-compassion.[67] To our knowledge, this is the first study of a mindfulness-based intervention for practicing primary care practitioners and the first to demonstrate effects not only on well-being but also on indicators of high-quality interpersonal care.

A theory of mindful practice forms the basis of this educational program.[24] It holds that enhancing intrapersonal and interpersonal self-awareness can improve well-being and effectiveness in clinical practice. Self-awareness can assist practitioners in becoming more attentive to the presence of stress, to their relationship with the sources of stress, and to their own personal capacity to attenuate the effects of stress. The skills cultivated in the mindful communication program appeared to lower participants' reactivity to stressful events and help them adopt greater resilience in the face of adversity.

In this group of physicians, we were able to demonstrate that increases in mindfulness correlated with reductions in burnout and total mood disturbance. The intervention was also associated with increased trait emotional stability (ie, greater resilience). The fact that improvements in temporary negative emotional states were associated with more stable personality traits is consistent with the findings from studies of the efficacy of mindfulness interventions in preventing relapse in patients with recurrent depression.[68] Likewise, improvements in patient-centered qualities (eg, the perspective-taking quality of empathy) were also correlated with increases in mindfulness. These relationships between increased mindfulness and greater resiliency, the capacity to handle challenges, and patient-centeredness provide preliminary evidence that mindfulness may be an active component in promoting such changes, thereby supporting the theory of mindful practice.

Ideally, institutional approaches to reducing burnout should complement person-centered approaches such as this type of intervention.[69] For example, with the support of institutional leadership, one health care organization enacted systems-level changes that provided physicians greater control over hours and procedures, improved efficiency and teamwork in practices, and provided meaning by integrating improvements in patients' experience of care into administrative meetings.[20] This program showed improvements in their practitioners' emotional exhaustion sub-

Table 4. Correlation of Change in Mindfulness With Change in Other Outcomes Across Postintervention Period[a]

	8-Week Postintervention, Correlation	P Value[c]	12-Month Follow-up, Correlation	P Value[c]	15-Month Follow-up, Correlation	P Value[c]	Overall Postintervention Measurements, Correlation[b]	P Value[c]
Maslach Burnout Inventory								
Emotional exhaustion	−.35	.008	−.03	.87	−.07	.63	−.32	<.001
Depersonalization	−.09	.52	.11	.45	.18	.23	−.19	.02
Personal accomplishments	.31	.021	.22	.12	.29	.05	.33	<.001
Jefferson Scale of Physician Empathy								
Perspective taking	.35	.007	.47	<.001	.22	.14	.31	<.001
Compassion	.26	.05	.34	.01	.14	.33	.01	.93
Patient's shoes	.27	.04	.29	.03	.07	.62	.12	.19
Total	.35	.007	.56	<.001	.26	.08	.20	.008
Physician Beliefs Scale								
Total	−.43	<.001	−.06	.67	−.02	.89	−.27	.001
Personality Mini-markers								
Extraversion	.35	.008	.28	.04	.21	.15	.18	.009
Agreeableness	.39	.003	.26	.06	.09	.53	.12	.13
Conscientiousness	.36	.007	.09	.51	.00	.98	.29	<.001
Emotional stability	.32	.01	.15	.30	.29	.05	.25	<.001
Openness	.26	.05	.16	.26	−.0713	.63	.02	.74
Profile of Mood States								
Tension	−.23	.09	−.31	.02	−.06	.72	−.31	<.001
Depression	−.33	.01	−.33	.01	−.25	.09	−.34	<.001
Anger	−.20	.14	−.24	.08	.17	.27	−.22	.01
Vigor	.34	.01	.14	.19	.22	.15	.26	.002
Fatigue	−.24	.07	−.28	.04	−.07	.62	−.32	<.001
Confusion	−.33	.01	−.28	.04	−.08	.60	−.24	.007
Total mood disturbance	−.37	.006	−.37	.007	−.14	.35	−.39	<.001

[a] Pearson correlation coefficients. Change scores computed as follow-up measurement score − baseline score.
[b] Linear mixed-effects model incorporating all change scores across postintervention measurements.
[c] Critical P value by false discovery rate=.0013.

scale of the Maslach Burnout Inventory. Although our findings are preliminary, they do suggest that it is possible to change attitudes toward care and improve several key aspects of burnout, well-being, and empathy even in the absence of systems changes.

This study has several limitations. First, it was not a randomized controlled trial, and participants were self-selected; we expected that this intervention would appeal to some physicians and not others. This is a novel intervention, and the goal was to demonstrate effectiveness of one model of a potential family of interventions to increase physician well-being and reduce psychological distress and burnout. Accordingly, we tested the intervention in a sample representative of those who would ultimately participate. Randomized controlled trials are not the only standard of research practice for educational and community-based research,[70-73] and before-and-after designs are often considered adequate for purposes of educational or policy decision making.

Compared with nonparticipants, participants were more likely to be family physicians and less likely to practice in rural areas. The degree to which this program would benefit reluctant physicians, physicians in other specialties, or those with little or no interest in the program curriculum needs to be evaluated. Nevertheless, the baseline characteristics of even this self-selected group (such as burnout scale scores) suggest that it would warrant attention. This group is at high risk for the consequences of burnout and mood disturbance. Accordingly, this program might be considered as one of a menu of options available to practicing primary care physicians to address the quality of work life and therefore should be subjected to further evaluation.

Second, we were unable to track how changes in self-report measures affected actual clinical care. Future studies might examine the effects of mindfulness programs through the analysis of recorded patient visits before and after participation, patient reports, claims data, and outcomes measures. An example of such an investigation is demonstrated in a randomized controlled study of psychotherapists in training, which showed that promoting mindfulness among the trainees could positively influence the therapeutic course and treatment results of their patients.[74]

Third, the results do not definitively establish that the improvements measured were due to any or all of the components within the intervention. The stability of the 2 preintervention measurements argues against regression to the mean as an explanation of our results, but it is possible that the observed changes resulted primarily from our participants' spending time together with their colleagues. However, the correlation of changes in well-being and attitudes toward care with improvements in mindfulness suggests a mediating influence of mindfulness and mindfulness training on the outcomes. This hypothesis could be explored in future investigations. Additionally, qualitative interviews examining participants' attributions of the changes in their attitudes might provide insight into the course and its curriculum. Future studies might also examine proposed psychological and neurocognitive mechanisms for the effect of mindfulness on burnout and empathy.[75]

Fourth, we conducted the course in a single location, with experienced course facilitators. Even though this might appear to limit generalizability, instructors of mindfulness-based courses are becoming more available; fees for 8-week programs may range from $450 to $600.[76] Training courses for instructors are regularly offered, and we could identify no factors unique to the Rochester environment that appear to limit the deployment of this course in other settings. Based on these initial findings, it would seem appropriate to test a carefully constructed, well-facilitated mindfulness program for other groups of health professionals.

CONCLUSIONS

Physicians who participated in a CME program on mindful communication showed improvements in measures of well-being and demonstrated an enhancement in personal characteristics associated with a more patient-centered orientation to clinical care. Further study will be necessary to investigate the effects on practice efficiency, patients' experience of care, and clinical outcomes. Longer-term follow up of this cohort may provide information about the sustainability of the changes beyond 15 months and the potential effects of mindful communication training on outcomes that have been considered consequences of physician burnout: quality of care, physicians' quality of life, suicidal ideation, the expression of empathy in clinical encounters, medical errors, and attrition from practice. Other investigations may help determine whether mindful communication training results in long-term changes in physicians' attitudes toward clinical care and toward their profession, the effect of similar programs on other groups of medical practitioners, and the degree to which reinforcement courses are needed to sustain the benefits. This program represents a model of CME that may help provide growth and sustenance to physicians in the service of promoting excellence in clinical care and professional satisfaction and well-being.

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> Words—so innocent and powerless as they are, as standing in a dictionary, how potent for good and evil they become, in the hands of one who knows how to combine them!
>
> —Nathaniel Hawthorne (1804-1864)