Original Investigation

Intervention to Promote Physician Well-being, Job Satisfaction, and Professionalism
A Randomized Clinical Trial

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IMPORTANCE Despite the documented prevalence and clinical ramifications of physician distress, few rigorous studies have tested interventions to address the problem.

OBJECTIVE To test the hypothesis that an intervention involving a facilitated physician small-group curriculum would result in improvement in well-being.

DESIGN, SETTING, AND PARTICIPANTS Randomized clinical trial of 74 practicing physicians in the Department of Medicine at the Mayo Clinic in Rochester, Minnesota, conducted between September 2010 and June 2012. Additional data were collected on 350 nontrial participants responding to annual surveys timed to coincide with the trial surveys.

INTERVENTIONS The intervention involved 19 biweekly facilitated physician discussion groups incorporating elements of mindfulness, reflection, shared experience, and small-group learning for 9 months. Protected time (1 hour of paid time every other week) for participants was provided by the institution.

MAIN OUTCOMES AND MEASURES Meaning in work, empowerment and engagement in work, burnout, symptoms of depression, quality of life, and job satisfaction assessed using validated metrics.

RESULTS Empowerment and engagement at work increased by 5.3 points in the intervention arm vs a 0.5-point decline in the control arm by 3 months after the study ($P = .04$), an improvement sustained at 12 months (+5.5 vs +1.3 points; $P = .03$). Rates of high depersonalization at 3 months had decreased by 15.5% in the intervention arm vs a 0.8% increase in the control arm ($P = .004$). This difference was also sustained at 12 months (9.6% vs 1.5% decrease; $P = .02$). No statistically significant differences in stress, symptoms of depression, overall quality of life, or job satisfaction were seen. In additional comparisons including the nontrial physician cohort, the proportion of participants strongly agreeing that their work was meaningful increased 6.3% in the study intervention arm but decreased 6.3% in the study control arm and 13.4% in the nonstudy cohort ($P = .04$). Rates of depersonalization, emotional exhaustion, and overall burnout decreased substantially in the trial intervention arm, decreased slightly in the trial control arm, and increased in the nontrial cohort ($P = .03$, .007, and .002 for each outcome, respectively).

CONCLUSIONS AND RELEVANCE An intervention for physicians based on a facilitated small-group curriculum improved meaning and engagement in work and reduced depersonalization, with sustained results at 12 months after the study.

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Invited Commentary

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Distress among physicians is a significant problem in modern medicine. Burnout affects nearly half of medical students,[1] residents,[2] and practicing physicians in the United States.[3,4] In addition, symptoms of depression are common among physicians,[4] who report high rates of dissatisfaction with quality of life and work-life balance.[2,4] These issues are important because they have potential for serious consequences on patient care,[5-7] professionalism,[8,9] physicians' own care and safety,[10,11] and the viability of the health care system.[12]

Despite the prevalence and ramifications of physician distress, few studies have tested interventions to address the problem. Most studies have evaluated individual-focused strategies (eg, personal stress reduction and resilience training) conducted on participants' personal time and have provided limited information to indicate efficacy.[13-15] Other studies have suggested that fostering self-awareness can help physicians identify what they value and connect with what is most meaningful in their work.[16] Such mindfulness-oriented training is intended to promote patient-oriented care and physician well-being through attention, awareness, intention, and self-reflection.[17-20] Additional approaches include Balint groups, in which physician groups explore the physician-patient relationship in discussions prompted by a specific patient interaction,[16] and informal Doctoring to Heal physician discussion groups, which may foster greater personal awareness and increase physician satisfaction.[18] Outcome measures from these approaches are scarce, and application of validated instruments in such studies has been limited. In addition, studies of these approaches have almost exclusively applied single-arm, nonrandomized designs.

Given the effect of physician distress on quality of care and turnover, physicians and health care employers have a shared responsibility to promote physician well-being.[21] We report the results of a randomized clinical trial testing an intervention with protected time (1 hour of paid time every other week, equal to 0.9% full-time equivalent) provided by the institution to promote well-being and reduce distress in physicians. Building on previous literature,[13-20] this intervention involved facilitated physician discussion groups organized around a curriculum incorporating elements of mindfulness, reflection, shared experience, and small-group learning intended to promote collegiality and community at work among participants. We hypothesized that this intervention would result in improved meaning in work and positively affect well-being domains most closely tied to meaning, including burnout.

Methods

Study Design, Setting, and Participants

This was a single-center, randomized clinical trial with a planned enrollment of 90 practicing physicians in the Department of Medicine at the Mayo Clinic in Rochester, Minnesota. The study was conducted between September 2010 and June 2012. Participants were recruited through electronic departmental communications, mailings, and announcements at departmental and division meetings. All volunteers provided written informed consent for participation in the trial. In addition, data on the cohort of nontrial participants who provided responses to departmental surveys conducted annually and coinciding with the trial baseline surveys were evaluated. This study was approved by the Mayo Clinic Institutional Review Board.

Randomization, Allocation Concealment, and Follow-up

Participants were randomized in a concealed fashion into 2 groups via a computer-generated algorithm. Randomization was stratified by sex and specialty (general internal medicine or other internal medicine specialty) using permuted blocks. Participants were evaluated at baseline, every 3 months through the 9-month study intervention, and at 3 and 12 months following the study.

Study Arms

Volunteers in both arms of the trial received 1 hour of protected time every other week to allow their participation during the workday in place of clinical activities. Those in the control arm could schedule and use this hour of protected time in any manner they believed was most useful but did not participate in the formal curriculum.

Participants randomized to the intervention arm engaged in a facilitated small-group curriculum administered at 1-hour meetings occurring once every 2 weeks for 9 months, for a total of 19 sessions. The 37 intervention arm participants were divided into 4 small groups (8-10 physicians each) with similar compositions by sex and specialty. Topics addressed during these sessions were organized into modules entitled "self," "patient," and "balance" and included meaning in work, personal and professional balance, medical mistakes, community, caring for patients, and other topics relevant to the work experiences of practicing physicians (eAppendix 1 in the Supplement). Each session followed the same general structure: (1) check-in and welcome, (2) preparing the environment (eg, journaling and reflective exercise), (3) facilitated group discussion, (4) learned skills and solutions, and (5) check-out and summary (eAppendix 2 in the Supplement).

The study facilitators were practicing internal medicine physicians with specific expertise in communication and teaching courses involving small-group facilitation. These individuals, who completed an additional 4-hour training session specific to the study curriculum before commencement of the small-group sessions, also participated in 1-hour, biweekly facilitator meetings to debrief and prepare for the next session.

Study Outcomes

Multiple validated instruments were used to measure domains of meaning in work, well-being, and distress in the randomized and nontrial groups. Surveys were administered to trial participants electronically by the Mayo Clinic Survey Research Center at baseline and every 3 months throughout the study, as well as 3 and 12 months after the conclusion of the intervention. The baseline and 3-month poststudy surveys were timed to coincide with department-wide electronic surveys of physician well-being also administered by the Mayo Clinic Survey Research Center to allow comparison of study

participants with other eligible physicians electing not to participate in the trial.

In the randomized arms of the study, we applied the Physician Job Satisfaction Scale[22] (an average of 12 items on a 1-5 scale ranging from *strongly disagree* to *strongly agree*; range, 1-5) to measure satisfaction at work and the Empowerment at Work Scale[23] (a total of 12 items on a 1-7 scale ranging from *very strongly disagree* to *very strongly agree*; range, 12-84) to measure empowerment, engagement, and meaning at work. Quality of life (QOL) and fatigue were measured by single-item linear analog scale assessment questions with a response range from 0 (as bad as it can be) to 10 (as good as it can be).[24] Poor QOL was defined by a score of 5 or less since this threshold correlates with poor outcomes in clinical studies.[25] In addition, we used the Medical Outcomes Study Short-Form Health Survey, which has 8 items with 5- and 6-point Likert-type scales. This instrument generates norm-based scores, calibrated to a mean score of 50, which are assigned to domains of mental and physical health.[26] Burnout, a syndrome encompassing 3 domains (depersonalization, emotional exhaustion, and a sense of low personal accomplishment) that is associated with decreased work performance, was measured with the Maslach Burnout Inventory, using established thresholds to define high levels of burnout in each domain.[27] Stress was measured using the Perceived Stress Scale (a total of 10 items scored on a 0-4 scale ranging from *never* to *very often*; range, 0-40).[28] Depression screening used the 2-question approach described by Spitzer et al[29] and validated by Whooley et al.[30] Empathy was measured using the Jefferson Scale of Physician Empathy (a total of 20 items on a 1-7 scale ranging from *strongly disagree* to *strongly agree*; range, 20-140).[31] Each of these metrics has been validated across a wide range of medical conditions and populations, including physicians.

In the nontrial cohort, an abbreviated survey was used. This survey included a single item measuring meaning at work drawn from the Empowerment at Work Scale,[23] single-item measures of depersonalization and emotional exhaustion,[32,33] and the single-item linear analog scale assessment QOL item.[24]

Statistical Analysis

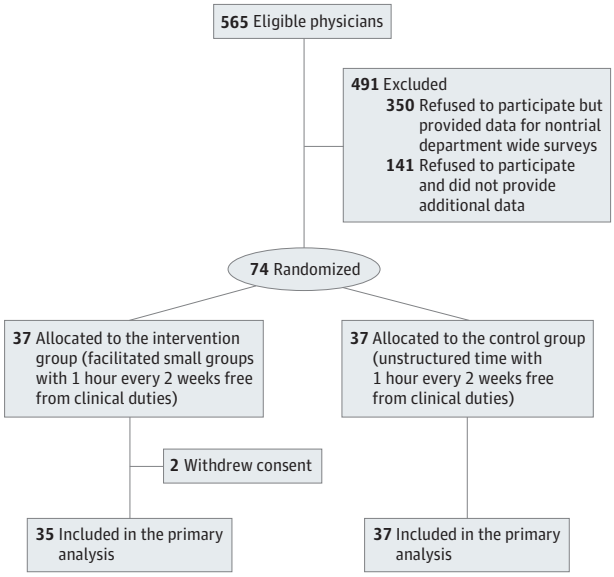
Standard univariate statistics were used to characterize the sample. The changes in each well-being metric from study baseline to study end, as well as at 3 and 12 months following the study, were analyzed according to the intent-to-treat principle using generalized estimating equations to account for the repeated-measures design. Because of baseline differences across groups for several variables, all analyses were adjusted for levels of distress at study onset. All tests were 2-sided ($\alpha = 0.05$). Statistical analyses were performed using SAS, version 9.2 (SAS Institute, Inc).

Results

Sample Characteristics and Baseline Measures

Of 565 practicing physicians in the Mayo Clinic Department of Medicine, 74 consenting volunteers were randomized equally to the 2 arms of the intervention study (**Figure 1**). As described, participants were randomized in blocks by sex and medical subspecialization. Baseline characteristics of the 2 trial groups were generally similar, with no statistically significant differences observed, although the intervention arm had slightly higher rates of high emotional exhaustion and overall burnout. The 350 members of the nontrial cohort included fewer women and general internists than did the trial groups but had rates of baseline distress similar to those of the trial participants (**Table 1**).

Figure 1. Study Flow



Consolidated Standards of Reporting Trials diagram for participant flow through the trial.

Of the 37 participants in each arm of the study, 34 (91.9%) provided survey responses. With this sample size, power was 80% to detect a moderate Cohen f^2 effect size of 0.15. Of the 491 nonstudy participants, 350 (71.3%) provided survey responses. With this sample size, power was 80% to detect a small Cohen f^2 effect size of 0.02.

Randomized Arms

The 35 participants analyzed in the intervention arm attended a mean of 11.7 of 19 facilitated small-group sessions. Outcomes comparing the randomized arms of the study are shown in **Table 2**. At the end of the 9-month intervention period, empowerment and engagement at work rose by 2.6 points in the intervention arm vs 0.8 points in the control arm ($P = .33$). Three months after the study, empowerment and engagement at work had increased by 5.3 points in the intervention arm vs a 0.5-point decline in the control arm ($P = .04$), a difference sustained at 12 months (+5.5 vs +1.3 points; $P = .03$). Differences in rates of emotional exhaustion and overall burnout were small, but the rate of high depersonalization 3 months following the study had decreased by 15.5% in the intervention arm vs a 0.8% increase in the control arm ($P = .004$). This difference was also sustained at 12 months (9.6% vs 1.5% decrease; $P = .02$).

Table 1. Baseline Demographic Characteristics of Randomized Arms of the Study and Cohort of Nonstudy Participants

Variable	Metric (Scale)	Intervention Arm (n = 37)	Control Arm (n = 37)	Nonstudy Cohort (n = 350)
Sex, No. (%)	Women	12 (32.4)	13 (35.1)	75 (21.4)
Specialty, No. (%)	General medicine	16 (43.2)	15 (40.5)	101 (28.9)
Engagement and meaning at work, mean (SD)	EWS (12-84)	54.2 (9.5)	58.2 (11.1)	NA
	Single item (1-7)	6.1 (1.0)	6.4 (0.8)	6.2 (1.0)
Burnout, No. (%)	Full MBI high depersonalization	9 (24.3)	9 (25.7)	NA
	High single item	6 (16.2)	6 (17.1)	35 (10.3)
	Full MBI high emotional exhaustion	17 (45.9)	12 (34.3)	NA
	High single item	13 (35.1)	8 (22.9)	95 (27.4)
	Full MBI overall burnout	20 (54.1)	15 (42.9)	NA
	Overall single-item burnout	15 (40.5)	11 (31.4)	98 (28.7)
Stress, mean (SD)	Perceived Stress Scale (0-40)	18.0 (5.6)	16.2 (6.2)	NA
Depression, No. (%)	Positive depression screen	11 (29.7)	11 (31.4)	NA
QOL, mean (SD)	Overall QOL (0-10)	6.7 (1.7)	6.7 (2.0)	6.7 (2.0)
Work-home conflicts, work/home/both, No. (%)	Work-home conflict in previous 3 wk	32 (88.9)	31 (88.6)	232 (66.3)
	Resolution of work-home conflict	19 (51.4) 4 (10.8) 14 (37.8)	15 (42.9) 8 (22.9) 12 (34.3)	173 (49.4) 27 (7.7) 122 (34.9)
Job satisfaction, mean (SD)	PJSS (1-5)	3.8 (0.7)	4.0 (0.7)	NA

Abbreviations: EWS, Empowerment at Work Scale; MBI, Maslach Burnout Inventory; NA, not applicable; PJSS, Physician Job Satisfaction Scale; QOL, quality of life.

Table 2. Changes From Baseline for Randomized Arms of the Trial

		During Intervention				Postintervention Follow-up			
Variable	Group	3 mo	6 mo	9 mo	*P* Value (End of Intervention)	3 mo	*P* Value (3 mo)	12 mo	*P* Value (12 mo)
Engagement at work[a]	Intervention	3.6	3.8	2.6	.33	5.3	.04	5.5	.03
	Control	0.3	1.8	0.8		−0.5		1.3	
High depersonalization, %[b]	Intervention	−7.2	3.0	−15.5	.31	−15.5	.004	−9.6	.02
	Control	−0.7	−2.8	1.6		0.8		−1.5	
High emotional exhaustion, %[b]	Intervention	−11.6	−9.5	−19.4	.91	−16.5	.54	−19.4	.69
	Control	−3.7	−14.3	−4.0		−7.8		−16.1	
Overall burnout, %[b]	Intervention	−14.1	−8.6	−24.7	.91	−24.7	.14	−21.7	.22
	Control	−9.6	−11.5	−6.5		−7.6		−15.6	
Perceived Stress Scale[b]	Intervention	−2.2	−2.2	−3.1	.90	−3.2	.83	−2.6	.58
	Control	−0.9	−2.5	−1.8		−2.3		−0.8	
Positive depression screen, %[b]	Intervention	−1.1	−11.5	−6.2	.17	2.7	.60	−6.2	.62
	Control	1.9	5.7	5.0		1.0		−4.1	
Overall QOL[a]	Intervention	0.4	0.1	0.5	.14	0.4	.48	1.5	.63
	Control	0.6	0.9	0.8		0.4		1.8	
PJSS[a]	Intervention	0.2	0.2	0.2	.84	0.2	.82	0.3	.93
	Control	0.1	0.2	0.2		0.1		0.2	

Abbreviations: PJSS, Physician Job Satisfaction Scale; QOL, quality of life.

[a] Increased score reflects improved outcome.

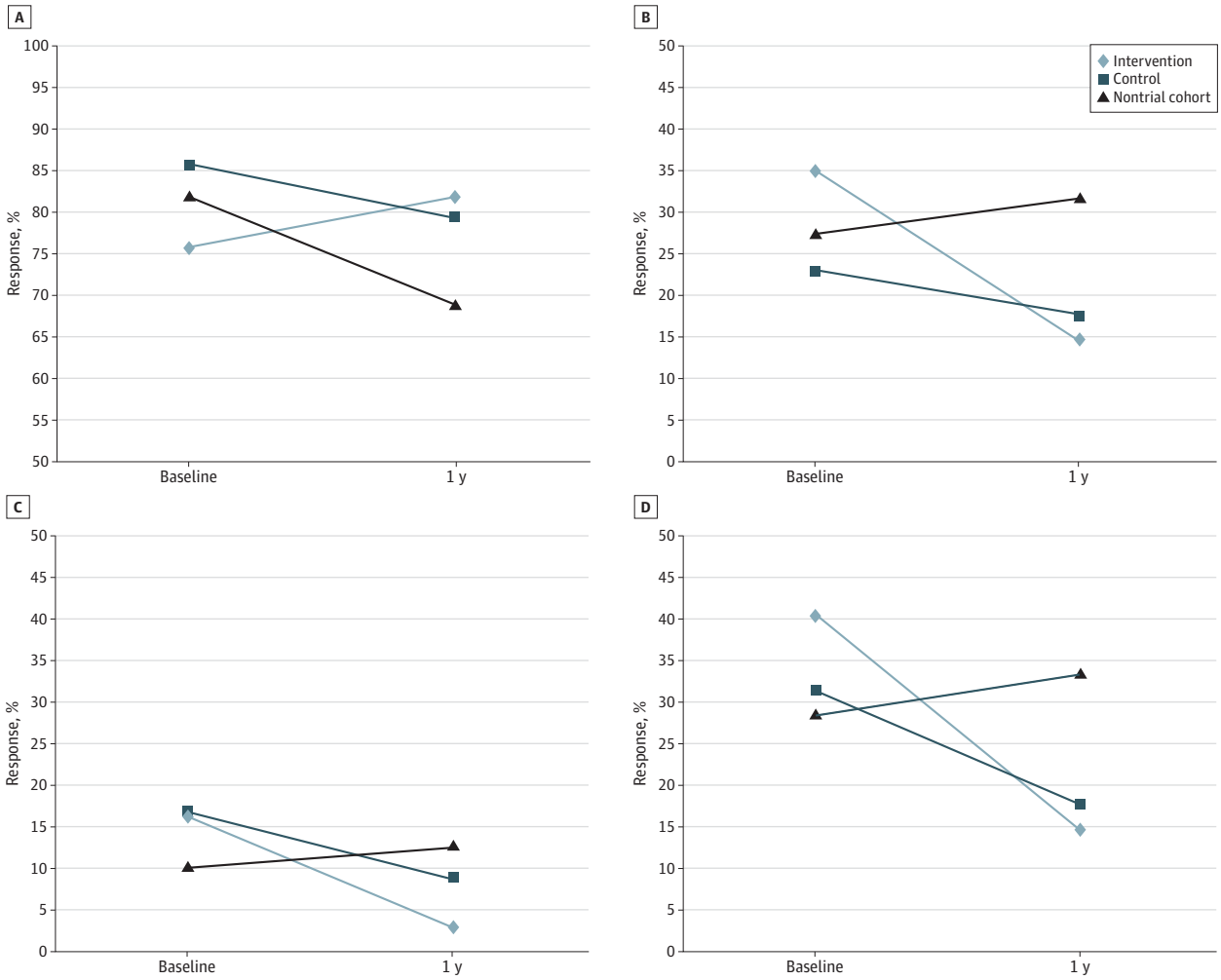
[b] Decreased score reflects improved outcome.

No statistically significant differences in stress, symptoms of depression, overall QOL, or job satisfaction were seen. Differences in mental and physical well-being, fatigue, and empathy were also small and not statistically significant (data not shown).

Comparisons With the Nontrial Cohort

Comparison of outcomes in the eligible physicians who chose not to participate (nontrial cohort) with those in the randomized arms of the study is shown in **Figure 2**. The proportion of participants strongly agreeing that their work was meaningful increased in the trial intervention arm but decreased in the trial control arm and the nonstudy cohort ($P = .04$). Rates of burnout dropped substantially in the trial intervention arm, declined slightly in the trial control arm and increased in the nonstudy cohort ($P = .03$, .007, and .002 for depersonalization, emotional exhaustion, and overall burnout, respec-

Figure 2. Changes From Baseline for Nontrial Cohort vs Randomized Arms of Trial



Proportion of participants who (A) strongly agreed that work is meaningful (P = .04) and rates of (B) high emotional exhaustion (P = .007), (C) high depersonalization (P = .03), and (D) overall burnout (P = .002).

tively). Rates of poor QOL improved most in the trial intervention arm (15.2% vs 0.6% decrease in the trial control arm and 7.3% increase in the nontrial cohort), but these differences were not statistically significant (P = .57).

Discussion

To our knowledge, this study is the first randomized clinical trial evaluating an initiative with employer-provided protected time designed to promote meaning in work and reduce distress among physicians. This trial evaluated whether a facilitated small-group curriculum was an effective way to use employer-provided protected time and compared participants in both active arms of the trial with eligible nonparticipants. Participants in the facilitated small-group intervention experienced significant improvements in meaning, empowerment, and engagement in work beyond that seen in the physicians receiving only protected time. These differences, which became most apparent toward the end of the study period, were sustained for 12 months after the end of the intervention period. In addition, rates of depersonalization decreased markedly in the intervention arm of the study compared with the control arm, a result that was also sustained for 12 months following the study. These findings suggest that although receiving unstructured protected time offered some benefits by itself, the advantages of the small-group curriculum were greater and persisted after the intervention concluded, particularly for meaning and the closely associated interpersonal aspects of burnout.[21] Differences in other domains of burnout and distress were not found between the trial arms, although compared with the nontrial participants, the facilitated small-group intervention resulted in improvements more broadly, including across all domains of burnout.

The observed improvements in some but not all domains of well-being suggest that approaches to physician distress likely must be directed at specific targets. The intervention in this study was primarily designed to promote meaning at

work through collegiality, community, shared experience, and reflection centered on discussions of topics related to the experience of being a physician, within the safety of a confidential small group. The topics covered in the curriculum included a focus on skills in reflection, self-awareness, and mindfulness, with this combination of community building and skill acquisition expected to promote a sense of connectedness and meaning in one's work.[34] Additional interventions designed to more specifically address other elements of distress may be necessary to affect those domains, including those extending beyond the workplace, such as QOL and symptoms of depression.

The results of this study illustrate the potential of institutional commitments to physician well-being programs to offer at least partial solutions to the current crisis of physician burnout and dissatisfaction. Given the shared responsibility of physicians and health care organizations to promote physician well-being,[21] maximal benefit is likely to require coupling institutional approaches (both institutionally supported individual efforts and restructuring of the institutional environment) with existing individual strategies to promote wellness such as mindfulness and resilience training.[15,19] Such a comprehensive approach has the potential to replace a culture of distress among physicians with a culture of thriving and flourishing.[35]

This study is subject to a number of limitations. First, the sample size in the randomized portion of the study was small. Second, the trial participants reflect a self-selected group of physician volunteers. Therefore, although comparisons between the trial and nontrial participants were adjusted for differences in measured demographic factors and baseline levels of distress, it is possible other important differences existed between these groups. Third, all participants were internal medicine physicians from a single academic medical center. The baseline well-being and distress levels in this study were generally similar to those reported in previous studies of physicians,[3,4] but these results may not be fully generalizable to other practices. For these reasons, the effectiveness of this intervention should be replicated in additional samples of physicians in other practice settings. Finally, it is not known which elements of this curriculum had the greatest effect on each outcome or if the full curriculum is necessary to achieve the benefits found in this trial, so future work should address the influence of specific aspects of the curriculum on physician well-being. More broadly, additional research using rigorous comparative designs is needed to better understand which interventions are most useful in improving well-being across its many dimensions, as well as which physicians would benefit the most from specific approaches.

Conclusions

This randomized clinical trial demonstrates that a facilitated small-group curriculum for physicians with protected time provided by the institution can improve elements of physician well-being, including meaning, empowerment, and engagement in work, and reduce distress, including depersonalization. This intervention is not a panacea for physician distress but represents an important addition to the medical profession's understanding of and ability to meaningfully promote physician well-being.

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Author Contributions: Dr West had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
Study concept and design: West, Dyrbye, Rabatin, Call, Hellyer, Sloan, Shanafelt.
Acquisition of data: West, Call, Davidson, Multari, Romanski, Hellyer, Shanafelt.
Analysis and interpretation of data: West, Sloan, Shanafelt.
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REFERENCES

1. Dyrbye LN, Thomas MR, Massie FS Jr, et al. Burnout and suicidal ideation among U.S. medical students. *Ann Intern Med*. 2008;149(5):334-341.
2. West CP, Shanafelt TD, Kolars JC. Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents. *JAMA*. 2011;306(9):952-960.
3. Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and career satisfaction among American surgeons. *Ann Surg*. 2009;250(3):463-471.
4. Shanafelt TD, Boone S, Tan L, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med*. 2012;172(18):1377-1385.
5. Fahrenkopf AM, Sectish TC, Barger LK, et al. Rates of medication errors among depressed and burnt out residents: prospective cohort study. *BMJ*. 2008;336(7642):488-491.
6. West CP, Tan AD, Habermann TM, Sloan JA, Shanafelt TD. Association of resident fatigue and distress with perceived medical errors. *JAMA*. 2009;302(12):1294-1300.
7. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American surgeons. *Ann Surg*. 2010;251(6):995-1000.
8. West CP, Shanafelt TD. Physician well-being and professionalism. *Minn Med*. 2007;90(8):44-46.
9. Dyrbye LN, Massie FS Jr, Eacker A, et al. Relationship between burnout and professional conduct and attitudes among US medical students. *JAMA*. 2010;304(11):1173-1180.
10. Shanafelt TD, Balch CM, Dyrbye LN, et al. Special report: suicidal ideation among American surgeons. *Arch Surg*. 2011;146(1):54-62.

11. West CP, Tan AD, Shanafelt TD. Association of resident fatigue and distress with occupational blood and body fluid exposures and motor vehicle incidents. *Mayo Clin Proc*. 2012;87(12):1138-1144.

12. Dyrbye LN, Shanafelt TD. Physician burnout: a potential threat to successful health care reform. *JAMA*. 2011;305(19):2009-2010.

13. McCue JD, Sachs CL. A stress management workshop improves residents' coping skills. *Arch Intern Med*. 1991;151(11):2273-2277.

14. Shapiro SL, Astin JA, Bishop SR, Cordova M. Mindfulness-based stress reduction for health care professionals: results from a randomized trial. *Int J Stress Manag*. 2005;12:164-176.

15. Sood A, Prasad K, Schroeder D, Varkey P. Stress management and resilience training among Department of Medicine faculty: a pilot randomized clinical trial. *J Gen Intern Med*. 2011;26(8):858-861.

16. Epstein RM. Mindful practice. *JAMA*. 1999;282(9):833-839.

17. Shanafelt TD, Sloan JA, Habermann TM. The well-being of physicians. *Am J Med*. 2003;114(6):513-519.

18. Rabow MW, McPhee SJ. Doctoring to Heal: fostering well-being among physicians through personal reflection. *West J Med*. 2001;174(1):66-69.

19. Krasner MS, Epstein RM, Beckman H, et al. Association of an educational program in mindful communication with burnout, empathy, and attitudes among primary care physicians. *JAMA*. 2009;302(12):1284-1293.

20. Warnecke E, Quinn S, Ogden K, Towle N, Nelson MR. A randomised controlled trial of the effects of mindfulness practice on medical student stress levels. *Med Educ*. 2011;45(4):381-388.

21. Shanafelt TD. Enhancing meaning in work: a prescription for preventing physician burnout and promoting patient-centered care. *JAMA*. 2009;302(12):1338-1340.

22. Williams ES, Konrad TR, Linzer M, et al; SGIM Career Satisfaction Study Group. Refining the measurement of physician job satisfaction: results from the Physician Worklife Survey. *Med Care*. 1999;37(11):1140-1154.

23. Spreitzer GM. Psychological empowerment in the workplace: dimensions, measurement, and validation. *Acad Manage J*. 1995;38:1442-1465.

24. Gudex C, Dolan P, Kind P, Williams A. Health state valuations from the general public using the visual analogue scale. *Qual Life Res*. 1996;5(6):521-531.

25. Tan AD, Novotny PJ, Kaur JS, et al. A patient-level meta-analytic investigation of the prognostic significance of baseline quality of life (QOL) for overall survival (OS) among 3,704 patients participating in 24 North Central Cancer Treatment Group (NCCTG) and Mayo Clinic Cancer Center (MC) oncology clinical trials [abstract]. *J Clin Oncol*. 2008;26(15 suppl):9515.

26. Ware JE, Kosinski M, Dewey JE, Gandek B. *How to Score and Interpret Single-Item Health Status Measures: A Manual for Users of the SF-8 Health Survey*. Lincoln, RI: QualityMetric, Inc; 2001.

27. Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory Manual*. 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.

28. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24(4):385-396.

29. Spitzer RL, Williams JB, Kroenke K, et al. Utility of a new procedure for diagnosing mental disorders in primary care: the PRIME-MD 1000 study. *JAMA*. 1994;272(22):1749-1756.

30. Whooley MA, Avins AL, Miranda J, Browner WS. Case-finding instruments for depression: two questions are as good as many. *J Gen Intern Med*. 1997;12(7):439-445.

31. Hojat M, Mangione S, Nasca TJ, et al. The Jefferson Scale of Physician Empathy: development and preliminary psychometric data. *Educ Psychol Meas*. 2001;61:349-365. doi:10.1177/00131640121971158.

32. West CP, Dyrbye LN, Sloan JA, Shanafelt TD. Single item measures of emotional exhaustion and depersonalization are useful for assessing burnout in medical professionals. *J Gen Intern Med*. 2009;24(12):1318-1321.

33. West CP, Dyrbye LN, Satele DV, Sloan JA, Shanafelt TD. Concurrent validity of single-item measures of emotional exhaustion and depersonalization in burnout assessment. *J Gen Intern Med*. 2012;27(11):1445-1452.

34. Beckman HB, Wendland M, Mooney C, et al. The impact of a program in mindful communication on primary care physicians. *Acad Med*. 2012;87(6):815-819.

35. Keyes CL. The mental health continuum: from languishing to flourishing in life. *J Health Soc Behav*. 2002;43(2):207-222.