

Mind-Body Skills Training for Resident Wellness: A Pilot Study of a Brief Mindfulness Intervention

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Journal of Medical Education and Curricular Development
Volume 5: 1–10
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DOI: 10.1177/2382120518773061



ABSTRACT

BACKGROUND: Interventions to address burnout include mind-body skills training (MBST), but few studies have evaluated the feasibility of MBST for busy pediatric residents.

OBJECTIVE: In this pilot study, we tested the feasibility of a brief MBST intervention, using in-person peer-led training supported by online modules, to decrease stress and burnout in pediatric resident physicians.

METHODS: Of 99 (10%) residents, 10 residents at Nationwide Children's Hospital in Ohio participated in up to four 90-minute MBST sessions more than 1 month, led by a co-resident with 5 years of informal training in mind-body skills. Participants were offered 8 assigned online modules through OSU Center for Integrative Health and Wellness. Measures including Maslach Burnout Inventory (MBI), Cohen's Perceived Stress, Smith's Brief Resilience, Cognitive and Affective Mindfulness Scale-Revised, and Neff's Self-Compassion Scale (NSS) were administered before (T1) and after (T2) the course. Participants were offered optional monthly "maintenance" sessions for 6 months and completed a third set of measures at this follow-up (T3).

RESULTS: The residents completed an average of 4.3/8 online modules and attended an average of 2.8/4 in-person sessions. There was significant improvement in positive attitude, perceived stress, and resilience post intervention (T2). Follow-up evaluation (T3) also demonstrated significant improvement in burnout (depersonalization) and mindfulness. More than 75% of participants found the course worthwhile.

CONCLUSIONS: A short mixed-method mindfulness-based skills course may be a practical way to offer resilience and stress management training to busy resident physicians.

KEYWORDS: Resident education, wellness, burnout, mindfulness

RECEIVED: September 7, 2017. **ACCEPTED:** March 21, 2018.

TYPE: Original Research

FUNDING: This study was supported by the Nationwide Children's Hospital Pediatrics Residency Program.

DECLARATION OF CONFLICTING INTERESTS: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Background

Residency training is a high-risk period for physician burnout¹—or “compassion fatigue.” Furthermore, burnout has been highly associated with not only poor physician health but also limitations in ability to provide empathetic, effective patient care.² Interventions that reduce burnout and promote residents' resilience could have important public health effects on the health care workforce and the delivery of quality care.

A number of interventions and regulations designed to mitigate stress and burnout have been implemented, including Accreditation Council for Graduate Medical Education (ACGME) resident work-hour restrictions, which have inconsistently demonstrated success in reducing burnout.³ Another approach has been dissemination of mind-body skills training (MBST). Increased mindfulness—or “paying attention in a particular way—on purpose, to the present moment, non-judgmentally”⁴—has been associated with improvement in health professional resilience and self-compassion and correlated with less stress and burnout.⁵

Strategies for teaching MBST range from short online self-directed modules, anywhere from 3 to 12 one-hour modules in several studies,^{6–10} to lengthy and costly retreats led by professional mindfulness instructors, some requiring greater than 40 hours in-person training over a several month period.¹¹ Even “abbreviated” in-person mindfulness courses require significant time commitment and typically rely on specially trained mindfulness teachers, ranging from 18 to 52 hours of participant time.^{12,13} Most reports focus on medical students, attending physicians or broadly include cohorts of various health professional groups such as nurses, dietitians, social workers, and health researchers.^{6,11,14} There are few studies of lower dose, in-person or hybrid (in-person and online) training, or training which specifically targets resident physicians.

In this small pilot study, we aimed to test whether a brief, practical, hybrid, flipped classroom¹⁵ model, using in-person peer-led training groups (6 total hours) supported by online modules (up to 8 hours), could improve mindfulness practices



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Table 1. In-person session description with corresponding online modules and participant participation.

SESSION	MODULE TITLES (NO. COMPLETED)	CLASS CONTENT (NO. OF PARTICIPANTS)
1	1. Intro to relaxation response (7) 2. Relaxation response—clinical, cognitive, emotional effects (6)	Intro to mindfulness, meditation myths and tips, breathing meditation (8)
2	3. Introduction to mindfulness (4) 4. Mindful breathing (3)	Benefits of mindfulness, reaction vs response, body-scan meditation, barriers to practicing (9)
3	5. Autogenic training (5) 6. Loving-kindness meditation (4)	Autogenic training, loving-kindness and self-compassion meditation, empathy vs compassion, guided imagery (4)
4	7. Mindfulness in everyday life (6) 8. Gratitude meditation (5)	Mindfulness in everyday life (eating, walking), moving meditation (yoga, tai chi), gratitude meditation, individual plan for practice (8)

and decrease stress and burnout in a group of self-selected pediatric and medicine-pediatric residents. We hypothesized that the program would (1) lead to improvement in resident mindfulness, self-compassion, resilience, and burnout, as demonstrated in more complex mindfulness trials⁷; (2) demonstrate feasibility and practicality; (3) be perceived as educational and worthwhile; and (4) succeed with a peer resident leader without professional MBST educator training.

Methods

Setting and participants

This pilot study of “low-dose MBST” included a convenience sample of 10 residents at a large children’s hospital. Residents were categorical pediatrics and internal medicine-pediatric residents in their second through fourth years of postgraduate training. No specific selection criteria were required, only availability and willingness to participate were required. Residents were recruited through e-mail, flyers, and word of mouth. For this pilot feasibility study, all participants were offered the intervention, and no control group was used. This study was approved by the Nationwide Children’s Hospital Institutional Review Board.

Intervention

Training consisted of 4 weekly group MBST basic skills sessions lasting 90 minutes each, led by a resident with 5 years of informal meditation and mindful movement experience. Prior to each session, participants were asked to complete 2 free online modules through the Ohio State University (OSU) College of Medicine’s Mind-Body Skills Training for Resilience, Effectiveness, and Mindfulness. This series consists of 12 total online modules, and 8 were chosen for this intervention, based on in-person session content and relevance to residency training. As an incentive, residents were offered 1.5 hours (for each skills session) and 1 hour (for each module) of lecture credits, which are tracked by the residency program. Skills sessions focused on open discussion of module content, sharing of participants’ mindfulness learning experiences between sessions, and hands-on teaching of MBST techniques, with most of the session time devoted to practice of the skills (Table 1).

Participants were encouraged to make an individual “mindfulness plan” for continuing their skills practice. For the following 6 months, the residents were offered optional monthly “maintenance” group sessions, with the opportunity to join remotely via online group video chat. Maintenance sessions were informal, peer-led, group sessions to discuss mindfulness plans, use of skills, situational relevance, barriers, and overall use of MSBT. Participants were also welcome to discuss any other topic related to mindfulness or their MBST experiences.

Data collection and measures

Deidentified participants completed wellness measures online at 3 time points during the study using the REDCap survey platform. Data were collected at baseline (T1), after completion of intervention (T2), and at follow-up 6 months after completion (T3). Baseline data included demographics and assessment of previous mindfulness training and skills (Table 2). A course evaluation with Likert-scale questions and narrative comment sections was administered at the end of the course at T2.

Data were collected via well-established, valid, and reliable instruments. Wellness measures included Maslach Burnout Inventory (MBI),¹⁶ Cohen’s Perceived Stress Scale (PSS),¹⁷ Smith’s Brief Resilience Scale (BRS),¹⁸ Cognitive and Affective Mindfulness Scale-Revised (CAMS-R),¹⁹ and Neff’s Self-Compassion Scale (NSS).²⁰ The MBI contains 3 factors: Emotional Exhaustion (EE), Depersonalization (DP), and Personal Achievement (PA).

Analysis

Changes in burnout, perceived stress, self-compassion, mindfulness, and resilience across the 3 time points were described descriptively. Where appropriate, paired sample *t* tests were completed. Analyses were conducted using SPSS Statistics version 24.

Classification of participant total dosage

Participants were placed in the corresponding tertile (low, medium, or high) based on the participant completion of mindfulness modules and class participation. Total dosage was

Table 2. Participant demographics, work characteristics, and previous mindfulness experience.

DEMOGRAPHICS	
Gender	
Male	3
Female	7
Age	
26-27	3
28-29	5
>30	2
Average/median	29.3/28
Total educational debt, US\$	
50 000-100 000	2
>100 000	8
Marital status	
Single	6
Married/partnered	4
Current living situation	
Live alone	2
Have nonrelated house/roommates	2
Live with family	6
Have children or currently pregnant	3
Work characteristics	
Average h/wk worked last month	
≤50	3
51-60	3
61-70	2
71-80	2
Residency year	
Second	5
Third	4
Fourth	1
Residency type	
Categorical pediatrics	7
Internal medicine—pediatrics	2
Dual pediatrics	1
Last vacation of >5 days	
In the past month	5
1-3 months ago	2

(Continued)

Table 2. (Continued)

DEMOGRAPHICS	
3-6 months ago	3
Next vacation of >5 days	
In the next month	3
1-3 months	3
3-6 months	3
Mindfulness experience	
Meditation	0
Tai chi	0
Yoga	1

determined by combining both the modules and class experiences. Participants who had a total dosage between 0 and 4 were placed in the Low Dosage category, those who had a total dosage between 5 and 8 were placed in the Medium Dosage category, and participants who completed 9 to 12 were placed in the High Dosage category. This allowed for comparisons across groups.

Results

Demographics

A total of 10 residents participated in the mindfulness intervention, of 99 eligible senior residents who were offered participation. Most participants were women (70%), between ages 26 and 37 (mean age 29) years, engaged in categorical pediatrics training program (70%), and most reported an educational debt greater than US\$100 000 (80%). No participants reported prior training in MBST such as meditation or tai chi, but one had previous experience with yoga (Table 2). For nonparticipants, most were women, although 62% compared with 70% of participants, and identically to participants, most (70%) were engaged in categorical pediatrics training.

Course participation and feasibility

Most (70%) residents completed at least 3 in-person sessions and the remainder completed 2 sessions (mean 2.8 sessions/participant; Table 3). Of the 8 online modules, completion rates per participant ranged from none to all (mean 4.3 modules/participant). Most residents estimated spending 10 to 15 hours total on sessions and modules combined over the 4 weeks. Not all residents completed all measures at each time point (Table 3). Eight residents completed both T1 and T2 measures and 9 residents completed both T1 and T3 measures. Only 5 residents completed measures across all time points. Paired samples *t* tests were completed across time points where data were present. For comparison, in other published interventions, completion rates were wildly variable, with lower

Table 3. Participant dosage and survey completion data.

PARTICIPANT	DOSE TERTILE	POSTGRADUATE YEAR (PGY)	TOTAL DOSE	MODULES	CLASSES	T1 DATA ^a	T2 DATA ^a	T3 DATA ^a
1	Low	2	3	1	2	C	C	C
5	Low	2	2	0	2	C	C	C
10	Low	2	3	1	2	C	C	C
3	Medium	2	6	3	3	C	I	C
7	Medium	3	7	4	3	C	C	I
8	Medium	2	7	4	3	C	I	C
2	High	3	12	8	4	C	C	I
4	High	3	11	7	4	C	C	C
6	High	3	10	7	3	C	I	C
9	High	3	9	6	3	C	C	C

^aC, complete; I, incomplete.

Table 4. Participant course evaluation responses.*

QUESTION	AVERAGE
The course was well designed	4
The online modules and surveys were clear and easy to navigate	4.2
The online modules were useful for me to increase my knowledge of mind-body techniques and the evidence base supporting their use	4.1
The online modules helped me with ideas and methods to practice mind-body skills for myself and my patients	3.9
The in-person sessions helped me better understand and master the concepts involved in improving mindfulness in my daily life	4.3
My investment of time in this course was worth it for me	4.2
The group leader helped me learn mindfulness techniques in a way that is relevant to my life as a resident	4.4

*Responses based on a 5-point Likert scale with 1 = Strongly Disagree and 5 = Strongly Agree.

completion rates in online-only interventions and with interventions directed at working health professionals.^{6–14}

At T2, 9 of the participants completed a brief survey of the course including seven 5-point Likert scale questions and open comment sections. Likert scales were based on the “1” value of “strongly disagree” to the “5” value of “strongly agree.” Table 4 demonstrates the average number awarded by the participants for each question. Three-fourths of participants found the course worthwhile. All but one agreed or strongly agreed that

in-person sessions helped master concepts related to improving mindfulness in daily life. All agreed that the leader helped them learn mindfulness techniques in a way that was relevant to life as a resident.

Wellness outcomes

There were significant improvements in Personal Achievement on the MBI ($P = .002$), perceived stress ($P = .015$), and resilience

Table 5. Comparison of burnout, perceives stress, self-compassion, mindfulness, and resilience from time 1 to time 2.

	TIME 1		TIME 2		N	T	DF	P VALUE
	M	SD	M	SD				
Measures								
MBI scales								
EE	27.1	6.94	23.7	8.90	7	1.26	6	.256
D	11.9	6.49	9.6	4.35	7	1.42	6	.207
PA	29.6	9.18	38.1	6.82	7	−5.26	6	.002*
PSS	20.1	3.94	15.9	3.27	8	3.22	7	.015*
Neff	38.6	3.46	39.9	3.85	7	−1.08	6	.321
CAMSR	22.7	3.61	25.8	2.14	6	−1.98	5	.105
BRS	19.1	4.30	22.6	1.90	7	−2.56	6	.041*

* $P < .05$.**Table 6.** Comparison of burnout, perceives stress, self-compassion, mindfulness, and resilience from time 1 to time 3.

	TIME 1		TIME 3		N	T	DF	P VALUE
	M	SD	M	SD				
Measures								
MBI								
EE	26.9	6.98	23.5	7.25	8	2.32	7	.053
D	12.6	5.53	8.5	4.07	8	3.27	7	.014*
PA	30.0	8.59	34.8	8.97	8	−2.16	7	.068
PSS	20.3	3.87	21.3	2.29	9	−.684	8	.513
Neff	40.1	3.60	38.5	2.68	8	2.73	7	.029*
CAMSR	22.9	3.44	26.3	2.96	8	−3.81	7	.007*
BRS	19.0	4.93	21.9	3.91	8	−1.78	7	.119

* $P < .05$.

($P = .041$) from T1 to T2 (Table 5). From T1 to T3 (6 months after the program), there were significant improvements in DP on the MBI ($P = .014$) and mindfulness ($P = .007$; Tables 5 and 6; Figures 1 to 7). There was an unexpected significant decrease in Self-Compassion from T1 to T3. No other changes were statistically significant in this small sample. Individual participant scores were compared across each wellness measure (Figures 1 to 7). Participants were grouped into dosage tertile (low, medium, and high). Interestingly, the low-dose group completely comprised junior residents (PGY-2), and the high-dose group comprised only senior residents (PGY-3 and PGY-4). Only one PGY-4 medicine-pediatric resident attended the course and was therefore denoted as a PGY-3 in the data to protect the participant's identification. Low-dose participants often showed the most significant initial improvement on all scales with the exception of self-compassion, however, did not

maintain improvement as often as the high-dose participants. Overall, the least amount of improvement was noted in the Neff's Self Compassion measure in both statistical analyses and qualitative trends. The low-dose cohort showed no improvement in self-compassion scores and even worsened in some; in the higher dose cohorts, scores were frequently unchanged but rarely improved.

Low dose (participants 1, 5, and 10). All 3 participants were junior residents, took 2 classes and 0 to 2 modules; they showed general improvement on all measures at T2, with the exception of self-compassion scores. Participants 1 and 10 maintained these improvements across most measures (with the exception of perceived stress). Participant 5 and 10 showed dramatic improvement in multiple scores at T2 (notably in MBI, BRS, and CAMS-R).

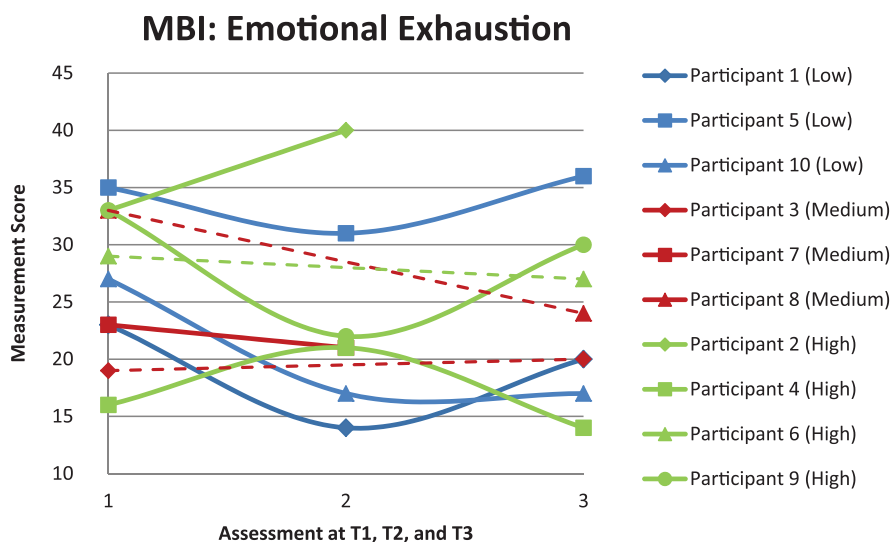


Figure 1. Comparison of individual participant scores on Emotional Exhaustion factor from Maslach Burnout Inventory (MBI) by dosage tertile. Dashed lines indicate that participant completed the survey at T1 and T3, but not T2.

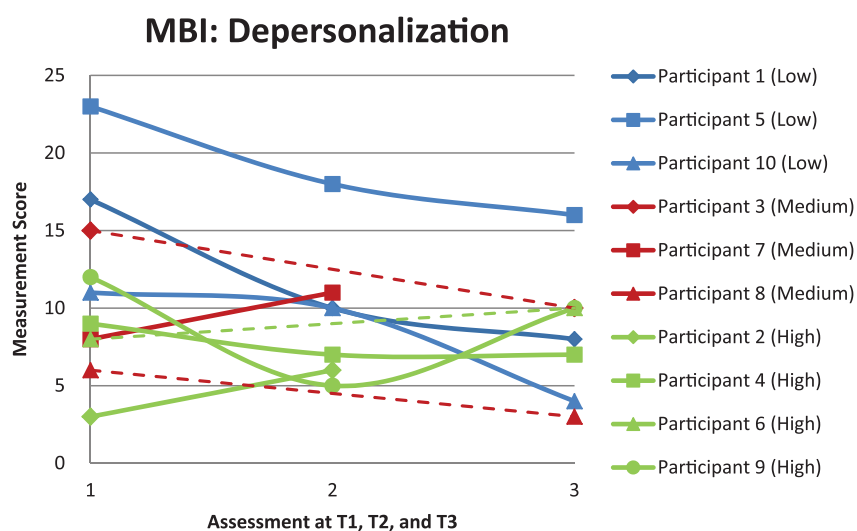


Figure 2. Comparison of individual participant scores on Depersonalization factor from Maslach Burnout Inventory (MBI) by dosage tertile. Dashed lines indicate that participant completed the survey at T1 and T3, but not T2.

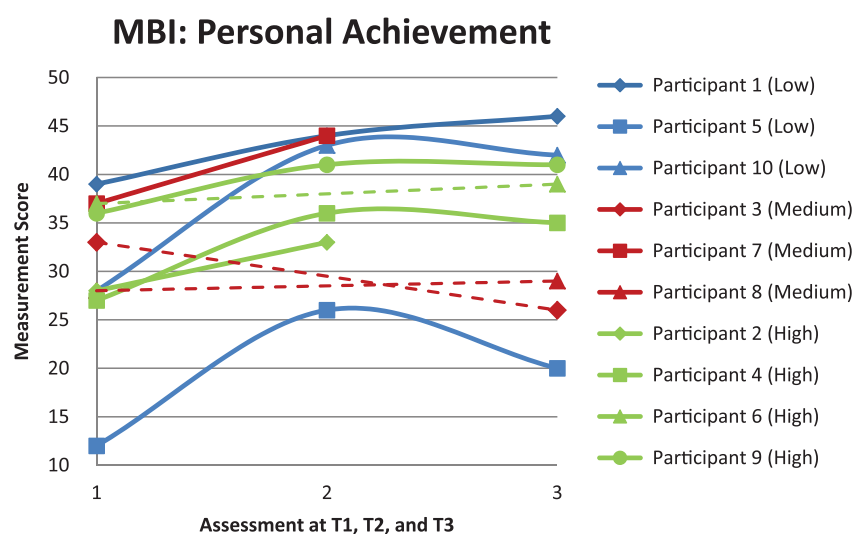


Figure 3. Comparison of individual participant scores on Personal Achievement factor from Maslach Burnout Inventory (MBI) by dosage tertile. Dashed lines indicate that participant completed the survey at T1 and T3, but not T2.

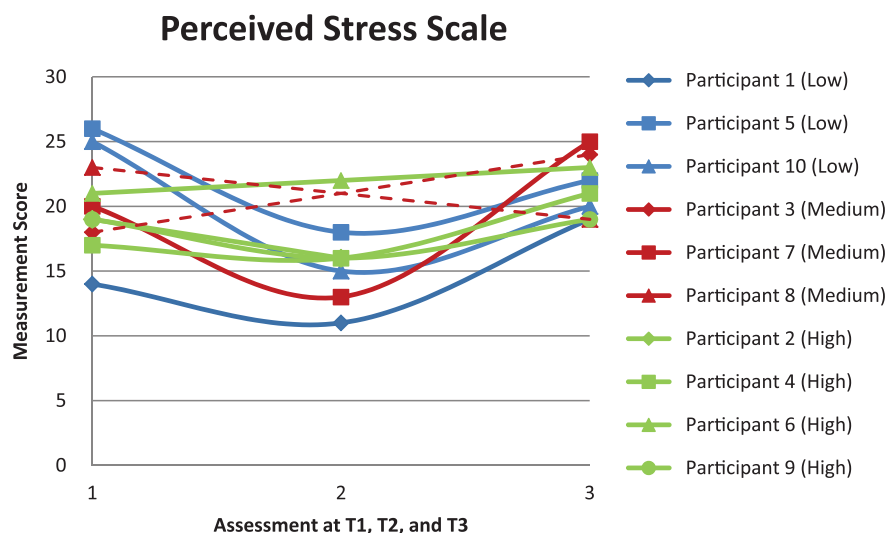


Figure 4. Comparison of individual participant scores on Perceived Stress Scale by dosage tertile. Dashed lines indicate that participant completed the survey at T1 and T3, but not T2.

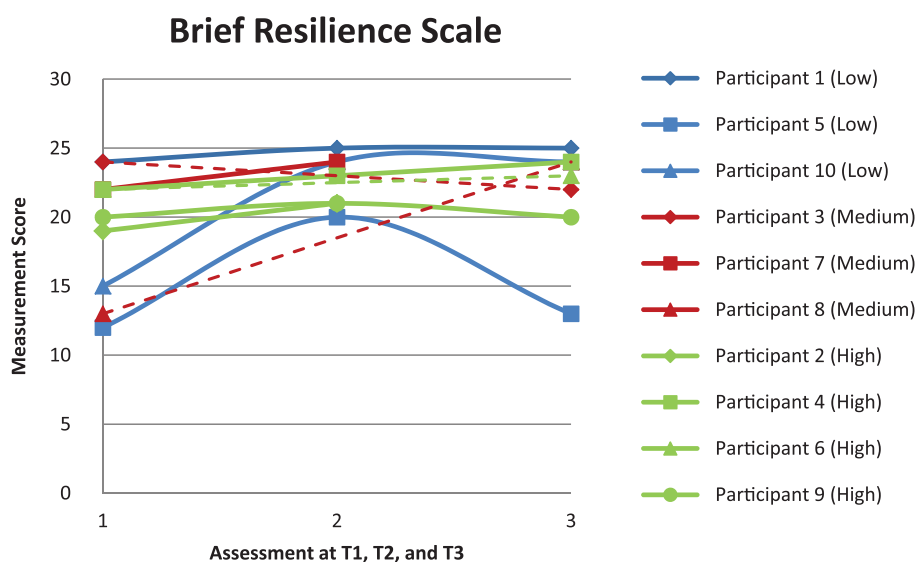


Figure 5. Comparison of individual participant scores on Brief Resilience Scale by dosage tertile. Dashed lines indicate that participant completed the survey at T1 and T3, but not T2.

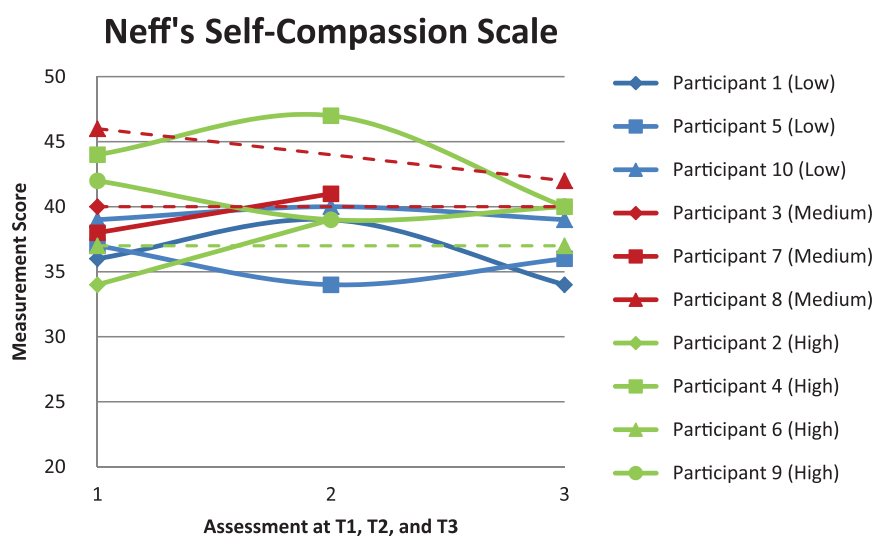


Figure 6. Comparison of individual participant scores on Neff's Self-Compassion Scale by dosage tertile. Dashed lines indicate that participant completed the survey at T1 and T3, but not T2.

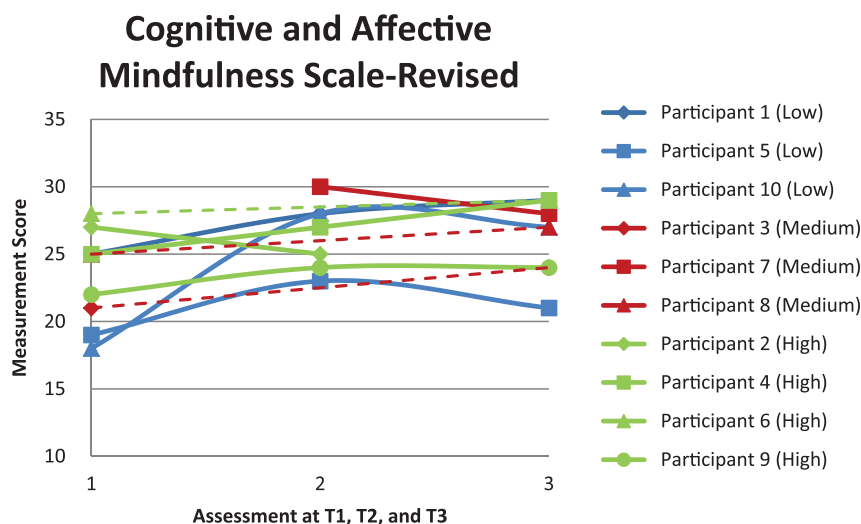


Figure 7. Comparison of individual participant scores on Cognitive and Affective Mindfulness Scale-Revised by dosage tertile. Dashed lines indicate that participant completed the survey at T1 and T3, but not T2.

Medium dose (participants 3, 7, and 8). Participant 3 and 8 were both junior residents, and participant 7 was a senior resident. Each took 3 of the classes and completed 3-4 modules. None completed all 3 data time-sets and showed incongruent trends with some improvement and some worsening of scores in the various instruments over time.

High dose (participants 2, 4, 9, and 6). All attended 3-4 of the in-person classes and completed at least 6 modules. Participant 2 only completed T1 and T2 data sets. Participant 6 only completed T1 and T3 data sets, and this participant's scores stayed relatively stable over these time points. Participants 2 and 4 had mixed results similar to the medium-dose participants. Participant 9 demonstrated improved scores over all scales, including self-compassion, and was able to maintain some of these improvements through T3.

Course feedback and qualitative comments

Participants shared their personal outcomes from the class: one resident stated that the course helped her engage fully with her children after work, and another resident described how he found gratitude for his own ability to breathe independently as he was watching over a patient on a ventilator. At T2, participants were also asked to comment on the values of the course and ways in which the course and its leader could improve. Participants noted that the course helped them in various ways such as providing “ideas on ways to manage stress” and being “mindful in everyday activities” “including work,” “tak[ing] care of myself,” “enjoy[ing] the moment [and] hav[ing] a greater sense of gratitude.” One participant acknowledged the helpful information and background provided by the modules, but that the in-person classes were “best for actually practicing.” Individuals disagreed on the ideal timing of the in-person sessions with one desiring longer sessions, another suggesting shorter but more frequent sessions, and yet another noting

having difficulty in making all the sessions as scheduled. Multiple participants wanted additional opportunities to practice and “reinforce” the learned skills and suggested the leader give more “tough love” to encourage more individual practice outside of classes. While one individual desired a “professional” leader, most others enjoyed having a peer lead the course. One participant commented that the

techniques learned were invaluable [and the leader] expanded my understanding and knowledge of mindfulness in an applicable way . . . [the leader's] insight into the struggles of a resident and how [the leader] used these tools was an incomparable point of view.

Discussion

This small pilot study suggests that a short abbreviated mixed-method mindfulness course is a feasible way of decreasing burnout and perceived stress, as well as bolstering resilience in busy pediatric residents. These results compare favorably with those seen with larger investments of training time and facilitator expertise.¹¹⁻¹³ As hypothesized, the approach used in this study was practical and feasible: 75% of the residents completed at least 2 sessions and 4 online modules, and most found the course worthwhile. Most believed the intervention helped in mastering concepts to improve mindfulness in daily life, and specifically, that the leader helped them apply the skills to resident life. Successful leadership of the class by a peer resident with no professional training was critical to the feasibility (cost and availability) of the program. Finally, we hypothesized that this short course could decrease burnout and stress and increase resilience and self-compassion using multiple validated measures. With exception of self-compassion scores, all other scores showed definitive improvement either immediately following conclusion of the course (T1 to T2) or at the 6-month follow-up (T1-T3). It is important to note that some factors, such as stress, rebounded back to the baseline levels over the 6 months, suggesting that methods for reinforcement of these concepts

and skills should be part of future work in this area. The MBI is an established, validated measure for burnout, and these findings are encouraging, suggesting the positive impact of such a brief “low-dose” MBST course on these important components of burnout and resident wellness. It is even more remarkable that such benefits were detected with such a small sample size.

Interestingly, the participants self-selected into dosage groups that reflected their year of residency training. The junior residents (PGY-2) made up the “low-dose” cohort exclusively, as well as 2 of the 3 individuals in the “medium dose.” The “high-dose” cohort was exclusively senior residents (PGY-3 or PGY-4). Possible explanations for this self-selected dosage finding are that the senior residents may have felt more commitment to the course because they knew the facilitator as a close peer, or they were more committed to resilience training because they had more personal experience with burnout during their residency.

The small sample size of this study is the biggest limitation. Low participation was likely multifactorial, and could have been influenced by lack of interest or comfort with MBST, lack of time, and/or difficult or busy clinical rotations. In addition, self-selection of motivated, interested participants without a control group may have contributed to the positive findings. Because the intervention was completed in July, it may be relevant to note that the junior residents had completed their intern year immediately prior to the intervention. Their initial scores may reflect the stress accumulated over their intern year, or, alternatively, they may have felt a sense of renewal and accomplishment by having recently completed their internship. Also, most residents were on an elective rotation or block with protected study time during the intervention, and none were on an inpatient ward rotation; this could be a confounding factor as they may have had decreased burnout scores regardless of intervention.

Despite less exposure, the low-dose cohort demonstrated more dramatic improvements in comparison with the higher dose group on wellness outcomes. Improvements may be a reflection of these participants having more extreme initial scores which afforded more opportunity for improvement. Alternatively, these participants may have responded more positively to the intervention due to lack of previous experience in self-taught resiliency skills. Senior resident score changes may have been less dramatic yet better maintained over time due to familiarity and comfort with residency experience and accompanying resilience at baseline. The lack of maintenance of improvement may be a reflection of a lower dosage having a less sustained effect. This outcome lends support in suggesting that maintenance courses or “booster doses” are indeed necessary for sustained success across all dosages.

It is perplexing that self-compassion scores were muted, even statistically worsened, at T3, especially for the junior residents. These results suggest that self-compassion may be a particularly difficult concept to both apply and master in a short period of time. Also, it is possible that high-achieving

individuals, such as physicians, may have difficulty with not easily succeeding in a new skill, paradoxically leading to self-judgment and deprecation.

The lack of formal and standardized training of the peer resident facilitator is both a strength and weakness of this intervention, as future applications of this course at both the original institution and others hinge on replicating and sustaining effective leadership. There are few examples of peer-led MBST programs in medical education but this may be a powerful approach for this subset of participants.^{21–23}

Finally, the participants found it difficult to make the optional monthly postcourse maintenance sessions with only 2 attending the first 2 sessions; no further sessions were held after that. Maintenance sessions were 1 hour, and attempts were made for these to be held at different times of the day (mornings, noon time, and late afternoons) to accommodate varying residents’ schedules. This suggests that this degree of commitment in follow-up is not feasible with resident schedules and would likely require protected time for more reliable participation. In post-course evaluation feedback, the reinforcement sessions were identified as too difficult to organize around the participants’ variable schedules outside of work-hours and that there was no incentive to complete this “optional” portion of the program.

Larger trials will be needed to fully assess the usefulness of this intervention, evaluate the impact of dose of treatment, and clarify the minimum number of sessions needed to sustain beneficial effects. A primary limitation was the lack of a control group, which will be essential to future studies. Power was another limitation of the study, with only a small number of residents completing all ratings for each time point. Booster doses of mindfulness training, or promotion of “apps” or other mindfulness prompts, may also be useful educational methods. Shorter, more frequent classes devoted to developing MBST may be just as effective or even more effective in future educational efforts. The difficulty of organizing and implementing maintenance group sessions should prompt further investigation into different methods of sustaining the impact of a MBST course over time.

Conclusions

This pilot study demonstrates that a peer-led, short mixed-method mindfulness-based skills course may be a practical way to offer resilience and stress management training and improve wellness in busy pediatric residents. However, our model had notable issues with penetration to the intended population, highlighting the need for residency program support and advocacy for such skills training to allow greater uptake of this intervention model.

Author Contributions

All authors meaningfully contributed to the design and development of this research project, data collection and analysis, and manuscript preparation and revision.

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