A Resident Retreat with Emergency Medicine Specific Mindfulness Training Significantly Reduces Burnout and Perceived Stress

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ABSTRACT

Introduction: We hypothesize that a resident retreat with mindfulness training tailored for Emergency Medicine (EM) physicians can significantly reduce levels of burnout and perceived stress in EM residents.

Methods: We conducted an intervention study of 60 EM residents undergoing an annual resident retreat with a 2.5-hour mindfulness training. The retreat was a department-funded 2-day off-site experience with a wellness theme. The training was developed and delivered by an EM physician (JOS) who is a Mindfulness-Based Stress Reduction (MBSR) teacher trainee, and a certified MBSR teacher (MD). The training focused on techniques that can be used on shift, such as mindful breathing, handwashing, eating/drinking, walking, and anchoring before resuscitations. The cohort contained an equal distribution of 1st, 2nd and 3rd year residents who received a financial incentive. The subjects completed the Maslach Burnout Inventory, Perceived Stress Scale and Mindful Attention and Awareness Scale at three time points: Time 1 - one month prior, Time 2 – one week post, Time 3 – one month post.

Results: The subjects were 60 EM residents (54% Male, 46% Female) with an average age of 29. Completion rates at the three time points were 70% (n = 42), 60% (n = 36) and 50% (n = 30) respectively. We found that Perceived Stress (ω2 = 0.15, p < 0.01) and Emotional Exhaustion (ω2 = 0.21, p < 0.01) decreased significantly over time in a linear progression across the three sampling periods. Though mindfulness as a trait did not change significantly during the study period, in the month after the retreat, 64% of resident respondents at Time 3 (n = 32) reported using the mindfulness techniques learned from the training at least 2 or 3 times a week on shift and 52% (n = 31) reported using them at least 2 or 3 times a week at home.

Conclusions: An EM resident retreat that included an EM specific mindfulness training significantly reduced perceived stress and emotional exhaustion. The learned mindfulness skills were readily adopted for use on shift. Further studies should investigate effectiveness of mindfulness training outside of the retreat format. Other wellness / academic activities that occur within the socially supportive milieu of a retreat could lead to the same significant reduction in burnout and perceived stress seen in the current study.

INTRODUCTION

There is an anecdotal belief among residents and educators that retreats are important, that they should be organizationally supported, and that they increase resident morale by bolstering social support [1-5]. While there is some evidence that wellness retreats can have health benefits [6], there is limited literature on the effect of resident retreats on burnout or perceived stress. The current study offers initial data on the potential for the resident retreat format to reduce burnout and perceived stress. In addition, such retreats offer an ideal environment for mindfulness training. A key component of both mindfulness training and the resident retreat model is the promotion of prosocial supportive skills and experiences.

Burnout among practicing emergency physicians has reached alarming rates [7]. EM resident burnout rates may be as high as 76.1% nationally [8]. Burnout has a significant impact on physician well-being, quality of care [9], patient safety [10], perceived medical error [11] and intent to leave the profession [12]. In systematic reviews and meta-analyses of interventions to reduce physician burnout, organizational and individual strategies are frequently described [13-15]. While organizational strategies are of paramount importance, among the studied individual strategies mindfulness training has consistently shown a positive effect on physician burnout [13-20].

Mindfulness is moment-to-moment awareness, cultivated by paying attention in a specific way to the present moment, as...
non-reactively, non-judgmentally, and open-heartedly as possible [21]. It is a naturally occurring human trait and may be cultivated using secular techniques that are widely employed in business [22-24], the military [25], and healthcare [26, 27]. While acute stress can have deleterious effects on core executive function [28], cognitive appraisal [29] and performance [30], mindfulness practices have been shown to reduce physiological markers of stress [31], increase attention control [32], upregulate immune function [33] and lead to increases in regional brain gray matter density correlated with the regulation of emotion and cognition [34].

Mindfulness has previously been highlighted in a systematic review and meta-analysis of healthcare professionals as effective at reducing stress [19]. While the 8-week Mindfulness Based Stress Reduction (MBSR) program has been a gold standard, abbreviated trainings can provide sustained and significant reduction in burnout in physicians [17-19] and other healthcare workers [35-37].

The Council of Residency Program Directors (CORD) and the ACGME have both reaffirmed their prioritization of resident wellbeing [38, 39]. Recently published CORD guidelines on resident wellness state, “Mindfulness training should be incorporated into residency training to improve wellness and reduce burnout (Level 1b, Grade B)” [38]. While some wellness curricula and toolkits that incorporate mindfulness have been proposed for EM residents, they have not been empirically tested [40-44]; to our knowledge the current study is the first pre-post intervention study incorporating a resident retreat with mindfulness training in EM residents.

The objective of the current study was to investigate if a resident retreat that included a novel mindfulness training tailored for EM physicians could significantly reduce levels of burnout and perceived stress in a cohort of 60 EM residents. Our primary outcome measure was change in Maslach Burnout Inventory and Perceived Stress Scale scores. The Mindful Attention and Awareness Scale was also used to establish the participants baseline trait mindfulness. A secondary aim was to establish participants receptiveness to learning new skills and future use of those skills both clinically on shift and at home in the month after the training.

METHODS

Participants

The study invite was extended to all 60 residents of a three-year EM residency training program that includes an urban safety net hospital as its main training site.

Materials

The study used the Maslach Burnout Inventory (MBI), the Perceived Stress Scale (PSS), and the Mindful Attention Awareness Scale (MAAS). Brief surveys were used to collect data on previous experience with meditative interventions, feedback on the intervention, and the use of techniques in the month after the intervention. Data collection took place during three time points. All instruments, including the consent form, were accessible to subjects on the Mind Garden website.

Design

This was an uncontrolled intervention study with pre- and post-testing around a resident retreat incorporating a 2.5-hour training that presented mindfulness skills directly applicable to clinical EM practice (Appendix A).

Procedures

One month prior to the delivery of the intervention, residents were invited by email to complete an online consent form and time 1 surveys using the Mind Garden website. A financial incentive of a $25 amazon gift card was offered for participation. An administrative assistant not involved in the study administered the financial incentive to ensure that the investigators were blinded to which residents chose to participate. The 2.5-hour mindfulness-based training was delivered by an Emergency Physician and a certified Mindfulness Based Stress Reduction teacher. The subjects were provided further resources to support ongoing practice (Appendix B). Immediately after the retreat, participants were invited to complete time 2 surveys. Four weeks after the retreat, residents were invited to complete the time 3 survey.

Statistical Analysis

Categorical variables were described using frequencies and percentages. Age and the survey subscales were described using means and standard deviations. The primary hypothesis – whether indicators of stress, burnout, and mindfulness changed over the course of the intervention – was evaluated using a repeated-measures multivariate analysis of variance (MANOVA). Significant effects were followed up using repeated-measures analyses of variance (ANOVA) for each scale. Omega-squared (ω2) and p values were used to assess the impact of the intervention. ω2 is a measure of the proportion of variance in the outcome that can be accounted for by change over time; 95% confidence intervals and p-values were computed using bias-corrected and accelerated bootstrapping (5,000 resamples). Missing data were estimated via multiple imputation using Fully Conditional Specification, an iterative Markov Chain Monte Carlo-based procedure [45]. All variables were used in the imputation model. Ten new datasets were imputed.

RESULTS

Of the 60 residents who were contacted, 50 provided responses to the survey items (83%). Demographics for the sample are presented in Table 1 (see next page). The sample had a mean age of 29.3; 54% of the sample identified as male and 46% as female. 50% of the sample identified as White, 24% as Black, 12% as Latino/a, 12% as Asian, 8% as Pacific Islanders, and 24% as “other”; 14% identified as Hispanic. The plurality of the sample (50%) had never been married, 24% were married, 16% were a member of an unmarried couple, 6% were separated, and 4% had been divorced. Finally, there was an approximately equal distribution of PGYs 1, 2, and 3.
Four fifths of participants found the training useful; 70% of residents expressed the intention to use the techniques on shift in the future. In the month after the retreat, 64% of residents reported using the techniques on shift and 52% used them at home at least 2 or 3 times a week.

The MAAS is a 15-item instrument, with a total range from 1 to 6, with higher scores indicating higher trait mindfulness. The mean normative MAAS-T (trait mindfulness) score is 3.85, with an increase to 4.38 among Zen meditators [46]. In our study the residents scored an average of 3.6 at Time 1. Short-term ‘state’ mindfulness was not tested, long-term ‘trait’ mindfulness did not change significantly over the short duration of the study.

Survey results for each timepoint are presented in Table 2. The MANOVA was significant (\(\omega^2 = .49, p < .001\)) indicating that measures of stress, burnout, and mindfulness changed over the course of the intervention. Follow-up ANOVAs were conducted for each subscale. The emotional exhaustion scale of the MBI significantly decreased across each timepoint (\(\omega^2 = .21, p < 0.001\)) such that approximately 21% of the variation was accounted for by the change over time. Similarly, self-reported stress decreased over time (\(\omega^2 = .15, p < 0.001\)) such that 15% of the variation was accounted for by the change over time. The depersonalization (\(\omega^2 = .01, p = .54\)), personal accomplishment (\(\omega^2 = .01, p = .57\)), and mindfulness (\(\omega^2 = .02, p = .36\)) were non-significant and were associated with fairly small pro-portions of variance. Figure 1 presents the change over time for each subscale.

### Table 2: Demographic Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>M or N</th>
<th>SD or %</th>
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<tr>
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<tr>
<td>Female</td>
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DISCUSSION

Despite a growing burnout problem [7, 8], a nationally increasing clinical burden each year [47], an EM workforce fatigued from staffing the frontlines of the ongoing COVID pandemic [48], and a related focus on resident wellness education [38, 39], there is a paucity of pre-post intervention studies [49] examining techniques that could reduce burnout and stress in physicians. This study sought to deliver a resident retreat with EM-specific mindfulness training consistent with the widely held but empirically untested belief that resident retreats promote wellbeing [1-5]. Existing research has demonstrated the benefit of “brief” mindfulness-based interventions in healthcare workers [17-20, 35]. The current study found a significant reduction in burnout and perceived stress in respondents that was sustained one month after the intervention. In addition, we found that the EM residents reported employing the mindfulness skills regularly during clinical work.

Our cohort’s trait mindfulness score of 3.6 was consistent across 3 time points and lower than the average undergrad student score of 3.85 found in MAAS validation studies [46]. For comparison, expert Zen meditators averaged 4.38. It may be reasonable to expect that certain responses to the MAAS would differ significantly between the general population and an EM cohort. For example, EM physicians have a professional culture that supports a dichotomy of strength-weakness, where strength is associated with productivity and patient care, and weakness with self-care [50]. Even in the presence of a desire to care for self, the needs of the critically ill may be more pressing. This may negatively skew responses to questions on the MAAS such as “I tend not to notice feelings of physical tension.
or discomfort until they really grab my attention.” ED physicians often find pride in the ability to get through a shift without eating or using the bathroom; mindfulness scale scores may have different meaning in this context [51]. Additional research is required to validate a mindfulness scale in this unique population and assess the baseline mindfulness of medical students and EM residency applicants in their training trajectory.

Further research should outline the extent to which different aspects of the current intervention contributed to the positive effect. The retreat, rather than the mindfulness intervention, may explain the significant reduction in burnout and perceived stress—or it may be a unique combination of the two. Traditional meditation instruction has an emphasis on learning skills with others in a mutually supportive group, with intensive skill acquisition often occurring at retreats. Residents may therefore be more likely to learn these skills in retreat format, away from the demands of clinical work and with the benefit of social support, which is a key mediator of resident well-being [52].

Further work is required to delineate which mindfulness skills are particularly palatable and useful to ED physicians in our unique work environment. Focusing on skills that emergency physicians (EPs) can readily place in a work context and practice on shift, such as handwashing, walking, handling interruptions, skillful use of compassion and therapeutic presence with patients may prove key to uptake.

The current study showed benefit 1-month post-intervention. If the significant reduction seen in this study were sustained at 3 months, would there be a wellness and indeed financial case for quarterly retreats? How does seasonality play into this, with the demands that remain, are both vital and inter-related targets for intervention.

At baseline, subjects in this study reported high levels of burnout consistent with national data [7, 8]. These high levels occurred despite a concerted departmental effort (e.g., wellness committee, leadership involvement, resident wellness curriculum, support for on-shift breaks and wellness related events) to support a culture of wellness. A significant portion of resident burnout on the initial survey was attributable to emotional exhaustion (EE), while at baseline they had reassuringly high scores in the domain of personal accomplishment (PA) and low scores on depersonalization (DP). This is a different pattern to the recently published National Survey of EM resident burnout, which found that most residents surveyed (72.5%) reported a high degree of depersonalization [8]. A combination of the current sustained departmental wellness effort and other factors may have positively impacted DP and PA without significantly reducing EE.

Advances in understanding burnout have led to a greater focus on subtype analysis [54]. This work would point to the pattern reported in our residents as an “overextended” subtype. It has been hypothesized that this category may be directly related to issues of high workload. In tandem with sustained wellness efforts, our program has seen an increase in patient volume that tracks national statistics, which despite innovative measures, has increased resident workload. It is unclear how issues of workload stress and retreat attendance with or without mindfulness training interact. In one survey of EP’s, the EE domain of the MBI was the most highly affected by the perceived effects of workload on patient outcomes, while PA was least affected [55]. In addition, the survey identified five resilience factor statements and the degree of agreement with them influenced the magnitude of correlation between workload’s effects on patient outcomes and EE. One of the five reported factors was “utility of mindfulness techniques” [56].

It may be that a bolus of increased social support from peers during a retreat away from work in addition to supportive mindfulness skills helped residents to manage workload stress over the 1-month follow-up post-intervention. Despite our study findings over a short follow-up period, the authors believe that focusing solely on reducing workload stress is harmful to the wellbeing of physicians, and very unlikely to be as beneficial over the medium to long term as organizational strategies aimed at reducing workload itself. This is particularly important when high levels of workload stress can last for many years as in the unremitting work life of an EP. It is likely that both reduced workload and strategies to reduce workload stress would have additive benefits that are more sustainable.

There has been a considerable and justified negative response to the view that burnout can be solved by organizations’ focus on the individual resilience of EPs, as this often leads to blaming the individual [57]. Emergency medicine is a unique occupational experience that places highly resourceful, resilient individuals selected for intelligence, grit and caring in an environment where demands can at times outstrip even the greatest personal resources. Medical care and healthcare organizations can place superhuman demands on individuals who are merely extraordinary. Reducing the demands, and skillfully managing the demands that remain, are both vital and inter-related targets for intervention.

The importance of both organizational- and individual-level factors is well justified within the psychological literature. Diathesis-Stress models of psychological distress posit that severe and clinical distress results from the interaction between individual factors (e.g. genetic predispositions, dispositional personality traits etc.) and contextual factors (e.g. situational stress, negative life events, etc.) [58, 59]. Within such models, severe distress can occur both when an individual who is relatively resilient to stress is exposed to extreme stressors, when an individual who is predisposed to experience more intense and enduring stress is exposed to mild-to-moderate stressors, and situations between those extremes. While the present intervention was associated with a significant decrease of both emotional exhaustion and perceived stress, the total change between Times 1 and 3 were only 4-5 points and 2-3 points, respectively. This leaves ample room for other organizational and individual interventions to contribute to physician well-being. It will be important to innovate across the board to optimize improvement in physician burnout, particularly in an occupation with a uniquely resilient workforce exposed to uniquely stressful work over a long-time course.
In summary, there is nascent literature on human factors in medicine that proposes a set of psychological skills for physicians that might help them control their response to stressful clinical scenarios common across organizations [60-66]. The investigation of mindfulness and other psychological skills; what they are, how they work, for whom, and in what circumstances, may be a key missing facet to research into optimal training for life as an EP. In addition, the investigation of different retreat formats and how they affect physician wellbeing may represent an underexploited engine of support which has the advantage of being already familiar to physicians.

LIMITATIONS
There was no control group in this intervention study. The use of gift cards could have altered participation and survey responses, however an administrative support staff member separate from the research team handled the incentives to maintain anonymity. The training took place during a resident retreat where lectures on diversity and inclusion, program review activities, and a keynote speaker were among the unmeasured variables. Our findings may not be generalizable beyond an urban academic center to community sites. Losses to follow-up would have introduced nonresponse bias. One of the training leaders was a faculty member known to the subjects and was involved in other evaluative roles in the residency beyond the training. An accurate measure of short-term changes in “state” mindfulness was not included.

CONCLUSION
Despite the national focus on EM resident burnout there is a paucity of pre-posttest intervention studies in this area. The current study showed that a resident retreat incorporating an EM specific mindfulness training significantly reduced perceived stress and emotional exhaustion in EM residents 1-month post-intervention. The learned mindfulness skills were readily adopted for use on shift. Further research is required to outline the extent to which different aspects of the current intervention contributed to the positive effect and how long that effect may last.

The modern EM workforce is flexible, and EPs often work in multiple different healthcare organizations in series and in parallel. New unforeseen challenges can arise at any moment, such as the COVID epidemic which significantly impacted EPs across the world. Each new situation presents its own differing challenges to EP wellbeing and professional efficacy, underscoring the need for residents to be trained in supportive skills that are clinically useful, portable and flexible.

REFERENCES
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Appendix A

Session 1 (60 mins)

9:30 (5 m) Introductions (JO’S, MD)
9:35 (5 m) Purpose, Goals, Logistics (JO’S)
9:40 (5 m) Defining Mindfulness (MD)
9:45 (10 m) Research on Mindfulness in Medicine (JO’S)
9:55 (20 m) Sitting with Awareness of the Breath (MD)

10:15 (15 m) Inquiry: Discussion of Application in the ED (JO’S, MD)

(Handwashing, Body Position -walking/standing/sitting, Listening to Patients)

Session 2 (65 mins)

10:30 (5 m) Listening to the Patient and Others as Observation (JO’S)
10:35 (20 m) Practicing the Skill of Listening (MD)
10:55 (10 m) Inquiry: How to increase Mindful listening in the ED (JO’S, MD)
11:05 (30 m) Experimental Practice: Standing Body Scan, Mindful Movement (MD)

Session 3 (25 mins)

11:35 (6 m) Body Scan and Informal Practice: Standing at the foot of the bed/resus (JO’S)
11:41 (17 m) Incorporating learnings into personal and clinical practice (JO’S, MD)
11:58 (2 m) Brief Sitting in Stillness (MD)
12:00 Distribution of resources for ongoing practice
End
Appendix B

Support for Home Practice

1) **Foundations Program** - Subjects were advised that they had online access to a Foundations Program Module available on Mindfulness in Emergency Medicine that includes definitions, explanations of key concepts, a guided meditation created by one of the authors (JO’S) and descriptions of how to use the key skills clinically on shift.

2) **Handout** - Subjects were given the following handout from the MBSR teacher (MD) in addition to having online access to his recorded guided meditations;

I. **Formal Mindfulness Practice (more than 5 minutes)**

II. **Less Formal Mindfulness Practice (less than 5 minutes)**

III. **Informal Mindfulness Practice (moments during the day)**

I. FORMAL MINDFULNESS

Design a daily routine that includes 2 or 3 practices per day totaling 30-60 minutes of combined practice per day. Use these formal practices: A. **Body Scan**  B. **Gentle Yoga**

C. Sitting Meditation  D. Walking Meditation

*NOTE: Materials to support formal practice are available via the online course page.*

II. LESS FORMAL MINDFULNESS

A. **Six Point Body Scan (3-5 minutes)**

Noticing your position, whether sitting, reclining, or standing. Bringing heartfelt attention into simply feeling the body as it is. Feeling the sensations as they are presenting in this moment. Accepting them as they are, breathing, feeling, resting into what is. Once you feel a sense of being “in touch” with your body and being connected to it try the Six Point Body Scan: Feet, Knees, Hips, Belly/Back, Heart, Face

1. Bringing awareness into the feet, noticing any and all sensations for 3-5 full breaths
2. Bringing awareness into the knees, noticing any and all sensations for 3-5 full breaths

3. Bringing awareness into the hips, noticing any and all sensations for 3-5 full breaths

4. Bringing awareness to the belly and lower back, noticing any and all sensations for 3-5 full breaths

5. Bringing awareness to the heart, noticing any and all sensations for 3-5 full breaths

6. Bringing awareness to the face, noticing any and all sensations for 3-5 full breaths

Ending the session with a full awareness stretching, feeling all the sensations of stretching...then resting into stillness for at least 3-5 full breaths...simply being with sensations, breathing, the unfolding of the present moment in the body (UW Health Integrative Medicine Mindfulness Program)

1 Medical Disclaimer: The content of this handout is provided for general informational purposes only and is not intended as, nor should it be considered a substitute for, professional medical advice. Do not use the information for diagnosing or treating any medical or health condition. Always work within your own range of limits and abilities. If you have or suspect you have a medical problem, promptly contact your professional healthcare provider before, during or after using these suggested practices. Limitation of Liability: You agree to hold harmless Mark A. Dannenfelser, the Mindfulness Center of Atlanta, Dannenfelser & Associates, PC and its affiliates and their officers, directors, employees and volunteers from all claims relating to this information.
B. 1:2 Breathing Exercise (The Long Exhale)

This 1:2 breathing practice, which involves gradually increasing your exhalation until it is twice the length of your inhalation, relaxes the nervous system. It can reduce insomnia, sleep disturbances, and anxiety. Try it before bedtime to help support sleep, in the middle of the night when you’re struggling with insomnia, or at any time of the day to calm stress or anxiety. (In general, it is best to avoid practicing 1:2 breathing first thing in the morning unless you’re experiencing anxiety. The relaxing effects of the practice tend to make it more difficult to get up and go on with your day.)

Once your inhalation and exhalation are equal, gradually increase the length of your exhalation by 1 to 2 seconds by gently contracting the abdomen. As long as the breath feels smooth and relaxed, continue to gradually increase the exhalation by 1 to 2 seconds once every few breaths. Make sure you experience no strain as the exhalation increases and keep going until your exhalation is up to twice the length of the inhalation, but not beyond. For example, if your inhalation is comfortably 4 seconds, do not increase the length of your exhalation to more than 8 seconds.

Keep in mind that even an exhalation that is only slightly longer than the inhalation can induce a calming effect, so take care that you don’t push yourself beyond your capacity. (If you do, you’ll likely activate the sympathetic nervous system, or stress response, and feel agitated rather than calm.)

If your breath feels uncomfortable or short, or if you’re gasping on the next inhalation, back off to a ratio that is more comfortable for 8 to 12 breaths. Then finish your practice with 6 to 8 natural, relaxed breaths. (By Kate Holcombe, founder and president of the nonprofit Healing Yoga Foundation in San Francisco. Adapted by Mark A. Dannenfelser, LPC)
III. INFORMAL MINDFULNESS

A. Start the Day with Mindfulness

When you open your eyes, gently pause and take 3-5 deliberate breaths. This is your chance to reconnect with your body. If you feel tired, anxious, unhappy or in any way distressed, see these feelings and thoughts as mental events condensing and dissolving in the space of awareness. If your body aches, recognize these sensations as sensations. See if you can accept all of your thoughts, feelings and sensations in a gentle way; with an openness to whatever is there in that particular moment, without judgement. Scan the body for a minute or two, or focus on the breath, or do some gentle stretches before getting out of bed.

B. Mindful Ordinary Activities

Whatever you are doing, see if you can remain mindful throughout as much of the event as possible. For example, when you are washing dishes, try to feel the water, the plates and the fluctuating sensations in your hands.

C. Gradually Increase your level of exercise

Walking, cycling, gardening, going to the gym—anything physical can be useful as a tool for being in touch with your body. See if you can bring a mindful and curious attitude to your body as you exercise.