Abstract

Introduction: Stress and burnout among health care providers can have serious repercussions. Mindfulness techniques, particularly when delivered by abbreviated training programs, have been studied for their success in managing symptoms and perceptions of stress and burnout among health care workers serving at the bedside, in clinic, as specialists, and in administration.

Materials and Methods: Our suburban community hospital system introduced an eight week, video-module based, single-breath mindfulness technique training program to a group of 23 physicians with a range of experience (0-38 years; 48% primary care). Repeated measures ANOVA were used to evaluate changes across the study period (baseline, end of study, and 8 weeks post-intervention). Multiple linear regression was used to assess the relationship between burnout/stress measures at baseline and provider sex, age, years in practice, and field of practice (primary care or specialty).

Results: 19 (83%) providers completed the program and 12 (52%) completed assessments at each time point. Significant improvements were observed across the study period in emotional exhaustion (p=0.01), personal accomplishment (p=0.007), and stress (p<0.001). The extent to which providers depersonalize their patients was not significantly impacted (p=0.14). No significant associations were observed between provider characteristics and burnout/stress metrics at baseline. However, at the α=0.10 level, primary care providers reported a significantly lower sense of personal accomplishment (-6.0 points, 95% CI: -12.2, 0.2 points; p=0.08) at baseline.

Conclusions: Symptoms of stress and burnout are equally likely to be observed in providers across discipline, age, sex, and experience. A flexible, easy to use, single-breath based mindfulness program can yield significant improvements for these professionals.

Keywords: Mindfulness; Burnout; Stress; Physician

Introduction

High levels of stress and physician burnout, a "syndrome of depersonalization, emotional exhaustion, and a sense of low personal accomplishment [1]," can lead to increased medical errors [2,3], suboptimal patient care [2,4], and an increase in medical lawsuits [5]. Numerous studies in the US and abroad have investigated this phenomenon as it relates to work-life balance [6,7], field of medical practice [8,9], and sense of "calling" to the profession [10,11]. Several studies have illuminated that, for some physicians, burnout begins as early as medical school or residency [12-16]. Practices of mindfulness, or focusing attention and awareness on only the present moment, have as they were originally conceived of by Kabat-Zinn in the early 1980s [22,23], were designed for patients battling chronic pain and other illnesses. These programs typically require a weekend retreat and weekly sessions lasting up to three hours over an 8-10 week period. Paradoxically, the demonstrated benefits of such programs are often difficult for physicians to achieve due to the intensive time commitment. In response, many researchers and health care systems, including our own, have implemented modified mindfulness programs designed to help health care providers develop the attention and awareness skills that are believed to be at the core of MBSRs success, but which ease the burden of time for these busy professionals [24-26]. Indeed, we describe elsewhere [27] a flexible, video-module based mindfulness program that was developed and deployed for providers in our community hospital system. Here we holistically re-evaluate our program using a repeated measures analysis and we explore the relationship between characteristics of providers in our sample and burnout/stress metrics at baseline.

Materials and Methods

Using a single-breath mindfulness technique taught during a live session and built upon using freely accessible video-modules, we sought to improve the well-being and decrease stress and burnout in a cohort of physicians serving a suburban hospital in the South Puget Sound region of Washington State. For full details of our program, see Pflugeisen et al. [27]. The Maslach Burnout Inventory [28] and Perceived Stress Scale [29] were used to measure physician burnout and stress, respectively, at three time points: baseline (T1; September 2014), immediately following the 8 week intervention (T2; November...
2014), and 8 weeks post-intervention (T3; January 2015). At each time point the tests were each administered in the early morning prior to the physicians starting their workday.

Here we use repeated measures ANOVA to evaluate the change in each of these four metrics across time (Table 1). To examine characteristics of providers experiencing burnout, we use multiple linear regression to evaluate the relationship between the burnout and stress metrics at baseline with select demographic variables, including practice field (primary care or specialty), provider sex (female/male), provider age, and years in practice. Significance was assessed at the 0.05 level and all analyses were conducted in the R statistical computing environment [30].

### Results

Twenty-three physicians enrolled in the pilot. Although 19 (82.6%) completed the program, only 12 (52.2%) completed all assessments at each time point. Mean emotional exhaustion, depersonalization, and stress decreased over the three time points, while providers’ sense of personal accomplishment increased over the 16 week period (Figure 1). While mean emotional exhaustion and stress continued to drop for study participants in the eight weeks post-intervention, depersonalization and sense of personal accomplishment remained constant between the end of the eight week intervention and follow up.

### Table 1: Repeated measures ANOVA for physician burnout and stress scales.

| Measure              | Estimate (T1-T3) | 95% CI          | F (2,22) | p   |
|----------------------|------------------|-----------------|----------|-----|
| Emotional exhaustion | 8.3              | (1.2, 15.5)     | 5.7      | 0.01|
| Depersonalization    | 2.7              | (-1.2, 6.5)     | 2.2      | 0.14|
| Personal accomplishment | -4.7   | (-9.2, 0.1)     | 6.2      | 0.007|
| Perceived stress     | 9.1              | (3.8, 14.4)     | 14.7     | <0.001|

Repeated measures ANOVA revealed a significant association between time and emotional exhaustion ($F_{2,22}=5.7$, $p=0.01$), with mean emotional exhaustion declining 8.3 points (95% CI 1.2-15.5 points; Figure 1a) over the sixteen week period. Similarly, perceived stress declined significantly ($F_{2,22}=14.7$, $p<0.001$) across the study period, dropping 9.1 points (95% CI 3.8-14.4 points; Figure 1d) between T1 and T3.
Physicians’ sense of personal accomplishment rose during the intervention (Figure 1c) but plateaued during the follow-up phase. Although personal accomplishment did not continue to rise, mean change over time was revealed to be significant for this metric ($F_{2,32}=6.2, p=0.007$). Depersonalization alone did not demonstrate a significant improvement ($F_{2,32}=2.2, p =0.14$) with a modest decrease of 2.7 points (95% CI -1.2 – 6.5 points; Figure 1b) across the study period.

Our study cohort was comprised of 11 (47.8%) primary care providers (Family or Internal Medicine), three (13%) Surgeons, two (8.7%) anesthesiologists, and seven (30.4%) physicians working in specialty practice, including Pediatric Neurology, Sleep Medicine, Clinical Informatics, Cardiology, Otolaryngology, Oncology, and Obstetrics/Gynecology. The cohort included nine (39.1%) women.

| Demographic variable | Summary information | Emotional exhaustion | Depersonalization | Personal accomplishment | Perceived stress |
|----------------------|---------------------|----------------------|-------------------|------------------------|-----------------|
|                      |                     | Estimate 95% CI       | p                  | Estimate 95% CI         | p               | Estimate 95% CI | p               |
| Primary care provider [N, %] | 11, 47.8% | -0.9 (-11.3, 9.5) | 0.86              | 1.1 (-4.4, 6.5) | 0.71          | -6.0 (-12.2, 0.2) | 0.08             |
| Female [N, %]        | 9, 39.1%           | 0.5 (-1.5, 2.5)     | 0.63              | -0.4 (-1.4, 0.6)      | 0.46          | -0.3 (-1.5, 0.9) | 0.62             |
| Age [mean (SD), range] | 48.3 (10.0), 32-68 | -0.3 (-2.4, 1.9)    | 0.80              | 0.5 (-0.7, 1.6)       | 0.43          | 0.5 (-0.8, 1.6)  | 0.45             |
| Years in practice [mean (SD), range] | 16.4 (10.5), 0-38 | -4.5 (-15.5, 6.5) | 0.43               | -3.7 (-9.4, 2.0)     | 0.22          | -0.4 (-7.0, 6.2) | 0.91             |

Table 2: Association of demographic variables with burnout metrics at baseline.

Discussion

Physician burnout is an important and widespread phenomenon with serious implications for patients and providers alike when unaddressed. Our video-module-based training program that focuses on a single-breath mindfulness technique was successfully implemented within a community hospital system for a diverse group of providers. Participants experienced a significant decrease in emotional exhaustion and stress during the study period as well as a significant increase in sense of personal accomplishment, and these improvements persisted eight weeks after the end of the program. The training did not significantly impact the extent to which providers depersonalized their patients.

Neither status as a primary care provider nor female sex was significantly associated with the burnout or stress levels at baseline. However, at the $\alpha = 0.1$ level, status as a primary care provider was associated with an average personal accomplishment score that was 6 points lower at baseline than that of specialists (95% CI -12.2, 0.2; $p=0.08$).

Mean age of the study cohort was 48.3 years, with participants ranging from 32-68 years of age. Average years in practice was 16.4, with as few as 0 years in practice for first-year residents who enrolled in the program and as many as 38 years. Neither of these covariates were significantly associated with burnout or stress indicators at baseline (Table 2).

Conflicts of Interest

Dike Drummond is CEO of TheHappyMD.com. TheHappyMD.com did not finance the work related to this manuscript, is not financing the publication of this manuscript, and is not expected to benefit financially from the publication of this manuscript. The work that Dr. Drummond performed related to this manuscript was done under contract with MultiCare Health System. Should this manuscript be published, it is anticipated that Dr. Drummond will include the citation on TheHappyMD website. The other authors have no financial or non-financial conflicts of interest to declare.

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