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A randomized controlled trial of mindfulness to reduce stress and burnout among intern medical practitioners

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ABSTRACT

Introduction: Stress and burnout are highly prevalent among medical doctors, and are associated with negative consequences for doctors, patients, and organizations. The purpose of the current study was to examine the effectiveness of a mindfulness training intervention in reducing stress and burnout among medical practitioners, by means of a Randomised Controlled Trial design.

Methods: Participants were 44 intern doctors completing an emergency department rotation in a major Australian hospital. Participants were randomly assigned to either an active control (one hour extra break per week) or the 10-week mindfulness training intervention. Measures of stress and burnout were taken pre-, mid- and post intervention.

Results: Participants undergoing the 10-week mindfulness training program reported greater improvements in stress and burnout relative to participants in the control condition. Significant reduction in stress and burnout was observed for participants in the mindfulness condition. No such reductions were observed for participants in the control condition.

Conclusions: Mindfulness interventions may provide medical practitioners with skills to effectively manage stress and burnout, thereby reducing their experience of these symptoms. It is likely that doctors would benefit from the inclusion of such a training program as a part of their general medical education.

Introduction

It is well documented that stress and burnout are highly prevalent among medical doctors (Willcock et al. 2004; Markwell & Wainer 2009). Doctors are subject to unique occupational stressors that place them at greater risk of experiencing stress and burnout when compared to the general population (Shanafelt et al. 2012). A number of negative consequences are associated with stress and burnout among doctors, not only for themselves but also their families, patients, and workplaces. Yet, despite the significant issue of stress and burnout and their serious consequences, very few interventions exist and even fewer have been systematically tested (McCray et al. 2008). The purpose of the current study was to examine a mindfulness based intervention aimed at reducing stress and burnout for intern doctors working in a large hospital emergency department.

Stress and burnout

Occupational stress is a well-documented problem in the helping professions, with doctors being considered to be at particular risk (Coomber et al. 2002). Occupational stress occurs when job-related factors interact with individual factors, resulting in a change in the individual's psychological and/or physiological state (Richardson & Rothstein 2008). Burnout may be conceptualized as a specific form of occupational stress (Schaufeli et al. 1993). It is the chronic depletion of energy as a result of the ongoing emotional demands associated with one's occupation (Schaufeli et al. 2009; Shanafelt et al. 2012). Although a number of

Practice points

- Occupational stress and burnout are highly prevalent among medical doctors, and may be highest among early career doctors and those working on the frontline of medical services.
- Participation in a 10-week mindfulness intervention was associated with greater improvements in stress and burnout than participation in an active control condition, as tested among intern (first year graduate) medical doctors whilst on an emergency department rotation.
- Mindfulness education programs may enable medical doctors to better manage occupational stress and burnout, which may lead to reduced medical errors, greater retention of doctors in the workforce, and lower medical costs.
- A mindfulness training program, such as the one tested in the current research, may be a valuable addition to medical training programs.

definitions of burnout exist, the most widely used conceptualization is Maslach's three-component model of emotional exhaustion, depersonalization, and reduced feelings of personal accomplishment (Maslach et al. 1986).

Willcock et al. (2004) found burnout to be as high as 75% among intern doctors. In a national study of doctors in the United States of America, 45.8% of doctors reported at least one symptom of burnout, with rates highest among

those practitioners at the front line of patient care, such as in family medicine, general internal medicine and emergency medicine (Shanafelt et al. 2012). A number of factors are believed to contribute to the high risk of burnout among doctors, including occupational culture, the number of hours spent at work each week, high workload, the challenges of balancing work and home life, physical and verbal abuse from patients and families, and low help-seeking behaviors (McCray et al. 2008; Markwell & Wainer 2009; Elliot et al. 2010). The exact causes of burnout are evidently complex and likely to be a combination of both organizational and personal characteristics (Willcock et al. 2004).

Doctor burnout has been associated with increased likelihood of self-perceived medical error (West et al. 2006; Fahrenkopf et al. 2008), suboptimal patient care (Shanafelt et al. 2002), and lower career satisfaction (Shanafelt et al. 2002; Cooke et al. 2013). At the organizational level, burnout has been associated with a string of detrimental issues including higher rates of absenteeism, increased risk of being sued for malpractice, greater staff turnover, attrition, reduced productivity, greater early retirement, and greater probability of ordering unnecessary tests and procedures (Jones et al. 1988; Wallace et al. 2009; Montgomery et al. 2011). Interventions to reduce burnout among doctors are therefore of importance at a personal level, organizational level, and most importantly, at a patient-care level.

Behavioural interventions for medical practitioners

There are few interventions targeting stress and burnout among doctors, and limited research evaluating the efficacy of those interventions that do exist. A review by McCray and colleagues (McCray et al. 2008) examined the evidence for interventions targeting burnout among resident doctors and medical students as these two populations were considered at greater risk. Only nine published studies satisfied inclusion criteria, of which only two studies examined the efficacy of the interventions by randomized controlled trial. The interventions reviewed included educational interventions, support and discussion group interventions, and one mindfulness based intervention. Rosenzweig et al. (2003) found that a 10-week mindfulness intervention reduced a number of stress related symptoms among second-year medical students. However, this investigation was a non-randomized trial and as such, participant selection bias may have compromised the internal validity of the study.

A more recent study by Krasner et al. (2009) found that an eight-week mindfulness and educational program resulted in improved mindfulness, burnout, empathy, belief of the importance of psychosocial aspects of patient care, and mood disturbance, with gains maintained at a 10-month follow-up. However, the study merely uncovered a pre-post intervention effect without a comparison or control condition, thereby the results are confounded with major threats to internal validity.

Mindfulness

As a strategy aimed at increasing concentration, awareness, and emotion regulation, mindfulness may hold considerable promise for reducing stress and burnout among doctors. Mindfulness is flexibly implemented, portable,

self-directed and noninvasive; all of which are properties likely to be considered attractive for busy practitioners. The efficacy of mindfulness in reducing negative affect in clinical populations has been well demonstrated (Hofmann et al. 2010). Importantly, mindfulness has also demonstrated efficacy in reducing stress among otherwise healthy populations (Chiesa & Serretti 2009). As such, mindfulness training may be an effective intervention to improve occupational stress and burnout among doctors. However, more rigorous study designs and methodologies are required to test this hypothesis.

The current study

The aim of the current study was to examine the efficacy of a mindfulness-based intervention to reduce stress and burnout among intern doctors working in a large hospital emergency department. This population was selected as burnout rates are high among intern doctors (Willcock et al. 2004), with emergency medicine identified as a high-risk practice area (Shanafelt et al. 2012). It was predicted that, when compared to the control condition, interns participating in the mindfulness intervention would report greater reductions in burnout and stress from pre-to-post intervention time points.

Methods

Participants and recruitment

Participants were 44 (64% female) intern doctors completing their practicum rotation in the emergency department of a major metropolitan hospital. Participants were aged between 22 and 48 years ($M = 26.88$, $SD = 4.79$). Participants were invited via email to take part in resiliency and mindfulness program by the medical education unit at the hospital. All registered interns expressed an interest to participate (100% response rate).

Measures

Demographic and control measures

In the first testing session, all participants completed a demographic form assessing their age, date, and the starting date of their current job. To control for prior experience with, appeal for, and expectations of mindfulness, participants completed three control questions before they were assigned to conditions. Participants answered "How much previous experience have you had with mindfulness, meditation, or yoga exercises?" on a 5-point response scale (from 1 = "None at all/Never" to 5 = "A Great Deal/Regular Practice"), "How much do the mindfulness exercises appeal to you?" on a 5-point response scale (from 1 = "None at all Appealing" to 5 = "Exceptionally Appealing"), and "How helpful do you expect mindfulness exercises to be in managing stress?" on a 5-point response scale (from 1 = "None at all Helpful" to 5 = "Exceptionally Helpful").

Burnout

Psychological burnout was measured using the Copenhagen Burnout Inventory (CBI; Kristensen et al. 2005). The CBI is a 19-item questionnaire assessing burnout along

three dimensions: personal (i.e. "How often do you feel worn out?"), work-related (e.g. "Do you feel worn out at the end of the working day?"), and client-related Burnout (e.g. "Does it drain your energy to work with clients?"). Only the personal burnout and work-related burnout were used in the current study. Depending on the wording of the item, two different 5-point response scales were used (from 1 = "To a Very High Degree" to 5 = "To a Very High Degree" or 1 = "Always" to 5 = "Never"). Item responses were averaged with higher scores indicating greater burnout. Kristensen et al. (2005) report good reliability estimates ($\alpha=0.85-0.87$) and evidence of convergent and criterion validity.

Perceived stress

Perceived stress was measured using the Perceived Stress Scale (PSS; Cohen et al. 1983). The PSS is a 10-item (e.g. "In the past month how often have you been upset because of something that happened unexpectedly?") questionnaire measuring the frequency of stress-related feelings and thoughts during the past month on a 5-point response scale (from 1 = "Never" to 5 = "Very Often"). Item scores are averaged to produce a total score with higher values representing greater perceived stress. Cohen et al. (1983) reported good reliability ($\alpha=0.84-0.86$ for three samples) and evidence for predictive validity for health status and health behavior.

Procedure

Following the provision of signed consent and the completion of the first testing session, participants were randomly assigned to the intervention ($n=23$) or control group ($n=21$). For the duration of the program (i.e. 10 weeks), participants in the control group were given an extra hour break time in the middle of the day each week (therefore it was an active control condition), while those in the intervention program were given weekly one-hour training workshops within which the intervention was delivered. Participants in both conditions completed the measures at the beginning of the intervention, mid-way through (week five) and in the final session (week 10). Ethics approval was obtained through the host institution.

Intervention

The intervention was a mix mindfulness education and practice. Material was adapted from well-validated psychological treatment programs (Mindfulness-Based Stress Reduction, Mindfulness-Based Cognitive Therapy, and Acceptance and Commitment Therapy). Adaptations to this material were necessary so that it was applicable for a non-clinical population. The 10 sessions focused on the following themes: (1) Introducing mindfulness, (2) Everyday awareness and automatic pilot, (3) Barriers to being mindful, (4) Mindfulness of breathing theory and activities, (5) Staying present at work and daily like, (6) Letting go of sensations and emotions, (7) The nature of thoughts, (8) Self-care, (9) Applying what has been taught, and (10) Review. Each session covered theoretical content contained in the intervention programs cited above and when time

permitted included common mindfulness exercises (mindfulness of breathing, mindfulness of the body, mindfulness of eating, etc.). Participants were encouraged to practice regularly outside of the sessions as well though anecdotal feedback suggested this did not routinely occur.

Results

Preliminary analyses showed internal consistency at each time point was good for stress ($\alpha=0.886-0.889$) and burnout ($\alpha=0.859-0.876$). There were no outliers within each condition for either DV ($\pm z=3.29, p<0.001$) nor issues with normality at any time point (skew and kurtosis within ± 1.00). Conditions were equivalent pretest in prior with regards to experience with meditation/mindfulness ($F=0.08, p=0.776, \eta^2<0.01$), the appeal of meditation/mindfulness ($F=0.73, p=0.401, \eta^2=0.02$), and expectations of the potential helpfulness of meditation/mindfulness ($F<0.01, p=0.963, \eta^2<0.01$). Descriptive statistics for the two focal DVs for each condition across the time points are presented in Table 1.

Parameter estimates for main and interactive effects on stress and burnout were calculated using multilevel analysis with condition as a fixed factor and time as a random factor. The time \times condition interaction provides a test of the effectiveness of the treatment. The estimates for the effects of condition, time, and their interaction on stress and burnout are presented in Table 2.

Collapsing across the three time points, there was no difference between the conditions for either outcome (no main effect of condition). Both conditions experienced significant variance in stress over time (a significant main effect of time on stress), while the effect on burnout was not significant (no main effect). For both stress and burnout, the interaction term was significant indicating that

Table 1. Mean estimates (and SD) for each condition across the three time points.

	T1		T2		T3	
	M	SD	M	SD	M	SD
Stress						
Control	2.55	0.62	2.69	0.63	2.61	0.62
Intervention	2.78	0.55	2.61	0.45	2.42	0.43
Burnout						
Control	2.65	0.75	2.87	0.76	2.81	0.87
Intervention	2.55	0.52	2.54	0.44	2.35	0.49

Table 2. Parameter estimates for the effect of the IVs and interaction on stress.

	Estimate	SE	t	p	95% CI	
					Lower	Upper
Stress						
Intercept	2.91	0.14	20.48	<0.000	2.63	3.20
Condition [=0]	-0.35	0.21	-1.64	0.106	-0.78	0.08
Time	-0.17	0.04	-3.95	<0.000	-0.26	-0.08
Condition \times Time	0.20	0.07	3.03	0.003	0.07	0.33
Burnout						
Intercept	2.61	0.17	15.60	<0.000	2.28	2.94
Condition [=0]	0.00	0.25	0.01	0.991	-0.50	0.50
Time	-0.09	0.05	-1.80	0.077	-0.19	0.01
Condition \times Time	0.17	0.08	2.26	0.027	0.02	0.32

The Condition [=1] fixed effect and Condition=1 \times Time interaction are suppressed as they provide only redundant information.

change over time in stress and burnout was contingent on the condition ($\eta^2 = 0.16$ large effect for stress and $\eta^2 = 0.09$ medium to large effect for burnout).

The mean estimates over time for each conditions (from Table 1) indicate that participants in the control condition perceived increasing stress and burnout over time, whereas participants in the intervention condition perceived decreasing stress and burnout over time. Simple effects analysis showed apparent changes over time for the control condition in stress ($F=1.25$, $p=0.302$, $\eta^2=0.08$) or burnout ($F=1.58$, $p=0.222$, $\eta^2=0.10$) were not significant. Conversely, changes over time for the intervention condition were significant for stress ($F=5.88$, $p=0.007$, $\eta^2=0.28$) and marginally significant for burnout ($F=2.88$, $p=0.072$, $\eta^2=0.16$). The magnitude of the simple effects for the intervention condition are large while those for the control condition are medium to large, therefore any non-significant simple effects may be a product of weak statistical power. The simple effects are displayed in Figure 1 for stress and Figure 2 for burnout.

Discussion

The aim of this study was to test whether a mindfulness-based intervention could reduce stress and burnout among intern doctors relative to an active control condition. The control condition constituted extra break time, which was equivalent to the mindfulness training time. Compared to the control participants, it was predicted that interns participating in the mindfulness intervention would report greater reductions in burnout and stress from pre-to-post intervention time points. A randomized control trial methodology (with 44 intern doctors) was utilized to test this hypothesis.

The results confirmed that participants undergoing the 10-week mindfulness training program reported greater improvements in stress and burnout relative to participants in the control condition. Over the 10-weeks, intervention participants reported large and significant reductions in stress and large though only marginally-significant reductions in burnout (though the improvement relative to the control condition was significant). For both outcomes, the data showed a trend for the control participants to report

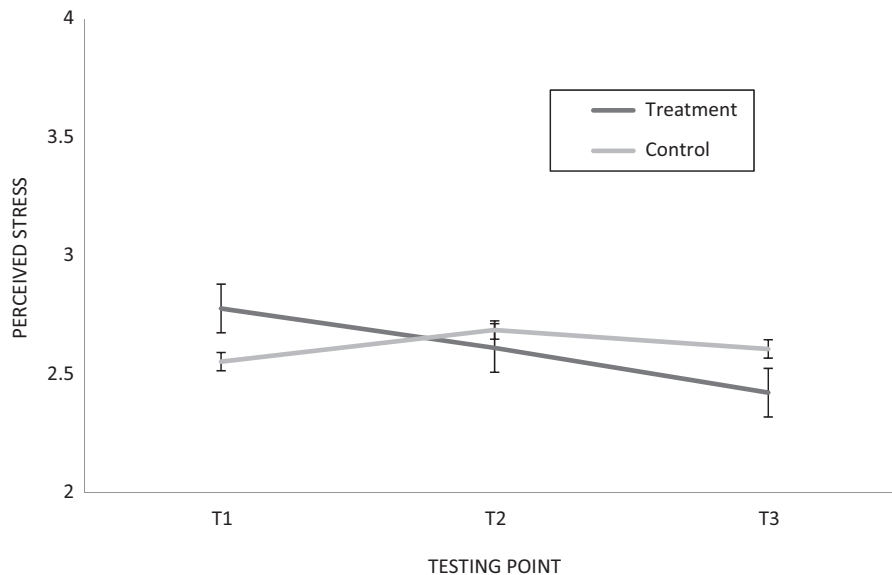


Figure 1. Mean estimates over time in perceived stress for each condition. Error bars represent ± 1 standard error of the mean (SEM).

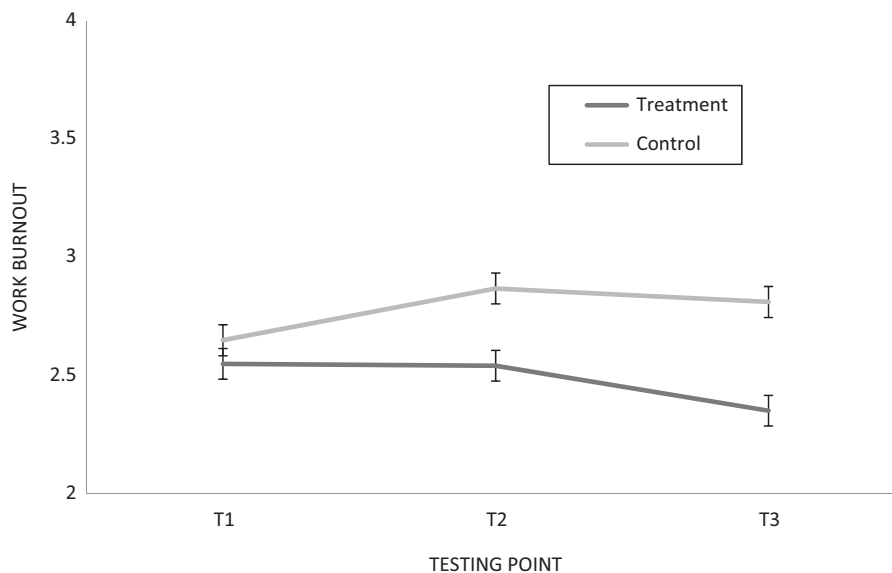


Figure 2. Mean estimates over time in burnout for each condition. Error bars represent \pm SEM.

increased stress and burnout over the 10-week period. Though non-significant, the trends observed for the doctors in the control condition are consistent with expectations for a 10-week emergency department placement. It appears that the initial five weeks produce the greatest effect, which tapers off in the second five weeks. Our intervention inoculated interns against this trend.

These findings are consistent with, and provide much needed corroboration for the recent study by Krasner et al. (2009), which showed that eight-week mindfulness and educational training improved mindfulness, burnout, empathy, belief of the importance of psychosocial aspects of patient care, and mood disturbance. However, as the study did not contain a control or comparison condition, results may have been confounded and thus are difficult to interpret.

Overall, the current results suggest that improvements in mental health (specifically stress and burnout) can be achieved for primary care doctors and that mindfulness training is one method capable of achieving this. This is noteworthy in light of the apparent wide-ranging benefits of mindfulness in healthy and mentally ill populations (e.g. Hofmann et al. 2010). The utility of mindfulness is likely to be an asset for this population (busy medical practitioners) given it is easily and flexibly implemented, very portable (can be practiced any time and in any place), can be self-directed, and is noninvasive. These benefits may also make mindfulness a particularly attractive treatment option for high functioning, non-disordered populations.

The sample size was a weakness of the current study and possibly precluded several simple effects from reaching conventional levels of significance. Future work is required to replicate these effects with larger samples. Also, we could not minimize any transfer of information on mindfulness between conditions and thus, there is a possibility that the control participants benefited indirectly from the mindfulness program. The result of this would be a reduction in the observed effect size for the relative improvement in stress and burnout. If this occurred, the current positive effects may be underestimated.

Mindfulness interventions may be an efficacious strategy for increasing resiliency among doctors. For example, such interventions could be implemented in training programs (i.e. during university courses or intern training) as a means of building resiliency. Fostering resiliency among medical practitioners may inoculate against some of the negative outcomes associated with burnout, such as higher absenteeism, increased risk of being sued for malpractice, greater staff turnover, attrition, reduced productivity, greater early retirement, and greater probability of ordering unnecessary tests and procedures (Jones et al. 1988; Wallace et al. 2009; Montgomery et al. 2011).

Conclusions

In sum, the current study found mindfulness training to be an effective means of reducing stress and burnout among primary care medical practitioners working within an emergency department. These effects were greater than merely offering them an extra hour break for 10 weeks. Implementing mindfulness training and interventions for doctors and doctors in training may have considerable benefits not only for the practitioners, but also their patients and workplaces.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

Glossary

Burnout: may be conceptualized as a specific form of occupational stress. It is the chronic depletion of energy as a result of the ongoing emotional demands associated with one's occupation. Although a number of definitions of burnout exist, the most widely used conceptualization is Maslach's three component model of emotional exhaustion, depersonalization, and reduced feelings of personal accomplishment (1–5).

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