5-year follow-up of a randomised controlled trial of the effects of mindfulness practice on medical practitioners’ stress

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Abstract

Background

Stress and psychological distress are common in doctors and have adverse effects for both doctors and patients.

Objective

This study aimed to investigate the long-term (5-year) effects of mindfulness practice on medical practitioners’ stress.

Methods

A 5-year follow-up study using quantitative and qualitative data analysis. Outcome measures of the original trial, Perceived Stress Scale (PSS) and Depression, Anxiety, Stress Scale (DASS), were repeated and a questionnaire/interview on doctors’ health and well-being was undertaken.

Results

Most participants (88%) continue to use mindfulness or relaxation exercises. Mean outcome scores (and standard deviations) at 5 year follow up revealed; PSS 13.8 (5.2) (maximal score of 40), anxiety subscale of DASS 4.4 (4.9) (maximal score of 42 and stress subscale of DASS 10.9 (7.3) (maximal score of 42). The 5 year follow up group mean PSS and DASS outcomes scores were all lower than post intervention scores from the original RCT, however differences were not statistically significant. Participants expressed concerns with the overall state of doctors’ health/wellbeing.
Conclusion

Mindfulness for stress management is sustainable and may be beneficial for long term use in doctors.

Keywords: Stress management, anxiety

Introduction

Stress and psychological distress are common in doctors (Beyond Blue, 2013; Willcock, Daly, Tennant, & Allard, 2004). Whilst there has been research into how to improve doctors’ mental health, in the past little attention has been paid to building doctors’ wellbeing and highlighting self-care practices as a preventive option for psychological distress. This may be changing (Eckleberry-Hunt, Van Dyke, Lick, & Tucciaron, 2009). A recent Cochrane review evaluating interventions to prevent stress in healthcare workers found cognitive behavioural training and relaxation can reduce stress but that further high quality research is required (Ruotsalainen, Verbeek, Marine, & Serra, 2015).

Our study provides 5-year follow-up of a multicentre, single-blinded, randomised controlled trial (RCT) conducted in 2009 investigating the impact of an intervention of mindfulness practice on medical student stress and psychological distress – Mindfulness in Medical Student Stress (MiMSS) (5). MiMSS found the practice of mindfulness reduced the level of stress and anxiety in senior medical students (Warnecke, Quinn, Ogden, Towle, & Nelson, 2011). The MiMSS intervention was an audio compact disc (CD) of thirty minutes of guided mindfulness practice produced specifically for MiMSS. The intervention is self-directed and flexible in terms of timing and location of use. Mindfulness is defined as ‘the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding experience moment to moment’ (Kabat-Zinn, 2003).

Working in a caring profession brings both rewards and challenges. Evidence-based interventions are required to deal with the challenges and ensure the rewards of working in healthcare outweigh the costs to both doctors and their patients. The primary aim of this study was to reassess quantitative outcomes from MiMSS at 5 year follow up to investigate the long-term effectiveness of the practice of mindfulness on medical practitioners’ stress. The secondary aim was to investigate participants' experiences of mindfulness and their views on wellbeing in doctors.

Methods

Participants

All sixty-five MiMSS participants were eligible to participate in this study as the control group received the intervention at the end of the trial period. Participants were found through several methods according to the ethics approved study protocol, including use of the publicly available register of the Australian Health Practitioner Regulation Agency (AHPRA) and the University of Tasmania alumni office. All participants who could be located were sent an email and/or letter inviting them to participate in the study. Reminder emails/letters were also sent to non-responders.

Study Design

A mixed methods study design was used to investigate the long term (5-year) effects on MiMSS participants and to provide more in-depth understanding of doctors’ health and wellbeing.
Data collection and measures

Participants completed a questionnaire of demographic details, any ongoing use of the MiMSS mindfulness intervention or other forms of stress management and repeated the self-report outcome measures used in MiMSS; both the Perceived Stress Scale (PSS) and the Depression, Anxiety and Stress Scale (DASS). The outcome tools used were the 10-item version of the PSS and the 42-item version of the DASS, comprising three scales to assess the severity of depression, anxiety and stress (Brown, Chorpita, Korotitsch, & Barlow, 1997; Cohen, Kamarck, & Mermelstein, 1983; Lovibond & Lovibond, 1995). Both the PSS and DASS are validated and widely used instruments for measuring psychological distress. The PSS has a maximum score of 40 indicating high perceived stress. Each scale of the DASS has a maximum score of 42, indicating severe depression, anxiety or stress. Open-ended questions sought participants’ opinion on the current state of doctors’ psychological health and wellbeing as well as suggestions to improve it. All participants were invited to undertake an individual, semi-structured interview with a researcher who was not a member of the MiMSS research team (MB), exploring doctors’ health and wellbeing in more depth.

Data analysis

Age, gender, PSS and DASS scores were tabulated. Statistical data analysis was by \( t \)-tests and chi-square tests to compare differences in means and proportions of the 5-year follow-up group (n=16) with the group lost to follow-up from the original RCT baseline (n=49) for representativeness. Paired \( t \)-tests were used for comparisons of the means of the 5-year follow-up group at baseline and 5-years. A \( p \)-value of \(<0.05 \) (two-tailed) was considered statistically significant. The number of participants recruited meant there was insufficient numbers for multivariable analysis directly comparing outcomes to the original data. It was expected multivariable analysis was unlikely to provide meaningful data after five years, however the trend in psychological distress was thought to be worth analysing. As the control group received the intervention at the end of MiMSS it was not possible to look for difference between the intervention and control groups. The questionnaires provided data on the proportion of participants still using the intervention or other forms of mindfulness. Content analysis of questionnaire and interview data was undertaken. NVivo 10 (QSR International software) was used for qualitative analysis. Three researchers (EW, KO, MB) independently analysed transcripts of audio-recorded interviews to identify recurrent and emergent themes. The three researchers then agreed on a set of key themes.

Ethics Approval

This study was approved by the University of Tasmania Social Sciences Human Research Ethics Committee (Ref. no. H0014674).

Results

Participants

Fifty participants of MiMSS could be contacted and invited to participate in this 5 year follow up study. Fifteen participants were not able to be contacted and therefore could not be included. These 15 participants did not have current medical registration in Australia and did not maintain any link with their University of graduation. From the baseline of fifty who could be contacted, sixteen participants completed the questionnaire (response rate=32%). Participants were spread across all states of Australia. General Practice was the most represented specialty of participants with eleven (69%) participants working in General Practice, compared with five (31%) working in the
hospital setting, including physician, paediatric and psychiatry training programs. Fourteen (88%) were still in medical training programs. Two (12.5%) participants had completed their General Practice (FRACGP) Fellowship training. Seven (44%) participants consented to undertake an interview.

**Primary and secondary outcomes**

Fourteen (88%) participants have continued to use some form of mindfulness, meditation or relaxation exercise, ten (63%) of whom specifically use mindfulness practices: the mindfulness intervention from MiMSS (n=4), smart phone applications (n=4); or self-directed mindfulness breathing practice (n=2). Yoga (n=2) and exercise (n=3) were reported as other forms of stress management. Participants used these interventions daily (n=4), three times a week (n=3), at least once a week (n=3), once to twice a month (n=1), six monthly (n=1) and as required (n=2). Participants reported using the mindfulness intervention to relax, assist with sleep and to ‘help keep perspective and objectivity in clinical practice’.

Table 1 presents the characteristics of the participants in the follow-up study and compares them to the original study. There was no statistically significant difference in age, gender or outcome scores between the participants of this 5 year follow up study (n=16) and those lost to follow-up (n=49). The 5 year follow up group could therefore be considered a representative sample of the MiMSS study. Mean outcome scores (and standard deviations) at 5 year follow up revealed; PSS 13.8 (5.2) (maximal score of 40), anxiety subscale of DASS 4.4 (4.9) (maximal score of 42) and stress subscale of DASS 10.9 (7.3) (maximal score of 42). The 5 year follow up group mean outcomes scores were all lower than post intervention scores from the original RCT, however differences were not statistically significant.

When asked via the questionnaire their opinion on the current state of psychological health and wellbeing of doctors, fourteen participants (88%) identified concerns. Stress, poor health and overwork were the most commonly reported concerns. The most common suggestion for interventions or other ways to improve the overall health and wellbeing of doctors was stress management, including mindfulness sessions, debriefing and access to counselling (n=7, 44%). Other suggestions were regular time off work, building relationships, stopping the culture of bullying and exercise.

Four key themes from the open-ended questionnaires and interview data were: 1) challenges to doctor wellbeing; 2) personal mechanisms for minimising work-related stress; 3) strategies for improving personal wellbeing and; 4) workplace strategies for improving doctor wellbeing. Table 2 details the key themes, sub-themes and illustrative quotes that emerged from the qualitative data on doctors’ wellbeing. Strong emotions associated with clinical cases coupled with a culture of doctors’ neglecting their own emotions, stress and variable levels of support were highlighted. Participants did recognise the occupational demands and high levels of stress. Personal mechanisms to minimise this stress included learning to deal with strong emotions, developing confidence and trying to ensure a separation between work and home life. Strategies for improving personal wellbeing included mindfulness, social supports, and a focus on diet, exercise and adequate sleep. Participants felt more could be done in the workplace to support wellbeing in doctors, including some flexibility in working hours and promoting a culture that provides adequate support and expression of emotions and concerns. Improvement in this area in recent years was discussed and was thought to be due to more media interest in doctors’ health and wellbeing.

**Discussion**

The study findings show most participants continued to use some form of mindfulness or relaxation practice and consider mindfulness to be a useful strategy for wellbeing. The main limitation of this study is the low response rate,
however given the 5-year follow up and lack of published long term RCT follow up studies the findings are relevant. There were no statistically significant differences in gender, PSS and DASS scores between the sixteen participants in the follow-up study compared to the forty-nine participants who did not participate in the follow-up study. This suggests that the follow-up participants were unlikely to differ substantially from those who were not followed-up from the original RCT cohort. Although no statistically significant differences in outcome scores were found between both the baseline and post intervention of MiMSS and 5-year follow-up outcome scores, the general trend of a decrease in scores, maintained at 5-year follow-up when compared with baseline and post intervention time points of MiMSS, has been shown in all outcome scores. Transition to working as a doctor is a known time of psychological distress (Markwell & Wainer, 2009; Parr, Pinto, Hanson, Meehan, & Moore, 2016; Willcock et al., 2004). The results not significantly changing may therefore represent a clinical significant difference given the known increase in psychological distress that occurs in senior medical students and junior residency years. The largest decrease in mean outcome scores from baseline of MiMSS to 5 year follow up was observed in the anxiety subscale of the DASS score (7.0 to 4.4 out of 42). This is consistent with the qualitative data analysis that found confidence and clinical experience led to a decrease in work related anxiety and stress.

The results of this study are consistent with the findings of other studies and provide long-term follow-up data. Regehr (2014) recently conducted a review and meta-analysis examining the effectiveness of interventions to reduce stress in doctors and medical students, which found evidence for the effectiveness of cognitive, behavioural and mindfulness- based approaches. Regehr (2014) also reviewed the sources of stress in medical practice and the association of stress to risks to doctors and patients. Organisational stressors were associated with long work hours, high caseload demands and time pressures. Personal sources of stress included high performance expectations, poor sleep habits and challenges in dealing with patients, their families and other colleagues. This is consistent with other existing literature focussing on emotional and organisational level stressors (Firth‐Cozens & Morrison, 1989; Lee, Stewart, & Brown, 2008; Tucker et al., 2010; Tyssen, Vaglum, Gronvold, & Ekeberg, 2000) and an acknowledgement of personal wellbeing strategies and formal debriefing as important for dealing with work related stress and burnout (Gunasingam, Burns, Edwards, Dinh, & Walton, 2015; Lee et al., 2008; Markwell & Wainer, 2009). Strategies, including those identified by the participants of the 5 year follow up of MiMSS require further investigation (Parr et al., 2016; Williams, Tricomi, Gupta, & Janise, 2015). This 5-year follow-up study has highlighted that an early introduction of a mindfulness intervention in medical school appears to be able to ‘prime’ doctors to consider their wellbeing and be more open to strategies and interventions to improve wellbeing.

Limitations and strengths

This study adds significantly to the literature, as there are very limited studies examining the long-term follow-up of mindfulness in doctors and medical students. MiMSS provided robust data on the effectiveness of the mindfulness intervention, as evidenced by being the only study to score full marks on the validity scale in a systematic review of stress management programs for medical students (Shiralkar, Harris, Eddins-Folensbee, & Coverdale, 2013). A recent ten-year systematic review found no known studies that follow senior medical students into the transition to junior doctors and specialty training (Alexander, Millar, Szmidt, Hanlon, & Cleland, 2014).

The main limitation of this study was the low (32%) response rate, thereby increasing the likelihood of introducing bias into the results. Poor response rates are a common issue in questionnaires and particularly those undertaken in junior doctors (Dobkin & Hutchinson, 2013). Study participants were a self-selected group and not a random sample of MiMSS. However, study participants were a representative sample of MiMSS as no statistically significant differences were found between those in this study and those lost to follow-up from MiMSS. It may be argued that those who consented were more likely to have continued use of a mindfulness intervention and therefore more interested in the study. However, a 2014 literature review examined the use of mindfulness clinically and found that
most trial participants continue to use mindfulness up to three years after the formal intervention has finished (14). Study participants were spread across most of Australia, however, it is not known how generalizable these findings are to other countries. The strength of this study is the long-term follow-up, which finds participants well into or having completed their specialty training.

**Conclusion**

The results from this study show the MiMSS mindfulness intervention for stress management is sustainable and may be beneficial for use in the long term. Stress is a known part of medical practice due to the workload and patient demands. Therefore, interventions that manage this stress and provide effective ways to cope and build resilience are vital for doctors. Meaningful conclusions on the long-term outcomes are limited by response rate and a lack of statistical significance. The clinical significance of the outcome scores remaining low should be further investigated given the known increase in psychological distress experienced in the junior residency years. A simple, self-administered, evidence-based mindfulness intervention with long-term sustainability follow-up data exists to enable medical students and doctors to manage stress. Further research investigating interventions to improve doctors’ ability to cope with stress and factors associated with wellbeing are required.

**Table 1**

| Time Point                  | Data at Baseline of original RCT T1 of MiMSS study (n=65) | Data at RCT Post 8 week intervention T2 of MiMSS study | Data at 5-year follow-up (n=16) |
|-----------------------------|-----------------------------------------------------------|--------------------------------------------------------|--------------------------------|
| Participant group           | 5-year follow-up participants (n=16)                      | Lost to follow-up at 5 years (n=49)                    | 5-year follow-up participants(n=16) |
| Mean age, years (SD)        | 25.3 (5.4)                                                | 23.5 (2.0)                                             | 25.3 (5.4)                      |
| Female sex, % (n)           | 62.5 (10)                                                 | 65.3 (32)                                              | 62.5 (10)                       |
| Mean PSS score (SD)         | 15.1 (6.7)                                                | 15.9 (5.4)                                             | 14.0 (4.7)                      |
| Mean DASS depression subscale score (SD) | 4.6 (5.8)                  | 6.7 (6.4)                                             | 3.9 (3.1)                       |

Table 1 - Comparison of characteristics of participants by follow-up status from original study to 5-year follow-up.
Mean DASS anxiety subscale score (SD) | 7.0 (6.8) | 7.2 (6.7) | 6.1 (5.7) | 4.4 (4.9)
Mean DASS stress subscale score (SD) | 13.1 (9.7) | 13.3 (7.0) | 11.4 (7.3) | 10.9 (7.3)

No difference between any of the outcome scores over time or between groups was statistically significant.

The only significant difference between the two groups at baseline was the expected increase in age of participants.

Table 2

| Theme | Sub-themes and illustrative quotes |
|-------|-----------------------------------|
| Challenges to doctor wellbeing | **Multiple stressors:**
| | Overall, quite poor [referring to doctors’ health] … especially for doctors in training. I think there’s lots of depression and anxiety but it’s not discussed very much among junior doctors. A lot of contributing factors – competition to get into training, hours, costs of training, exams, access to leave for personal reasons. (Questionnaire 12) |
| | **Difficulties related to the nature of the work:**
| | Our job is a stressful one and doctors are exposed to trauma on a regular basis. Without consciously learning how to offload some of those stressors, it can result in chronic stress, anxiety and poor mental health. (Questionnaire 2) |
| | **Attention to work hours:**
| | The majority are over-worked, sleep-deprived and don’t have a balanced work-life lifestyle. I know many colleagues who are burnt out and have subsequently quit medicine altogether or changed specialty training to GP[General Practice] as it is more balanced. (Questionnaire 5) |
| | **Bullying in the workplace:**
| | Old school belief that doctors don’t have emotions, they don’t break down, they’re supposed to be tough. That is still rampant and obviously the workplace bullying …unfortunately that’s still commonplace. If somehow we could work around that I think a lot of the stressors and pressures would be taken off doctors. (Interview 7) |
| | **Lack of clinical support:**
| | As an intern you’re just sort of chucked in the deep end. (Interview 4) |
| | **Difficulty maintaining healthy behaviours:**
| | I’ve had to decide the hospital’s not for me because it is hard to get outdoors easily when you’re a shift worker. (Interview 3) |
## Personal mechanisms for minimising work-related stress

| Strategies to manage the emotionally charged consultation: |
|----------------------------------------------------------|
| I just find it very useful to talk to doctors in the same situation as me, just to feel...like you’re not the only one struggling. Often just hearing that other people have had the same experience so you feel like it’s not any fault of your own. (Interview 6) |

| Ensuring own capability: |
|--------------------------|
| Your wellbeing improves as you gain confidence in your abilities to do what you do in your work, so in turn, I guess the things that used to keep me up at night and stress me out, wouldn’t do so anymore. (Interview 5) |

| Leaving work at work: |
|-----------------------|
| I’d like to say that I try and keep it at work and when I go home I don’t bring it home, but you do sometimes. (Interview 2) |

## Strategies for improving personal wellbeing

| Mindfulness: |
|--------------|
| I recommend it to a lot of my patients and I use it quite regularly myself and have done over the last two years. … [As a medical student prior to the study] I didn’t really know anything about it [mindfulness] back then, so it was really good in that it let me know it was there and it was something that could be useful. (Interview 4) |

| Social networks: |
|------------------|
| Making sure I stay connected with friends is also very important and talking to people if I am struggling, so family, friends or close people that you feel confident to discuss things with. (Interview 2) |

## Workplace strategies for improving doctor wellbeing

| Expression of concerns: |
|-------------------------|
| …So there was actually an avenue that if you felt unsupported …there was a pathway to tell someone and for changes to be made. (Interview 1) |

| Formal debriefing: |
|-------------------|
| Maybe if there was a once a month meeting where they got together and actually focussed on doing a bit of mindfulness or a bit of a de-brief or something like that would probably be very useful. (Interview 4) |

| Valuing employees: |
|--------------------|
| I think lately the hospitals are getting a bit more supportive. I think the hospitals are acknowledging it a bit more now and some of them have doctors’ wellbeing groups or activities. (Interview 6) |

| Peer support mechanisms: |
|-------------------------|
| I’ve learnt the importance of… being able to debrief with a colleague. (Interview 1) |

| Flexibility in work hours: |
|---------------------------|
| I think none of us expect to get every weekend off … But … getting a day off to go to a course or … a few hours off to go to an appointment shouldn’t really be very hard … if you had a bit of flexibility … that would make a big difference to how doctors managed their stress. (Interview 6) |

## Take Home Messages

Training and working in all medical specialties should involve learning strategies to manage the stressors and demands of medical practice. Mindfulness is an evidence based, self-directed and flexible intervention that could be utilised and researched more widely as a stress management technique for medical practitioners and medical students.
Notes On Contributors

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Appendices

Declarations

The author has declared that there are no conflicts of interest.

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