



Cultivating mindfulness in health care professionals: A review of empirical studies of mindfulness-based stress reduction (MBSR)

Julie Anne Irving^{a,*}, Patricia L. Dobkin^b, Jee-seon Park^a

^a Department of Educational and Counselling Psychology, McGill University, Montreal, Quebec, Canada

^b Department of Medicine, McGill Programs in Whole Person Care, Montreal, Quebec, Canada

ABSTRACT

Keywords:

Mindfulness meditation
Health care professional's well-being
Clinician self-care
Mindfulness-based stress reduction

Demands faced by health care professionals include heavy caseloads, limited control over the work environment, long hours, as well as organizational structures and systems in transition. Such conditions have been directly linked to increased stress and symptoms of burnout, which in turn, have adverse consequences for clinicians and the quality of care that is provided to patients. Consequently, there exists an impetus for the development of curriculum aimed at fostering wellness and the necessary self-care skills for clinicians. This review will examine the potential benefits of mindfulness-based stress reduction (MBSR) programs aimed at enhancing well-being and coping with stress in this population. Empirical evidence indicates that participation in MBSR yields benefits for clinicians in the domains of physical and mental health. Conceptual and methodological limitations of the existing studies and suggestions for future research are discussed.

© 2009 Elsevier Ltd. All rights reserved.

1. Introduction

Burnout is endemic in health care professionals with over 40% of nurses reporting general occupational burnout, 28% of physicians endorsing two out of the three aspects of burnout, and up to 60% of psychologists admitting to having practiced at times when they viewed themselves as distressed to the point of clinical ineffectiveness.^{1–3} Numerous authors have noted that stress and burnout in health care professionals are associated with various physical health problems including: fatigue, insomnia, heart disease, depression, obesity, hypertension, infection, carcinogenesis, diabetes, and premature aging.^{4,5}

Burnout has been also associated with decreased patient satisfaction, “suboptimal self-reported patient care”, and longer patient-reported recovery times.^{3,6–8} Moreover, stress has been shown to significantly reduce clinicians’ attention and concentration, detract from decision-making skills, and diminish health care professionals’ abilities to communicate effectively, to convey empathy, and to establish meaningful relationships with patients.^{9–11}

In light of these findings, there has been a call for initiatives aimed at promoting the well-being of health care professionals. The practice of mindfulness meditation has been proposed as one

means of engendering self-care with the additional benefit of enhancing communication with patients and clients for clinicians. Epstein’s (1999)¹² seminal article in the *Journal of American Medical Association* entitled, “Mindful practice” defined mindfulness as a logical extension of the concept of reflective practice, consistent with being present in everyday experience and open to all thoughts, actions, and sensations. He asserted that the goals of mindful practice are to be aware of one’s own mental processes as well as what is occurring around oneself and thereby be able to act with compassion. In one review, Stewart (1995)¹³ underscored the connection between effective physician–patient communication and patient outcomes (i.e., emotional health, symptom resolution, functional status, and pain control). He purported that in order for optimal physician–patient communication to occur, physicians must be “mindful” of themselves, the patient, and the context.

This article will provide an overview of the current literature pertaining to clinicians’ health and wellness. A review of empirical studies that have examined the impact of participation in mindfulness training will be presented. Finally, a critique of existing methods as well as implications for future research and practice will be provided.

2. Clinician stress and burnout

Initial investigations of burnout in health care professionals have largely focused upon so-called “occupational hazards” such as anxiety, depression, substance abuse, and heightened rates of

* Corresponding author. Department of Educational and Counselling Psychology, McGill University, 3700 McTavish Street, Room 614, Montreal, Quebec H3A 1Y2, Canada. Tel.: +1 514 781 7987; fax: +1 514 398 6968.

E-mail address: Julie.Irving@mail.mcgill.ca (J.A. Irving).

suicide.^{14–16} Given these findings, attention has been extended to health care trainees, particularly at the outset of their training periods.¹⁷ Professional training in medicine, nursing, and psychology is posited to be particularly stressful in light of the challenges inherent to the application of theoretical classroom learning in the field coupled with the novice's sense of urgency to "do something to help" patients in distress.¹⁷ Transitional training periods commonly strain existing relationships with family and friends, often resulting in the reduction of social support networks, which in turn can reduce the resources necessary for coping with stress.¹⁸ The stressful nature of training programs notwithstanding, some scholars¹⁹ have posited that some individuals who pursue careers in the health care professions may have higher preexisting rates of depression and anxiety priming them to be reactive to demanding training periods from the outset.

Burnout has also been linked to specific coping styles and attitudes towards the self. For example, Shanafelt et al (2002)⁶ found that residents with the highest levels of burnout were the most likely to report that they perceived their personal needs as "inconsequential" (p. 2885). Miller and McGowen (2000)¹⁵ point to the "culture" of clinical training as engendering self-critical and excessively self-sacrificing attitudes and practices in physicians. The authors explain that "task-oriented coping skills developed during training do not go away automatically after training ... the goal-oriented approach leads to neglecting alternative sources of gratification or self-esteem; thus, after training, physicians may not have a way to find meaningful balance between work and other life activities" (p. 970). Ratanawongsa et al (2007)²⁰ supported this notion in a study showing that medical residents tend to prioritize professional accomplishment above familial, social, spiritual, mental, and financial needs. While the residents interviewed deemed this a "temporary imbalance" for the finite residency period, the authors warned that physicians may require assistance in reestablishing balance once training is completed.

3. Health care professionals' well-being: balance and self-care

Relative to the ample body of research examining distress and burnout in health care professionals, scant attention has been directed towards preventive interventions and the promotion of wellness. Taub and colleagues (2006)²¹ called for the establishment of ethical guidelines pertaining to health and wellness in physicians, and highlighted the need for the medical profession to take the initiative in establishing physician health programs. Weiner et al (2001)²² found that physicians engaged in wellness-promotion practices, including practicing mindfulness, were more likely to report higher scores of global well-being. Coster and Schwebel (1997)²³ conducted a study of "well-functioning" psychologists; clinicians who have an enduring quality of professional functioning over time, notwithstanding personal and professional stressors. Self-awareness/self-monitoring, personal values, preserving a balance between personal and professional lives, maintaining meaningful relationships with the spouse, family, and friends, taking vacations, and partaking in personal therapy were identified as means of maintaining psychological health and well-being.

Despite the numerous indications that self-care strategies need to be supported during training periods for health care providers, Christopher et al (2006)²⁴ note that clinical and academic training programs typically do not explicitly include such strategies; "[s]elf-care is typically presented to the student as an individual responsibility" (p. 496).

4. Definition of mindfulness

Mindfulness practice has been proposed to reduce stress and burnout among health care professionals through a number of pathways linked to the tenets underlying the philosophy of practice. In the psychological literature, mindfulness has been defined in many ways, with various foci including cognition, awareness (metacognition), and emotion. Huss and Baer (2007)²⁵ stated that one of the defining features of mindfulness is that "[p]articipants learn to observe these phenomena without evaluating their truth, importance, or value and without trying to escape, avoid, or change them" (p. 17). This tolerance of internal or external stimuli is described in many eastern languages as a general curiosity or openness, an "affectionate, compassionate quality within the attending, a sense of openhearted, friendly presence and interest"²⁶ (p. 145). Furthermore, Brown and Ryan (2003)²⁷ consider mindfulness to be an attribute of consciousness; they propose that consciousness encompasses both awareness and attention (see Brown et al²⁸ for an in-depth examination of fundamental questions about mindfulness in the context of psychological inquiry). When purposefully cultivated, mindfulness results in heightened awareness of inner and outer experiences through open, non-judgmental, focused attention in the present moment. Bishop and colleagues (2004)²⁹ proposed that mindfulness, in contemporary psychological terms, could be defined as the self-regulation of attention, involving sustained attention, attention switching, and the inhibition of secondary processing.

For the purpose of this paper, Kabat-Zinn's (2003)²⁶ operational definition of mindfulness will be used. He defines mindfulness as "the awareness that emerges through paying attention, on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment" (p. 145). Attention rests with various stimuli, including breath, bodily sensations, perceptions (sights, sounds), as well as cognitions and emotions. To be mindful in the context of daily activity, one usually needs to formally learn how to be "awake" or fully present in the "now".³⁰

Meditation is a primary means through which mindfulness is cultivated.^{31,32} Forms of meditation, such as transcendental or object focused meditation, tend to be distinguished in terms of: (a) the type of attention garnered; (b) the actions taken upon cognitive processes; and (c) the underlying goals of the practice.³³ Mindfulness is unique in that practitioners ultimately allow a state of "fluid attention" to emerge rather than maintaining focus upon any specific object or mantra (i.e., sound). Cognitions are observed and accepted, as they are, without being manipulated. In mindfulness one lets go of expectations and goals, so as to de-condition the automaticity that typically dominates cognitive processing.

5. What is mindfulness-based stress reduction?

Mindfulness-based stress reduction (MSBR) is a psycho-educational program developed by Kabat-Zinn and colleagues at the University of Massachusetts Medical Center. Spanning 8 weeks, the program consists of weekly 2.5 h-long classes and one "day of silence" in between the 6th and 7th weeks. Participants are taught various types of meditation practices, which they apply in class and at home to routine aspects of daily life such as eating, driving, walking, washing the dishes, and interacting with others.³⁴ Key elements of the program include: (a) the group format; (b) emphasis upon a non-goal orientation; (c) expectation of relief (or placebo effect); (d) sense of active engagement in the process and responsibility for outcomes; (e) demand characteristics (a significant time commitment and amount of home practice); (f) variation of meditation techniques (body scan, sitting and walking meditation, and hatha yoga); (g) didactic material (i.e., the relationship of

stress to illness); (h) finite duration (long enough to practice skills, yet short enough not to become dependent upon the group); and (i) a long-term perspective (continued practice is encouraged after the group is terminated).³⁵

A number of controlled studies have demonstrated the efficacy of MBSR with a range of clinical populations for conditions such as chronic pain and other illnesses (e.g., cancer) as well as psychiatric disorders, such as generalized anxiety.^{36–42} In the past decade, a relatively smaller number of studies have examined the application of MBSR with non-clinical populations, including health care professionals.

6. MBSR for trainees and clinicians in the health care professionals

In this section, studies that examined the effectiveness of MBSR on trainees and clinicians will be reviewed. A summary of these studies is presented in Table 1.

6.1. Quantitative studies

Kabat-Zinn and colleagues have taught MBSR to medical students at the University of Massachusetts for over two decades. Others have extended this endeavor to include undergraduate student populations as well as other mental health professionals.^{43,44}

Pre-post design quantitative research on medical and premedical students who participated in an MBSR program demonstrated positive effects on self-report measures of psychological symptoms such as anxiety and depression, as well as increased ratings of empathy and spirituality.^{43–45} Similarly, Beddoe and Murphy (2004)⁹ piloted an MBSR program with undergraduate nursing students and found that the participants demonstrated a significant increase in empathy following completion of the program. A recent randomized controlled study also conducted with nursing students, which shortened the MBSR program to 4 weeks, demonstrated significant decreases in symptoms of burnout and increased relaxation and life satisfaction, based on self-report.⁴⁶

Also using a 4-week abbreviated version of the MBSR, Jain et al (2007)⁴⁷ conducted a three-arm randomized clinical trial with a mixed-group of students in training programs for medicine and nursing. They were compared to a waitlist control group and a group that received relaxation training. The subjects in the mindfulness intervention and relaxation groups were equivalent in terms of decreases in distress. However, effect sizes for increases in positive affect were larger for the mindfulness meditation group. Mindfulness intervention also resulted in significant decreases in distracting and ruminative thoughts. Interestingly, the authors concluded that the effectiveness of the mindfulness intervention was partially mediated through the reduction in ruminative thoughts.

In a recent uncontrolled study that examined the outcomes of a MBSR program with counseling psychology students²⁴ participants reported declines in negative affect, perceived stress, rumination, and state and trait anxiety. Significant increases in positive affect and self-compassion were also reported from the intervention group.

In addition, Grepmaier et al (2007)⁴⁸ conducted an intriguing study examining outcomes in both trainees as well as their patients. The authors hypothesized that mindfulness training could potentially enhance required skills and qualities needed by psychotherapists such as attention and vigilance to patients' non-verbal signals, self-awareness, and management of counter-transference. In a randomized clinical trial, the psychotherapists in training who were enrolled in the mindfulness condition received higher client

evaluations on measures of therapeutic relationship as well as ability to solve problems and to communicate clearly during sessions. Patients of the trainees in the mindfulness group also reported greater symptom reduction as indicated by self-report scales.

Shapiro et al (2005)⁸ conducted a randomized controlled study ($n = 38$) with health care professionals (physicians, psychologists, nurses, social workers, and physical therapists). Outcome measures included self-report measures of psychological distress and the self-compassion scale.⁴⁹ Results indicated that individuals in the experimental condition demonstrated significantly lower levels of perceived stress, and an increase in ratings of self-compassion.⁸

6.2. Qualitative studies

There is a relative paucity of published qualitative examinations of MBSR or mindfulness interventions with clinicians or trainees. Christopher et al (2006)²⁴ conducted a qualitative investigation of the impact of taking a course that included mindfulness meditation practice upon counseling psychology students' self-care practices. Results suggested that students improved in domains such as interpersonal functioning and coping with stress. Participants also reported that they felt the program had enhanced their clinical training. Despite the promising findings in this study, it should be stated that mindfulness practice was just one component of the course, which also included substantial didactic material unrelated to the standard MBSR protocol.

7. Critique and directions for future research

Despite the promising findings for both clinical and non-clinical populations, research on MBSR, and mindfulness more generally, has been limited by a number of conceptual and methodological issues. Many of the quantitative studies employed small sample sizes, and only one included an additional treatment comparison intervention in order to control for factors such as group support, home practice, or placebo effects. For example, the amount of time the participants spend in home practice is likely to vary significantly. Nonetheless, issues of "dose" were not adequately addressed, as only two studies examined the relationship between the amount of practice and outcomes. This issue may be of particular importance in relation to mindfulness programs when offered to health care professionals, as preliminary research suggests that this population may be particularly likely to have higher attrition due to time and scheduling issues.⁸ Further, future research could examine the aspects of the program that are most difficult to adhere to (i.e., class attendance, time spent on daily home practice, or the exercises themselves).

While there is strong support for the remedial effects of MBSR upon stress, which was the initial target of the program, the underlying mechanisms of how this was achieved have not been tapped by symptom-focused outcome measures in clinical studies. This semeiotic perspective has neglected positive outcomes despite research linking meditative practice to self-actualization, empathy, tolerance of stress, autonomy, positive sense of control, morality, and spirituality.⁵⁰ Further, only three of the studies reviewed included process measures to capture the mechanisms through which mindfulness practice may lead to outcomes. Almost all of the studies utilized self-report indices; few included adjunctive physiological measures such as salivary cortisol.⁵¹ Future research may include multimodal assessment strategies such as physiological, neuro-hormonal, and cognitive measures.

Salmon and colleagues (2004)³⁴ have suggested that greater attention should also be directed towards behavioral variables, such as adherence, in order to assess the frequency and intensity of

Table 1
Summary of studies that examined the effectiveness of MBSR on trainees and clinicians.

Study	<i>n</i>	Type of participant	Research design	Treatment group after drop out	Control group(s) after drop out	Outcome measures	Findings
Shapiro, Brown, and Biegel (2007) ⁵⁹	64	Master's level counseling psychology students	Prospective, non-random, cohort-controlled	<i>n</i> = 22; in intervention course that included MBSR	<i>n</i> = 32 in the two control courses	1 MAAS 2 Positive and negative affectivity scale(s) 3 Perceived stress scale 4 State-trait anxiety inventory 5 Reflection rumination questionnaire 6 Self-compassion scale	1 Stress, negative affect, rumination, and state and trait anxiety were decreased 2 Positive affect and self-compassion were increased
Jain et al (2007) ⁴⁷	104	Full-time medical students, graduate nursing students, undergraduate premedical or pre-health students	Randomized controlled study	<i>n</i> = 27; Mindfulness meditation program based upon MBSR, 4 sessions of 1.5 h	(a) <i>n</i> = 24, somatic relaxation (breathing, progressive muscle relaxation) (b) <i>n</i> = 30, waitlist control	Pre-intervention 1 Brief symptom inventory 2 Positive states of mind scale 3 Practice log Pre- and post-intervention 1 Daily emotion report 2 Index of core spiritual experiences 3 Marlowe-Crowne Social Desirability Scale short form	1 MBSR and relaxation conditions had similar decreases in distress and increases in positive affect 2 MBSR group yielded larger effect sizes for positive affect 3 MBSR group had significant decreases in distractive and ruminative thoughts and behaviors 4 Decreases in ruminative thoughts and behaviors are suggested as unique mediators of decreased distress
Shapiro et al (2005) ⁸	40	Physicians, nurses, social workers, physical therapists, and psychologists	Randomized controlled study	<i>n</i> = 18; MBSR program	<i>n</i> = 20, waitlist control	1 Brief symptom inventory 2 Maslach burnout inventory 3 Satisfaction with life scale 4 Self-compassion scale	1 MBSR group had significant decreases in perceived stress, and increases in life satisfaction and self-compassion
Galantino et al (2005) ⁵¹	84	Employees from a university hospital, both administrators and those involved in direct patient care	Pre-post design	<i>n</i> = 69; Mindfulness meditation program based upon MBSR, 8 weekly 2 h classes		1 Profile of mood states 2 Maslach burnout scale 3 Interpersonal reactivity index 4 Salivary cortisol	1 Emotional exhaustion was decreased 2 Mood was improved 3 No changes were found in empathy 4 No changes in salivary cortisol were detected
Mackenzie et al (2006) ⁴⁶	30	Nurses and nurse aides from long-term and complex continuing care units	Randomized controlled study	<i>n</i> = 16; Mindfulness meditation program based on MBSR, 4 weekly 30 min sessions	<i>n</i> = 14	1 Maslach burnout inventory 2 Smith relaxation dispositions inventory 3 Intrinsic job satisfaction subscale 4 Satisfaction with life scale 5 13-item version of orientation to life scale (SOC)	1 Fewer symptoms of burnout were reported 2 Relaxation and satisfaction with life were increased 3 No statistically significant improvements in the sense of coherence, but increases in scores were observed on the SOC
Rosenzweig et al (2003) ⁴⁴	302	Second-year medical students	Prospective, non-randomized, controlled trial	<i>n</i> = 125	<i>n</i> = 152	1 Profile of mood states (POMS)	1 Scores on total mood disturbance decreased significantly in the MBSR group
Beddoe and Murphy (2004) ⁹	23	Undergraduate nursing students	Pre-post test design, convenience sample	<i>n</i> = 16; 8-week MBSR course		1 Derogatis stress profile 2 Interpersonal reactivity index 3 Homework questionnaire	1 Anxiety was significantly reduced 2 Favorable downward trends were observed on measures of stress and overidentification
Young et al (2001) ⁵⁷	30	Third-year nursing students	Non-randomized trial	<i>n</i> = 15	<i>n</i> = 15	1 SF-36 health survey 2 SCL-90-R 3 13-item version of orientation to life scale (SOC)	1 Health related complaints decreased in both groups 2 Psychological symptoms decreased in both groups, but significantly were more in the MBSR group

Cohen-Katz et al (2005) ³⁸	27	Nurses from an academic-community-based hospital	Randomized controlled trial	n = 12	n = 13	<ol style="list-style-type: none"> Maslach burnout inventory Brief symptom inventory Mindful attention awareness scale (MAAS) 	<ol style="list-style-type: none"> Scores on 2 of the 3 subscales of the Maslach burnout inventory were decreased significantly more in the treatment group Changes were maintained at 3-month follow-up in the treatment group
Shapiro et al (1998) ⁴³	78	Premedical and medical students	Matched randomized design	n = 36; 8-week MBSR program + didactic material and experiential exercises to develop mindful listening	n = 37	<ol style="list-style-type: none"> Empathy construct rating scale SCL-90-R Depression subscale of SCL-90-R was used to assess depression State-trait anxiety inventory Index of core spiritual experiences – INSPIRIT Daily journal Evaluation packet 	<ol style="list-style-type: none"> Reductions were found in state and trait anxiety Reports of psychological distress and depression decreased An increase was observed in the overall empathy levels Spirituality increased

mindfulness practice required to contribute to sustainable effects. In order to do this, a means of measuring both the quality and quantity of formal and informal meditation practice needs to be refined. Further, methodologies that combine process and outcome research, with both quantitative and qualitative methods may provide a richer understanding of the processes that lead to physical and psychological health outcomes.⁵²

A number of studies reviewed have consisted of mixed populations of nursing, medical, and other mental health professionals, and students at various stages of training (i.e., premedical and medical residents). As the nature of training varies across and within disciplines of health care, research with more homogenous samples may be warranted in order to examine the specific demands and advantages of the program across groups to discern the benefits of introducing the program at specific stages of training.

A striking limitation in this arena pertains to the absence of research on potentially harmful or negative effects of mindfulness practice, despite documented occurrences by scholars and practitioners.^{32,53} Such an omission can reinforce the notion that MBSR programs are beneficial for everyone.⁵⁴ The few studies that have explored the potentially negative side effects of mindfulness found (albeit rarely) exacerbation of psychiatric symptoms, including depression and anxiety, as well as altered reality testing, grandiosity, unusual behavior, euphoria, and even psychosis.⁵⁵

Central to the philosophy of teaching mindful practice, is the notion that teachers embody mindful qualities themselves. For example, in order to become an instructor of Kabat-Zinn's (1982)³⁵ MBSR program, instructors must go through intensive training over a number of years and be committed to maintaining their personal practice. Nevertheless, none of the studies reviewed explicitly addressed instructor training or experience, which may influence the effectiveness of mindfulness interventions.⁵⁶ Furthermore, Allen and colleagues (2006)⁵⁵ cite the importance of instructor training in terms of handling challenges that arise, "the skill of the instructor in dealing with such eventualities may be important in determining whether they become valuable learning opportunities or, alternatively, adverse events" (p. 290). Instructor training and treatment integrity are topics which warrant further attention in future studies.

8. Conclusions

As the demands placed upon health care providers continue to mount, the interest in the applications of mindfulness training for this population is timely. Research suggests that mindfulness training can serve as a viable tool for the promotion of self-care and well-being. Despite the promising results of the existing body of literature, there remain many questions surrounding the mechanisms through which mindfulness training contributes to positive health related outcomes. Research initiatives with a combined focus upon process and outcome variables and diversified research methods (e.g., use of qualitative and physiological methods) are recommended. Moreover, the potential for positive outcomes of mindfulness training to translate into improved patient care remains relatively unexplored.

Conflict of interest

None.

Role of the funding source

This research is supported by the Social Sciences and Humanities Research Council of Canada Doctoral Fellowship and by funds from the Jewish General Hospital of Montreal, Segal Center and the Weekend to End Breast Cancer.

Acknowledgements

The authors would like to thank those who made this work possible. Special thanks to Dr. Tom Hutchinson, as well as Ms. Eileen Lavery and Ms. Nancy Gair at McGill Programs in Whole Person Care for their support and Dr. Marilyn Fitzpatrick for her helpful comments and suggestions.

References

- Bruce SM, Conaglen HM, Conaglen JV. Burnout in physicians: a case for peer support. *Internal Medicine Journal* 2005;**35**:272–8.
- Pope KS, Tabachnik BG, Keith-Spiegel P. Ethics of practice: the beliefs and behaviours of psychologists as therapists. *American Psychologist* 1987;**42**:993–1006.
- Vahey DC, Aiken LH, Sloane DM, Clarke SP, Vargas D. Nurse burnout and patient satisfaction. *Medical Care* 2004;**42**:57–66.
- Miller KI, Stiff JB, Ellis BH. Communication and empathy as precursors to burnout among human service workers. *Communication Monographs* 1988;**55**:250–65.
- Spickard A, Gabbe SG, Christensen JF. Mid-career burnout in generalist and specialist physicians. *Journal of the American Medical Association* 2002;**288**:1447–50.
- Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. *Family Journal* 2002;**12**:396–400.
- Shapiro SL, Carlson LE, Astin JA, Freedman B. Mechanisms of mindfulness. *Journal of Clinical Psychology* 2006;**62**:373–86.
- Shapiro SI, Astin JA, Bishop SR, Cordova M. Mindfulness-based stress reduction for health care professionals: results from a randomized trial. *International Journal of Stress Management* 2005;**12**:164–76.
- Beddoe AE, Murphy SO. Does mindfulness decrease stress and foster empathy among nursing students? *Journal of Nursing Education* 2004;**43**:305–12.
- Enochs WK, Eitzbach CA. Impaired student counselors: ethical and legal considerations for the family. *Family Journal* 2004;**12**:396–400.
- Skosnik PD, Chatterton RT, Swisher T. Modulation of attentional inhibition by norepinephrine and cortisol after psychological stress. *International Journal of Psychophysiology* 2000;**36**:59–68.
- Epstein RM. Mindful practice. *Journal of the American Medical Association* 1999;**282**:833–9.
- Stewart M. Effective physician–patient communication and health outcomes: a review. *Canadian Medical Association Journal* 1995;**152**:1423–33.
- Gunderson L. Physician burnout. *Annals of Internal Medicine* 2001;**135**:145–8.
- Miller MN, McGowen KR. The painful truth: physicians are not invincible. *Southern Medical Journal* 2000;**93**:966–73.
- Shanafelt TD, Habermann TM. The well-being of physicians. *American Journal of Medicine* 2003;**114**:513–9.
- Chandler C, Bodenhamer-Davis E, MinerHolden J, Evenson T, Bratton S. Enhancing personal wellness in counselor trainees using biofeedback: an exploratory study. *Behavioral Science* 2001;**26**:1–7.
- Truell R. The stresses of learning counseling: six recent graduates comment on their personal experience of learning counseling and what can be done to reduce associated harm. *Counselling Psychology Quarterly* 2001;**14**:67–89.
- Sharkley S, Sharples A. The impact on work-related stress of mental health teams following team-based learning on clinical risk management. *Journal of Psychiatric and Mental Health Nursing* 2003;**10**:73–81.
- Ratanawongsa N, Wright SM, Carrese JA. Well-being in residency: a time for temporary imbalance? *Medical Education* 2007;**41**:237–80.
- Taub S, Morin MS, Goldrich PR, Benjamin R. Physician wellness. *Occupational Medicine* 2006;**56**:77–82.
- Weiner EL, Swain GR, Wolf B, Gottlieb M. A qualitative study of physicians' own wellness-promotion practices. *Western Journal of Medicine* 2001;**174**:19–23.
- Coster JS, Schwebel M. Well-functioning in professional psychologists. *Professional Psychology: Research and Practice* 1997;**28**:5–13.
- Christopher JC, Christopher SE, Dunnagan T, Schure M. Teaching self-care through mindfulness practices: the application of yoga, meditation, and qigong to counselor training. *Journal of Humanistic Psychology* 2006;**46**:494–509.
- Huss DB, Baer RA. Acceptance and change: the integration of mindfulness-based cognitive therapy into ongoing dialectical behavior therapy in a case of borderline personality disorder with depression. *Clinical Case Studies* 2007;**6**:17–33.
- Kabat-Zinn J. Mindfulness-based interventions in context: past, present, and future. *Clinical Psychology: Science and Practice* 2003;**10**:144–56.
- Brown KW, Ryan RM. The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology* 2003;**84**:822–48.
- Brown KW, Ryan RM, Creswell JD. Mindfulness: theoretical foundations and evidence for its salutary effects. *Psychological Inquiry* 2007;**18**:211–37.
- Bishop SR, Lau M, Shapiro S, Carlson L, Anderson ND, Carmody J, et al. Mindfulness: a proposed operational definition. *Clinical Psychology: Science and Practice* 2004;**11**:230–41.
- Tolle E. *The power of now*. Oakland, CA: New World Library; 2004.
- Finn M, Rubin JB. Psychotherapy with Buddhists. In: Richards PS, Bergin AE, editors. *Handbook of psychotherapy and religious diversity*. Washington, DC: American Psychological Association; 2000. p. 317–40.
- Walsh R. Meditation. In: Corsini RJ, editor. *Handbook of innovative psychotherapy*. New York: Wiley; 2001. p. 368–80.
- Walsh R, Shapiro SL. The meeting of meditative disciplines and western psychology: a mutually enriching dialogue. *American Psychologist* 2006;**3**:227–39.
- Salmon P, Sephton S, Weissbecker I, Hoover K, Ulmer C, Studts JL. Mindfulness meditation in clinical practice. *Cognitive and Behavioral Practice* 2004;**11**:434–46.
- Kabat-Zinn J. An out-patient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: theoretical considerations and preliminary results. *General Hospital Psychiatry* 1982;**4**:33–47.
- Kaplan KH, Goldenberg DL, Galvin NM. The impact of a meditation-based stress reduction program on fibromyalgia. *General Hospital Psychiatry* 1993;**15**:284–9.
- Williams JMG, Teasdale JD, Segal Z, Soulesby J. Mindfulness-based cognitive therapy reduces over general autobiographical memory in formerly depressed patients. *Journal of Abnormal Psychology* 2000;**109**:150–5.
- Randolph PD, Caldera YM, Tacone AM, Greak ML. The long-term combined effects of medical treatment and a mindfulness-based behavioral program for the multidisciplinary management of chronic pain in west Texas. *Pain Digest* 1999;**9**:103–12.
- Goldenberg DL, Kaplan KH, Nadeau MG, Brodeur C, Smith S, Schmid HC. A controlled study of a stress-reduction, cognitive-behavioral treatment program in fibromyalgia. *Journal of Musculoskeletal Pain* 1994;**2**:53–66.
- Kabat-Zinn J, Wheeler E, Light T, Skillings A, Scharf MS, Cropley TG, et al. Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemotherapy (PUVA). *Psychosomatic Medicine* 1998;**60**:625–32.
- Specia M, Carlson LE, Goody E, Angen M. A randomized, wait-list controlled clinical trial: the effect of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients. *Psychosomatic Medicine* 2000;**62**:613–22.
- Carlson LE, Ursuliak Z, Goodey E, Angen M, Specia M. The effects of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients: 6-month follow-up. *Supportive Care in Cancer* 2004;**9**:112–23.
- Shapiro SL, Schwartz GE, Bonner G. Effects of mindfulness-based stress reduction on medical and premedical students. *Journal of Behavioral Medicine* 1998;**21**:581–99.
- Rosenzweig S, Reibel DK, Greeson JA, Brainard GC, Hojat M. Mindfulness-based stress reduction lowers psychological distress in medical students. *Teaching and Learning in Medicine* 2003;**15**:88–92.
- Astin JA. Stress reduction through mindfulness meditation: effects on psychological symptomatology, sense of control, and spiritual experiences. *Psychotherapy and Psychosomatics* 1997;**66**:97–106.
- Mackenzie CS, Poulin PA, Seidman-Carlson R. A brief-mindfulness based stress reduction intervention for nurses and nurse aides. *Nursing Research* 2006;**19**:105–9.
- Jain S, Swanick S, Roesch SC, Mills PJ, Bell I, Schwartz GE. A randomized controlled trial of mindfulness meditation versus relaxation training: effects on distress, positive states of mind, rumination, and distraction. *Annals of Behavioral Medicine* 2007;**33**:11–21.
- Grepmair L, Mitterlehner F, Nickel M. Promotion of mindfulness in psychotherapists in training and treatment results of their patients. *Journal of Psychosomatic Research* 2006;**60**:649–50.
- Neff KD. The development and validation of a scale to measure self-compassion. *Self and Identity* 2003;**2**:223–50.
- Shapiro SL, Schwartz GE, Santerre C. Meditation and positive psychology. In: Lopez CRSSJ, editor. *Handbook of positive psychology*. New York: Oxford; 2002. p. 632–45.
- Galantino ML, Baime M, Maguire M, Szapary PO, Farrar JT. Short communication: Association of psychological and physiological measures of stress in health-care professionals during an 8-week mindfulness meditation program: mindfulness in practice. *Stress and Health* 2005;**21**:255–61.
- Dobkin PL. Mindfulness-based stress reduction: what processes are at work? *Complementary Therapies in Clinical Practice* 2008;**14**:8–16.
- Shapiro DH. Adverse effects of meditation: a preliminary investigation of long term meditators. *International Journal of Psychosomatics* 1992;**39**:62–7.
- Bishop SR. What do we really know about mindfulness-based stress reduction? *Psychosomatic Medicine* 2002;**64**:71–84.
- Allen NB, Chambers R, Knight W, Blashki GB, Ciechomski L, Hassed C, et al. Mindfulness-based psychotherapies: a review of conceptual foundations, empirical evidence and practical considerations. *Australian and New Zealand Journal of Psychiatry* 2006;**40**:285–94.
- Grossman P, Niemann L, Schmidt S, Walach H. Mindfulness-based stress reduction and health benefits: a meta-analysis. *Journal of Psychosomatic Research* 2004;**57**:35–43.
- Young LE, Bruce A, Turner L, Linden W. Evaluation of a mindfulness-based stress reduction intervention. *Canadian Nurse* 2001;**97**.
- Cohen-Katz JC, Wiley SD, Capuano T, Baker MA, Shapiro S. The effects of mindfulness-based stress reduction on nurse stress and burnout, part II. *Holistic Nursing Practice* 2005;**19**:26–35.
- Shapiro SL, Brown K, Biegel G. Self-care for health care professionals: Effects of MBSR on mental well being of counseling psychology students. *Training and Education in Professional Psychology* 2007;**1**(2):105–15.