

# Evaluating the Effectiveness of a Brief Mindful Self-Care and Resiliency (MSCR) Intervention for Nurses: a Controlled Trial

Susan Slatyer<sup>1,2</sup>  · Mark Craigie<sup>3</sup> · Brody Heritage<sup>4</sup> · Sue Davis<sup>1</sup> · Clare Rees<sup>3</sup>

Published online: 26 August 2017  
© Springer Science+Business Media, LLC 2017

**Abstract** It has been well documented that workplace stress can have a negative impact on nurse well-being and productivity, and can result in the syndrome of compassion fatigue, which is comprised of secondary traumatic stress and burnout. Identifying effective and practical workplace interventions to help improve nurse resilience to prevent compassion fatigue is therefore a high priority. This study trialled the effectiveness of a brief mindful self-care and resiliency intervention for nurses working in an Australian tertiary hospital compared to nurses in a wait list control condition. A total of 91 nurses participated in the study ( $n = 65$  intervention condition;  $n = 26$  control condition). The intervention involved a 1-day workshop followed by three weekly mindfulness practice sessions. Nurses completed measures of burnout, secondary traumatic stress, negative mood, self-compassion, compassion satisfaction, subjective quality of life and general self-efficacy at pre-test, post-test and 6-month follow-up. Analysis revealed that compared to the control group, the intervention group had significant reductions in burnout and depressed mood upon completion of the MSCR. Follow-up data indicated that these reductions persisted at 6-month post-MSCR for the intervention group. While interactions between intervention and

control conditions for other measures failed to reach statistical significance, follow-up analysis revealed significant improvements in compassion satisfaction, self-compassion and subjective quality of life for nurses completing the intervention. As a whole, the findings demonstrate that a brief mindfulness-based self-care intervention is effective at improving the emotional functioning of nurses.

**Keywords** Compassion fatigue · Nurses · Burnout · Mindfulness · Resilience · Intervention

## Introduction

International research over the last few decades has consistently established that nurses working in acute care hospitals are routinely exposed to patient distress, patient trauma, unrealistic expectations and high workload stressors (Beck 2011; Lim et al. 2010; McVicar 2016). Such stressors can have a high psychological and professional impact, and can result in the syndrome of compassion fatigue, that has been previously defined as consisting of burnout and secondary traumatic stress (Figley 1995). For example, in the nursing and healthcare profession, research has shown that compassion fatigue is associated with a number of deleterious effects including psychological distress, reduced productivity and increased absenteeism (Mealer et al. 2012). Poor outcomes in nurses also potentially affect the patients in their care. High levels of stress in nurses have been negatively correlated with the quality of care provision (Sarafis et al. 2016). This is concerning as the retention of an engaged, compassionate and skilled nursing workforce is instrumental to ensure safe patient care (Francis 2013). Moreover, it has been predicted that the negative effects of caring are likely to lead to a worldwide shortage of nurses by 2025 (Health Workforce Australia

✉ Susan Slatyer  
susan.slatyer@health.wa.gov.au

<sup>1</sup> Centre for Nursing Research, Sir Charles Gairdner Hospital, Perth, WA, Australia

<sup>2</sup> School of Nursing, Midwifery and Paramedicine, Curtin University, Perth, WA, Australia

<sup>3</sup> School of Psychology and Speech Pathology, Curtin University, Perth, WA, Australia

<sup>4</sup> School of Psychology and Exercise Science, Murdoch University, Perth, Australia

2012). Interventions to protect nurses and sustain their caring behaviours, and which are feasible for delivery in the acute care practice environment, are therefore required.

While compassion fatigue and its associated negative effects have been shown to be problematic for nurses, not everyone exposed to workplace stress experiences negative outcomes. Individuals that are more immune to stress have been described as “resilient”. Resilience has been defined by the American Psychological Association (APA) as “the process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress” (APA 2015, p.1). It is generally accepted that resilience is a multidimensional construct made up of both trait-based aspects and skills that can be learned (Southwick and Charney 2012). For example, higher resilience is related to lower vulnerability for compassion fatigue and burnout, and greater persistence in the nursing workforce (Hegney et al. 2015; Hodges et al. 2010; Manzano García and Ayala Calvo 2012). Zeller and Levin (2013) have therefore argued that interventions for nurses that focus on building psychological resilience and adaptive coping to stress are vital if the worst effects of stress are to be avoided.

It has been previously argued by Gentry and Baranowsky (1998) that interventions that target adaptive emotion regulation and patterns of thinking in response to stressors, and foster new ways of relating to work may be central to building resiliency for prevention and amelioration of compassion fatigue. Consistent with this view, a number of studies have shown that relatively brief (4-h educational seminar) interventions that focus on teaching skills for identifying symptoms of compassion fatigue and implementing adaptive ways of regulating anxious arousal and problematic thinking in response to work-based stressors can yield significant reductions in compassion fatigue and related symptoms (Flarity et al. 2013; Potter et al. 2013). Longer (12-week) multimodal interventions for nurses have similarly demonstrated significant benefits (Berger and Gelkopf 2011; Mealer et al. 2014), although complexity and length may limit their broader adoption.

Recently, Rees et al. (2015) proposed a model of workforce resilience which identifies several individual psychological factors considered to play a major role in determining overall resilience. One of the major factors in this model is mindfulness, defined as the “awareness that emerges through paying attention on purpose, in the present moment, and non-judgementally” (Kabat-Zinn 2003, p. 145). Following previous arguments of the role of mindfulness as an adaptive process for responding to negative internal experience (Teasdale 1999; Wells 2005) and facilitating more balanced appraisals of stressful events (Garland et al. 2011), the authors proposed that optimal levels of workplace resilience depend on an individual’s ability to effectively detach from negative experience. In line with the key role given to mindfulness in this model, mindfulness-based interventions have been evaluated to assess their benefits for reducing stress, negative mood and

symptoms of burnout in a variety of populations. Mindfulness-based stress reduction (MBSR: Kabat-Zinn 1990) and mindfulness-based cognitive therapy (MBCT: Segal et al. 2002) are the most prominent mindfulness-based interventions aimed at learning and enhancing mindfulness. Clinical studies have shown that these protocols (8-weekly sessions) are effective in increasing mindfulness, self-compassion and positive affect (van der Velden et al. 2015), as well as in reducing negative mood and preventing depression (Khoury et al. 2013). In occupational settings, mindfulness-based interventions have also resulted in lower stress (Wolever et al. 2012) and burnout (Goodman and Schorling 2012; Ruths et al. 2013), and higher job satisfaction (Hülshager et al. 2013).

While mindfulness-based interventions like mindfulness-based cognitive therapy and mindfulness-based stress reduction appear to offer some promise for building resiliency and preventing compassion fatigue, the actual number of trials that have been conducted to evaluate their effectiveness among nurses is quite limited. A recent meta-analysis by Burton et al. (2017) found nine published studies of mindfulness-based interventions conducted with health professionals and only two were conducted with nurses (both uncontrolled trials). We found one additional non-randomised controlled trial of mindfulness-based therapy conducted with nurses (Duarte and Pinto-Gouveia 2016). This study with oncology nurses utilised a mindfulness-based intervention based on MBSR and consisted of six, 2-h group sessions. Participants in the intervention showed significant reductions in compassion fatigue, burnout and stress compared to those in the wait list control group. Although the intervention was slightly shorter in duration than in standard mindfulness-based interventions, it still required a significant time commitment from the nurses. While the results of the study are promising, no follow-up data were provided, and thus, conclusions about the maintenance of the changes cannot be made.

It has been argued that the duration and intensity of conventional 8-week mindfulness-based interventions can be a challenge in terms of recruiting and retaining busy workers such as nurses, and therefore may limit their broader adoption (Zeller and Levin 2013). Another issue that may hinder their implementation for nurses in acute care settings is that they predominantly target clinical health conditions and depression, rather than occupational stress or compassion fatigue. Transferring such protocols into work settings without an appropriate rationale and modification may conceivably limit their relevance and acceptability to nurses. Fortunately, a few studies have shown that briefer and less intensive mindfulness-based interventions lead to significant reductions in burnout symptoms in nurses and healthcare workers (Gauthier et al. 2015; Mackenzie et al. 2006), and increased resilience in physicians (Sood et al. 2011). Notwithstanding, there has been a paucity of such studies for nurses that

integrate compassion fatigue education and explain the role of mindfulness for resiliency.

As a preliminary step in addressing some of the aforementioned limitations (Craigie et al. 2016), we developed a mindful self-care and resiliency (MSCR) program as a brief psychosocial intervention that integrates compassion fatigue prevention education developed by Gentry and colleagues (e.g. Flarity et al., 2013; Gentry and Baranowsky 1998) with some of the key ideas and practices of mindfulness-based cognitive therapy. A preliminary feasibility evaluation of MSCR for nurses working at an acute care hospital (Craigie et al. 2016) showed that the intervention was associated with significant reductions in burnout and a number of other symptom domains, which were maintained at 1-month follow-up. A qualitative analysis conducted by Slatyer et al. (2017) of the experience of nurses completing the program also demonstrated the feasibility and acceptability of the protocol and that the strategies were being practically employed. However, as the study was only a small pilot evaluation, no control group was employed. Moreover, no significant reductions in secondary traumatic stress symptoms were observed and there was no significant improvement in general resilience. These issues, therefore, limit interpretation of the findings and suggest larger, more methodologically sound trials are required before stronger conclusions about the effectiveness of MSCR can be drawn.

The aim of this study was to assess the effectiveness of the MSCR intervention in reducing burnout, secondary traumatic stress and symptoms of general psychological distress in nurses working in an Australian tertiary hospital. A secondary aim was to determine whether the intervention increased protective factors for occupational stress, including compassion satisfaction, self-compassion and resilience. It was hypothesised that compared to nurses in the wait list control condition, nurses completing the MSCR intervention would show significant reductions in the symptoms of burnout, secondary traumatic stress and general psychological distress from pre- to post-intervention and from pre-intervention to follow-up. Additionally, compared to nurses in the wait list control condition, nurses completing the MSCR intervention would show significant improvements in compassion satisfaction, self-compassion and resilience from pre- to post-intervention and from pre-intervention to follow-up.

## Method

### Participants

The study was conducted in a 608 bed public teaching tertiary hospital in Australia. This is the state's principal hospital for neurosurgery and liver transplantation, home

to the state's comprehensive cancer centre, plus a range of clinical services and a very busy emergency department. Patient acuity and activity is high, with increasing bed pressures as approximately 80% of inpatients are admitted through the emergency department. These factors contribute to a stressful work environment for nursing staff. The hospital employs 2000 nurses and has attained Magnet® recognition through the American Nurses Credentialing Centre Magnet Recognition Program®. This program recognises those hospitals demonstrating excellence in nursing and patient care.

Convenience sampling was used to recruit registered nurses to participate in one of three MSCR programs. Inclusion criteria were registered nurses working in either a full-time or part-time capacity in a nursing management, education or direct care role within the study hospital. We anticipated enrolments of at least 20 participants per group and attrition of 10% based on earlier pilot work (Craigie et al. 2016), providing an expected sample size of 56 nurses contributing intervention group data. A priori sample size estimation using the software G\*Power Version 3.1.9.2 (Faul et al. 2007), assuming at least an 80% chance of detecting a moderate anticipated between-groups effect size ( $f = .25$ ) at an alpha level of 0.05, suggested that a total sample of  $N = 86$  would be sufficient. Our total sample of  $N = 91$  total participants therefore exceeded this calculated sample value for the pre-test model estimation. However, participant drop-out at the post-test stage of analysis (leading to  $N = 76$ ) suggested a potentially underpowered analysis for effects contrasting the intervention and control conditions at this data point.

A sample of 65 nurses contributed intervention group data and 26 nurses who were enrolled in later groups provided control group data. The sample consisted of 61 female, 6 male, and 24 non-specified participants. The mean participant age was 47.57 years ( $SD = 10.40$ ). Table 1 presents detailed participant characteristics. Participant scores on each scale at pre-test were examined for significant variations in scale means on the basis of gender, marital status and mode of employment. All tests of mean difference were statistically non-significant ( $p > .05$ ).

Prior to conducting inferential analyses, preliminary descriptive statistics were calculated and are presented in Table 2. Bivariate correlations were also examined and indicated relationships between outcome variables in logical directions, and reliabilities derived from calculation of  $\alpha$  for each scale at each measurement occasion indicated the scales were sufficiently reliable ( $\alpha > .70$ ). At pre-test, participants in the control and treatment groups did not vary significantly on demographic variables or on any of the outcome variables (all  $t$  tests  $p > .05$ ). No scales were indicative of potential multicollinearity ( $r < .90$ ; see Tabachnick and Fidell 2013).

**Table 1** Frequencies of sample demographic characteristics

Variable	Group 1	Group 2		Group 3		Total		
	Intervention	Intervention	Control	Intervention	Control	Intervention	Control	Sample
<i>N</i>	19	23	16	23	10	65	26	91
Gender								
Female	18	8	12	13	10	39	22	61
Male	1	0	4	1	0	2	4	6
Not specified	0	15	0	9	0	24	0	24
Marital status								
Single	6	1	0	2	0	9	0	9
Married	9	4	13	10	9	23	22	45
Other	4	2	3	2	1	8	4	12
Not specified	0	16	0	9	0	25	0	25
Citizenship								
Australian	15	6	14	11	9	32	23	55
Other/multiple	4	2	2	3	1	9	3	12
Not specified	0	15	0	9	0	24	0	24
Position								
RN	0	0	0	3	1	3	1	4
CN	0	1	1	8	2	9	3	12
SDN	1	2	2	0	2	3	4	7
SRN	18	5	13	0	2	23	15	38
Other	0	0	0	0	3	0	3	3
Not specified	0	15	0	9	0	24	0	24
Mode								
Full-time	19	6	10	8	5	33	15	48
Part-time	0	2	6	6	5	8	11	19
Not specified	0	15	0	9	0	24	0	24
Ward								
In-patient	9	5	10	10	7	24	17	41
Out-patient	6	2	3	3	3	11	6	17
Both/other	3	1	2	1	0	5	2	7
Not specified	1	15	1	9	0	25	1	26

*RN* registered nurse, *CN* clinical nurse, *SDN* staff development nurse, *SRN* senior registered nurse

## Procedure

This study employed a wait list control trial design with data collection at three time points: pre-intervention, post-intervention and 6-month follow-up. The flow of participants through the study can be seen in Fig. 1.

Prior to commencement of the study, ethical clearance was obtained from the study hospital (2013–248) and supporting university (HR08/2014). As an earlier trial of the intervention had shown it to be effective, for ethical reasons all nurses allocated to the wait list control condition were also offered the intervention following the control period. Recruitment involved providing nurses with an overview of the MSCR program, information about the research component and the dates of three scheduled intervention groups via their clinical

divisions, plus an invitation to enrol in a program of their choice. Upon arrival at the MSCR, a researcher who was not involved in program delivery welcomed participants and provided detailed study information with an invitation to participate in the research. Participation in the research component was optional and involved providing written informed consent and completion of the study questionnaires that were distributed by and returned to the researcher in individual folders. To protect the participants' confidentiality regarding the decision to participate, each folder contained a reading activity that could be completed as an alternative to data collection. Despite this option, all program participants (100% response) chose to participate in the research component.

All MSCR programs were held during 2015 in May–June (program 1), July–August (program 2) and September–

**Table 2** Means and standard deviations for outcome measures (*N* = 91)

Measures	Control group ( <i>n</i> = 26)		Intervention group ( <i>n</i> = 65)		
	Pre-test ( <i>n</i> = 26)	Post-test ( <i>n</i> = 16)	Pre-test ( <i>n</i> = 65)	Post-test ( <i>n</i> = 60)	Follow-up ( <i>n</i> = 42)
ProQol5 BO	23.35 (5.97)	23.38 (5.57)	23.75 (5.84)	21.65 (5.12)	21.49 (5.89)
ProQol5 CS	38.77 (4.91)	37.56 (6.40)	38.68 (5.45)	39.65 (5.88)	39.35 (6.59)
ProQol5 STS	20.08 (5.36)	18.56 (5.35)	20.48 (5.36)	18.53 (5.50)	17.63 (5.09)
SCS-SF	3.23 (0.73)	3.23 (0.80)	3.18 (0.82)	3.38 (0.74)	3.46 (0.84)
WHO Five	2.95 (0.97)	2.98 (1.23)	2.93 (0.91)	3.39 (0.77)	3.32 (1.01)
CD-RISC10	27.54 (5.17)	27.38 (6.06)	28.35 (5.97)	29.48 (5.72)	29.04 (7.75)
GSES	31.88 (4.84)	31.13 (2.45)	31.40 (3.94)	32.53 (3.83)	31.86 (4.05)
Stress	5.35 (3.96)	5.38 (4.95)	5.88 (3.88)	4.68 (3.00)	4.79 (4.29)
Anxiety	1.81 (2.06)	2.75 (4.80)	2.32 (2.68)	1.70 (2.13)	1.67 (2.59)
Depression	1.81 (1.92)	4.31 (5.15)	2.91 (3.19)	1.98 (2.51)	2.37 (3.58)

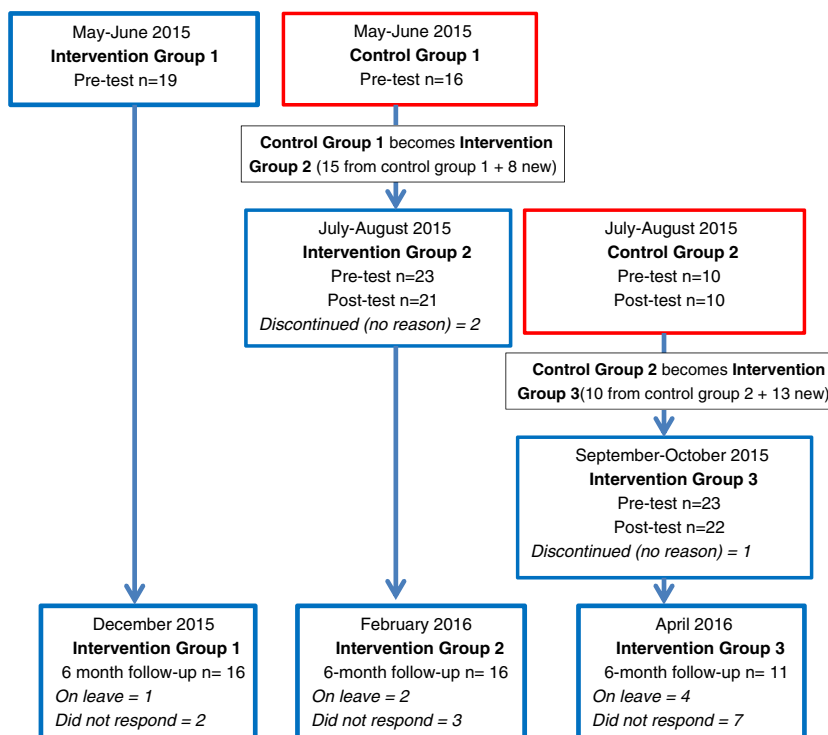
Standard deviations are presented in parentheses

*BO* ProQol5 Burnout subscale, *CS* ProQol5 Compassion Satisfaction subscale, *STS* ProQol5 Secondary Traumatic Stress subscale, *SCS-SF* Self-Compassion Scale (short form), *CD-RISC10* Connor-Davidson Resilience Scale 10, *GSES* Generalised Self-Efficacy Scale, *Stress* DASS21 Stress subscale, *Anxiety* DASS21 Anxiety subscale, *Depression* DASS21 Depression subscale

October (program 3). Nurses in program 1 provided intervention data only. Questionnaires were distributed upon arrival at the first MSCR session with time allowed for completion and return. Questionnaires were then repeated at the end of the final program 1 follow-up session. Nurses enrolled in program 2 were approached via email in the 2 weeks prior to commencement of program 1 and invited to participate in the research. Interested participants were provided with study information, the consent form and questionnaires delivered to

their workplace with directions to return the completed questionnaires using a sealed supplied envelope via the internal mail. For program 2 nurses, participation involved providing control data by completing the questionnaires during the first week and then final weeks of program 1 and then providing intervention data by completing the questionnaires at the commencement of program 2 and again at end of the final program 2 follow-up session. Recruitment into the third MSCR was slower; however, any nurses registered in program 3 before

**Fig. 1** Flow of participants through study



commencement of program 2 were similarly approached via email and invited to participate in the research by providing control data (at the same time as program 2) and intervention data at the commencement and end of program 3. The MSCR sessions were conducted in a private seminar room located on the hospital campus but away from the clinical units.

### *Intervention and Control Conditions*

All intervention groups were facilitated by one of the authors (MC), an experienced clinical psychologist with experience in running the intervention. The MSCR intervention constituted a full-day educational workshop comprising four sessions of about 1.5 h each, and three follow-up sessions of 1.75 h each held weekly (total duration of 11.5 h). The full-day workshop comprised two sessions of education about compassion fatigue resiliency based on Eric Gentry's Compassion Fatigue Prevention and Resiliency: Fitness for the Frontline (adapted with permission; J.E Gentry, personal email communication November 7–9, 2013), and two sessions introducing participants to mindfulness concepts (e.g. autopilot metaphor; staying present) and basic practices (e.g. raisin exercise; body and breath meditation) adapted from the work of Segal et al. (2002). Each participant was provided with a client manual at the commencement of the educational workshop that included intervention educational materials about compassion fatigue (CF) and its causes, and skills to build CF resiliency, referred to as the five "antibodies" (1—self-regulation, 2—intentionality, 3—perceptual maturation, 4—connection and social support and 5—self-care and revitalisation).

A central aim of the five mindfulness sessions (session themes: autopilot, staying present, allowing/letting be, thoughts as thoughts, review) was to learn mindfulness-based skills and practices to support CF resiliency. Mindfulness sessions were adapted from an abbreviated protocol described by MacKenzie et al. (2006), which was in part based on Segal et al. (2002). Both formal (e.g. body and breath; body scan; mindful movement and stretching; sitting with the breath, body and thoughts) and informal practices (e.g. breathing space, mindful eating) as described by Williams and Penman (2011) were practiced (about 10 to 25 min duration) and assigned as home-based practice exercises using a CD where applicable. A full description of the MSCR session content is provided in Craigie et al. (2016). Participants contributed control group data prior to participation in the intervention, when they were receiving usual support from supervisors and peers.

### *Data Collection*

Intervention group data were collected at three time points: time 1 at pre-intervention upon arrival at the full-day seminar,

time 2 at post-intervention following completion of the final weekly follow-up session, and time 3 at 6 months following completion of the MSCR intervention. Demographic details were also collected at time 1 unless the participant had previously provided control group data. Control group data were collected at two time points: time 1 during the same week as the previous MSCR program commenced (when time 1 pre-intervention group data were collected) and time 2 being 4 weeks later at the same time as the previous MSCR program completed (when time 2 post-intervention group data were collected). Demographic details were collected from the control group at time 1.

### **Measures**

The Professional Quality of Life Scale version 5 [ProQol5] (Stamm 2010) provides a measure of the constructs of compassion satisfaction and compassion fatigue; the second of which comprises burnout and secondary traumatic stress. Compassion satisfaction indicates an individual's positive adjustment to work derived from the pleasure of caring for others and the sense of performing well. On the other hand, burnout manifests as feelings of frustration, depressed mood and exhaustion that arise as negative aspects of caring. The third construct, secondary traumatic stress constitutes avoidance behaviours in response to work-related trauma associated with exposure to others' suffering through caring. The ProQol5 is a 30-item, 5-point Likert scale, containing three 10-item subscales measuring each of the aforementioned constructs. The scale has been utilised internationally and also has been psychometrically validated in different studies for various target populations and has demonstrated sound psychometric properties for nurses in an Australian acute care hospital (Hegney et al. 2014). The ProQol5 scales demonstrated sufficient ( $\alpha > .70$ ) evidence of reliability at each measurement point in our study. The secondary traumatic stress scale's reliability at pre-test ( $\alpha = .79$ ), post-test ( $\alpha = .84$ ) and follow-up ( $\alpha = .80$ ) were all acceptable. The compassion satisfaction scale's reliabilities indicated no concerns at pre-test ( $\alpha = .88$ ), post-test ( $\alpha = .90$ ) and follow-up ( $\alpha = .92$ ). The burnout scale's reliability was similarly acceptable at pre-test ( $\alpha = .83$ ), post-test ( $\alpha = .78$ ) and follow-up ( $\alpha = .84$ ).

The Depression, Anxiety and Stress Scale [DASS21] (Lovibond and Lovibond 1995) is a 21-item instrument that measures an individual's feelings of stress, anxiety and depression over the previous week. Shorter than the original 42-item scale, the DASS21 contains three 7-item subscales (stress, anxiety and depression) that are each summed to obtain a total subscale score with higher scores indicating more negative symptoms. Each item comprises a 4-point scale with participants asked to rate their responses to a series of statements on a range of "Did not apply to me at all" to "Applied to me very much, or most of the time". The DASS21 has been

widely used in clinical and general populations and has demonstrated strong psychometric properties (Lovibond and Lovibond 2004). No concerns with inadequate scale reliability ( $\alpha < .70$ ) were presented at each point of measurement in our study. The stress subscale demonstrated adequate reliability at pre-test ( $\alpha = .88$ ), post-test ( $\alpha = .87$ ) and follow-up ( $\alpha = .91$ ). The anxiety scale was similarly indicative of adequate reliability at pre-test ( $\alpha = .73$ ), post-test ( $\alpha = .85$ ) and follow-up ( $\alpha = .78$ ). The depression subscale indicated no reliability concerns on the basis of its alpha coefficients at pre-test ( $\alpha = .85$ ), post-test ( $\alpha = .89$ ) and follow-up ( $\alpha = .93$ ).

The Connor-Davidson Resilience Scale [CD-RISC10] (Connor and Davidson 2003) is a short form of the original 25-item tool developed as a survey based measure of stress, coping ability or resilience. Factor analysis has shown the 10-item version to be a pure measure of the core construct of resilience while retaining the psychometric qualities of the longer version (Campbell-Sills and Stein 2007). Evidence from previous studies in the community (Hegney et al. 2008) and nursing populations (Gillespie 2007) has shown the scale to be valid and reliable in assessing resilience in both normal and clinical populations (Connor et al. 2003). A 5-point response scale asks participants to rate how much they feel a series of statements applied to them over the previous month. Higher scores reflect greater resilience. The CD-RISC10 indicated adequate alpha reliability ( $\alpha > .70$ ) at each data collection point for our study, with pre-test ( $\alpha = .90$ ), post-test ( $\alpha = .91$ ) and follow-up ( $\alpha = .95$ ) alpha coefficients suggesting no reliability concerns.

The General Self-Efficacy Scale [GSES] (Schwarzer and Jerusalem 1995) is a 10-item scale measuring the optimistic self-belief that one can cope with adversity. The scale has been well-validated in samples from 23 nations. It is designed for the general population and is self-administered. Positive coefficients have been found with favourable emotion, and work satisfaction, while negative coefficients have been found with depression, anxiety, stress and burnout. Respondents are asked to rate how much each item statement applies to them using a 4-point Likert scale ranging from “Not true at all” to “Exactly true”. Higher scores indicate a stronger sense of self-efficacy. The GSES indicated sufficient alpha reliability ( $\alpha > .70$ ) at pre-test ( $\alpha = .91$ ), post-test ( $\alpha = .88$ ) and follow-up ( $\alpha = .91$ ) for our sample.

The Self-Compassion Scale-short form [SCS-SF] (Raes et al. 2011) is a brief 12-item scale measuring self-kindness, common humanity and mindfulness, defined as holding one’s experience in a balanced perspective. Evidence suggests that self-compassion is a protective factor associated with psychological health, happiness and optimism (Neff et al. 2007). We considered self-compassion to be a key variable to measure in the current study as the emotion regulation model of self-compassion

suggests that higher self-compassion assists with the ability to regulate emotions in the face of stressful events (Finlay-Jones et al. 2015). The SCS-SF consists of six subscales measuring self-kindness, self-judgment, common humanity, feelings of isolation, mindfulness, and over-identification (the tendency to fixate on negative perceptions of self) (Raes et al. 2011). Each item is structured as a statement describing a particular behaviour. The respondent is asked to indicate how often he or she behaves in this stated manner on a 5-point scale from “Almost never” to “Almost always”. Negative constructs (self-judgment, isolation and over-identification) are reverse scored and the total mean calculated to obtain a total self-compassion score. Higher scores indicate more self-compassion in difficult times. The SCS-SF suggested no concerns regarding its alpha reliabilities ( $\alpha > .70$ ) at the pre-test ( $\alpha = .91$ ), post-test ( $\alpha = .90$ ) and follow-up ( $\alpha = .93$ ) measurements we conducted.

The WHO (Five) Well-being Index [WHO Five] (Bech 1998) is a short instrument measuring subjective quality of life based on positive mood, vitality and general interest. It has five items rated on a 6-point Likert scale. Percentage scores are reported and compared to monitor changes in well-being. A difference of 10% indicates a significant change. The instrument has been well-validated in the general population (Bech et al. 2003), as well as with samples of older people (Heun et al. 2001), adolescents with diabetes (de Wit et al. 2007), and medical outpatients (Lowe et al. 2007). In a similar manner to the previous calculations of alpha reliability for the measures used in this study, the WHO Five demonstrated acceptable alpha reliability ( $\alpha > .70$ ) at the pre-test ( $\alpha = .90$ ), post-test ( $\alpha = .89$ ) and follow-up ( $\alpha = .95$ ) data collection periods.

## Data Analyses

The inferential data analyses were conducted via generalised linear mixed modelling (GLMM) using the software SPSS Version 22 (IBM Corporation, Armonk, NY, USA). GLMM was chosen as the most appropriate statistical analysis approach due to its robustness in analysing nested repeated measure data with missing responses without the need for missing data substitution (Handley et al. 2015; Holden et al. 2008). Furthermore, the maximum likelihood model estimation process used by the GLMM procedure employs and removes the need for balanced sample sizes across conditions (Heck et al. 2014), making this approach appropriate for our analyses. Heck et al. (2014) noted that smaller group sizes are less likely to be as reliably estimated as larger group sizes and recommend use of the restricted maximum likelihood estimation process to account for this potential bias in the data. As GLMM employs restricted maximum likelihood estimation by default (Heck et al.

2014), our approach was consistent with this recommended mitigating factor for smaller group sizes. Moreover, we employed a robust method of estimation of the model's covariance matrix parameter estimates as a further safeguard against violated model assumptions. In summary, while varying and smaller sample sizes were a potential concern for our data, we conducted our data analysis with several approaches designed to mitigate sample size-related concerns.

In an analysis approach consistent with that of the clinical intervention study by Handley et al. (2015), time of measurement, intervention group and the interaction between these terms (time  $\times$  intervention) were entered in the model as fixed effects. Significant interaction terms had effect size calculated as partial  $\eta^2$  in the manner described by Richardson (2011) and were examined via post hoc least significant difference (LSD) contrasts, delineated by time-of-measurement pairs, in a manner similar to that of Handley et al. (2015). Per Handley et al. (2015), effect size coefficients for the time-of-measurement pairs were calculated to derive a Cohen's (1988)  $d$  coefficient in each instance. While both participant and intervention group were intended to be entered as random nested effects in the model, the intervention group nesting of the data did not indicate significant variation in intercepts or slopes per grouping ( $p > .05$ ) and was consequently not included in each model due to parameter redundancy. Random nested effects on a participant basis were retained as a random model effect, due to accounting for significant residual variance for each outcome variable tested ( $p < .05$ ).

## Results

### Treatment Effects on ProQoL5 Outcomes

As demonstrated in Table 3, the burnout scale of the ProQoL5 demonstrated a significant time  $\times$  intervention interaction term ( $p = .003$ , partial  $\eta^2 = .04$ , a small-to-moderate effect size). The compassion satisfaction subscale did not indicate a statistically significant intervention or time-related effect; however, the interaction effect was near-significant ( $p = .060$ ). The secondary traumatic stress scale demonstrated a time-related main effect ( $p < .001$ , partial  $\eta^2 = .04$ , a small-to-moderate effect size).

The nature of the significant time  $\times$  intervention interaction for the burnout scale was examined via LSD contrasts in a pairwise approach. While the control group pre- and post-burnout scores did not significantly vary ( $p > .05$ ), the treatment group pre- and post-intervention scores significantly varied,  $t(205) = 4.15$ , ( $p < .001$ ), ( $d = 0.38$ ). This small-to-moderate effect reflected a significant reduction in burnout scores between the pre- and

post-intervention measurements for the treatment group. This effect was repeated when comparing pre-intervention and follow-up measurements for the treatment group,  $t(205) = 2.63$ , ( $p = .009$ ), ( $d = 0.39$ ), again reflecting significant reduction between pre-intervention and follow-up measurements of burnout for the treatment group. No significant ( $p > .05$ ) mean differences between post-intervention and follow-up burnout measurements were indicated for the treatment group, suggesting that the reduction in burnout scores at post-test did not significantly deviate at follow-up measurement.

The near-significant interaction observed for compassion satisfaction and prior research (Craigie et al. 2016) that has demonstrated improvements in compassion satisfaction after MSCR suggested the possibility that a type II error may have occurred. As such, pairwise comparisons between measurement events for the treatment and control group were also investigated for the compassion satisfaction subscale of the ProQoL5. For the treatment group, a statistically significant improvement between pre- and post-intervention compassion satisfaction scores was observed,  $t(205) = -2.24$ , ( $p = .026$ ), ( $d = 0.17$ ), although this effect was marginal in magnitude. There were no further significant differences between measurement occasions for either group.

The main effect for time-related change for the secondary traumatic stress scale significantly varied for the intervention group between the pre-test and follow-up measurements,  $t(205) = 2.43$ , ( $p = .001$ ), ( $d = 0.52$ ), reflective of a moderately sized effect. Secondary traumatic stress was significantly lower at follow-up in comparison to pre-intervention. The pre- and post-test measurement comparison, and the post-test and follow-up measurement comparison, did not elicit significant differences between the means for secondary traumatic stress ( $p > .05$ ).

### Treatment Effects on DASS21 Outcomes

Table 3 demonstrates that the stress and anxiety subscales of the DASS21 did not indicate any significant differences due to time-related, intervention-related or interaction (time  $\times$  intervention) effects. Contrary to this pattern, the depression subscale of the DASS21 indicated a significant interaction effect ( $p = .007$ , partial  $\eta^2 = .04$ , a small-to-moderate effect size). Follow-up LSD pairwise comparisons indicated that differences in depression subscale scores at pre-test and post-test were statistically significant (albeit in different directions) for the control group,  $t(205) = -2.07$ , ( $p = .040$ ), ( $d = 0.71$ ), a moderate-to-large effect size, and for the intervention group,  $t(205) = 2.55$ , ( $p = .011$ ), ( $d = 0.32$ ), a small-to-moderate effect size. No statistically significant differences ( $p > .05$ ) were noted for pairwise comparisons between the intervention group's pre- and post-test scores with their follow-up scores.



**Table 3** Summary of intervention, time and interaction effects on each measure

Measure	Intervention	Time	Intervention × time
ProQol5 BO	$F(1, 205) = 0.62, p = .432$	$F(2, 205) = 1.75, p = .177$	$F(1, 205) = 9.14, p = .003^{**}$
ProQol5 CS	$F(1, 205) = 1.11, p = .294$	$F(2, 205) = 0.17, p = .840$	$F(1, 205) = 3.59, p = .060$
ProQol5 STS	$F(1, 205) = 0.02, p = .894$	$F(2, 205) = 8.06, p < .001^{***}$	$F(1, 205) = 0.70, p = .402$
SCS-SF	$F(1, 205) = 0.05, p = .818$	$F(2, 205) = 3.70, p = .026^*$	$F(1, 205) = 2.97, p = .086$
WHO Five	$F(1, 205) = 0.74, p = .391$	$F(2, 205) = 2.39, p = .094$	$F(1, 205) = 3.61, p = .059$
CD-RISC10	$F(1, 204) = 1.54, p = .216$	$F(2, 204) = 0.23, p = .797$	$F(1, 204) = 1.81, p = .180$
GSES	$F(1, 204) = 0.00, p = .979$	$F(2, 204) = 1.53, p = .218$	$F(1, 204) = 1.98, p = .161$
Stress	$F(1, 205) = 0.51, p = .600$	$F(2, 205) = 0.02, p = .898$	$F(1, 205) = 1.94, p = .165$
Anxiety	$F(1, 205) = 0.05, p = .828$	$F(2, 205) = 0.13, p = .876$	$F(1, 205) = 2.24, p = .136$
Depression	$F(1, 205) = 0.65, p = .422$	$F(2, 205) = 0.78, p = .461$	$F(1, 205) = 7.74, p = .007^{**}$

BO ProQol5 Burnout subscale, CS ProQol5 Compassion Satisfaction subscale, STS ProQol5 Secondary Traumatic Stress subscale, SCS-SF Self-Compassion Scale (short form), CD-RISC10 Connor-Davidson Resilience Scale 10, GSES Generalised Self-Efficacy Scale, Stress DASS21 Stress subscale, Anxiety DASS21 Anxiety subscale, Depression = DASS21 Depression subscale

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < n.001$

### Treatment Effects on the CD-RISC10, GSES, SCS-SF and WHO Five

As demonstrated in Table 3, the CD-RISC10 scale demonstrated non-significant main effects for time-related change, intervention-related change and the interaction between these terms ( $p \geq .180$ ). Similarly, the GSES scale demonstrated non-significant main and interaction effects ( $p \geq .161$ ).

The SCS-SF scale demonstrated a significant main effect for time-related change ( $p = .026$ , partial  $\eta^2 = .02$ , a small effect size) and a near-significant effect for the time × intervention interaction ( $p = .086$ , partial  $\eta^2 = .01$ , a small effect size). Given the near-significant effect for the interaction, a type II error appeared possible to warrant further post hoc testing. While there was no evidence of statistically significant time-related change in SCS-SF for the control group ( $p > .05$ ), a significant increase was observed for the intervention group between pre- and post-test measurement periods,  $t(204) = -3.38, (p = .001), (d = 0.27)$ , reflective of a small-to-moderate effect size. Additionally, a significant increase in SCS-SF scores between pre-test and follow-up for the intervention group was observed,  $t(204) = -2.93, (p = .004), (d = 0.35)$ , similarly reflective of a small-to-moderate effect size. There was no significant difference between post-test and follow-up scores for the intervention group ( $p > .05$ ).

Following the previous rationale regarding the possibility of type II errors when observing near-significant interaction effects on short-form measures, the WHO Five's near-significant time × intervention interaction ( $p = .059$ , partial  $\eta^2 = .02$ , a small effect size) was also probed. While there were no significant differences in WHO Five scores between pre- and post-test for the control group ( $p > .05$ ), the pairwise comparisons

for the intervention group revealed a significant difference between pre- and post-test measurement periods,  $t(205) = -4.47, (p < .001), (d = 0.54)$ , and was reflective of a moderate effect size. Furthermore, the pre-test and follow-up pairwise comparison for the intervention group was also statistically significant,  $t(205) = -2.15, (p = .033), (d = 0.39)$ , albeit reflective of a small-to-moderate effect size. There was no significant difference between post-test and follow-up WHO Five scores for the intervention group ( $p > .05$ ).

### Discussion

The results of this study provide confirmation of the effectiveness of a brief mindful self-care and resiliency intervention for nurses. Importantly, this study has replicated the findings of an earlier pilot study (Craigie et al. 2016) showing that the MSCR intervention reliably reduces burnout among nurses. This study extends the earlier findings because of the inclusion of a control group thus strengthening conclusions that the improvements seen are the result of the intervention itself and not other extraneous factors such as the passage of time. Further, the significant reductions in burnout scores persisted at 6-month follow-up and were of equal magnitude as those observed directly following the intervention. The fact that an intervention of only 11.5-h duration can produce significant reductions in burnout that persist up to 6 months is a very promising finding.

The current findings are in line with a small number of other studies that have found brief forms of mindfulness-based interventions can lead to reductions in burnout and negative mood symptoms among nurses, healthcare workers,

medical students and physicians (Craigie et al. 2016; Duarte and Pinto-Gouveia 2016; Gauthier et al. 2015; Keng et al. 2015; Mackenzie et al. 2006; Sood et al. 2011). Achieving significant reductions in burnout symptoms via relatively brief interventions such as MSCR is particularly important for busy professional groups such as nurses who have little available time to participate. Mindfulness-based interventions emphasise the importance of regular practice of the strategies taught in order to achieve maximum benefit. Interviews with nurses who participated in the initial pilot evaluation of MBSR indicated that they were indeed applying the strategies taught in the course in their day-to-day work (Slatyer et al. 2017). Thus, the continued reductions in burnout scores observed in the present study at 6 months are likely related to the nurses continuing to apply the strategies taught.

As well as significant reductions in burnout symptoms, participants who completed the MSCR intervention also had statistically significant reductions in depression symptoms as measured by the DASS21. These reductions in depression occurred directly after the intervention (pre–post), but there was no evidence that the statistically significant improvements were sustained at the 6-month follow-up. Interestingly, participants in the control group showed the opposite result, with depression scores increasing during the wait list period. This finding could be taken as further evidence of the need for nurses to receive support to better cope with their busy and stressful positions. Alternatively, it could be that the nurses simply became more aware of their symptoms as a result of being asked to report on them. Scores on the anxiety and stress subscales also reduced for the intervention group following participation in the MSCR group, but these were not statistically significant changes.

While there was no significance between group differences observed from pre–post in terms of scores on secondary traumatic stress, the intervention group scores significantly improved from pre-test to follow-up. While this is a positive finding, it is impossible to know if this is a direct result of participation in the MSCR program because there was no comparison control group at the 6-month follow-up period. Both groups showed reductions in mean scores from pre–post, so it is plausible that the changes seen are the result of other non-specific factors. Nonetheless, the reduction in secondary traumatic stress scores is consistent with a moderate-sized effect.

In addition to examining the ability of the MSCR program to reduce symptoms of psychological distress, we also aimed to assess the impact of the program on building protective factors. A number of these variables reached near significance in terms of the interaction effect. We considered it clinically useful to explore these near-significant interactions further given the possibility that a type II error had occurred. Consistent with earlier work (Craigie et al. 2016), it is a promising finding that participants who completed the MSCR

intervention evidenced statistically significant improvements in compassion satisfaction directly following the intervention. Significant improvements were also observed in self-compassion scores for the MSCR group only and this moderately sized effect was observed at both post-test and at the 6-month follow-up. This is consistent with the work of Duarte and Pinto-Gouveia (2016) who also found increases in self-compassion following a 6-week mindfulness-based intervention with nurses. Finally, subjective quality of life scores as measured by the WHO Five significantly improved between pre and post and pre and follow-up for those who completed the MSCR group. These improvements also correspond with a moderate effect size. We did not observe any significant differences between the MSCR or control group on the variables of resilience or general self-efficacy. The lack of change on these variables could be explained by our use of short versions of the measures, which along with the restricted range in scores on these measures could account for the lack of observed change.

The accumulating evidence from the results of the present study as well as our earlier pilot and the work of other groups (e.g. Duarte and Pinto-Gouveia 2016) indicates that mindfulness-based interventions, even those of modest length such as the MSCR intervention trialled here, are capable of producing important improvements in nurse psychological well-being. We did not have sufficient power in this study to examine which variables predicted treatment outcome. Theoretically, the emotion regulation model of self-compassion suggests that the significant improvements observed in self-compassion scores would underlie the improvements seen in the other measures (i.e. burnout, depression, quality of life). However, empirical research has also linked improvement in decentering and positive reappraisal of stressors to subsequent decreases in anxiety and stress after mindfulness-based interventions (Garland et al. 2011; Hayes-Skelton et al. 2015). Given MSCR involves a number of skills components that target a more decentred and regulated stance to negative internal experience (e.g. self-regulation skill and mindfulness practices) and balanced appraisal of workplace stressors (e.g. perceptual maturation), future dismantling studies may wish to examine the role of these additional processes as potential change mechanisms in MSCR.

To summarise, nurses who completed the MSCR program had significant reductions in burnout and depression scores as well as improved levels of compassion satisfaction, self-compassion and subjective quality of life. These effects were generally small to moderate in size and for most variables were still significant at the 6-month follow-up period. Achieving small to moderate effects is a clinically important outcome given the brief nature of the intervention and the fact that the nurses who participated were not selected on the basis of high pre-intervention levels of distress. Interventions such as this can serve an

important preventative function, helping to improve nurse functioning before symptoms worsen.

The main strengths of the current study are the inclusion of a control group and a 6-month follow-up. Both of these design features greatly improve confidence in conclusions drawn about the effectiveness of the MSCR program. It is important, however, to acknowledge some limitations.

### Limitations

This study was conducted in a single setting and may have been underpowered to detect some outcomes. While our pre-test between-groups model estimates were sufficiently powered as noted in the “[Method](#)” section, our post-test between-groups model estimates were underpowered, suggesting that the risk of type II error may have been inflated for these analyses. Relatedly, our examination of model estimates that provided preliminary indications of potentially significant effects may not have been hampered by sample size as we suggested in the “[Results](#)” section, but may instead reflect a marginally valuable effect. Consequently, the need for future evidence via collected data with sufficiently large group sizes at each condition and phase of data collection is a pressing direction for further research.

Additionally, participants were not randomly allocated to conditions as they had to fit attendance at the full study day and follow-up sessions within pre-existing work schedules; instead they selected a treatment group that was convenient for them to participate in. Therefore, the groups may have differed in their engagement in the program if more motivated participants chose to enrol in the earlier groups. While we intended to control for gender-related effects as a covariate, approximately one quarter of our sample did not indicate their gender, making this aspect of statistical control potentially less rigorous than anticipated. However, as we indicated that gender effects were unlikely based on our statistically non-significant pre-test comparisons on each measure, this potential shortfall in statistical control would arguably have limited impact on our presented findings.

Lastly, due to ethical reasons, we do not have control comparison data at the 6-month follow-up as this would have required that participants were prevented from accessing the intervention shown to be potentially beneficial in pilot work. This limits our ability to draw conclusions about the long-term impact of participation in MSCR.

The results of this controlled trial build on earlier evidence indicating that MSCR is an effective and feasible intervention for improving the emotional functioning of nurses. Although the intervention is brief, it produces improved symptoms that persist 6 months after participation in the program. The significant and persistent improvements in burnout are particularly important given that burnout is part of the construct of compassion fatigue that has been reliably associated with

reduced productivity and increased absenteeism among nurses (Mealer et al. 2012). As nursing is a stressful occupation, with known threats to workforce retention, MSCR may provide an important means by which to help retain this group of health professionals. An important next step in evaluating MSCR will be to conduct a full randomised controlled trial with large numbers of participants and the inclusion of an economic analysis of the cost effectiveness of this intervention.

**Acknowledgements** We acknowledge the work of Ms. Rebecca Osseiran-Moisson for her assistance with the data entry and analysis. We also wish to thank the Nursing Executive Committee at the study hospital who funded the study and the International Collaboration for Workforce Resilience (ICWR1). Finally, we thank the nurses who participated in the study.

**Author Contributions** SS: designed and executed the study, led recruitment and data collection and wrote the paper. MC: collaborated with design of the study, developed and implemented the intervention and contributed to writing and editing the manuscript. BH: analysed the data and wrote part of the results. SD: collaborated with participant recruitment and delivery of the intervention and wrote part of the methods. CR: oversaw the design and execution of the study and the writing and editing of the final manuscript.

**Funding** The study was funded internally by the study hospital.

### Compliance with Ethical Standards

**Ethical Approval** Ethical approval to conduct the study was obtained from the study hospital (HREC No: 2013/248) and supporting university (HR08/2014). The study was therefore performed in accordance with the Helsinki Declaration and its later amendments.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

### References

- American Psychological Association (2015). The road to resilience. Retrieved from <http://www.apa.org/helpcenter/road-resilience.aspx>.
- Bech, P. (1998). *Quality of life in the psychiatric patient*. London: Mosby-Wolfe.
- Bech, P., Olsen, L., Kjolle, M., & Rasmussen, N. (2003). Measuring well-being rather than the absence of distress symptoms: a comparison of the SF-36 mental health subscale and the WHO-five well-being scale. *International Journal of Methods in Psychiatric Research*, 12(2), 85–91. doi:10.1002/mpr.145.
- Beck, C. (2011). Secondary traumatic stress in nurses: a systematic review. *Archives of Psychiatric Nursing*, 25(1), 1–10. doi:10.1016/j.apnu.2010.05005.
- Berger, R., & Gelkopf, M. (2011). An intervention for reducing secondary traumatization and improving professional self-efficacy in well baby clinic nurses following war and terror: a random control group trial. *International Journal of Nursing Studies*, 48(5), 601–610. doi:10.1016/j.ijnurstu.2010.09.007.
- Burton, A., Burgess, C., Dean, S., Koutsopoulou, G. Z., & Hugh-Jones, S. (2017). How effective are mindfulness-based interventions for reducing stress among healthcare professionals? A systematic

- review and meta-analysis. *Stress & Health*, 33, 3–13. doi:10.1002/smi.2673.
- Campbell-Sills, L., & Stein, M. B. (2007). Psychometric analysis and refinement of the Connor–Davidson resilience scale (CD-RISC): validation of a 10-item measure of resilience. *Journal of Traumatic Stress*, 20(6), 1019–1028. doi:10.1002/jts.20271.
- Cohen, J. (1988). *Statistical power for the behavioural sciences* (2nd ed.). Hillsdale: Erlbaum.
- Connor, K. M., & Davidson, J. (2003). Development of a new resilience scale: the Connor–Davidson resilience scale (CD-RISC). *Depression and Anxiety*, 18, 76–82. doi:10.1002/da.10113.
- Connor, K. M., Davidson, J. R. T., & Lee, L. C. (2003). Spirituality, resilience and anger in survivors of violent trauma: a community study. *Journal of Traumatic Stress*, 16(5), 487–494. doi:10.1023/A:1025762512279.
- Craigie, M., Slatyer, S., Hegney, D., Osseiran-Moisson, R., Gentry, E., Davis, S., et al. (2016). A pilot intervention of a mindful self-care and resilience (MSCR) intervention for nurses. *Mindfulness*, 7, 764–774. doi:10.1007/s12671-016-0516.x.
- Duarte, J., & Pinto-Gouveia, J. (2016). Effectiveness of a mindfulness-based intervention on oncology nurses' burnout and compassion fatigue symptoms: a non-randomized study. *International Journal of Nursing Studies*, 64, 98–107. doi:10.1016/j.ijnurstu.2016.10.002.
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G\*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. doi:10.3758/bf03193146.
- Figley, C. R. (1995). Compassion fatigue as secondary traumatic stress disorder: An overview. In C. R. Figley (Ed.), *Compassion fatigue: Coping with secondary stress disorder in those who treat the traumatized* (pp. 1–20). New York: Brunner-Routledge.
- Finlay-Jones, A. L., Rees, C. S., & Kane, R. T. (2015). Self-compassion, emotion regulation and stress among Australian psychologists: testing an emotion regulation model of self-compassion using structural equation modeling. *PloS One*, 10(7), e0133481. doi:10.1371/journal.pone.0133481.
- Flarity, K., Gentry, J. E., & Mesnikoff, N. (2013). The effectiveness of an educational program on preventing and treating compassion fatigue in emergency nurses. *Advanced Emergency Nursing Journal*, 35(3), 247–258. doi:10.1097/TME.0b013e31829b726f.
- Francis, R. (2013). Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry Executive Summary (Mid Staffordshire NHS Foundation Trust Public Inquiry). Retrieved from [http://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/279124/0947.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/279124/0947.pdf).
- Garland, E. L., Gaylord, S. A., & Fredrickson, B. L. (2011). Positive reappraisal mediates the stress-reductive effects of mindfulness: an upward spiral process. *Mindfulness*, 2(1), 59–67. doi:10.1007/s12671-011-0043-8.
- Gauthier, T., Meyer, R. M., Grefe, D., & Gold, J. I. (2015). An on-the-job mindfulness-based intervention for pediatric ICU nurses: a pilot. *Journal of Pediatric Nursing*, 30(2), 402–409. doi:10.1016/j.pedn.2014.10.005.
- Gentry, J. E., & Baranowsky, A. B. (1998). *Treatment manual for the accelerated recovery program*. Toronto: Psyche Ink Resources.
- Gillespie, B.M. (2007). The predictors of resilience in operating room nurses. (Doctoral dissertation). Griffith University, Gold Coast, Australia.
- Goodman, M. J., & Schorling, J. B. (2012). A mindfulness course decreases burnout and improves well-being among healthcare providers. *The International Journal of Psychiatry in Medicine*, 43(2), 119–128. doi:10.2190/PM.43.2.b.
- Handley, A. K., Egan, S. J., Kane, R. T., & Rees, C. S. (2015). A randomised controlled trial of group cognitive behavioural therapy for perfectionism. *Behaviour Research and Therapy*, 68, 37–47. doi:10.1016/j.brat.2015.02.006.
- Hayes-Skelton, S. A., Calloway, A., Roemer, L., & Orsillo, S. M. (2015). Decentering as a potential common mechanism across two therapies for generalized anxiety disorder. *Journal of Consulting and Clinical Psychology*, 83(2), 395. doi:10.1037/a0038305.
- Health Workforce Australia (2012). Health workforce 2025- Doctors, nurses and midwives – Volume 1. Retrieved from [http://submissions.education.gov.au/forms/archive/2015\\_16\\_sol/documents/Attachments/Australian%20Nursing%20and%20Midwifery%20Accreditation%20Council%20\(ANMAC\).pdf](http://submissions.education.gov.au/forms/archive/2015_16_sol/documents/Attachments/Australian%20Nursing%20and%20Midwifery%20Accreditation%20Council%20(ANMAC).pdf).
- Heck, R. H., Thomas, S. L., & Tabata, L. N. (2014). *Multilevel and longitudinal modeling with IBM SPSS* (2nd ed.). New York: Routledge.
- Hegney, D., Ross, H., Baker, P., Rogers-Clark, C., King, C., Buikstra, E., et al. (2008). *Identification of personal and community resilience that enhance psychological wellness: a Stanthorpe study*. Toowoomba: University of Southern Queensland.
- Hegney, D., Craigie, M., Hemsworth, D., Osseiran-Moisson, R., Aoun, S., & Francis, K. (2014). Compassion satisfaction, compassion fatigue, anxiety, depression and stress in registered nurses in Australia: study 1 results. *Journal of Nursing Management*, 22, 506–518. doi:10.1111/jonm.12160.
- Hegney, D., Rees, C., Eley, R., Osseiran-Moisson, R., & Francis, K. (2015). The contribution of individual psychological resilience in determining the professional quality of life of Australian nurses. *Frontiers in Psychology*, 6, 1613. doi:10.3389/fpsyg.2015.01613.
- Heun, R., Bonsignore, M., Barcoe, K., & Jessen, F. (2001). Validity of the five-item WHO Well-Being Index (WHO-5) in an elderly population. *European Archives of Psychiatric and Clinical Neuroscience*, 251(2 Supplement), 27–31. doi:10.1007/BF03035123.
- Hodges, H. F., Troyan, P. J., & Keeley, A. C. (2010). Career persistence in baccalaureate-prepared acute care nurses. *Journal of Nursing Scholarship*, 42(1), 83–91. doi:10.1111/j.1547-5069.2009.01325.x.
- Holden, J. E., Kelley, K., & Agarwal, R. (2008). Analyzing change: a primer on multilevel models with applications to nephrology. *American Journal of Nephrology*, 28(5), 792–801. doi:10.1159/000131102.
- Hülsheger, U. R., Alberts, H. J., Feinholdt, A., & Lang, J. W. (2013). Benefits of mindfulness at work: the role of mindfulness in emotion regulation, emotional exhaustion, and job satisfaction. *Journal of Applied Psychology*, 98(2), 310–325. doi:10.1037/a0031313.
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144–156. doi:10.1093/clipsy.bpg016.
- Kabat-Zinn, J. (1990). *Full catastrophe living*. New York: Dell Publishing.
- Keng, S.-L., Phang, C. K., & Oei, T. P. (2015). Effects of a brief mindfulness-based intervention program on psychological symptoms and well-being among medical students in Malaysia: a controlled study. *International Journal of Cognitive Therapy*, 8(4), 335–350. doi:10.1521/ijct.2015.8.4.335.
- Khoury, B., Lecomte, T., Fortin, G., Masse, M., Therien, P., Bouchard, V., & Hofmann, S. (2013). Mindfulness-based therapy: a comprehensive meta-analysis. *Clinical Psychology Review*, 33(6), 763–771. doi:10.1016/j.cpr.2013.05.005.
- Lim, J., Bogossian, F., & Ahern, K. (2010). Stress and coping in Australian nurses: a systematic review. *International Nursing Review*, 57, 22–31. doi:10.1111/j.1466-7657.2009.00765.x.
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, 33(3), 335–343. doi:10.1016/0005-7967(94)00075-U.
- Lovibond, S., & Lovibond, P. (2004). *Manual for the depression anxiety stress scales* (2nd ed.). Sydney: The Psychology Foundation of Australia.

- Lowe, B., Spitzer, R., Grafe, K., Kroenke, K., Quenter, A., Zipfel, S., et al. (2007). Comparative validity of three screening questionnaires for DSM-IV depressive disorders and physicians' diagnoses. *Journal of Affective Disorders*, 78(2), 131–140. doi:10.1016/S0165-0327(02)00237-9.
- Mackenzie, C. S., Poulin, P. A., & Seidman-Carlson, R. (2006). A brief mindfulness-based stress reduction intervention for nurses and nurse aides. *Applied Nursing Research*, 19(2), 105–109. doi:10.1016/j.apnr.2005.08.002.
- Manzano García, G., & Ayala Calvo, J. C. (2012). Emotional exhaustion of nursing staff: influence of emotional annoyance and resilience. *International Nursing Review*, 59(1), 101–107. doi:10.1111/j.1466-7657.2011.00927.x.
- McVicar, A. (2016). Scoping the common antecedents of job stress and job satisfaction for nurses (2000–2013) using the jobs-resources model of stress. *Journal of Nursing Management*, 24(2), E112–E136. doi:10.1111/jonm.12326.
- Mealer, M., Jones, J., Newman, J., McFann, K. K., Rothbaum, B., & Moss, M. (2012). The presence of resilience is associated with a healthier psychological profile in intensive care unit (ICU) nurses: results of a national study. *International Journal of Nursing Studies*, 49, 292–299. doi:10.1016/j.ijnurstu.2011.09.015.
- Mealer, M., Conrad, D., Evans, J., Jooste, K., Solyntjes, J., Rothbaum, B., & Moss, M. (2014). Feasibility and acceptability of a resilience training program for intensive care unit nurses. *American Journal of Critical Care*, 23(6), 97–105. doi:10.4037/ajcc2014747.
- Neff, K., Kirkpatrick, K., & Rude, S. (2007). An examination of self-compassion in relation to positive psychological functioning and personality traits. *Journal of Research in Personality*, 41, 908–916. doi:10.1016/j.jrp.2006.08.002.
- Potter, P., Deshields, T., Berger, J. A., Clarke, M., Olsen, S., & Chen, L. (2013). Evaluation of a compassion fatigue resiliency program for oncology nurses. *Oncology Nursing Forum*, 40(2), 180–187. doi:10.1188/13.ONF.180-187.
- Raes, F., Pommier, E., Neff, K., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the self-compassion scale. *Clinical Psychology & Psychotherapy*, 18(250–255). doi:10.1002/cpp.702.
- Rees, C. S., Breen, L., Cusack, L., & Hegney, D. (2015). Understanding individual resilience in the workplace: the international collaboration of workforce resilience model. *Frontiers in Psychology*, 6, 73. doi:10.3389/fpsyg.2015.00073.
- Richardson, J. T. E. (2011). Eta squared and partial eta squared as measures of effect size in educational research. *Educational Research Review*, 6(2), 135–147. doi:10.1016/j.edurev.2010.12.001.
- Ruths, F. A., de Zoysa, N., Frearson, S. J., Hutton, J., Williams, J. M. G., & Walsh, J. (2013). Mindfulness-based cognitive therapy for mental health professionals—a pilot study. *Mindfulness*, 4(4), 289–295. doi:10.1007/s12671-012-0127-0.
- Sarafis, P., Rousaki, E., Tsounis, A., Malliarou, M., Lahana, L., Bamidis, P., et al. (2016). The impact of occupational stress on nurses' caring behaviours and their health related quality of life. *BMC Nursing*, 15, 56. doi:10.1186/s12912-016-0178-y.
- Schwarzer, R., & Jerusalem, M. (Eds.). (1995). *Generalized self-efficacy scale*. Windsor: Nfer-Nelson.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression*. New York: The Guilford Press.
- Slatyer, S., Craigie, M., Rees, C., Davis, S., Dolan, T., & Hegney, D. G. (2017). Nurses' experience of participation in a newly developed mindfulness based self-care and resiliency program. *Mindfulness* (in press).
- Sood, A., Prasad, K., Schroeder, D., & Varkey, P. (2011). Stress management and resilience training among Department of Medicine faculty: a pilot randomized clinical trial. *Journal of General Internal Medicine*, 26(8), 858–861. doi:10.1007/s11606-011-1640-x.
- Southwick, S., & Charney, D. (2012). *Resilience: the science of mastering life's greatest challenges*. New York: Cambridge University Press.
- Stamm, B. (2010). *The concise ProQOL manual* (2nd ed.). Pocatello: The ProQOL.org.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Boston: Pearson.
- Teasdale, J. D. (1999). Metacognition, mindfulness and the modification of mood disorders. *Clinical Psychology & Psychotherapy*, 6(2), 146–155. doi:10.1002/(SICI)1099-0879(199905)6:2<146::AID-CPP195>3.0.CO;2-E.
- van der Velden, A., Kuyken, W., Wattar, U., Crane, C., Pallesen, K., Dahlgaard, J., et al. (2015). A systematic review of mechanisms of change in mindfulness-based cognitive therapy in the treatment of recurrent major depressive disorder. *Clinical Psychology Review*, 37, 26–39. doi:10.1016/j.cpr.2015.02.001.
- Wells, A. (2005). Detached mindfulness in cognitive therapy: a metacognitive analysis and ten techniques. *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, 23(4), 337–355. doi:10.1007/s10942-005-0018-6.
- Williams, M., & Penman, D. (2011). *Mindfulness: a practical guide to finding peace in a frantic world*. London: Piatkus.
- de Wit, M., Pouwer, F., Gemke, R., Delemarre-van de Waal, H., & Snoek, F. (2007). Validation of the WHO-5 well-being index (WHO-5) in adolescents with type 1 diabetes. *Diabetes Care*, 30(8), 2003–2006. doi:10.2337/dc07-0447.
- Wolever, R., Bobinet, K., McCabe, K., Mackenzie, E., Fekete, E., Kusnick, C. A., & Baime, M. (2012). Effective and viable mind-body stress reduction in the workplace: a randomized controlled trial. *Journal of Occupational Health Psychology*, 17(2), 246–258. doi:10.1037/a0027278.
- Zeller, J. M., & Levin, P. F. (2013). Mindfulness interventions to reduce stress among nursing personnel. *Workplace Health & Safety*, 61(2), 85–89. doi:10.1177/216507991306100207.