

A review on mindfulness and nursing stress among nurses

Zaini Said ^{*)1}, Goh Lei Kheng ²

^{1,2} Universiti Kebangsaan Malaysia

^{*)}Corresponding author, ✉e-mail: zainisaid@ukm.edu.my

Abstract

Previous research has been done on mindfulness and nursing stress but no review has been done to highlight the most up-to-date findings, to justify the recommendation of mindfulness training for the nursing world. The present paper aims to review the relevant studies, derive conclusions, and discuss future direction of research in this field. A total of 19 research papers were reviewed. The majority was intervention studies on the effects of mindfulness-training programs on nursing stress. Higher mindfulness is correlated with lower nursing stress. Mindfulness-based training programs were found to have significant positive effects on nursing stress and psychological well-being. The studies were found to have non-standardized intervention methods, inadequate research designs, small sample sizes, and lack of systematic follow-up on the sustainability of treatment effects, limiting the generalizability of the results. There is also a lack of research investigation into the underlying mechanism of action of mindfulness on nursing stress. Future research that addresses these limitations is indicated.

Keywords: mindfulness, nurse, nursing stress

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Introduction

The nature of the nurses' job is widely recognized as stressful. They have heavy workload juggling between clinical contacts and administrative tasks, time constraint, insufficient number of colleagues to share the work burden, strained relationship with other healthcare providers, role conflicts, and challenges in dealing with the patients and the families' expectations and sufferings (American Holistic Nurses Association 2012). Nurses in Malaysia also face the similar stressors (IntanNazni&Asri 2003). However, research focusing on the nurses' stress levels in Malaysia had contradictory outcomes on whether the prevalence of stress was high (Emilia & Noor Hassim 2007) or moderate (Lua &Imilia 2011; Sharifah Zainiyah et al. 2011). In fact, the participants in each study reported various levels of stress. This suggests that given similar external stressors, individual nurses' differential experiences of stress can be explained by their personal appraisals and coping strategies. The use of self-blame and emotional ventilation among the nurses predicted a higher level of stress (Emilia & Noor Hassim 2007; Wan Salwina, Raynuha, Ainsyah et al. 2009).

The issue of nursing stress concerns the society because the nurses play an important role within the healthcare settings. Ongoing experience of high stress levels contributes to a higher likelihood of burnout, psychological distress, and physical health but diminished job satisfaction among the nurses (Michie& Williams 2003; Wan Salwina et al. 2009)

This contributed to a high turnover rate among the nurses (O'Henley et al. 1997) that would worsen the problem with lack of manpower within the field. It also impeded healthcare outcomes and patients' satisfaction (Brady, O'Connor, Burgermeister et al. 2011; Larrabee, Ostrow, Withrow et al. 2004). Without the use of adaptive coping, combined with the alarming negative impacts of nursing stress, necessitate the implementation of stress-management program as part of the nurses' training so that they can learn to cope with stress more effectively.

In recent years, there is an escalating amount of research attention focusing on the effectiveness of mindfulness training programs which include mindfulness-based stress reduction (MBSR; Kabat-Zinn 1990) and mindfulness-based cognitive therapy (MBCT; Segal, Williams & Teasdale, 2002) developed from MBSR in stress reduction and well-being enhancement (Baer 2003; Grossman, Niemann, Schmidt et al. 2004) across different population including people with cancer, depression, heart disease and healthcare providers (Beddoe & Murphy 2004; Bruce & Davies 2005; Gazella 2005; Smith, Richardson, Hoffman, & Pilkington 2005; Tacon et al. 2003 as cited in Praissman 2008). Mindfulness is the receptive awareness and attention to the present events and experiences which encompass observing, describing, acting with awareness, non-judging, and non-reactivity to private experiences (Baer, Smith, Hopkins et al. 2006; Brown & Ryan 2003). Mindfulness can be a psychological trait, a state with high awareness of the present or as a result of meditational practices that cultivate mindfulness (Germer, Siegel & Fullton 2005). The origin of mindfulness can be traced back to the ancient Buddhist tradition of contemplation. However, it is now widely applied within the secular context without the need of spirituality support because it depends on universal humans' ability to be attentive to the present (Coffey & Hartman 2008).

As there is a rise in the number of research investigations on the relationships between mindfulness and nursing stress, it is important to conduct a literature review to highlight the most up-to-date research findings and justify the need to introduce mindfulness training to the profession. To date, only one review has been done by Smith (2014) on the studies that investigated the specific effects of MBSR on healthcare providers' ability to cope with work-related stress. However, no systematic literature review has been done on the relationship between mindfulness and nursing stress. The present paper serves to fill in the gap by reviewing the relevant studies to date to draw conclusions and identify future research directions.

Method

Studies mindfulness and nursing stress were identified after a comprehensive search using three electronic databases: EBSCO (1997-present), Pro-Quest Health and Medical Complete (1994-present), PubMed (1999-present), and SCOPUS (2001-present). Google Scholar was used to search for unpublished dissertations. The inclusion criteria are research studies that investigate the effects of training programs that incorporate mindfulness on nursing stress. The exclusion criteria are research studies that investigate the effects of other stress management programs on other population's stress. Keywords used to search for the articles include "mindfulness," "nurse," and "nursing." The generic keywords were used to identify as many studies as possible. Filters such as "English language" and "peer-reviewed" were used to refine search. 14 full articles, three unpublished dissertations, noted with an asterisk (*), one abstract of a review paper, and one abstract of a research whereby the manuscript was under corrected proof from the abovementioned databases were identified and included in this review (Figure 1).

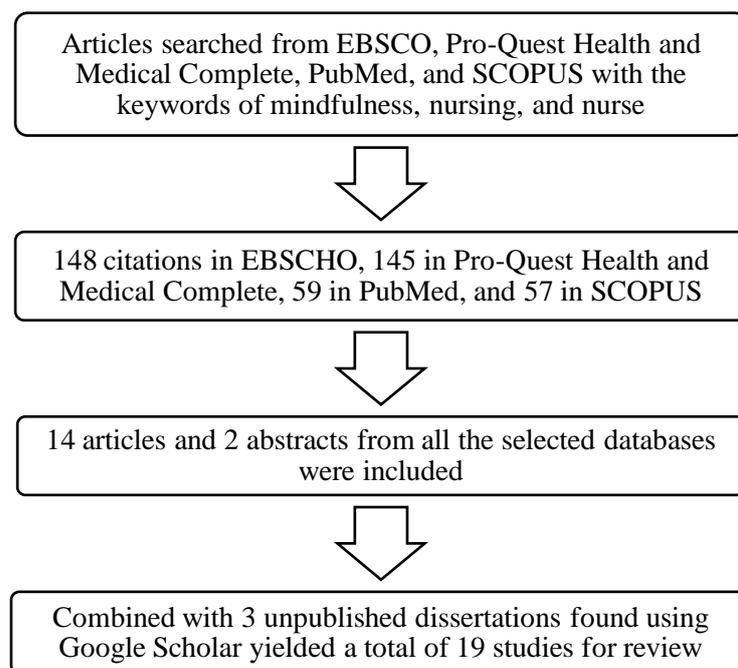
Figure 1: Flowchart of the reviewing process

Table 1 presents the studies on mindfulness training programs for nursing stress and their relevant important features (a) authors, (b) participants, (c) location, (d) research design, (e) program, (f) measures of stress-related outcome, (g) measures of well-being related outcome, and (h) treatment outcomes with significant improvement.

Results and Discussion

A total of 19 research papers from the year 1994 till present fulfilled the inclusion criteria to be reviewed in the present paper (see Table 1 and Table 2). 17 of the research papers are intervention studies on the effects of mindfulness training programs on nursing stress and other well-being measure, one is survey study, and another one is a review paper. 18.75% of the intervention studies were randomized controlled pre-post studies, 37.5% were nonrandomized controlled, another 37.5% were quasi-experiments, and the remaining one study was qualitative. There were ten studies that involved only nurses, three that included other healthcare professionals besides nurses, and four that recruited nursing students as participants. The study by Horner, Piercy, Eure & Woodard (2013) is under corrected proof thus only the abstract with limited details is made available. Excluding Horner et al.'s (2013) study, there were a total number of 1460 nurses and 197 nursing students that were being studied. Most of the studies were conducted in U.S. (64.7%), two in South Korea, and the others were each carried out in Australia, Canada, China, Japan, and Malaysia.

Of all the intervention studies, eight studies (47%) investigated on the effects of MBSR in alleviating stress experienced by the nurses. MBSR was developed by Jon Kabat-Zinn from the University of Massachusetts Medical Center based on the concept of being entirely present to one's personal experience without resisting or attaching any judgment termed mindfulness. The program was detailed in Kabat-Zinn's (1990) textbook entitled "Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness." The original MBSR spans across eight weeks, with at least 2.5 hours of weekly group sessions for formal didactic instruction on topics such as communication skills, stress reactivity, and self-compassion and experiential exercises and a 6-hour daylong retreat during the 6th or 7th week. The participants would also be instructed to actively practice mindfulness meditation for 6 days per week facilitated by the audiotaped instructions. They would also be expected to integrate the mindfulness skills and concepts into daily routine. Beddoe and Murphy (2004), Beth Elsa et al. (2007), and

Cohenz-Katz, Wiley, Capuano, Baker, and Shapiro's (2005) studies were based on the traditional Kabat-Zinn's (1990) version of MBSR.

Other researchers modified the traditional format and/or content but found similar improvement. Bazarko, Cate, Azocar, and Kreitzer (2013) named the modified MBSR as telephonic MBSR (tMBSR) by replacing the group meeting sessions with 6 scheduled weekly 1.5-hour group teleconference calls, an additional in-person retreat day at the beginning of the program, email discussion with the instructor in between sessions, and access to personalized instructions and supports. Brady, O'Connor, Burgermeister and Hanson (2011) and Mackenzi, Poulin and Sigmund-Carlson's (2006) adapted the duration to 4 weeks to cater to the nurses' heavy job demands. There were weekly 1-hour group sessions focusing on formal meditation and attention to breath, mindfulness in daily activities, total body relaxation, and mindfulness at workplace and the requirement to practice meditation and mindfulness in daily activities at least 30 minutes daily. On the other hand, Foureur, Besley, Burton, Yu and Crisp (2013) modified the content into only a 1-day workshop to psychoeducate the nurses' on the relationships among body, mind, emotion, and behavior and strategies for moment-to-moment mindfulness and the assignment to meditate daily for 8 weeks. Hee, Subramaniam, Rahmat and Phang (2014) devised a 5-week program constituting 2-hour weekly sessions and daily mindfulness practice, named brief-MBCT by integrating MBSR and MBCT approaches. b-MBCT seeks to train the participants in cultivating meta-mindfulness so that by being more aware of their private experiences, they assume a detached perspective to defuse from the negative internal events (Phang & Ooi 2012; Segal et al. 2002). b-MBCT also consists of the elements of compassion and gratitude in addition to mindfulness. In O'Brien et al.'s (2013) study where exposure to humor was incorporated to 7-minute daily meditation for 4 weeks, there was also significant improvement in terms of the nursing students' anxiety and well-being.

There were four intervention studies that concluded the positive effects of mere daily mindfulness meditation practice across a variety of duration on nursing stress and well-being. The participants in Kang, Choi and Ryu's (2009) 8-week mindfulness meditation program learned and practiced walking mindfully and body scan and breathing meditation as daily routine. On the other hand, in Pipe, Bortz, Dueck et al.'s (2009) study, the participants underwent a 4-week daily meditation program. Ando, Natsume, Kuki-hara, Shibata and Ito (2011) investigated on 2-week daily 30-to-60 minute cyclic meditation whereby the participants moved their hands or legs while meditating to focus their attention on mind and body. The program with the shortest duration is Chen, Yang, Wang and Zhang's (2013) that involved nursing students to meditate for 30 minutes daily for only a week.

There were two other intervention studies that had also shown positive effects of spirituality program that incorporated important elements of mindfulness on nurses' stress and well-being. Borrman, Becker, Gershwin et al. (2006) and Yong, Kim, Park, Sweo and Swinton's (2013) 5-week, 90-minute weekly sessions of spirituality program was based on *The Mantram Handbook* (Easwaran 1998), that includes practicing Mantram as a form of meditation, cultivating one-pointed attention, slowing down, and repeating mantram during daily activities.

There is only one qualitative study (Beth Elisa et al. 2007) and two quantitative studies that had included some qualitative findings (Cohen-Katz et al. 2005; Foureur et al. 2013). The participants reported that they found the program helpful in managing stress and instilling calmness but having difficulty in following routine meditation and doubted the feasibility of such program to be conducted in the hectic settings.

Twelve intervention studies (70.5%) measured both nursing stress-related and well-being outcomes. Three (17.6%) measured only stress-related findings whereas two (11.7%) measured only psychological well-being at post intervention. To measure stress-related outcomes including perceived stress, burnout symptoms, emotional distress, and job satisfaction, different instruments were used across studies. Three studies used Perceived Stress Scale (PSS) (Bazarko et al. 2013; Borrman et al. 2006; Hee et al. 2014), one study used Derogatis Stress Profile (DSP) (Beddoe & Murphy 2004) and Mental Health Professionals Stress Scale (MHPSS) (Brady et al. 2011). Five studies used Maslach Burnout Inventory (MBI) (Brady et al. 2011; Cohen-Katz et al. 2005; Mackenzi et al. 2006; Penque et al. 2009; Yong et al. 2011) and one used Copenhagen Burnout Inventory (CBI) (Bazarko et al. 2013) to measure their burnout symptoms. Certain studies also measured depression, anxiety, stress, and anger using respective questionnaires such as Depression Anxiety Stress Scale (DASS) (Foureur et al. 2013), State/Trait Anxiety Anger Inventory

(STAA) (Borrman et al. 2006), Beck Depression Inventory (BDI) (Kang et al. 2009). Chen et al. (2013) adopted Self-rated Anxiety and Depression Scale and physiological measures. Other instruments used were Brief Symptom Inventory (BSI) and Emotional Exhaustion Subscale (EES) (Cohen-Katz et al. 2005). The studies that include work satisfaction measures used Index of Work Satisfaction (Penque et al. 2009) and Job Satisfaction Scale (Yong et al. 2011).

In line with the review done by Smith (2014) which concluded that the healthcare providers including the nurses' ability to cope with job stress was improved after the MBSR, all the nurses or nursing students who had undergone the mindfulness training program regardless format and content differences, experienced significant reduction in terms of stress-related symptoms including perceived stress, burnout symptoms, anxiety, and anger. The only exception is that Brady et al. (2013) did not find significant improvement in the participants' burnout symptoms despite the significant improvement in stress levels with MBSR. Also, mindfulness training programs were found to have no impact on depressive symptoms (Chen et al. 2013; Fourer et al. 2013; Kang et al. 2009). In terms of job satisfaction, the findings by two studies were contradictory whereby the nurses in Penque et al. (2009) but not Yong et al.'s (2011) reported higher job satisfaction at post-intervention. This might be due to other individual and environmental differences in addition to stress that also affect to what extent that they could derive contentment from their job.

Besides stress-related outcomes, most intervention studies also assess the effects of mindfulness training programs on different well-being related outcomes, including mindfulness, sense of coherence, sense of self, quality of life, spiritual well-being, empathy, self-compassion, happiness, and satisfaction with life. 66.7% studies included a combination of different measures in attempt to capture the totality of psychological well-being. This is in line with the general consensus that the definition of well-being is multifaceted (Ryff & Keyes 1995). The most widely used instrument is Mindfulness Attention Awareness Scale (MAAS) (Beth Elisa et al., 2007; Cohen-Katz et al. 2005, Hee et al. 2014; O'Brien et al. 2013), followed by General Health Questionnaire (GHQ-12) (Ando et al. 2011; Foureur et al. 2013), Sense of Coherence Scale (SOC) (Ando et al. 2011; Foureur et al. 2013), and Interpersonal Reactivity Index (Beddoe & Murphy 2004; Penque et al. 2009). Others are listed in Table 1.

In the studies that also measured the treatment outcomes at 1, 2, 3, and 4 months respectively after post-intervention, the positive effects of mindfulness training programs on nursing stress and psychological well-being sustained overtime (Bazarko et al. 2013; Beth Elisa et al. 2007; Cohen-Katz et al. 2005; Mackenzi et al. 2006; Penque et al. 2009).

The survey study done by Heard (2010) showed that the nurses who reported higher level of dispositional mindfulness also had lower propensity to burn out. This implied that without mindfulness training program, individuals' trait mindfulness is also likely to buffer against stress. Based on Taylor, White and Muncer's (1999) findings, facing with the challenge of consistently inadequate number of colleagues to share the workload, the working nurses perceived a lack of resources and support that negatively affected their self-efficacy in managing the job demands. Therefore, trait mindfulness or mindfulness cultivated via training programs assist the nurses to focus while fulfilling their roles, without attaching negative judgment on personal capability and the inevitable stressful job demands. While the training programs also engaged them to develop the habit of being mindful in daily activities, it also improved their general well-being.

Table 1: Studies of mindfulness training programs on nursing stress

Study	Participants	Location	Design	Program	Measures of stress-related outcome	Measures of well-being related outcome	Significant improvement
Ando et al. (2011)	N=28 nurses Treatment-15; Control-13	Elderly ward, Japan	Nonrandomized controlled pre-post intervention study	2-week of daily cyclic meditation for 30-to-60 minutes	N/A	General Health Questionnaire (GHQ-12), Sense of Coherence (SOC), Functional Assessment of Chronic Illness Therapy-Spiritual Well-being Scale (FACIT-Sp)	GHQ-12, SOC
Bazarkoe t al. (2013)	N=36 29 clinical nurses, 7 staff nurses	Midwest & Southwestern Healthcare Company, U.S.	Quasi-experimental, single group, pre-post intervention study	8-week tMBSR with additional 1 retreat day at the beginning, 2 and 4-month follow-up	Perceived Stress Scale (PSS), Copenhagen Burnout Inventory (CBI)	Brief Serenity Scale, SF-12v2 Health Survey, Self-Compassion Scale, Jefferson Scale of Physician Empathy	All
Beddoe& Murphy (2004)	23 nursing students	U.S.	Quasi-experimental, single group, pre-post intervention study	8-week MBSR	Derogatis Stress Profile (DSP)	Interpersonal Reactivity Index (IRI)	All
Beth Elisa et al. (2007)	4 nurses	Wisconsin, U.S.	Qualitative	8-week MBSR, 3-month follow-up	N/A	Self-development, Mindfulness Attention Awareness Scale (MAAS)	MAAS
Brady et al. (2011)	N=16 7 psychiatric nurses	Inpatient behavioral health unit in Midwest hospital,	Quasi-experimental, single group, pre-post intervention	4-week brief MBSR, 1-hour weekly sessions, without retreat day	Mental Health Professionals Stress Scale (MHPSS),	Sense of Self Scale, the Toronto Mindfulness Scale	All except burnout

		U.S.	study		Maslach Burnout Inventory (MBI)		
Borrmann et al. (2006)	N=62 31 nurses 31 staffs	Veterans Affairs San Diego Healthcare System, U.S.	Quasi-experimental, single group, pre-post intervention study	5-week <i>Mantram</i> repetition	PSS, Spielberger State/Trait Anxiety Inventory (STAI) and Anger Inventory (STAA)	Endicott's Quality of Life Enjoyment and Satisfaction Short Form, Spiritual Well-being Scale	All

Table 1: Continued

Study	Participants	Location	Design	Program	Measures of stress-related outcome	Measures of well-being related outcome	Significant improvement
Chen et al. (2013)	N=60 nursing students Treatment - 30; Control - 30	Medical University in Guangzhou, China	Randomized controlled pre-post intervention study	1-week of daily 30-minute mindfulness meditation	Self-rated Anxiety Scale, Self-rated Depression Scale, heart rate, blood pressure	N/A	anxiety, systolic blood pressure
Cohen-Katz et al. (2005)	N=25 nurses Treatment-12; Control-13	Lehigh Valley Hospital & Health Network, U.S.	Randomized controlled pre-post intervention study	8-week MBSR, 3-month follow-up	MBI, Brief Symptom Inventory (BSI), Emotional Exhaustion Subscale	MAAS	All

					e (EES)		
Fouret et al. (2013)	N=40 20 nurses, 20 midwives	2 teaching hospitals in New South Wales, Australia	Nonrandomized controlled pre-post intervention study	Modified 8-week MBSR: 1-day workshop, without retreat day	Depression, Anxiety and Stress Scale (DASS)	GHQ-12, SOC	All
Hee et al. (2014)	N=37 critical care nurses	Hospital Serdang, Malaysia	Quasi-experimental, single group, pre-post intervention study	5-week brief MBCT, 2 hours/week	DASS, PSS	MAAS, Subjective Happiness Scale (SHS)	All
Horner et al. (2013)	In press, corrected proof	U.S.	Nonrandomized controlled pre-post intervention study	10-week mindfulness training program	-	-	All: stress, burnout, mindfulness, compassion
Kang et al. (2009)	N=41 nursing students Treatment- 20; Control- 21	South Korea	Nonrandomized controlled pre-post intervention study	8-week mindfulness meditation stress coping program	Psychosocial Well-being Index-Short Form (PWI-SF), STAI, Beck Depression Inventory	N/A	Stress, anxiety

Table 1: Continued

Study	Participants	Location	Design	Program	Measures of stress-related outcome	Measures of well-being related outcome	Significant improvement
Mackenz i et al. (2006)	N=30 nurses and nurse-aides	Canada	Nonrandomize d controlled pre-post intervention study	4-week MBSR, 1 month follow-up	MBI	Satisfaction With Life Scale (SWLS)	burnout symptoms, relaxation, and life satisfaction
	Treatment- 16; Control- 14						
O'Brien et al. (2013)*	N=73 Junior and Senior nursing students	Capella University, U.S.	Nonrandomize d controlled pre-post intervention study	4-week daily 7- minute guided mindfulness meditation + humor	STAI	MAAS	STAI, MAAS
	Treatment- 36; Control-37						
Penque et al. (2009)*	N=61 nurses	Abbott Northwestern Hospital in Minnesota, U.S.	Quasi- experimental, single group, pre-post intervention study	8-week MBSR, 3 months follow-up	MBI, Index of Work Satisfaction	Brief Freiburg Mindfulness Inventory (BFMI), Self-Compassio n Scale, BSS, IRI	MAAS, self- compassion, serenity, work satisfaction, job burnout
Pipe et al. (2009)	N=33 nurse leaders	U.S.	Randomized controlled pre- post intervention study	4-week brief mindfulness meditation course	Symptom Checklist 90- Revised	N/A	Stress
Yong et al. (2013)	N=51 manager nurses	Hospital in Seoul, South Korea	Nonrandomize d controlled pre-post intervention study	5-week spirituality program	MBI, Job Satisfaction Scale	Spiritual Well- being, Spiritual Integrity	Burnout, spiritual well-being, integrity, leadership practice
	Treatment- 24; Control-27						

Table 2: Other non-intervention studies paper

Study	Participants	Design	Program	Measures of stress-related outcome	Measures of well-being related outcome
Heard (2010)*	N=1186 registered nurses from 4 hospitals in South Mississippi, U.S.	Survey	N/A	MBI, Index of Work Satisfaction, Nurse Comfort Questionnaire	MAAS, Langer Mindfulness scale, Mindfulness-Based Self Efficacy Scale,
Smith (2014)	-	Review paper	MBSR	-	-

It is indicated from this review that research on mindfulness and nursing stress is limited in the aspects of research design, research participants, generalizability of results, measures of treatment outcomes, intervention content and dosage, comparisons with other stress-buffering factors, and the underlying explanation of the positive effects of mindfulness on nursing stress.

In terms of research design, there are only a limited number of randomized controlled trials (RCTs) for the intervention studies, though RCT is widely recognized as the gold standard in evaluating the efficacy and effectiveness of a treatment (Akobeng 2005). For the single-group pre-post intervention studies where there is no controlled or comparison group, it is difficult to determine the validity of the significance of improvement. Out of 17 intervention studies, 12 did not assess the long term effects of mindfulness training program, thus weakening the justification to incorporate mindfulness training in the nursing field.

Moreover, there is no standardized treatment component except daily meditation that is required in all programs. Across studies, the participants self-monitored and self-reported on their assignments to carry out daily meditation; thus, without an objective monitoring method, it is uncertain whether they actually perform the assignments. The duration of different adaptations of the programs ranges from 1-to-10 week. The method of delivery such as classroom or telecommunication-based and content such as didactic presentations, group sharing sessions, retreat day, and self-directed meditative practices also vary by studies. There is no specific research to determine which treatment components have the largest positive effects (Penque et al. 2009). There is also no investigation to determine the format and dosage that is the most cost and time effective.

Although there are many other stress-reduction programs such as relaxation therapy, assertiveness training, and peer support groups (Lee & Ellis 1990) that were found to be effective, to date, there is no study that compares mindfulness training programs against other stress-management programs for nurses to determine the best intervention option.

There is a wide range of measures of treatment outcome which makes comparisons among studies difficult. In fact, nursing stress was not assessed directly and specifically using work-stress instruments. Although it is shown that mindfulness training programs effectively reduce stress, it is necessary to pinpoint whether the reduced stress is pertaining to the job demands in order to further justify the need to incorporate mindfulness training in the field.

The generalizability of the findings is limited because of the intervention studies that involved small sample size (Cohen-Katz et al. 2005; Mackenzie et al. 2006; Yong et al. 2011) making it difficult to obtain conclusive findings. Brady et al. (2013) explained that small sample size might have resulted in insignificant improvement in the participants' burnout symptoms. There is also a lack of investigation on

the impact of gender. Among the participating nurses across studies, there was only three male nurses were involved in the Penque et al.'s (2009) study. However, this is inevitable as it is in line with the fact that male is always the underrepresented group within the nursing field (Penn State School of Nursing, 2007).

Mindfulness has been proven effective as a mean by which nurses can empower themselves to combat various stressors and comfort themselves through mindfulness meditation. However, there is no research in the underlying mechanism of the positive effects.

These limitations of current studies done on mindfulness training programs and nursing stress inform the direction of future research. Future studies are needed to compare mindfulness training programs against controlled and comparisons group using other stress management programs using RCT. The sustainability of positive effects needs to be accessed via long term follow-ups. It is also important to devise the program so that the participants' daily meditation can be measured objectively. The investigations should also aim to produce a manualized protocol that details standardized format, content, and dosage that is deemed most cost and time effective, in order to cater to the nurses' busy schedule. This can be done by researching on specific efficacy and effectiveness of the therapeutic components. The measure of stress can be specified to be job-related. To improve the generalizability of the findings, the sample size needs to be larger and the sample should be representative of nurses across departments, genders, and other cultural groups. Further research is indicated to explore the mechanism of action underlying the positive effects mindfulness has on the nursing stress by using mediator or path analysis studies.

Conclusions

Mindfulness has been proven to be effective in reducing nursing stress and improving psychological well-being. However, future research is necessary to include larger sample size that is randomized and representative of the nursing population, compare mindfulness to other training programs, examine the long-term benefits, and explore the underlying mechanism of action to allow more conclusive findings and produce manualized protocol that is most cost and time effective that justify adoption of mindfulness-based training program in the nursing field.

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