

## Interventions to Reduce Perceived Stress Among Graduate Students: A Systematic Review with Implications for Evidence-based Practice

By: Susan B. Stillwell, [Amber L. Vermeesch](#), Jane G. Scott

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### **Abstract:**

**Background** Stress is a part of daily life for graduate students, including graduate nursing students. Contemporary graduate nursing students are facing unprecedented challenges to meet rigorous academic standards as they prepare for their advanced professional role to meet the demands of the nation's complex and ever-changing healthcare system. Empowering graduate nursing students to ease their perceived stress and minimize undesirable health effects may benefit their capacity to adapt and successfully manage perceived stress in their future healthcare role.

**Aims** To conduct a systematic review to evaluate the existing evidence with the aim of identifying evidence-based self-care interventions for coping with perceived stress.

**Methods** We conducted a systematic review, searching CINAHL Plus with Full Text, PsycINFO, and MEDLINE. Inclusion criteria included self-care, graduate students, perceived stress as measured by Perceived Stress Scale, quantitative analysis, conducted within the United States, English language, and peer reviewed. Two authors completed an asynchronous review of the articles, and one expert evidence-based practice mentor and one wellness expert conducted rigorous appraisal of the eight identified studies. Evidence was evaluated and synthesized, and recommendations for practice were determined.

**Results** Eight studies meeting the criteria for this systematic review were critically appraised. The interventions varied from a stress management course to mind-body-stress-reduction (MBSR) techniques, such as yoga, breath work, meditation, and mindfulness. All studies measured the outcome of stress with the Perceived Stress Scale. Each study demonstrated a reduction in perceived stress postintervention.

**Linking Evidence to Action** Most effective self-care MBSR interventions include (a) a didactic component, (b) a guided MBSR practice session, and (c) homework. Consideration should be given to a trained or certified MBSR instructor to teach the intervention.

**Keywords:** stress | graduate students | graduate nursing students | healthcare

### **Article:**

Stress is a part of daily life for graduate students, including graduate nursing students. Contemporary graduate nursing students are facing unprecedented challenges to meet rigorous academic standards as they prepare for their advanced professional role to meet the demands of the nation's complex and ever-changing healthcare system (Baldwin, 2013; Kenty, 2000; Sochalski & Weiner, 2011). Empowering graduate nursing students to ease their perceived stress and minimize undesirable health effects may benefit their capacity to adapt and successfully manage perceived stress in their future healthcare role.

Our graduate nursing students reached out to faculty and described their feelings of being overwhelmed, asking if this was normal, and asked for suggestions to handle the stress they were experiencing. As faculty in an academic setting that embraces an integrative health perspective, defined as “An approach that refocuses care on health and healing, appreciates the complexity of human beings, honors the innate ability of the person to heal, values the relationship between client and healthcare provider, is supported by evidence, and uses all appropriate modalities to facilitate healing (University of Portland, 2016),” we were intent to explore evidence-based self-care interventions that would mitigate perceived stress and support our graduate nursing students.

## **BACKGROUND**

Perceived stress, or the perception of feeling overwhelmed, can lead to deleterious effects physically (such as a weakened immune system), mentally, and emotionally (Cohen, Tyrrell, & Smith, 1993; McGregor, Antoni, Ceballos, & Blomberg, 2008). Perceived stress exists among graduate students in general (Johnson, Batia, & Haun, 2008) and in particular, graduate health science students, of whom graduate nursing students are a core member (Dutta, Pyles, & Miederhoff, 2005). Health science graduate students may encounter excessive personal, educational, and work-related demands, and experience feelings of being overwhelmed or anxious (Stecker, 2004), pressure, tension, and worry (Coffey et al., 2017) and exhibit depressive symptomatology (Melnik et al., 2016).

Perceived stress in graduate nursing students has been documented in the literature for over 30 years (Mancini, Lavecchia, & Clegg, 1983; Maville, Kranz, & Tucker, 2004; Reilly & Fitzpatrick, 2009). Sources of stress include finances (Maville et al., 2004; Reilly & Fitzpatrick, 2009), time management (Maville et al., 2004), role responsibilities (Maville et al., 2004), relationships (Reilly & Fitzpatrick, 2009), and competing obligations (Maville et al., 2004). Other sources of stress were academic demands (Maville et al., 2004) and clinical practicum experiences aimed at learning to interact with clients (e.g., patients or healthcare consumers; Mancini et al., 1983; Maville et al., 2004).

Graduate students from nonnursing health science programs report similar sources of perceived stress. Academic expectations are a documented source of stress for pharmacy, psychology, and medical students as well as physician assistants and athletic trainers (Beall,

DeHart, Riggs, & Hensley, 2015; Finkelstein, Brownstein, Scott, & Lan, 2007; Ford, Olotu, Thach, Roberts, & Davis, 2014; Heins, Fahey, & Leiden, 1984; Kuhn, Kranz, Koo, Cossio, & Lund, 2005; Marshall, Allison, Nykamp, & Lanke, 2008; Nelson, Dell'Oliver, Koch, & Buckler, 2001; Reed & Giacobbi, 2004). Several studies have found financial obligations as a source of stress for all students except athletic trainers (Beall et al., 2015; Finkelstein et al., 2007; Ford et al., 2014; Heins et al., 1984; Kuhn et al., 2005; Marshall et al., 2008; Nelson et al., 2001), whereas time management was perceived as stressful by all students except pharmacy students (Finkelstein et al., 2007; Heins et al., 1984; Kuhn et al., 2005; Nelson et al., 2001; Reed & Giacobbi, 2004).

A source of stress common to pharmacy and medical students included relationships (Beall et al., 2015; Finkelstein et al., 2007; Ford et al., 2014; Heins et al., 1984; Marshall et al., 2008), whereas psychology students found clinical practicum and working with clients to be stressful (Nelson et al., 2001). Athletic trainers reported uncertainty regarding the future as a source of stress (Reed & Giacobbi, 2004) illustrating the variety of sources of stress.

Two reviews and three meta-analyses focused on mental health promotion and stress reduction programs among university and medical students in general but not specifically for graduate nursing students (Colman et al., 2016; Conley, Durlak, & Dickson, 2013; Conley, Durlak, & Kirsch, 2015; Regehr, Glancy, & Pitts, 2013; Shapiro, Shapiro, & Schwartz, 2000). Shapiro et al. (2000) determined that medical students who participated in stress-management programs developed better coping and role resolution skills. Conley et al. (2015) and Regehr et al. (2013) found that programs including supervised practice of skills-training, particularly those focused on cognitive, behavioral, and mindfulness were more effective in reducing symptoms, including stress, among higher education students.

Behavior modification through nonpharmacological means such as mindfulness training, qigong, and stress management have been found to be effective in reducing stress in counseling, psychology, and medical graduate student populations (Abel, Abel, & Smith, 2012; Chrisman, Christopher, & Lichtenstein, 2009; Cohen & Miller, 2009; Finkelstein et al., 2007). Mind-body practices can be beneficial for reducing stress-related effects including physical, emotional, mental, spiritual, and interpersonal changes (Schure, Christopher, & Christopher, 2008). However, no studies evaluating effective interventions of perceived stress among graduate nursing students were found.

## PICOT Question

The PICOT question that drove the search for the evidence was: In graduate students (P) how does practicing self-care interventions (I) compared to those not practicing self-care interventions (C) affect perceived stress (O) during graduate school (T).

## AIMS

To address our graduate nursing students' concern, a systematic review was undertaken to evaluate the existing evidence with the aim of identifying evidence-based self-care interventions for coping with perceived stress.

## METHODS

### Search Structure

**Definitions** Because of similarities in academic demands, practicum or placement competencies, role transitions, and life stressors, graduate students were defined as individuals in the following programs: nursing, midwifery, pharmacy, podiatry, medical, social work, counseling, clinical psychology, athletic training, audiology, dental, dental hygiene, dietetics, medical technology, occupational therapy, physical therapy, physician assistant, radiologic technology, respiratory therapy, speech-language pathology, and chiropractic. Perceived stress was operationally defined as the degree to which one perceives an event or situation as threatening or demanding and beyond one's coping resources as measured by the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983). The PSS is a valid and reliable instrument in measuring perceived stress that has been translated into multiple languages, has reported alphas ranging from .84 to .86, and correlates with impact of life events and number of life events scores ranging from .20 to .49 (Cohen et al., 1983).

Sample questions include: (a) How often have you been upset because of something that happened unexpectedly? (b) How often have you felt that you were unable to control the important things in your life? (c) How often have you felt nervous and “stressed”? (d) How often have you found that you could not cope with all the things that you had to do? (e) How often have you been angered because of things that were outside of your control? Given our students' descriptions of what they were experiencing and that these questions reflected most accurately the thoughts and feelings expressed by our students, stress was defined as perceived stress, not anxiety or mood states.

**Search strategy** Using the PICOT question, two authors searched CINAHL Plus with Full Text, PsycINFO, and MEDLINE. All three databases used the EBSCO platform and were searched individually allowing for full utilization of the unique thesauri. The thesauri for CINAHL Plus with Full Text, MEDLINE, and PsycINFO were used to identify the controlled vocabulary for the individual elements of the PICOT question. Each thesaurus used similar terms for all elements of the question with the exception of the population. Therefore, the same keywords were used in each search string for all elements of the question with the exception of population. Keywords used in all databases were: study OR intervention OR experiment OR research and self-care OR selfcare OR self care OR stress OR coping OR anxiety OR mindfulness. There were no limiters placed on the searches (see Table S1).

**Search review** Two of the authors, one being an expert evidence-based practice (EBP) mentor, completed an asynchronous review of the 5,108 articles. Each author read the article title, the abstract, and accompanying metadata. Each used the following inclusion criteria and saved articles to a unique EBSCO folder. Interrater reliability was established through applying the inclusion criteria to a number of test articles prior to this review process. Inclusion criteria for article selection were:

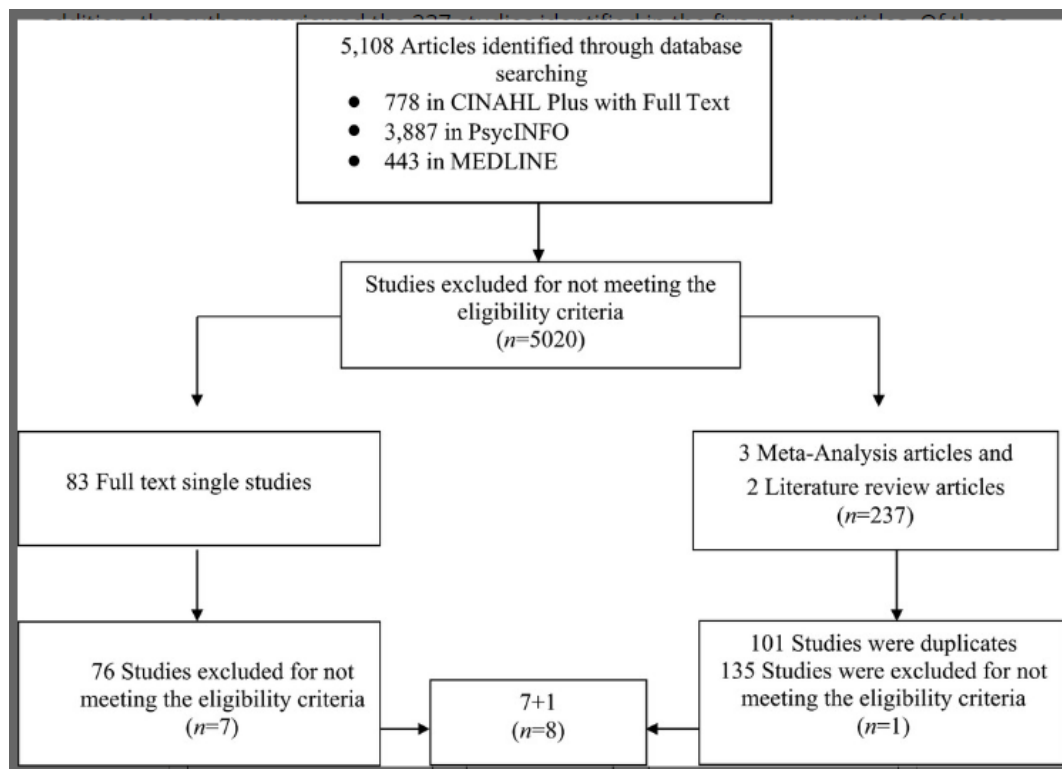
1. Self-care as the intervention.
2. Participants were graduate students.
3. Perceived stress as measured by the PSS.

4. Quantitative analysis of the outcome.
5. Conducted within the United States.
6. English language.
7. Peer-reviewed.
8. Approval of Institutional Review Board.

## RESULTS

### Data Extraction

Using the inclusion criteria, 5,020 articles were excluded in the initial review conducted by the three authors (see Figure 1) yielding 83 full text single studies and three meta-analyses and two literature review articles. Upon close examination, an additional 76 studies (from the 83) were excluded for not meeting the inclusion criteria (19 excluded for the type of stress studied, 23 excluded for not being the correct population, 10 excluded for not being valid quantitative studies, eight for not having an intervention, 16 for not being within the United States). In addition, the authors reviewed the 237 studies identified in the five review articles. Of these studies, 101 studies were duplicates and 135 were excluded for not meeting the inclusion criteria (13 excluded for the type of stress studied, 96 excluded for the population studied, nine excluded for not having an intervention, 12 excluded for not being within the United States, & five for not being peer-reviewed). Therefore, eight studies meeting the criteria for this systematic review were critically appraised (see Figure 1).



**Figure 1.** Flow diagram of studies selected.

## Study Quality Assessment

**Critical appraisal** Two authors, one an expert EBP mentor and one a wellness expert, conducted rigorous appraisal of the eight identified studies using the critical appraisal tools of the Joanna Briggs Institute (JBI, 2016) for quasi-experimental studies and randomized controlled trials (RCTs). The two authors who conducted the appraisals then met with the third author to discuss the appraisal findings.

**Evaluation of the evidence** Key data were abstracted from each study and entered into an evaluation table to summarize the study characteristics. In addition to the strength and quality of the studies, the evaluation table includes the study design, identification of the sample and setting, independent and dependent variables, data collection tool, and the statistics and study findings (see Table S2). A meta-analysis was not performed for this systematic review.

The majority of the studies were pre-post design. The strongest level of evidence was one unblinded RCT that used a random number generator to select the participants. No study included graduate nursing student participants. However, the participants in the studies were mostly female graduate students in graduate health science programs and similar to our population. Attrition rates of two of the studies (Cohen & Miller, 2009; Shapiro, Brown, & Biegel, 2007) exceeded 20%. The interventions varied from a stress management course to mind-body-stress-reduction (MBSR) techniques, such as yoga, breath work, meditation, and mindfulness. All studies measured the outcome of stress with the PSS (Cohen et al., 1983). Each study demonstrated a reduction in perceived stress postintervention, however the reduction in perceived stress in two of the studies was not statistically significant, including the only RCT and the only study to measure stress longitudinally (Erogul, Singer, McIntyre, & Stefanov, 2014).

**Synthesis of the interventions and outcomes** Similarities and differences in the intervention schedules, strategies, topics, and homework of each stress reduction study are presented (see Table S3). All eight studies included a didactic portion, experience component, and homework. All studies included some type of self-care MBSR intervention. Breathing technique and meditation were the most common interventions. The delivery of the intervention occurred in universities located in the United States and ranged from 6 to 18 days, with the majority of the interventions being held 1 day per week (Abel et al., 2012; Beck & Verticchio, 2014a; Bond et al., 2013; Chambers, Phillips, Burr, & Xiao, 2016; Cohen & Miller, 2009; Erogul et al., 2014; Shapiro et al., 2007). Only one study reported meeting 5 days per week for 3 weeks (Beck & Verticchio, 2014b). Total intervention session times ranged from 120 minutes (Chambers et al., 2016) to 1,800 minutes (Shapiro et al., 2007) and included content on stress, stress response, relaxation response, and stress management techniques delivered by experienced teachers with advanced training or certification in the MBSR technique. Homework included practicing the stress reduction technique only or the stress reduction technique combined with reflective writing assignments. All studies reported a reduction in perceived stress. Reported effect sizes ranged from small to large (see Table S4).

## Strengths and Limitations

This is the only known systematic review to analyze studies in which the goal was to identify interventions to mitigate perceived stress in graduate health science students in the United States.

The eight studies included in this review met the stringent inclusion criteria of only graduate students, within the United States, evaluating the effectiveness of peer-reviewed interventions on perceived stress using the PSS and reporting the results in a statistical fashion. Major strengths of this systematic review are the reduction in perceived stress within the eight studies meeting the inclusion criteria, the use of the same measurement tool, and the surprising similarities of the interventions.

To locate the articles, the authors searched CINAHL plus with Full Text, PsycINFO, and MEDLINE, using appropriate vocabulary and search strategies. Ancestry searching was performed on the retrieved articles. A search of gray literature was not performed. The authors acknowledge the potential of publication bias as a limitation and note that to create a reproducible search, limiting the search to published materials was necessary. Although Hartling et al. (2016) concluded the “majority of relevant studies (for a systematic review) can be found within a limited number of databases” (p. 1), it is possible that other studies pertinent to our review might have been catalogued elsewhere. PubMed, where the most recent literature to be catalogued in MEDLINE would first appear, was not searched. By intentionally using only one proprietary search algorithm (in this case EBSCO's algorithm & platform), the authors' search could be readily reproduced.

In addition, the authors limited the search to studies published in English, and only those studies with quantitative analysis. These are real limitations; however, the authors were focused on retrieving evidence-based interventions that would be recommendable within an English speaking portion of the United States. To implement the findings in international settings, tailoring the interventions to their home institutions' preferences would be necessary to maximize effectiveness.

## **DISCUSSION**

The aim of this systematic review was to identify evidence-based self-care interventions, which effectively reduced perceived stress in graduate nursing students. In all studies, self-care interventions reduced perceived stress in graduate health science students. The predominate level of evidence, based on JBI Levels of Evidence, is a JBI Level 2. With the exception of one unblinded RCT, JBI Level 1, studies were quasi-experimental with pre-post designs and only the unblinded RCT measured the outcome longitudinally to determine the effects of the MBSR intervention. Although a reduction in perceived stress at 6 months postintervention was found, it is not known what dose and frequency of the intervention would sustain the outcome throughout graduate school.

All studies had small sample sizes and were conducted in single-site university settings, having the potential for bias, including selection bias. The MBSR interventions were not included or fully described in any of the studies. All but one study engaged individuals who were trained or certified in MBSR techniques to teach the technique. However, MBSR protocols varied in dose, frequency, and length of the intervention, making it difficult to recommend a standardized self-care MBSR approach, for example, a stand-alone course or integration of the interventions throughout the curriculum. Nonetheless, what is known, is perceived stress in graduate health science students was reduced in all studies.

## IMPLICATIONS FOR PRACTICE AND RESEARCH

Stress is positively correlated with depression, a mental health disorder that can hinder academic performance (Melnyk et al., 2016). Implementing a self-care MBSR program may be an encouraging practice for students entering health science graduate programs. Although the majority of participants in these studies were female students in graduate health science programs, no graduate nursing students were studied. Thus, further research with graduate nursing students is needed to determine the effectiveness of self-care MBSR programs in reducing stress in this population. In addition, this review captured the best available evidence of self-care MBSR interventions for graduate health science students in schools delivering traditional face-to-face programs in the United States. No studies of self-care MBSR programs implemented with graduate health science students enrolled in distance learning programs meeting our inclusion criteria were found. With numerous online graduate nursing programs, more studies are needed to determine the effectiveness of self-care MBSR programs in this educational delivery method.

## RECOMMENDATIONS

The authors have assigned a JBI Grade A recommendation to all of the self-care MBSR studies (see Table S5). The outcome of perceived stress was reduced in all the studies, no matter the type or dose of the intervention. There were no reported risks or harms associated with self-care MBSR interventions in graduate health science students, and the cost is minimal considering the benefit of student well-being and their ability to use self-care MBSR techniques throughout their lifetime. The authors recommend graduate health science colleges and universities consider incorporating a self-care MBSR program to alleviate perceived stress and promote graduate health science students' well-being, and tailor such a program based on institution preferences, values, resources, and feasibility, and be formatively and summatively evaluated to monitor sustainability and effectiveness.

## CONCLUSIONS

Implementation of self-care MBSR interventions (see Table S3) can be tailored to the preferences and values of the educational institution. Most effective self-care MBSR interventions include (a) a didactic component, (b) a guided MBSR practice session, and (c) homework. More research is needed to develop a standardized self-care MBSR protocol to decrease perceived stress in the graduate student population and especially the graduate health science student and graduate nursing student populations.

### LINKING EVIDENCE TO ACTION

- Conduct weekly sessions of self-care MBSR interventions by trained or certified MBSR instructors.
- Implement MBSR sessions ranging in frequency from 15 to 180 minutes per week for 3–18 weeks.
- Deliver didactic instruction on self-care MBSR topics such as stress, mindfulness, meditation, breath work, yoga, and relaxation.
- Practice self-care MBSR techniques within each session.
- Assign homework related to technique and practice.



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