

EFFECTIVENESS OF A BRIEF STRESS REDUCTION INTERVENTION
FOR NURSING STUDENTS IN REDUCING PHYSIOLOGICAL
STRESS INDICATORS AND IMPROVING WELL-BEING
AND MENTAL HEALTH

by

Diane K. Leggett

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ABSTRACT

Nursing students are faced with stress on a regular basis, which can impact physical and psychological functioning. Despite the identification of stress, anxiety, poor performance, and risk for depression, few studies identify measures to manage stress in a student nurse population. The purpose of this study was to examine the effectiveness of a brief mindfulness breathing intervention to decrease stress and ultimately the risk for depression while increasing self-efficacy with clinical skills performance in a 1st-year student nurse population.

Participants were recruited from an associate degree nursing program at a northwestern university. Data gathered included demographic information, depression scores, physiological measures (i.e., blood pressure and pulse), self-efficacy scores, and skills performance scores. The design was a two-group (experimental and no-treatment control) true experimental randomized control trial with the following four repeated measures: (a) pretest, (b) posttest, (c) 2-month follow-up test, and (d) 4-month follow-up test. Data collection took place from November 2009 to March 2010. The sample ($N = 85$) was predominantly female (87.1%, $n = 74$) and Caucasian (89.4%, $n = 86$). Fifty-six of the participants were married and 46% of the participants identified themselves as parents of children still living at home.

Analyses of variance demonstrated a greater mean decrease for the intervention group than for the treatment-as-usual group following the mindfulness breathing

intervention for depression, $F(1,82) = 6.864, p = .010$; systolic, $F(1,81) = 6.557, p = .012$; and diastolic, $F(1,81) = 6.078, p = .016$ —measures indicating the intervention may be of benefit. Pulse did not reach statistical significance. Analyses of variance for mindfulness, self-efficacy, and skills performance did not reach significance. Correlations conducted on measures indicated that as depression decreased, systolic and diastolic measures also decreased. As mindfulness increased, self-efficacy increased, and as self-efficacy increased, skills performance also increased.

These results suggest that mindfulness may be of benefit as a method to decrease the risk for depression while contributing to increased self-efficacy and skills performance in a student nurse population. Although not all measures achieved statistical significance, the findings are encouraging for increasing feelings of confidence, leading to a more rewarding educational experience in nursing students.

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CHAPTER 1

INTRODUCTION

The purpose of this study was to investigate a brief stress reduction intervention as a method of decreasing stress and ultimately the risk for depression while increasing self-efficacy with clinical skill performance in a 1st-year student nurse population. Health care has been identified as an area of increased stress for workers (Geiger-Brown, Muntaner, & Trinkoff, 2004; Marine, Routsalainen, Serra, & Verbeek, 2009; Tveito & Eriksen, 2009) with higher expectations, increased demands, limited time, and decreased social support. These factors contribute to adverse psychological and physical symptoms, decreased work performance, absenteeism, and burnout. With the nursing profession contributing to the largest portion of providers, stress and its effects are an area of concern.

Prior to practicing as a nurse, an individual must complete educational requirements and pass board examinations to obtain a license for practice. Stress can begin early in the profession during the educational process (Beddoe & Murphy, 2004; Evans & Kelly, 2004; Jones & Johnston, 1997; Watson et al., 2009; Young, Bruce, & Turner, 2001), with some students reporting decreased feelings of confidence and an ability to complete tasks (Evans & Kelly; Moscaritolo, 2009). This diminished confidence in ability can increase anxiety and stress, leading to a lack of confidence and, potentially, the risk for depression. Tasanapradit (2008) found that medical students were at a higher

risk for depression, as measured by the Center for Epidemiologic Studies Depression Scale, from stress associated with demands of university training. Thus, learning stress management techniques as a student has the potential to contribute to improved student and professional outcomes.

Although studies have been conducted relating to stressors, outcomes, and some interventions, this study addressed the lack of knowledge connecting stress management and self-efficacy in skills performance. *Self-efficacy* is defined as a personal belief in an ability to produce certain outcomes (Bandura, 1997; Janz, Champion, & Strecher, 2002), which is an important aspect for clinical skills. Bandura stated, “Students who have a low sense of efficacy to manage academic demands are especially vulnerable to achievement anxiety” (p. 235). The current study conducted a trial of a brief stress management intervention among 1st-year nursing students to decrease stress and the risk for depression while increasing mindfulness and self-efficacy.

Summary of Chapters

This dissertation followed a three-article format. The content for each of the chapters is outlined in the following paragraphs:

Chapter 1 is an introduction and overview of the dissertation and research. A description and summary of each chapter are included. The significance, purpose, research procedures, and study limitations are introduced.

Chapter 2 is the literature review, which is written as an article for publication. This review includes information on stress and its effects on the individual, stress reduction interventions, self-efficacy, and mindfulness. This information is discussed in relation to health professions and, more specifically, nurses and nursing students.

Chapter 3 is a discussion of the main results of the brief mindfulness intervention

on improving a participant's risk for depression and physiological stress measures. This chapter is written as an article for publication.

Chapter 4 includes secondary results of the study examining the effectiveness of the brief mindfulness intervention on improving mediators of actually improving the hypothesized mindfulness awareness, self-efficacy, and clinical skills performance. Correlations of mindfulness with other outcome measures are also examined. This chapter is written as an article for publication.

Chapter 5 contains a discussion of the implications of the study results for including a brief mindfulness intervention when teaching clinical skills to 1st-year nursing students, including the limitations and recommendations for future research and practice.

Significance of the Study

Stress is defined as “a condition in which the person experiences changes in the normal, balanced state” (Berman, Snyder, Kozier, & Erb, 2008, p. 1061). Stress is an almost universal experience and can occur from both positive and negative experiences. The stress response leads to physiological changes in the body described as a fight or flight response (Berman et al.; Sapolsky, 2004; Smeltzer, Bare, Hinkle, & Cheever, 2007). These changes disrupt the normal functioning of systems in the body and result in an adaptation response to regain homeostasis or stability. Stress can be an actual physical threat or the thoughts of a possible threat. The anxiety produced from thoughts can become as damaging physically as an actual threat (Sapolsky). Small amounts of stress assist individuals to maintain an alert state of mind that increases attention and learning, but prolonged exposure to stress can lead to decreased functioning and a decline in health both mentally and physically (Berman et al.; Sapolsky; Smeltzer et al.). Research has

demonstrated that individuals with chronic stress have more depressive symptoms as measured by the Center for Epidemiologic Studies Depression Scale depression instrument (Mortimer et al., 2005; Tasanapradit, 2008). Diminished feelings of well-being can lead to an increase in the risk for depression with a decrease in learning and positive feelings of accomplishment. This downward trend can increase anxiety, contributing to further negative emotions (Anisman & Zacharko, 1982; Dolan, 2002; Kendler, Hettema, Butera, Gardner, & Prescott, 2003; Kendler, Karkowski, & Prescott, 1999; Paykel et al., 1969).

Practicing Nurses

The work environment is frequently a source of stress with workplace relations, physical demands, and mental demands. Nursing has been identified as an occupation with high stress levels from increasing patient acuity, extended work hours with varying time schedules, and daily exposure to illness, pain, and loss (Cohen-Katz, Wiley, Capuano, Baker, & Shapiro, 2004; Fukuda, Ichinose, Kusama, Anndow, & Akiyoshi, 2008; Golbasi, Kelleci, & Dogan, 2008; McVicar, 2003; Watson et al., 2009). These factors increase the risk for chronic stress, emotional exhaustion, and burnout (Cohen-Katz et al.; Salovey, Rothman, Detweiler, & Steward, 2000; Sapolsky, 2004).

Student Nurses

Not only is the profession of nursing stressful but the journey to obtain a license to practice as a nurse has been identified as a high source of stress (Beck & Srivastava, 1991; Billingsley, Collins, & Miller, 2007; Jones & Johnston, 1997). Nursing students face many challenges during their educational process due to clinical placement, a theory-practice gap, and the nurse-student relationship (referred to as being the most stressful;

Beck & Srivastava; Billingsley et al.; Jones & Johnston; Levett-Jones, Lathlean, Higgins, & McMillan, 2009). Increased stress decreases learning and can lead to errors (Welker-Hood, 2006) with a resulting decline in a belief of capabilities to perform procedures. Bandura (1997) stated, “If people believe they have no power to produce results, they will not attempt to make things happen” (p. 3). This point is important, considering that much of the work of nursing students is based on performance and that the stressors previously listed relate to clinical performance. Maciejewski, Prigerson, and Mazure (2000) found that increased self-efficacy decreased the effects of stressful events in a probability sample of individuals over the age of 25. Manojlovich (2005) found that personal self-efficacy had a strong relationship with practice behaviors. Stress, feelings of inadequacy from lack of knowledge, and limited positive reinforcement from mentor nurses can contribute to diminished self-efficacy. All of these factors can lead to emotional burnout and increased risk of depression during the educational process (Cohen-Katz et al., 2004; Mackenzie, Poulin, & Seidman-Carlson, 2006).

Stress and Interventions

In order to enhance the learning environment and prevent adverse effects of stress, measures should be instituted early in the educational process. A variety of interventions have demonstrated the ability to manage educationally related stress and related symptoms (Brunero, Cowan, & Fairbrother, 2008; Jain et al., 2007; Jones & Johnston, 2000; Marine et al., 2009; Moscaritolo, 2009; Stephens, 1992). Few studies exist that examine the use of mindfulness in a student nurse population. The current study examined the use of mindfulness breathing to increase feelings of self-efficacy in the performance of skills in the clinical area and to increase feelings of well-being. Mindfulness is easily learned (Allen, Blashki, & Gullone, 2006), it decreases negative

responses such as fear or apprehension (Arch & Craske, 2006), and it positively affects well-being while decreasing tension, anxiety, and stress (Brown & Ryan, 2003). Meta-analytic reviews by Baer (2003) and Grossman, Nieman, Schmidt, and Walach (2004) found moderate effect sizes when averaged for studies investigating the usefulness of mindfulness as an intervention. Brown, Ryan, and Creswell (2007) examined findings in recent randomized clinical trials and found positive results for mental and physical health through the use of mindfulness. Studies have examined the use of mindfulness as an intervention to reduce stress in the health-care population, focusing mainly on practicing nurses, graduate nurses, or medical students (Cohen-Katz et al., 2005; Jain et al.; Mackenzie et al., 2006; O'Haver-Day & Horton-Deutsh, 2004; Shapiro, Astin, Bishop, & Cordova, 2005; Tsai & Crockett, 1993; Young et al., 2001). One study examined the use of mindfulness as a stress management technique. Beddoe and Murphy (2004) tested a convenience sample of baccalaureate nursing students for changes in stress and empathy following an 8-week course of mindfulness based on stress reduction training. The results demonstrated decreased stress, as measured by the Derogatis Stress Profile, and increased empathy, as measured by the Interpersonal Reactivity Index. The students also completed a posttest questionnaire that was used to correlate attitude and behavior changes. No studies were found that linked mindfulness breathing to self-efficacy and clinical skills. Hence, the current study was the first randomized control trial to examine the effect of a brief mindfulness breathing intervention to reduce clinical practice stress and depression and improvements in clinical skills in 1st-year nursing students. In addition, the hypothesized mediators of increased mindfulness and increased self-efficacy were also measured.

Research Aims

The purpose of this study was to develop and test a brief intervention to reduce stress, feelings of inadequacy, and risk for depression by increasing self-efficacy associated with critical nursing skills and, thereby, improve skills performance in 1st-year nursing students. In order to achieve this goal, the following three aims were proposed:

1. Aim 1, to determine the immediate and 4-month longitudinal effectiveness of a brief intervention for stress management to increase mindfulness, increase self-efficacy, decrease feelings of inadequacy leading to a risk for depression, and improve clinical skill performance with 1st-year nursing students
2. Aim 2, to determine the association of mindfulness to physiological measures of stress (i.e., blood pressure and pulse), increase self-efficacy, emotional well-being or risk of depression, and clinical performance in a sample of 1st-year nursing students
3. Aim 3, to determine if students at higher risk for depression, as measured by the Center for Epidemiologic Studies Depression Scale (Radloff, 1977) scores of 16 or greater, have considerable improvements in mindfulness, self-efficacy, and physiological measures of stress (i.e., blood pressure and pulse) than lower-risk students at baseline.

An additional, longer-term goal of this study was to include stress reduction modules in the regular curriculum at the university should this study demonstrate their effectiveness. Publications and presentations at conferences will help to disseminate the results to other university nursing programs.

Participant Selection Criteria

Participants in this study were recruited from 120, 1st-year nursing students enrolled in 1 of 12 fall classes known as Foundations of Nursing Practice Clinical. Participants were 2-year associate degree nursing students. The students were in their 1st year of the nursing program. The participants were both men (15%) and women (85%), with ages ranging from 19 to 50 years. None of the students was below the age of 19 years. The ethnicity of the participants was approximately 90% Caucasian. Age 19 was selected as the cutoff for inclusion because the youngest age of students enrolled in the Foundations of Nursing Practice Clinical classes was listed as 19, which allowed all students the opportunity to participate. Inclusion criteria included all students enrolled in 1 of the 12 Foundations of Nursing Practice Clinical classes who had voluntarily signed consent forms to participate in the research (see Appendix A). Exclusion criteria included any enrolled students who did not sign the consent forms to participate in the research or who did not complete the Foundations of Nursing Practice Clinical class and dropped out of the study.

Design

The design was a two-group (experimental and no-treatment control) true experimental randomized control trial design with the following four repeated measures: (a) pretest, (b) posttest, (c) 2-month follow-up test, and (d) 4-month follow-up test. The no-treatment control group was a treatment-as-usual group that received the psychological measurements (i.e., blood pressure and pulse) and the regular Foundations of Nursing Practice Clinical class but received no brief mindfulness stress management treatment modules. The 12 Foundations of Nursing Practice Clinical classes were randomly assigned in order to receive the brief stress intervention or the no-treatment

intervention in the regular Foundations of Nursing Practice Clinical classes. Because all students in the 12 Foundations of Nursing Practice Clinical classes received the treatment group or the control group, the effective sample size was 12 classes. Because of the nesting effects, statistical methods to control for this interdependency were conducted in the data analysis using hierarchical linear modeling.

Research Questions and Hypotheses

Research questions and hypotheses guided the study.

Research Question 1

Compared with the no-treatment group, is there a decrease in depression scores after participating in the brief stress reduction intervention as measured by the Center for Epidemiologic Studies Depression Scale (Radloff, 1977)?

Hypothesis 1

It was hypothesized that the mean decrease and effect sizes for the depression scores in the treatment group would be larger than the treatment-as-usual group.

Research Question 2

Compared with the no-treatment control group, are the participants' physiological measures of stress (i.e., blood pressure and pulse) lower at later measurements than at baseline following participation in the mindfulness breathing?

Hypothesis 2

It was hypothesized that the mean decrease in effect sizes for the physiological measures of stress (i.e., blood pressure and pulse) scores in the treatment group would be larger than the treatment-as-usual group.

Research Question 3

Is there greater improvement in higher-risk students for relative risk of depression, as determined by the Center for Epidemiologic Studies Depression Scale (Radloff, 1977) scores of 16 or greater, in measures of stress, as determined by physiological measures of blood pressure and pulse, than lower-risk students at baseline?

Hypothesis 3

It was hypothesized that the higher-risk students for depression at baseline would have larger improvements in outcomes.

Research Question 4

Compared with the no-treatment control group, is there an increase in mindfulness scores for the brief stress reduction intervention participants after completing the mindfulness breathing as measured by the Mindfulness Attention Awareness Scale (Brown & Ryan, 2003)?

Hypothesis 4

It was hypothesized that the mean increase and effect sizes for the mindfulness scores in the treatment group would be higher than the treatment-as-usual group.

Research Question 5

Compared with the no-treatment control group, is there an increase in self-efficacy after completing the mindfulness breathing stress reduction intervention as measured by the Student Clinical Completion Appraisal form (see Appendix B)?

Hypothesis 5

It was hypothesized that the mean increase in effect sizes for the self-efficacy scores in the treatment group would be higher than the treatment-as-usual group.

Research Question 6

Compared with the no-treatment control group, is there an increase in clinical performance skills following participation in the mindfulness breathing as demonstrated by individual performance grading sheets?

Hypothesis 6

It was hypothesized that the mean increase and effect sizes for the clinical performance skills scores in the treatment group would be higher than the treatment-as-usual group.

The null hypothesis to be tested for all of these hypotheses is that there will be no difference between the treatment and control groups in the outcome measure of interest in the research question and hypothesis.

Limitations

Limitations of this study reflect possible threats to internal validity. For example,

stress management was discussed in the classroom setting with all of the students several times during the semester, which may have led to a change in behavior not related to the intervention in both the control and treatment-as-usual groups. The questionnaires were administered five times over a 4-month span, which could have led to familiarity with the measures that may have had an effect on the results. For those students nested in classes within a school, the selection of participants presented the greatest challenge. Students were randomized by groups or classes according to clinical instructors. Statistical control was managed by using hierarchical linear modeling for analysis, which allows for a multilevel analysis (Bickel, 2007; Osborne, 2000). Another limitation was that the study could not be conducted until after approval by the Institutional Review Board of the University of Utah, which delayed the intervention until the end of the clinical skills class.

Delimitations

Because a true experimental design was used, threats to internal validity should be controlled; however, there could have been threats to external validity of the results such as generalization or fidelity to the curriculum. The sample for this study consisted of a group of nursing students located in a university in northern Utah. The population included both men and women of various ages, with the group being predominantly Caucasian, middle-class females in their 20s. These demographics limited external validity or generalization of the results to students in other geographic regions or age groups.

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CHAPTER 2

LITERATURE REVIEW

Stress, a common occurrence in daily living for the majority of people, has been defined as “a condition in which the person experiences changes in the normal, balanced state” (Berman, Snyder, Kozier, & Erb, 2008, p. 1061), identified as *homeostasis*. Psychological or emotional homeostasis is referred to as mental well-being. Psychological homeostasis is maintained through feelings of love, security, self-esteem, and positive interactions with others (Berman et al.). An alteration in the physiological or psychological environment perceived as a threat is termed *stress*. The change in homeostasis from stress leads to what has been identified as a stress response (Berman et al.; Sapolsky, 2004; Smeltzer, Bare, Hinkle, & Cheever, 2007) and initiates physiological changes in the body described as the fight or flight response. Interestingly, psychological disruptions have the capacity to elicit the same response in the body as a physical stressor (Sapolsky). An example of a psychological change affecting homeostasis would be the individual receiving news of a job loss. Thoughts of fear or anger may arise that in turn begin the physiological responses of the fight or flight reaction. The response to regain homeostasis can be more difficult to control unless the individual is able to manage thought processes. “The stress response can become more damaging than the stressor itself, especially when the stress is purely psychological” (Sapolsky, p. 13).

Stress can lead to negative emotional states that “are thought to be associated with unhealthy patterns of psychological functioning” (Salovey, Rothman, Detweiler, &

Steward, 2000, p. 110) and has been suggested as a contributing factor in physical ailments, emotional and mental disturbances, and altered social interactions (Berman et al., 2008; Pelletier, 2000; Smeltzer et al., 2007). These changes can lead to declines in overall feelings of well-being. Health-care professions are vulnerable to stress and the related conditions from high demands in caring for others with limited time, personnel, and increased acuity. Anxiety, exhaustion, depression, and decreases in immune function are some of the documented results of stress in this population (Beck & Srivastava, 1991; Cohen-Katz, Wiley, Capuano, Baker, & Shapiro, 2004; Fukuda, Ichinose, Kusama, Anndow, & Akiyoshi, 2008; Geiger-Brown, Muntaner, & Trinkoff, 2004; McVicar, 2003; Peterson et al., 2008; Salovey et al.; Tveito & Eriksen, 2009; Watson et al., 2009).

The educational process itself can be a source of stress as individuals proceed through multiple levels of learning. Life events as well as academic pressures contribute to stress, affecting the emotional well-being of students. A report by the American College Health Association (2008) identified 50% of students reporting higher than usual to tremendous stress affecting academic performance. Jones and Johnston (1997) found higher stress levels in nursing students than in other college students across the 4-year program of study. Higher stress levels have implications for students in nursing programs that will last 2 to 4 years since stress longer than 6 months is termed *chronic stress*, putting the nursing student population at higher risk for anxiety and depressive symptoms (Finlay-Jones & Brown, 1981; Kessler, 1997; Paykel et al., 1969).

Skills are an important part of the health-care learning environment, with competency at an acceptable level expected prior to performing in the clinical setting. Learning and performance are enhanced with increased feelings of self-efficacy (Bandura, 1977, 2001). Unfortunately, self-efficacy is eroded with stress and anxiety that can impede learning and performance. Studies examining the effects of stress on learning

have documented decreased retention of material and limited recall that have implications for professions depending on skill proficiency in the workplace (Anderson et al., 2004; Beddoe & Murphy, 2004; Hains et al., 2009; Locken & Norberg, 2005; McVicar, 2003; Moscaritolo, 2009; Palumbo et al., 2007; Tanaka, Takehara, & Yamaguichi, 2006).

Limited studies document the effects of stress on self-efficacy in this population and the connection among stress, learning, and self-efficacy.

Addressing stress to limit negative effects is an important aspect to improve learning, skills performance, and feelings of well-being. An examination of methods utilized for stress reduction in health-care professionals, nurses, and student nurses includes cognitive therapy, mindfulness training, cognitive-behavioral therapy with relaxation, and mindfulness-based stress reduction. Mindfulness and mindfulness-based stress reduction have become more prevalent in recent years with the introduction of a mindfulness-based stress reduction program in a university setting (University of Massachusetts Worcester Campus Center for Mindfulness, n.d.). Studies linking mindfulness and wellness have documented benefits with regular practice (Allen, Blashki, & Gullone, 2006; Astin, 1997; Baer, 2003; Brown & Ryan, 2003; Brown, Ryan, & Creswell, 2007; Grossman, Nieman, Schmidt, & Walach, 2004; Kabat-Zinn, 2003; Poulin, Mackenzie, Soloway, & Karayolas, 2008; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008).

With origins in Eastern philosophy and meditation practices, mindfulness assists individuals to focus attention on them and their immediate surroundings. Mindfulness is also believed to contribute to memory recall, self-actualization, and healthy living (Hirst, 2003). In addition, mindfulness is easily adopted, increases attentiveness, and decreases stress (Allen et al., 2006; Brown & Ryan, 2003). The incorporation of mindfulness into a program identified as reducing stress holds promise for those impacted by increasing

stress levels.

Stress and Response

Stress and the accompanying response involve the whole body, which has the potential to create more damage than the actual stressor. Sapolsky (2004) discussed the negative effects of stress on hormone production, cardiovascular health, metabolic and gastrointestinal changes, immunity, pain, sleep, memory, and aging. The stress response elicits release of energy in the form of glucose, simple proteins, and fats. Heart rate, respirations, and blood pressure increase to deliver energy sources throughout the body, but minor systems such as digestion, growth, tissue repair, and reproduction slow down. A negative effect of continued exposure to the stress response is suppression of the immune system and increased risk of disease (Beck & Srivastava, 1991; Nelson, Lust, Stiry, & Ehlinger, 2008; Smeltzer et al., 2007). A review of literature by Salovey et al. (2000) demonstrated a decrease in immunity, mood, and feelings of health with an increase in respiratory illness from stress across a variety of populations.

Research has demonstrated a link among stress, disease, mental health, and decreased feelings of wellness (Geiger-Brown et al., 2004; Näslindh-Ylipanagar, Sihvonen, Sarna, & Kekki, 2008; Nelson et al., 2008; Smeltzer et al., 2007). Näslindh-Ylipanagar et al. found increased health complaints among men with higher levels of stress and anxiety. These men also suffered from insomnia and feelings of depression. Nelson et al. demonstrated an association between stress and adverse health changes among college students. Stressors faced during the educational experience contribute to higher levels of physical and psychological health complaints as measured by self-report measures and immune system measures (American College Health Association, 2008; Tasanapradit, 2008; Whitehouse et al., 1996). An increased risk of physical or

psychological illness, as measured by the General Health Questionnaire, was found among nursing students with the highest stress levels (Beck & Srivastava, 1991). Watson et al. (2009) concluded that life events and stress “contributed significantly to psychological distress” (p. 270) in nursing students and new nurses, which may lead to higher levels of work-related illnesses and attrition. Psychological distress that is not addressed can lead to depression and decreased involvement in life experiences (Anisman & Zacharko, 1982; Kessler, 1997; Paykel, 1978; Paykel et al., 1969).

Stress and Learning

Learning and academic performance are also negatively affected by increased stress (Beddoe & Murphy, 2004; Evans & Kelly, 2004; Locken & Norberg, 2005; Meisenhelder, 1987; Moscaritolo, 2009), which has implications in the health-care learning environment. Hormones released during the stress response contribute to memory impairment, disruption in learning, and depression (Sapolsky, 2004). Studies have shown physical and chemical changes in the area of the brain associated with learning and memory in both mice and humans exposed to stress that decrease memory recall and learning (Anderson et al., 2004; Burriss, Ayers, Ginsberg, & Powell, 2008; Hains et al., 2009; Palumbo et al., 2007). Another study identified higher levels of depression, anxiety, and memory impairment in health-care workers with greater work-related stress that contributed to disengagement, exhaustion, and burnout (Peterson et al., 2008).

Health-care employees, specifically nurses, face multiple stressors that include limited personnel to manage patient care, long hours with fluctuating shifts, acute needs of patients, and managing the unexpected. Tvieta and Eriksen (2009) found that most of the sick leave in Norway was for health-care workers. Stress can build in individuals,

leading to exhaustion, psychological distress, burnout, and exodus from the stressor that, in the case of nurses, is the job (Watson et al., 2009). An examination of nurses and nursing students by Watson et al. found high levels of stress, as measured by a brief life events inventory and a work-stress inventory. The General Health Questionnaire provided information for psychological health related to anxiety, insomnia, social dysfunction, and depression. Results indicated that increased stress levels contributed to higher scores on somatic symptoms, including depression. McVicar (2003) identified increased levels of stress in the nursing profession leading to emotional exhaustion. The health-care environment is also facing a shortage of nurses from multiple factors that include stress (American Association of Colleges of Nursing, 2008; Buerhaus et al., 2007).

Stress begins early in the nursing career as a nursing student. Jones and Johnston (2000) found higher levels of stress in 1st-year nursing students when compared with medical students or the general female population, which “may carry a risk to the affective well-being of the student” (p. 481). Moscaritolo (2009) stated, “When students cannot manage stress, the normal line of defense is broken and anxiety results” (p. 19). The physical and mental health of nursing students is at risk with continued exposure to stress-producing situations. Beck and Srivastava (1991) found stress levels to be consistently high for all levels of nursing education, with the presence of psychiatric symptoms higher than the general population. Feelings of frustration, discouragement, and inadequacy were voiced by students, with greater than 50% of them reporting increased stress levels with their choice of nursing as a career.

Stress and Self-Efficacy

Negative emotions and the cycle of frustration, stress, and decreased learning contribute to the erosion of confidence to produce positive outcomes. This loss of

confidence affects the self-efficacy of students, decreasing the desire to continue trying and further increasing vulnerability to anxiety (Bandura, 1997). Bandura (1989) stated, “It requires a strong sense of efficacy to remain task oriented in the face of . . . failures” (p. 1176). Self-efficacy is a personal belief or confidence in the ability to produce an outcome. Bandura (1997) believed self-efficacy to be central to choice of actions by individuals, stating, “If people believe they have no power to produce results, they will not attempt to make things happen” (p. 3). Students want to succeed and feel satisfaction with their educational goals, which decreases when self-efficacy is diminished.

The concept of self-efficacy as an aspect of behavioral change was first addressed by Bandura (1977) and has continued to evolve. Bandura (1997) believed that many factors contribute to an individual’s ability to function within society but also believed that self-efficacy is foundational. He stated, “Beliefs of personal efficacy constitute the key factor of human agency” (p. 3). As a foundation, self-efficacy guides actions for desired outcomes even in the face of adverse conditions or situations. Self-efficacy beliefs are derived from the following four sources: (a) mastery experience, (b) vicarious experience, (c) verbal persuasion, and (d) physiological status (Bandura, 1997).

Mastery experience is believed to be the most influential component of self-efficacy by providing genuine evidence of perseverance to succeed. Throughout life, individuals face multiple experiences that require a certain level of performance. Simple things such as an infant learning to sit unassisted, hold items, or walk provide opportunities for achievement. Positive experiences give impetus to continue trying whereas negative outcomes reduce the belief in self and the possibility for achievement. “After people become convinced that they have what it takes to succeed, they persevere in the face of adversity and quickly rebound from setbacks” (Bandura, 1997, p. 80).

Factors such as previous successes or failures, level of difficulty, or amount of

effort an individual is willing to put forth contribute to the building of self-efficacy through experiences. Learning new skills, performance requirements, limited practice time, and the need to transfer theory knowledge to the clinical situation create stress in the nursing student. Success in achieving goals will increase feelings of efficacy in the student, but students often believe there is a gap in knowledge needed that leads to decreased feelings of success (Beck & Srivastava, 1991; Evans & Kelly, 2004; Jones & Johnston, 1997).

Vicarious experiences, another source of acquiring self-efficacy, are provided through observation. Referred to as modeling (Bandura, 1997), individuals observe the actions of others that succeed or fail in a variety of activities. These observations provide a guide from which to determine personal capabilities. Bandura observed that “the greater the assumed similarity, the more persuasive are the models’ successes and failures” (p. 87). Because an individual’s environment is not static, multiple opportunities for the observation of modeling occur on a regular basis, which can increase self-efficacy. Modeling others is not the only method available; self-modeling is also effective for increasing efficacy. “Seeing oneself perform successfully can enhance proficiency in at least two ways: it provides clear information on how to best perform skills, and it strengthens beliefs in one’s capabilities” (Bandura, p. 94). For the nursing student, multiple opportunities to self-model exist, but this follows the observance of instructors and the nurse’s performance. The student then attempts to achieve the skill level of the seasoned professional and finds the performance to fall below the observed skill. This belief of diminished performance can contribute to decreased feelings of self-efficacy.

A third method of increasing individual self-efficacy is through verbal persuasion. Individuals encouraged by other individuals of importance to them can increase feelings of efficacy if the encouragement is realistic. During the performance of skills or tasks,

positive feedback on the ability of an individual to succeed can enhance the feelings of efficacy while increasing efforts and competence. “Perceived self-efficacy contributes to performance accomplishments over and above the effects of skill development” (Bandura, 1997, p. 102). It is important to note that false praise or encouragement can actually have a negative effect on self-efficacy. Whereas verbal persuasion is useful in building self-efficacy, Bandura noted that “it is more difficult to instill enduringly high beliefs of personal efficacy” (p. 104) through verbal persuasion than it is to decrease feelings of efficacy. Instructors and nurses acting as mentors will give encouragement and praise to the nursing student, but students do not always believe that the encouragement is realistic. There are occasions when those over the student are stern and give little or no praise, which decreases feelings of adequacy and self-efficacy.

The last method of increasing self-efficacy examines an individual’s physical and mental state. In a balanced state, physiological indicators such as pulse and respiration are within individual average parameters, but when faced with a situation requiring new or stressful skills performance, these indicators increase in rate. An individual with lower feelings of self-efficacy and the stressful physiological response may “generate further stress through anticipatory self-arousal” (Bandura, 1997, p. 106). This response can lead to even greater distress and further declines in beliefs of ability. Change in physical status can be attributed to other conditions and individual differences in response, but it is important to note as it may affect feelings of efficacy. As noted earlier, the mental state or thoughts of an individual can affect the physiological state, and it can also contribute to increasing or decreasing self-efficacy. An individual with positive memories and emotions from prior experiences is more likely to attempt a new skill than one with negative memories and emotions. The same can be said of an individual’s psychological

state, with positive moods increasing and negative moods decreasing efficacy (Bandura). College students and nursing students list decreased time and increased stress as a contributor to a decline in health status, which may affect feelings of efficacy (Beck & Srivastava, 1991; Billingsley, Collins, & Miller, 2007; Evans & Kelly, 2004; Nelson et al., 2008).

Each of these methods contributes to an individual's feelings of self-efficacy at various stages of life, with occurrences or events, social situations, and a variety of environments. Bandura (1989) believed that people's beliefs about abilities were central to the choice of action to achieve a desired outcome, stating: "People devise ways of adapting flexibly to remarkably diverse geographic, climatic, and social environments . . . to realize desired outcomes" (Bandura, 2001, p. 22). College is a time in life in which choices made can affect outcomes on an individual's life for an extended period of time. During this time, a career choice is made with the decision to apply oneself to learning. Students with increased self-efficacy have been shown to achieve better outcomes (Bandura, 1997). This point is significant to consider when examining the loss of confidence with feelings of inadequacy experienced by nursing students early in the educational process (Beck & Srivastava, 1991; Billingsley et al., 2007; Evans & Kelly, 2004; Jones & Johnston, 2000).

Self-efficacy has been compared with self-esteem, but it is important to note that self-efficacy and self-esteem are not the same. *Self-efficacy* is a belief in personal capabilities, and *self-esteem* is a judgment of self-worth (Bandura, 1997; Lawrance & McLeroy, 1986). The daily tasks of nurses and student nurses involve the performance of skills and confident decision making in the care of others. A strong sense of self-efficacy is needed for confidence and should be developed during training (Dory & Beaulieu, 2009). Education, training, and practice will improve confidence of an individual moving

through the role of a student to that of an employee. Golbasi, Kelleci, and Dogan (2008) found a strong correlation to job satisfaction and self-confidence, which has implications for the nursing workforce and students entering the profession.

Nursing Student Stressors

Students across all levels of nursing education frequently list as a stressor the gap between theory and practice when entering the clinical area (Beddoe & Murphy, 2004; Billingsley et al., 2007; Evans & Kelly, 2004; Moscaritolo, 2009), which contributes to doubts with regard to the choice to pursue nursing education. The nursing student enters the clinical facility armed with classroom knowledge and skills practiced on mannequins but quickly learns that more knowledge and practice are needed. This knowledge contributes to the stress of establishing a satisfactory learning relationship with the assigned staff nurse, which is another area of concern listed by students (Levett-Jones, Lathlean, Higgins, & McMillan, 2009). Other areas listed as stressors for students include fear of failure or mistakes, questioning one's ability to perform or complete tasks, rapidly changing circumstances, finances, lack of personal time, and lack of timely feedback from instructors (Billingsley et al.; Jones & Johnston, 1997, 2000; Levett-Jones et al.; Locken & Norberg, 2005; Moscaritolo; Stephens, 1992; Watson et al., 2009). Another concern is the negative effect of stress and anxiety on learning and performance of nursing students. Hughes (2005) stated, "Stress contributes to anxiety, which can in turn interfere with students' academic performance" (p. 22). Skills and task performance at an acceptable level for patient care are required prior to and during clinical situations. It has been demonstrated that nursing students experiencing stress have impaired learning as well as impaired performance (Beddoe & Murphy; Locken & Norberg; Stephens). Being

impaired creates a cycle of frustration, increasing stress, and further declines in learning capabilities. Evans and Kelly found that 45% of the nursing student population studied had a decrease in self-image and 54% expressed a loss of confidence. A concern for the student nurse population is the risk for depression from decreased self-image and loss of confidence (Kendler, Hetteema, Butera, Gardner, & Prescott, 2003).

Stress, Self-Efficacy, and Interventions

Acknowledging and addressing stress early in the nursing profession while providing methods for management will contribute to increased job satisfaction. The relationship among stress, learning, academic performance, and self-efficacy should be addressed in the beginning of nursing education to give students tools to use throughout the following years and into the working environment. Interventions that have demonstrated positive effects on decreasing stress, anxiety, and health-related complaints and increasing coping include cognitive therapy (Brunero, Cowan, & Fairbrother, 2008), mindfulness training (Cohen-Katz et al., 2005; Mackenzie, Poulin, & Seidman-Carlson, 2006; Moscaritolo, 2009), and cognitive-behavioral training with relaxation (Jones & Johnston, 2000; Norvell, Belles, Brody, & Freund, 1987; Yung, Fung, Chan, & Lau, 2004). An examination of the effectiveness of each method demonstrated a combination of cognitive-behavioral training and relaxation to be the most effective in reducing stress (Marine, Routsalainen, Serra, & Verbeek, 2009). Yung et al. were able to account for 53% of the changes in the participants' scores to be attributable to the relaxation intervention. A 1-day stress management program using cognitive-behavioral training decreased stress and improved nurses' mental attitude at work (Brunero et al.). The program consisted of one 8-hour workshop and self-directed learning to reinforce the intervention.

Mindfulness

A method that has demonstrated positive outcomes on physical and mental health is mindfulness or mindfulness meditation. *Mindfulness* is identified as paying attention on purpose to the current situation or present moment (Allen et al., 2006; Bhikkhu, 1997; Brown & Ryan, 2003; Brown et al., 2007; Gunaratana, 1990; Kabat-Zinn, 1994; Moore, 2008) and is cultivated by following the breath as it moves in and out. Attention and awareness are considered a part of everyday existence, but mindfulness can assist individuals to decrease the amount of automatic thoughts, reactions, and behaviors that occur throughout each day. “Because mindfulness permits an immediacy of direct contact with events as they occur, . . . consciousness takes on a clarity and freshness that permits more flexible . . . responses” (Brown et al., p. 212). Gunaratana explained, “Mindfulness is mirror-thought. It reflects only what is presently happening and in exactly the way it is happening. There are no biases” (p. 83).

Mindfulness has been shown to increase positive feelings and “enduring shifts in the processing of negative emotion under stress” (Kabat-Zinn, 2003, p. 147). In a study of young adults in a community setting, McKee, Zvolensky, Solomon, Bernstein, and Leen-Feldner (2007) found higher anxiety scores with lower mindfulness scores; they also found those with lower anxiety scores had higher mindfulness scores, indicating positive outcomes with mindfulness. These findings indicate that mindfulness can help an individual gain control of his or her thoughts, which can lead to increasing stress. An examination of mindfulness by Brown and Ryan (2003) found those practicing mindfulness reported more feelings of well-being and positive emotional states, with a decrease in tension, anxiety, depression, fatigue, and stress. An inverse relationship was also found with depression (as measured with the Center for Epidemiologic Studies Depression Scale and Beck Depression Inventory), anxiety (as measured with the State-

Trait Anxiety Inventory and Profile of Moods States), and physical health (as measured with a subjective and objective self-report). Grossman et al. (2004) found that “improvements were consistently seen across a spectrum of standardized mental health measures including psychological dimensions of quality of life scales, depression, anxiety, coping style, and other affective dimensions of disability” (p. 40).

Throughout the course of a day, there are constant events around each individual. The changes in scenery, weather, conversations, and even thoughts occur on a regular basis without much notice until a nonroutine occurrence brings attention to the individual. This inattention is termed *mindlessness*, which “is linked to all those habitual behaviors performed without attention” (Hirst, 2003, p. 362). Mindfulness training assists individuals in paying attention to circumstances as they occur, to develop a clear awareness of each moment. Mindfulness is “often associated with the formal practice of mindfulness meditation. Mindfulness, however, is more than meditation” (Shapiro, Carlson, Astin, & Freedman, 2006, p. 374); it is awareness. Becoming aware of thoughts, reactions, and emotions allows individuals to consciously pay attention to each moment of each experience with greater comprehension, which often results in a shift of perspective. Focusing attention during a task can decrease preoccupation with other thoughts, assisting in the successful completion of the task, and can guide to more effective goal attainment (Brown et al., 2007). When a stressful situation arises, mindfulness provides a method to see circumstances as they really are without overriding emotional attachments, leading to a more calm approach for the situation (Gunaratana, 1990). This adaptation was demonstrated in a study by Arch and Craske (2006) using a brief, focused breathing exercise adapted from a mindfulness course with college students prior to viewing negative or aversive picture slides. Students utilizing focused breathing reported lower negative emotional responses than the control group.

The positive effects of mindfulness indicate that it is an intervention with potential for individuals faced with chronic stress such as nurses and nursing students. The use of mindfulness interventions demonstrated a decrease in habitual thought, increased attention and awareness, and decreased overall stress in a psychiatric nursing practice (O'Haver-Day & Horton-Deutsh, 2004), which has implications for increasing attention and learning in nursing students. Ott (2004) found mindfulness meditation to decrease stress and contribute to a feeling of inner calmness with both formal and informal practice. A 1-month study comparing relaxation and mindfulness meditation in a group of medical and nursing students found the following: "Comparison of effect sizes indicates that mindfulness and relaxation are similar with respect to reducing distress; however, mindfulness appears to be more effective in enhancing positive states of mind" (Jain et al., 2007, p. 20). In a review of mindfulness-based studies, Brown et al. (2007) found that "empirical research to date supports the role of mindfulness in well-being" (p. 220), with a reduction in stress symptoms, better task performance, more effective goal attainment, and greater optimism.

A study conducted with nurses and human services professionals demonstrated "that mindfulness-based interventions offer a unique opportunity for participants to reduce the effects of stress in their lives and improve their well-being" (Poulin et al., 2008, p. 78). This point is important to consider, with increasing stress levels resulting in decreased performance, more use of sick leave, and employees choosing to leave the job. Interventions that can contribute to decreasing attrition while improving personal health should be examined. A randomized controlled study by Shapiro et al. (2008) with undergraduate college students demonstrated a decrease in stress with mindfulness practice and increased well-being. An interesting note from the study is the low dropout rate of only 3 from the 47 participants at the 2-month follow-up. This finding suggests

that the intervention was beneficial enough for participants to continue the practice. When utilized by nursing students, mindfulness has been able to decrease stress and anxiety while increasing empathy and learning (Beddoe & Murphy, 2004; Billingsley et al., 2007; Moscaritolo, 2009).

Mindfulness-Based Stress Reduction

Another method that has demonstrated positive outcomes is mindfulness-based stress reduction. A comparative study examining the use of cognitive-behavioral stress reduction and mindfulness-based stress reduction found that participants in the mindfulness-based stress reduction group had better outcomes on all measures (Smith et al., 2008). Mindfulness-based stress reduction is a program incorporating mindfulness meditation, yoga, discussions, instruction, and daily practice. The program was introduced in 1979 at the University of Massachusetts to assist individuals in dealing with stress, pain, and illness (University of Massachusetts Worcester Campus Center for Mindfulness, n.d.). The basic program consists of once weekly meetings for 8 weeks in 2- to 2.5-hour sessions, with 1 week including an all-day session. Participants are expected to practice at least 6 days during the week for 45 minutes outside of the classroom (Astin, 1997; Beddoe & Murphy, 2004; Brown & Ryan, 2003). The program has been revised and adapted for a variety of situations, but the mindfulness component remains the same. Early studies following introduction of the program demonstrated positive effects on individuals in reducing symptoms from a variety of medical conditions such as cancer and heart disease and in decreasing pain and stress (Kabat-Zinn, 1992). A review of literature by Baer (2003) found mindfulness-based stress reduction to be effective in relieving pain, alleviating anxiety and depression, reducing symptoms in individuals with fibromyalgia or psoriasis, and achieving significant reductions in depression with cancer

patients. A calculation of effect sizes “suggests that mindfulness-based interventions have yielded at least medium-sized effects, with some effect sizes falling within the large range” (p. 135). Baer stated, “Although the current empirical literature includes many methodological flaws, findings suggest that mindfulness-based interventions may be helpful in the treatment of several disorders” (p. 125). Later studies have verified the association among mindfulness, a decrease in psychological distress, and reported medical symptoms with increased feelings of wellness (Koerbel & Zucker, 2007; Matchim, Armer, & Stewart, 2008; Nyklícek & Kuijpers, 2008; Shapiro et al., 2008).

Although positive results with chronic conditions indicate the usefulness of mindfulness-based stress reduction as part of the treatment regimen, a review of five research articles by Koerbel and Zucker (2007) found weaknesses with small sample sizes and high attrition. “Attrition rates of the studies may reflect the fact that MBSR [mindfulness-based stress reduction] is not a program that appeals to everyone” (Koerbel & Zucker, p. 273). The program requires a commitment of time, willingness to be attentive, and dedication to continue the practice. Education with regard to the involvement and examination of methods utilizing shorter time frames while maintaining consistency prior to initiation into a program may assist in decreasing attrition rates. Despite weaknesses in the studies, “MBSR [mindfulness-based stress reduction] . . . continues to provide researchers with a body of knowledge that makes it a legitimate health behavior intervention” (Koerbel & Zucker, p. 274).

The use of mindfulness-based stress reduction has been found to be useful in decreasing stress and anxiety, inducing relaxation, and improving quality of life for participants (Astin, 1997; Baer, 2003; Beddoe & Murphy, 2004; Carmody & Baer, 2008; Carmody, Reed, Kristeller, & Merriam, 2008; Poulin et al., 2008; Young, Bruce, & Turner, 2001). Participants in a qualitative study examining the usefulness of

mindfulness-based stress reduction for the treatment of depression described the use of breathing techniques as beneficial during stressful situations. Practice logs demonstrated a link between the amount of practice documented during the week and the amount of positive change present (Mason & Hargreaves, 2001). A randomized study of cancer patients using an abbreviated form of mindfulness-based stress reduction provided “evidence that a relatively brief mindfulness meditation-based stress reduction program can effectively reduce mood disturbance, fatigue, and a broad spectrum of stress-related symptoms in cancer patients” (Speca, Carlson, Goodey, & Angen, 2000, p. 619).

Obtaining positive results with shorter sessions is encouraging for those investigating the use of a mindfulness-based stress reduction program but are deterred by time requirements. The utilization of shorter sessions also has implications for retention when conducting interventions with a variety of individuals. Regardless of the time involved in learning the practice itself, it is believed that anyone undertaking mindfulness-based stress reduction should be committed to the development of mindfulness on a regular basis. Kabat-Zinn (2003) stated, “It takes a personal commitment and perseverance in formal practice gradually to establish a degree of stability in one’s capacity to attend, especially to stressful or aversive objects, including emotional turbulence” (p. 150).

Brown and Ryan (2003), in a study of mindfulness-based stress reduction with 58 cancer patients (90-minute sessions once a week and a one-time longer session for 2 to 3 hours), were also able to produce positive results with shorter sessions. The results indicated that participants were able to achieve mindfulness in the shorter time frame, and those with higher mindfulness scores had lower levels of distress, tension, and mood disturbances. Results of early studies with mindfulness-based stress reduction found a more rapid clearing of psoriasis in those practicing mindfulness than in those not practicing an improved immune function and a decrease in a prostate cancer indicator (Kabat-Zinn).

It is believed that the process of mindfulness induces relaxation, which may contribute to positive effects in a variety of settings (Baer, 2003). The effects of relaxation have been termed the *relaxation response* that “results in generalized decreased sympathetic nervous system activity” (Beary & Benson, 1974, p. 118; Wallace, Benson, & Wilson, 1971). This response results in a decreased respiratory rate, oxygen consumption, and muscle tone. This response could also be of benefit for individuals suffering with stress and related symptoms. Shapiro, Schwartz, and Bonner (1998) were able to decrease stress in medical and premedical students with the introduction of mindfulness-based stress reduction, and a group of health-care professionals were able to decrease stress and demonstrate greater self-compassion with the use of mindfulness-based stress reduction (Shapiro, Astin, Bishop, & Cordova, 2005). Stress has also been indicated as a causative factor in heart disease. Robert-McComb, Tacon, Randolph, and Caldera (2004) demonstrated a decrease in breathing patterns and cortisol levels with individuals practicing mindfulness-based stress reduction when compared with the control group. A meta-analysis of 10 studies demonstrated that “although derived from a relatively small number of studies, these results suggest that MBSR [mindfulness-based stress reduction] may help a broad range of individuals to cope with their clinical and nonclinical problems” (Grossman et al., 2004, p. 35).

Mindfulness-Based Stress Reduction and Nursing Students

Young et al. (2001) examined the use of the traditional 8-week session of mindfulness-based stress reduction with 30, 3rd-year nursing students by employing a quasi-experimental pretest and posttest design. Both the control group and the intervention group completed the Health Status Profile scale, with only 15 students in the

intervention group attending the mindfulness-based stress reduction sessions. The scale was completed by both groups at the conclusion of an 8-week training session. Despite the small sample size, “The MBSR [mindfulness-based stress reduction] intervention produced small to moderate effect sizes for health-related effects, sense of coherence, and physical symptoms. Psychological symptoms had by far the greatest decrease” (pp. 25-26). During focus group discussions, at which time the focus group leaders were able to gain information with regard to the student’s perception of the program and satisfaction with the intervention, qualitative findings were obtained from students in the intervention group. Students found the intervention to be of benefit in achieving balance in their lives and recommended the course be incorporated into the nursing curriculum.

As discussed previously, nursing students face many stressors throughout their training. Stress not only affects learning, self-efficacy, and achievement but it can also affect the responses of students to individuals assigned to their care while in training. Moscaritolo (2009) conducted a literature review examining a variety of methods to improve the learning environment for nursing students, concluding, “The literature indicates that mindfulness training is an effective interventional strategy to decrease anxiety among undergraduate nursing students” (p. 22).

A group of baccalaureate nursing students ($N = 16$) introduced to an 8-week session of mindfulness-based stress reduction in a nonexperimental design with a no-comparison group were able to decrease anxiety and stress levels, as measured by the Derogatis Stress Profile. They showed no statistically significant changes in empathy scores, as measured by the Interpersonal Reactivity Index (Beddoe & Murphy, 2004). Beddoe and Murphy believed the limited change in empathy scores was due to the profession attracting those with greater empathy; thus, pretest empathy scores were already elevated. Even with higher pretest empathy scores, a decrease in anxiety and

stress will have long-term benefits for empathy by allowing student nurses or nurses to focus on the individual in their care rather than on personal distress.

Of interest is that none of these studies with nursing students measured actual changes in mindfulness awareness and increased self-efficacy, which are hypothesized mediators of the reductions in stress and anxiety or the nursing students' improvements in clinical skills if they have a brief mindfulness intervention.

The ability to decrease anxiety and stress in the nursing profession should also contribute to retention in the workplace. The continued exposure to stress, anxiety, and feelings of inadequacy and the resulting physiological and psychological responses lead to exhaustion and eventual burnout. The use of mindfulness-based stress reduction can decrease these symptoms and improve personal and professional outcomes (Cohen-Katz et al., 2005; Mackenzie et al., 2006).

Summary

Stress is an inevitable part of life and is encountered on a regular basis throughout a normal day. Something as simple as finding shoes or deciding what to have for a meal can create stress. Stress can occur from both positive and negative influences. Some stress enhances an individual's alertness, assisting in learning and the completion of tasks (Berman et al., 2008; Smeltzer et al., 2007). Concern arises with continued exposure to stress and the accompanying responses that disrupt the balance of an individual physically, psychologically, and emotionally. A brief description of these effects has been demonstrated in this literature review.

This literature review explored the connection among stress, learning, self-efficacy, and mindfulness-based stress reduction. Positive outcomes included increased attentiveness and positive attitudes and decreased psychological and physical symptoms

of stress. This intervention can address the needs of those in the health-care learning environment, specifically student nurses. Providing tools for this population will contribute to job satisfaction and retention for the profession. With projected shortages of nurses to work in health care, methods to maintain nurses are important.

To date, studies have focused on the traditional 8-week course, but few have examined the effects of decreased training time. No recorded studies exist that examine the effects on self-efficacy with a reduction in stress on student nurses and learning. The current study addressed the links among stress, learning, self-efficacy mitigation, and risk for depression with an abbreviated version of the mindfulness-based stress reduction intervention program among undergraduate nursing students.

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CHAPTER 3

EFFECTS OF MINDFULNESS BREATHING INTERVENTION ON STUDENT NURSES' STRESS AND RISK FOR DEPRESSION MAIN RESULTS

Background

Stress is a part of daily life with deadlines, relationships, or even disruptions in routine. *Stress* has been defined as “a condition in which the person experiences changes in the normal, balanced state” (Berman, Snyder, Kozier, & Erb, 2008, p. 1061), referred to as *homeostasis*. This alteration can occur from an overload or stressor in either the physical or psychological environment that is perceived as a threat. The change in homeostasis from stress leads to what has been identified as a stress response (Berman et al.; Sapolsky, 2004; Smeltzer, Bare, Hinkle, & Cheever, 2007), and it initiates physiological changes in the body described as the *fight or flight response*. Interestingly, psychological disruptions have the capacity to elicit the same response in the body as a physical stressor (Sapolsky). The response to regain homeostasis can be more difficult to control unless the individual is able to manage thought processes, or “the stress-response can become more damaging than the stressor itself, especially when the stress is purely psychological” (Sapolsky, p. 13).

Prolonged exposure to stress can lead to declining emotional states that “are thought to be associated with unhealthy patterns of psychological functioning” (Salovey,

Rothman, Detweiler, & Steward, 2000, p. 110), and it has been suggested as a contributing factor in both physical and mental health (Berman et al., 2008; Pelletier, 2000; Smeltzer et al., 2007). The impact from the unhealthy pattern of functioning can result in decreased feelings of well-being and risk for depression. Health-care professions are vulnerable to stress and the related conditions from high demands in caring for others with limited time, personnel, and increased acuity. Anxiety, exhaustion, depression, and decreases in immune function are some of the documented results of stress in this population (Beck & Srivastava, 1991; Cohen-Katz, Wiley, Capuano, Baker, & Shapiro, 2004; Fukuda, Ichinose, Kusama, Anndow, & Akiyoshi, 2008; Geiger-Brown, Muntaner, & Trinkoff, 2004; McVicar, 2003; Peterson et al., 2008; Salovey et al.; Tveito & Eriksen, 2009; Watson, Gardiner, Hogston, Stimpson, Wrate, & Deary, 2009).

The educational process for employment in health care can be a source of stress as individuals proceed through multiple levels of learning. Life events as well as academic pressures contribute to stress, affecting the emotional well-being of students. A report by the American College Health Association (2008) identified 50% of students reporting higher than usual to maximum stress affecting academic performance. Jones and Johnston (1997) found higher stress levels in nursing students than other college students across the 4-year program of study. These findings have implications for students in nursing programs that will last 2 to 4 years since stress longer than 6 months is termed *chronic stress*. This type of stress puts the nursing student population at higher risk for anxiety and depressive symptoms (Finlay-Jones & Brown, 1981; Kessler, 1997; Paykel et al., 1969).

An examination of nurses and nursing students by Watson et al. (2009) found high levels of stress, as measured by a brief life-events inventory and a work-stress inventory. The General Health Questionnaire provided information for psychological health related

to anxiety, insomnia, social dysfunction, and depression. Results indicated that increased stress levels contributed to higher scores on somatic symptoms, including depression. Another study identified higher levels of depression, anxiety, and memory impairment in health-care workers with greater work-related stress that contributed to disengagement, exhaustion, and burnout (Peterson et al., 2008). Psychological distress that is not addressed can lead to depression and decreased involvement in life experiences (Anisman & Zacharko, 1982; Kessler, 1997; Paykel, 1978; Paykel et al., 1969).

Learning and self-efficacy are other areas affected by increased stress and anxiety in the student nurse population. Moscaritolo (2009) stated, “When students cannot manage stress, the normal line of defense is broken and anxiety results” (p. 19). The physical and mental health of the nursing student is at risk with continued exposure to stress-producing situations. Negative emotions and the cycle of frustration, stress, and decreased learning contribute to the erosion of confidence to produce positive outcomes. This loss of confidence affects the self-efficacy of the student, decreasing the desire to continue trying and further increasing vulnerability to anxiety (Bandura, 1997). Bandura (1989) stated, “It requires a strong sense of efficacy to remain task oriented in the face of . . . failures” (p. 1176). Students want to succeed and feel satisfaction with their educational goals, which decreases when self-efficacy is diminished (Bandura, 1997, 2001).

Studies examining the effects of stress on learning have documented decreased retention of material and limited recall, which has implications for the student nurse population (Anderson et al., 2004; Beddoe & Murphy, 2004; Hains et al., 2009; Locken & Norberg, 2005; McVicar, 2003; Moscaritolo, 2009; Palumbo et al., 2007; Tanaka, Takehara, & Yamaguichi, 2006). Students across all levels of nursing education frequently list as a stressor the gap between theory and practice when entering the clinical

area (Beddoe & Murphy; Billingsley, Collins, & Miller, 2007; Evans & Kelly, 2004; Moscaritolo), which contributes to doubts with regard to the choice to pursue nursing education. Other areas listed as stressors for students include fear of failure or mistakes, questioning of ability to perform or complete tasks, rapidly changing circumstances, finances, lack of personal time, and lack of timely feedback from instructors (Billingsley et al.; Jones & Johnston, 1997, 2000; Levett-Jones, Lathlean, Higgins, & McMillan, 2009; Locken & Norberg; Moscaritolo; Stephens, 1992; Watson et al., 2009). Limited studies exist that document the effects of the connection among stress, learning, and depressive symptoms.

Interventions that have demonstrated positive effects on decreasing stress, anxiety, and health-related complaints and on increasing coping include cognitive therapy (Brunero, Cowan, & Fairbrother, 2008), mindfulness training (Cohen-Katz et al., 2005; Mackenzie, Poulin, & Seidman-Carlson, 2006; Moscaritolo, 2009), cognitive-behavioral training with relaxation (Jones & Johnston, 2000; Norvell, Belles, Brody, & Freund, 1987; Yung, Fung, Chan, & Lau, 2004), and mindfulness-based stress reduction (Smith et al., 2008). The current study examined the benefits of a brief mindfulness-based stress reduction in a group of 1st-year nursing students.

Purpose

The purpose of this study was to determine the effectiveness of a brief mindfulness breathing intervention in reducing stress and the risk for depression in 1st-year nursing students by measuring depression scores and physiological measures (i.e., blood pressure and pulse).

Research Questions and Hypotheses

Research questions and hypotheses guided the study.

Research Question 1

Compared with the no-treatment group, is there a decrease in depression scores after participating in the brief stress reduction intervention as measured by the Center for Epidemiologic Studies Depression Scale (Radloff, 1977)?

Hypothesis 1

It was hypothesized that the mean decrease and effect sizes for the depression scores in the treatment group would be larger than the treatment-as-usual group.

Research Question 2

Compared with the no-treatment control group, are the participants' physiological measures of stress (i.e., blood pressure and pulse) lower at later measurements than at baseline following participation in the mindfulness breathing?

Hypothesis 2

It was hypothesized that the mean decrease in effect sizes for the physiological measures of stress (i.e., blood pressure and pulse) scores in the treatment group would be larger than the treatment-as-usual group.

Research Question 3

Is there greater improvement in higher-risk students for relative risk of depression,

as determined by the Center for Epidemiologic Studies Depression Scale (Radloff, 1977) scores of 16 or greater, in measures of stress, as determined by physiological measures of blood pressure and pulse, than lower-risk students at baseline?

Hypothesis 3

It was hypothesized that the higher-risk students for depression at baseline would have larger improvements in outcomes.

Methods

Sample

The research sample consisted of 11 males and 74 females, ranging in age from 19 to 45 years, and they were 89.4% Caucasian. Demographics are illustrated in Tables 3.1, 3.2, 3.3, and 3.4. Participants in this study were recruited from 120 nursing students enrolled in 1 of 12 fall clinical classes in a course at a northwest university referred to as Table 3.1

Frequency and Percentage of Gender

Gender	Frequency	%
Male	11	12.9
Female	74	87.1
Total	85	100.0

Table 3.2

Frequency and Percentage of Race

Race	Frequency	%
African American	1	1.2
Asian or Pacific Islander	3	3.5
Caucasian	76	89.4
Hispanic/Latino	3	3.5
Other	2	2.4
Total	85	100.0

Table 3.3

Frequency and Percentage of Marital Status

Marital status	Frequency	%
Married	48	56.5
Single	32	37.6
Divorced	4	4.7
Widowed	1	1.2
Total	85	100.0

Table 3.4

Frequency and Percentage of Ages of Participants' Children Living at Home

Ages of children	Frequency	%
None	55	54.5
0 to 5 years old	23	22.8
6 to 12 years old	10	9.9
13 to 18 years old	9	8.9
19 to 25 years old	4	4.0
Total	101	100.0

Foundations of Nursing Practice Clinical. The study commenced during the 11th week of a 15-week semester. Following approval from the Institutional Review Board of the University of Utah, I visited each clinical class, introduced the research, answered questions, and gave each student a consent to participate form (see Appendix A), which was to be returned the following week. From this sampling, 90 students returned the signed consent form. Five students were unable to complete the exercises and requested to withdraw from the study within the 1st week. The participants were 2-year associate degree nursing students in the 1st year of the nursing program.

The *inclusion criteria* included all students enrolled in the 12 courses who voluntarily gave written consent to participate in the research (see Appendix A). The *exclusion criteria* included any enrolled student who did not sign the consent forms or those who did not complete the course and dropped out of the study.

Design

The current study included both descriptive and experimental components.

Descriptive measures included a Demographic Survey (see Appendix C) completed with the first set of questionnaires and a program evaluation completed with the final set of questionnaires. The independent variable in this study was a brief mindfulness breathing intervention taught by the primary investigator (6 classes) during clinical education laboratory times or treatment as usual of no intervention (6 classes). Dependent variables included physiological measures (i.e., blood pressure and pulse) and depression (Center for Epidemiologic Studies Depression Scale; Radloff, 1977).

A two-group (i.e., experimental and no-treatment control) randomized control trial design with four repeated measures (i.e., pretest, posttest, 2-month follow-up test, and 4-month follow-up test) was utilized to determine the effects of the independent variable on the dependent variables (i.e., blood pressure, pulse, and Center for Epidemiologic Studies Depression Scale). All students in the study participated in the Foundations of Nursing Practice Clinical course (i.e., 12 classes), but only the intervention classes received the intervention of mindfulness breathing. The no-treatment control classes did not receive the brief mindfulness breathing treatment modules. All classes completed the pretest, posttest, 2-month follow-up test, and 4-month follow-up test.

The 12 classes were *randomly assigned* to the treatment intervention or treatment-as-usual group using a number chart of generated random numbers. Students in the 6 treatment classes ($n = 42$) received the mindfulness breathing intervention and the remaining 6 classes ($n = 43$) were the no-treatment of no mindfulness breathing intervention in the regular Foundations of Nursing Practice Clinical course.

Procedures

Following Institutional Review Board approval from the University of Utah and the participating university, the 12 classes were randomized into groups by assigning each

class a number and then using a number chart of computer-generated random numbers. During a clinical laboratory education session, I approached students enrolled in the clinical classes. The students were informed about the research study and given opportunities to ask questions. Those students in the intervention classes also received information with regard to the mindfulness breathing sessions. Students agreeing to participate in the research were given a consent form (see Appendix A), with 1 week to complete and return the signed document. The following week the completed consent forms were collected. The control classes completed the Demographic Survey (see Appendix C), Center for Epidemiologic Studies Depression Scale (Radloff, 1977), Mindfulness Attention Awareness Scale (Brown & Ryan, 2003), and Student Clinical Completion Appraisal form (see Appendix B), and they had physiological measures taken following collection of the consent forms. For the intervention participants, prior to the first session of the intervention, each participant completed the Demographic Survey, Center for Epidemiologic Studies Depression Scale, Mindfulness Attention Awareness Scale, Student Clinical Completion Appraisal form, and each participant had physiological measures taken. The physiological measures and measurement tools were completed again posttest, 2 months follow-up, and 4 months follow-up for all participants.

Instruments

The instruments selected for this study were the following: (a) Center for Epidemiologic Studies Depression Scale (Radloff, 1977) and (b) physiological measures. All measures were administered pretest, posttest, 2-month follow-up test, and 4-month follow-up test for both the intervention and control groups.

Center for Epidemiologic Studies Depression Scale. The Center for Epidemiologic Studies Depression Scale is a self-report measure developed by Radloff (1977) to assess the intensity of “depressive symptomatology” (p. 385) in the general population. The scale was developed as a method of measuring an individual’s current level of depression symptoms with an emphasis on emotions and mood. The Center for Epidemiologic Studies Depression Scale consists of 20 items that make up the following four subscales: (a) depressed affect, (b) positive affect, (c) somatic symptoms, and (d) interpersonal. The total scale has a high internal consistency, producing a coefficient alpha of .80 or above in previous studies (Golden et al., 2008; U.S. Department of Health & Human Services, 1985). The Center for Epidemiologic Studies Depression Scale has been proven useful in surveys of general populations to measure depression symptoms (Beekman et al., 1997; Mortimer et al., 2005; Radloff). Concurrent validity for measures of depressive symptoms ranges from .30 to .80 when compared with similar instruments (Caracciolo & Giaquinto, 2002; Radloff; U.S. Department of Health & Human Services).

Scoring ranges from 0 to 60, with each of the 20 items having a *low value* of 0 to a *high value* of 3. Scores of greater than 16 have been recommended as a cutoff point for determining mild depression (Comstock & Hesling, 1976; Golden et al., 2008; Pandya, Metz, & Patten, 2005; Schein & Koenig, 1997; Weissman & Locke, 1983). Other studies have found variances in the general populations and gender differences, recommending scores of 17 up to 23 as a cutoff for determining mild depression (Ferketich, Schwartzbaum, Frid, & Moeschberger, 2000; Husani, Neff, Harrington, Hughes, & Stone, 1990; Roberts & Vernon, 1983). As a self-report measure, it is important to note that the Center for Epidemiologic Studies Depression Scale measures an individual’s response to situations that have occurred over the previous week and may be affected by events such as illness. The Center for Epidemiologic Studies Depression Scale assesses self-reported

depressive symptoms, but it is not diagnostic of depression (Golden et al.; Pandya et al.); only a diagnostic evaluation can determine depression.

Physiological measures (i.e., blood pressure and pulse). Physiological measures were taken using standardized equipment and procedures. Blood pressure and pulse measurements are a quick method of determining individual status and have been used by health-care providers as a first step in an assessment (Berman et al., 2008; Curran, n.d.; Smeltzer et al., 2007). Factors affecting a blood pressure reading include state of mind (i.e., stress and anxiety increase blood pressure), time of day (i.e., usually lower in the morning), gender (i.e., females from puberty to menopause are generally lower than males), and proper cuff size. A blood pressure cuff that is too small or too large will produce false high or low readings. Another factor that may influence the reading when repeated measures are taken is the choice of arms, as readings can differ from arm to arm (Berman et al.; Smeltzer et al.). To ensure an accurate reading in the participants, the cuff was measured for each participant for a width that was 40% of the arm circumference and was placed with the bladder of the cuff over the artery of the selected arm 1 to 2 inches above the antecubital space.

The Microlife Blood Pressure Monitor was used for this assessment. The individual was seated with feet flat on the floor, arm resting on lap with elbow slightly flexed, palm facing up, and forearm at heart level. The deflated cuff was wrapped around the forearm (right or left depending on individual preference) and secured with the Velcro attachment. The individual was instructed to sit still until the measurement was completed as the start button was pushed. If a repeated measure was needed, a wait of 1 to 2 minutes between readings was instituted to ensure accuracy of the measurement (Berman et al., 2008). The monitor displayed both the blood pressure and the pulse. Recording of the blood pressure and pulse included the arm used to ensure consistency in

follow-up measurements. No elevated readings of greater than or equal to 160/100 (U.S. Preventive Services Task Force, 2004) were noted in this sample. Elevated readings would have been noted with instructions to contact the personal health-care provider for follow-up.

The Microlife Blood Pressure Monitor was calibrated and tested at the factory with results on file and available upon request. The monitor was rated as high accuracy by the American Heart Association (Microlife Corporation, n.d.). An evaluation of blood pressure monitoring devices comparing mercury sphygmomanometers and automatic devices indicated that their use eliminated observer bias and were useful for blood pressure measurements (Buchanan, 2009).

Intervention. Materials for the brief mindfulness breathing intervention were developed into a standardized curriculum, with the content adapted from evidence-based mindfulness breathing courses designed and tested by Bhikkhu (1997), Gunaratana (1990), and Kabat-Zinn (1992, 1994, 2006). The script for the mindfulness breathing intervention (see Appendix D) was reviewed by a trained mindfulness breathing facilitator prior to use. In order to maintain consistency, I conducted all sessions for the intervention groups.

Participants in the intervention classes were instructed on a brief mindfulness breathing intervention for 3 consecutive weeks following enrollment. Week 1 participants were introduced to mindfulness breathing, mindfulness history, and uses for mindfulness breathing. Students were allowed to ask questions for clarifications at this time. Students were requested to make themselves comfortable, after which the mindfulness breathing script was followed to guide the participants through the breathing experience (see Appendix D). At the conclusion of the breathing script, students were guided through a debriefing exercise following a script to maintain consistency in each group. Debriefing

following the breathing exercise provided an opportunity for the participants to examine feelings and possible applications for the mindfulness breathing in clinical practice, school work, and daily life. The session lasted approximately 1 hour, 30 minutes. At the conclusion of the session, students were given a compact disc containing the mindfulness breathing script (see Appendix D) and instructed to continue daily practice at home. Students were also told to include any music with the compact disc that would help them to focus on breathing, if they desired. The intervention session was repeated at Week 2 and Week 3, using the mindfulness breathing script (see Appendix D) and the debriefing script (see Appendix E). Students were given color-coded weekly practice logs (see Appendix F) at the first session in order to record days of practice during the week, which they were instructed to return by Week 5. The daily practice logs (see Appendix F) were gathered at Week 5 with the data collection. Students in the intervention groups were asked to refrain from discussing mindfulness breathing with students other than those in their clinical group during the next 4 months so as to prevent a possible change in behavior in the control participants.

Analyses and Results

Because of nesting effects, statistical analysis was conducted using hierarchical linear modeling. Despite the random assignment of the groups for this study, students within a group tend to be more alike due to similar experiences as well as having the same clinical instructor. This tendency towards homogeneity in the group leads to a higher incidence of a Type I error (Bickel, 2007; Osborne, 2000). Hierarchical linear modeling provides a method to more accurately model the effects of the variable on the outcomes and addresses independence issues in the sample population. Missing data were determined to be missing completely at random, with pairwise deletion used for analysis.

Depression Outcomes

Research Question 1 examined whether differences exist on depression by group (intervention compared with control), as measured by the Center for Epidemiologic Studies Depression Scale (Radloff, 1977), while participants are nested in teachers. The hierarchical linear mixed model analyses of variance demonstrated an increasing difference between groups, reaching a significance level by posttest (see Tables 3.5 and 3.6). Means and standard deviations for the depression measure demonstrated a downward trend for the intervention group; in contrast, the control group had an increase at 2-month follow-up and 4-month follow-up.

Physiological Stress Measures: Blood Pressure and Pulse

Research Question 3 examined whether differences exist on the participants' physiological measures of stress (i.e., blood pressure and pulse) by group (intervention compared with control) while participants are nested in teachers. The hierarchical linear mixed model analyses of variance reached statistical significance for systolic and diastolic measures by posttest but not for pulse (see Table 3.7). Interestingly, pulse did not demonstrate the same trend as did the blood pressure measures. The means and standard deviations demonstrated a greater decrease of physiological measures in the intervention group (see Table 3.8).

Table 3.5

Analyses of Variance on Depression Variable Across Four Repeated Measures by Group: Intervention Compared With Control

CES-D (research variables)	<i>df</i>	<i>F</i>	Sig.	Cohen's <i>d</i>
<u>Pretest</u>				
Between group	1	.623	.432	0.17
Within group	83			
Total	84			
<u>Posttest</u>				
Between group	1	3.056	.084	0.39
Within group	82			
Total	83			
<u>2-month follow-up test</u>				
Between group	1	3.643	.060	0.42
Within group	83			
Total	84			
<u>4-month follow-up test</u>				
Between group	1	6.864	.010**	0.58
Within group	82			
Total	83			

Note. CES-D = Center for Epidemiologic Studies Depression Scale.

**Statistically significant between-group outcomes at the $p < .01$ alpha level.

Table 3.6

Means and Standard Deviations on Center for Epidemiologic Studies Depression Scale Over Four Repeated Measures by Group: Intervention Compared With Control

	Intervention ($n = 42$)		Control ($n = 43$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Pretest	16.43	9.14	18.02	9.48
Posttest	9.73	8.61	13.12	9.11
2-month follow-up test	12.74	8.37	16.70	10.60
4-month follow-up test	12.02	8.29	17.49	10.62

Table 3.7

*Analyses of Variance Results of Blood Pressure and Pulse Measures by Group:
Intervention Compared With Control*

Vital signs (research variables)	<i>df</i>	<i>F</i>	Sig.	Cohen's <i>d</i>
<u>Systolic pretest</u>				
Between group	1	.191	.663	0.10
Within group	83			
Total	84			
<u>Diastolic pretest</u>				
Between group	1	1.173	.282	0.24
Within group	83			
Total	84			
<u>Pulse pretest</u>				
Between group	1	2.766	.100	0.37
Within group	83			
Total	84			
<u>Systolic posttest</u>				
Between group	1	.558	.457	0.17
Within group	78			
Total	79			
<u>Diastolic posttest</u>				
Between group	1	1.373	.245	0.27
Within group	77			
Total	78			
<u>Pulse posttest</u>				
Between group	1	.111	.740	0.08
Within group	75			
Total	76			
<u>Systolic 2-month follow-up test</u>				
Between group	1	3.329	.072	0.41

Table 3.7 (continued)

Within group	81			
Total	82			
<hr/>				
<u>Diastolic 2-month follow-up test</u>				
Between group	1	2.685	.105	0.36
Within group	82			
Total	83			
<hr/>				
<u>Pulse 2-month follow-up test</u>				
Between group	1	.526	.470	0.16
Within group	81			
Total	82			
<hr/>				
<u>Systolic 4-month follow-up test</u>				
Between group	1	6.557	.012**	0.57
Within group	81			
Total	82			
<hr/>				
<u>Diastolic 4-month follow-up test</u>				
Between group	1	6.078	.016**	0.55
Within group	81			
Total	82			
<hr/>				
<u>Pulse 4-month follow-up test</u>				
Between group	1	.059	.809	0.05
Within group	80			
Total	81			

**Statistically significant between-group outcomes at the $p < .01$ alpha level.

Table 3.8

Means and Standard Deviations on Research Variables by Group: Intervention Compared With Control

	Intervention (<i>n</i> = 42)		Control (<i>n</i> = 43)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Systolic pretest	120.6	11.28	121.7	12.37
	7		9	
Diastolic pretest	72.83	9.07	75.00	9.37
Pulse pretest	74.02	10.51	78.00	11.50
Systolic posttest	113.7	10.18	115.4	10.55
	0		4	
Diastolic posttest	73.58	8.23	71.49	7.65
Pulse posttest	72.28	11.21	71.41	11.48
Systolic 2-month follow-up test	114.2	12.28	119.1	12.54
	0		7	
Diastolic 2-month follow-up test	72.05	12.46	75.88	8.64
Pulse 2-month follow-up test	74.10	11.91	75.88	10.45
Systolic 4-month follow-up test	113.5	11.24	119.6	10.56
	3		5	
Diastolic 4-month follow-up test	70.40	8.53	75.40	9.82
Pulse 4-month follow-up test	74.90	13.11	74.21	12.63

Results of Correlational Analysis of Depression With Stress Measures

Correlations were conducted on depression and physiological measures. Positive correlations were found between depression and some physiological measures, indicating that as depression decreased the physiological measure also decreased. An example of this is depression and diastolic measurement at 4-month follow-up ($r = .232, p < .05$). Diastolic and systolic measures at 4-month follow-up were also correlated ($r = .576, p < .01$). No correlation was found between pulse and depression.

Results of Analysis of the Impact of Depression on Other Measures

Research Question 3 examined differences on the research variables by at-risk students (high risk = depression scores of 18.75 and above and low risk = depression scores at 9 and below). Risk scores were determined by taking 25% of the highest scores and 25% of the lowest scores. Previous studies examining the Center for Epidemiologic Studies Depression Scale (Radloff, 1977) have recommended scores of between 16 and 23 as indicative of mild depression (Comstock & Hesling, 1976; Ferketich et al., 2000; Golden et al., 2008; Husani et al., 1990; Pandya et al., 2005; Roberts & Vernon, 1983; Schein & Koenig, 1997; Weissman & Locke, 1983). No differences were found (see Table 3.9).

Table 3.9

T Tests on Physiological Measures by Depression

Research variables	<i>t</i>	<i>df</i>	Sig.	At-risk group			
				Low		High	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Systolic posttest	1.009	37	0.319	117.68	11.44	114.40	8.77
Systolic 2-month follow-up test	-0.104	39	0.917	117.40	15.19	117.86	12.82
Systolic 4-month follow-up test	0.711	38	0.481	120.68	10.11	118.19	11.88
Diastolic posttest	0.582	37	0.564	75.74	7.24	74.40	7.10
Diastolic 2-month follow-up test	1.205	39	0.236	77.55	9.43	73.90	9.92
Diastolic 4-month follow-up test	-0.194	38	0.847	74.68	8.98	75.33	11.83
Pulse posttest	-1.470	34	0.151	70.61	9.50	76.50	14.09
Pulse 2-month follow-up test	-0.333	39	0.741	76.40	12.61	77.57	9.81
Pulse 4-month follow-up test	-0.277	38	0.783	76.05	11.10	77.33	17.15

Discussion

The current study demonstrated the possibility for the use of a brief session of mindfulness breathing in decreasing the risk for depression and stress in this sample of nursing students. Of interest is that these statistically significant results were not manifest immediately at posttest or the 2-month follow-up test but were evident by the 4-month test. For some reason, the control group also improved by posttest but did not maintain these improvements over time like the effectiveness of the mindfulness breathing intervention on the experimental students. It is hoped that the students were remembering

to use these mindfulness techniques to reduce their stress during clinical procedures and that these mindfulness techniques were reducing their stress and depression.

Previous studies utilizing mindfulness breathing have incorporated learning sessions of 2 hours or more daily over several weeks (Beddoe & Murphy, 2004; Brown & Ryan, 2003; Kabat-Zinn, 2003; Poulin, Mackenzie, Soloway, & Karayolas, 2008; Shapiro, Astin, Bishop, & Cordova, 2005; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008), which can be burdensome to nursing students who already feel overwhelmed with time constraints. Several studies condensed the time to four shorter sessions and maintained positive benefits (Jain et al., 2007; Mackenzie et al., 2006; Poulin et al.). This intervention consisted of one 60- to 90-minute session once weekly for 3 weeks, with students reporting an average of 3 days of practice during each of the study weeks. The results appear to indicate an ability to learn and utilize mindfulness in a brief time frame to decrease the risk for depression in a student nurse population.

Results of this study suggest that interventions to manage stress early in the nursing education may contribute to a more positive educational experience for students. Health-care professions are vulnerable to stress from high demands caring for others with limited time, personnel, and increased acuity of those under their care, leading to declines in health status that includes the risk for depression (Beck & Srivastava, 1991; Cohen-Katz et al., 2004; Fukuda et al., 2008; McVicar, 2003; Salovey et al., 2000; Tveito & Eriksen, 2009; Watson et al., 2009). This stress begins early during the educational process, with students listing stressors that include a gap between theory and practice when participating with procedures in the clinical area (Beddoe & Murphy, 2004; Billingsley et al., 2007; Evans & Kelly, 2004; Moscaritolo, 2009), fear of failure or mistakes, questioning of ability to perform or complete tasks, rapidly changing circumstances, finances, lack of personal time, and lack of timely feedback from

instructors (Billingsley et al.; Jones & Johnston, 1997, 2000; Levett-Jones et al., 2009; Locken & Norberg, 2005; Moscaritolo; Stephens, 1992; Watson et al.).

The continued exposure to circumstances that create stress decreases learning, leads to physiological health changes, and increases the risk for depression (Anderson et al., 2004; Bandura, 1997; Beddoe & Murphy, 2004; Hains et al., 2009; Locken & Norberg, 2005; McVicar, 2003; Moscaritolo, 2009; Palumbo et al., 2007; Tanaka et al., 2006). Students in the current study demonstrated an ability to learn mindfulness breathing in a short time frame and then apply this in a variety of situations. As mindfulness increased, the risk for depression decreased and the participant's blood pressure lowered.

Students who have a positive mental attitude will be in a better situation for learning as they progress through the educational process. Those with positive experiences will be more likely to carry a positive attitude into the workplace following graduation, thus leading to decreased burnout and risk for depression during employment. Positive experiences and a positive attitude can contribute to greater satisfaction in the workplace. The majority of students (91%) in the intervention group stated feeling satisfied with the program, would continue the practice, and would recommend the mindfulness breathing to other students. Some students commenting on the use of mindfulness breathing believed it had contributed to lower blood pressure, decreased number of headaches, and better sleeping.

Limitations

While the design was a randomized class design, there were threats to the validity of the results such as inadvertent diffusion of the intervention to the control group. In addition, the sample size was actually the number of classes, which reduces the power to

detect significant differences. The hierarchical linear modeling design helped to control for nesting effects of students within randomized classes, but it also reduced the ability to detect statistical differences. Hence, the effect sizes were of greater interest and they were reasonably large. The control group probably improved because they were not a true no-treatment control group but, in fact, were receiving the nursing skills training class, which would have increased confidence with clinical skills, thus assisting in a reduction in the risk for depression and stress by the end of class. However, only those with the mindfulness breathing intervention maintained these gains over time.

This study was limited to one geographical area with little ethnic diversity in the sample, which can affect generalization to other populations. The sample size itself was smaller than expected. Students at the end of the 1st semester may have already felt burdened with school requirements; consequently, only 71% of the available population participated. Timing of data gathering may have affected the results, with some students completing a clinical rotation prior to answering questions while others were at the beginning of a clinical experience, thus affecting scores. Students were also at the end of the semester for the pretest and posttest with a 3-week vacation from school responsibilities before gathering data at the 2-month follow-up test, which could have resulted in a more relaxed state of mind. Despite instructing students not to communicate any information with regard to the intervention, there may have been some inadvertent comments between students as they entered the 2nd semester in new clinical groups, which contained both control and intervention participants, leading to a contamination of final results.

Recommendations

This study commenced at the end of the 1st semester when stress levels may have

been increased. Students may be more willing to participate if introduced at the beginning of the semester, which would also avoid the break between semesters when stress levels may naturally decrease. The increased willingness of students at the beginning of the semester could also increase the number of participants. Documenting and managing the timing for completion of questionnaires would provide more accuracy in the measures. Increasing diversity and locations would enhance the probability of generalization to other populations. Comparing number of days practiced with scores would assist in identifying the benefits of practice.

Conclusion

These results show that mindfulness (a) can be learned and applied to situations in a brief time frame, (b) decreases risk for depression, and (c) shows a downward trend on blood pressure (i.e., a physiological measure of stress). By increasing awareness in student nurses, learning can be enhanced in various educational settings, which can transfer into personal life and employment.

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CHAPTER 4

EFFECTS OF MINDFULNESS BREATHING ON MINDFULNESS, SELF-EFFICACY, AND SKILLS PERFORMANCE IN FIRST-YEAR STUDENT NURSES

In Chapter 3, the positive impact of a mindfulness breathing intervention on reducing stress and depression in 1st-year associate degree nursing students was reported. This chapter examines the hypothesized mediators of the impact of the mindfulness breathing intervention on reducing stress and depression in these students. In fact, the intervention increased their mindfulness, resulting in improved clinical skills and self-efficacy in performing these skills. Rarely in prevention science do investigators test whether the presumed mediators of the effectiveness of the intervention are related to the manifest posttest results (McKinnon, 2010).

Studies examining stress and nursing students have documented a cycle of anxiety, fear of failure, and decreased performance (Beck & Srivastava, 1991; Beddoe & Murphy, 2004; Billingsley, Collins, & Miller, 2007; Jones & Johnston, 1997; Levett-Jones, Lathlean, Higgins, & McMillan, 2009; Locken & Norberg, 2005; Moscaritolo, 2009; Tanaka, Takehara, & Yamaguichi, 2006; Watson et al., 2009). Addressing stress early in the educational process can contribute to more positive outcomes in a student population. Although studies have examined the association among anxiety, stress, and learning, none was found connecting these with an increased risk for depression,

decreased self-efficacy, and clinical performance.

Interventions that have demonstrated positive outcomes in decreasing anxiety, stress, negative emotional response, and physical and psychological symptoms in student nurse populations include mindfulness (Beddoe & Murphy, 2004; Jain et al., 2007; Moscaritolo, 2009; Young, Bruce, & Turner, 2001), cognitive restructuring (Billingsley et al., 2007), and imagery (Stephens, 1992). It is of interest to note that mindfulness induces the relaxation response (Baer, 2003), which is similar to imagery.

Beddoe and Murphy (2004) found a decrease of stress, improved empathy, and personal satisfaction with the use of mindfulness. Although the authors acknowledged the interference of stress with learning and performance, these were not measured. Jain et al. (2007) found mindfulness to be a buffer for the psychological consequences of stress while increasing positive mood states in graduate student nurses and medical students. The current study was a randomized controlled study with a control group with a pretest and posttest design. Stress, empathy, and personal satisfaction were assessed with the Brief Symptom Inventory, Positive States of Mind Scale, Daily Emotion Report, Index of Core Spiritual Experiences, and Marlowe-Crowne (M-C) Short Form. In an examination of four studies utilizing mindfulness to decrease student anxiety, Moscaritolo (2009) found that the students were better able to perform in the clinical setting. Young et al. (2001) reviewed 24 qualitative and 25 quantitative studies. They concluded that participants voiced positive improvements in physical and psychological symptoms while quantitative measures demonstrated a decrease in stress with increased physical, social, emotional, and mental health.

Cohen-Katz, Wiley, Capuano, Baker, and Shapiro (2004) described mindfulness as a good intervention for nurses to increase self-care and to decrease stress. Kabat-Zinn (1992) discussed the ability of mindfulness to break the stress cycle, which can be of

benefit to nursing students. Mindfulness was found to be a mediator in perceived stress and quality of life (Nyklícek & Kuijpers, 2008) and in producing positive outcomes in wellness (Shapiro, Oman, Thoresen, Plante, & Flinders, 2008). An examination of the research literature on mindfulness breathing interventions revealed that few studies measured whether mindfulness increased following the mindfulness intervention and whether increases in mindfulness were correlated with increased self-efficacy and clinical performance skills, let alone depression and stress.

Purpose

The purpose of this study was to determine the effectiveness of a brief mindfulness breathing intervention in reducing depression and stress, as measured by blood pressure and pulse. These results were covered in Chapter 3. This chapter examines the mediating effects of the intervention on increasing mindfulness, self-efficacy associated with the performance of critical nursing skills in 1st-year nursing students, and skills performance.

Research Questions and Hypotheses

Research questions and hypotheses guided the study.

Research Question 1

Compared with the no-treatment control group, is there an increase in mindfulness scores for the brief stress reduction intervention participants after completing the mindfulness breathing as measured by the Mindfulness Attention Awareness Scale (Brown & Ryan, 2003)?

Hypothesis 1

It was hypothesized that the mean increase and effect sizes for the mindfulness scores in the treatment group would be higher than the treatment-as-usual group.

Research Question 2

Compared with the no-treatment control group, is there an increase in self-efficacy after completing the mindfulness breathing stress reduction intervention as measured by the Student Clinical Completion Appraisal form (see Appendix B)?

Hypothesis 2

It was hypothesized that the mean increase in effect sizes for the self-efficacy scores in the treatment group would be higher than the treatment-as-usual group.

Research Question 3

Compared with the no-treatment control group, is there an increase in clinical performance skills following participation in the mindfulness breathing as demonstrated by individual performance grading sheets?

Hypothesis 3

It was hypothesized that the mean increase and effect sizes for the clinical performance skills scores in the treatment group would be higher than the treatment-as-usual group.

Methods

Sample

The 85 participating nurses were recruited from 120, 1st-year associate degree nursing students enrolled in 1 of 12 fall clinical classes in a 15-week course at a northwest university referred to as Foundations of Nursing Practice Clinical. The research study was delayed until the 11th week while waiting for University of Utah Institutional Review Board approval. Ninety students signed the consent form (see Appendix A); however, 5 students were unable to complete the exercises and requested to withdraw from the study within the 1st week. The demographic characteristics were described in Chapter 3 (i.e., 89% female and 89.4% Caucasian).

The *inclusion criteria* included all students enrolled in the 12 courses who also voluntarily gave written consent to participate in the research. The *exclusion criteria* included any enrolled student who did not sign the consent forms or those who did not complete the course and dropped out of the study.

Design

A two-group (i.e., experimental and no-treatment control) randomized control trial design with four repeated measures (i.e., pretest, posttest, 2-month follow-up test, and 4-month follow-up test) was utilized to determine the effects of the independent variable (i.e., mindfulness breathing) on the dependent variables (i.e., Mindfulness Attention Awareness Scale, self-efficacy, and clinical performance). All students in the study participated in the Foundations of Nursing Practice Clinical course (i.e., 12 classes), but only the intervention classes received the intervention of mindfulness breathing. The no-treatment control classes did not receive the brief mindfulness breathing treatment modules. All classes completed the pretest, posttest, 2-month follow-up test, and 4-month

follow-up test.

The 12 classes were *randomly assigned* to the treatment intervention or treatment-as-usual group using a number chart of generated random numbers. Those in the 6 treatment classes ($n = 42$ students) received the mindfulness breathing intervention and the remaining 6 classes ($n = 43$ students) received the no-treatment or no mindfulness breathing intervention in the regular Foundations of Clinical Nursing Practice Clinical course.

Procedures

Approval was obtained from the University of Utah and the participating university prior to commencement of the study. A computer-generated number chart was used to randomly assign the 12 classes to the intervention or control group. Consent was obtained from each participant during a regularly scheduled clinical laboratory education session. At this time, students were informed about the research study and given opportunities to ask questions. Both the intervention and control classes completed the Demographic Survey (see Appendix C), Mindfulness Attention Awareness Scale (Brown & Ryan, 2003), and Student Clinical Completion Appraisal form (see Appendix B). The measurement tools were completed again at 5 weeks, 2 months, and 4 months for all participants. Clinical nursing skills were tested on all participants pretest and posttest. Participants in the intervention group also received the mindfulness intervention.

Instruments

The instruments selected for this study were the following: (a) Mindfulness Attention Awareness Scale (Brown & Ryan, 2003), (b) Student Clinical Completion Appraisal form (see Appendix B), and (c) clinical skills evaluation. The Mindfulness

Attention Awareness Scale and Student Clinical Completion Appraisal form were administered pretest, posttest, 2-month follow-up test, and 4-month follow-up test to both the intervention and control groups. The clinical skills evaluation was completed pretest and posttest in both groups.

Brown and Ryan (2003) developed the Mindfulness Attention Awareness Scale as a method to examine the “role of mindfulness in psychological well-being” (p. 822). The scale consists of 15 items to assess mindfulness. The 15 items are scored on a Likert-type scale from 0 (*almost always*) to 6 (*almost never*) in order to assess attention with various activities such as when driving, eating, or walking—with higher scores indicating greater mindfulness. The scale has been found to have high reliability with a Cronbach’s alpha of .80 or above, and adequate validity (i.e., test-retest, convergent, and discriminant) in a variety of studies (Carmody, Reed, Kristeller, & Merriam, 2008; Nyklícek & Kuijpers, 2008; Shapiro et al., 2008; Smith et al., 2008). This finding indicates that on repeated tests the scale measured the constructs identified, had minimal extraneous variables influencing the scores, and produced similar results with repeated testing. In studies utilizing the Mindfulness Attention Awareness Scale, as mindfulness increased, negative physical and mental symptoms of wellness decreased, indicating that mindfulness benefited health status (Brown & Ryan; Carmody et al.; Shapiro et al.).

The Student Clinical Completion Appraisal form was developed following Bandura’s (2006) guide for the development of self-efficacy scales. The critical skills examined were the following: (a) medication administration, (b) wound care/dressing change, and (c) urinary catheter insertion. The appraisal form asks students to rate their perceived ability to complete a task related to a skill when confronted with a stressful situation. The skills are part of the standard clinical laboratory teaching program and are also measured for competency by the clinical instructor on a grading scale from 1 to 100.

The grading sheets are standardized throughout the nursing program at the university and are used in each clinical laboratory group for grading students.

Each section of the Student Clinical Completion Appraisal form included five to six questions, asking students to assess their personal ability to complete a task related to a skill when faced with an obstacle or challenge. The scores ranged from 0 (*cannot do at all*) to 100 (*highly certain can do*). The scores for each section were added and then divided for an average score. High scores indicated that students felt confident in their ability to complete tasks or high self-efficacy and low scores indicated a decreased belief in their ability or low self-efficacy. The appraisal form was developed for the current study, demonstrating a high reliability with a Cronbach's alpha of .91.

The clinical skills evaluation is completed on all students in the nursing program to test skill knowledge and competence in performance. Students who perform nursing skills are evaluated and then graded on a standardized grading sheet by the clinical instructor. These grading sheets are used throughout the nursing program at the university, grading clinical skills from 0 to 100 points.

A brief mindfulness breathing intervention was developed into a standardized curriculum, with the content adapted from evidence-based mindfulness breathing courses designed and tested by Bhikkhu (1997), Gunaratana (1990), and Kabat-Zinn (1992, 1994, 2006). The script (see Appendix D) was used to instruct participants in the intervention classes on mindfulness breathing intervention at Weeks 1, 2, and 3. Chapter 3 provides a complete description of the intervention. Students in the intervention groups were instructed to discuss mindfulness breathing only with students in their clinical group during the next 4 months so as to prevent a possible change in behavior in the control participants.

Data Analysis Procedures and Results

With students nested in classes, statistical analysis was conducted using hierarchical linear modeling. Even though groups were randomly assigned, students within a group tend to be more alike due to similar experiences and have the same clinical instructor. This tendency towards homogeneity in the group leads to a higher incidence of a Type I error (Bickel, 2007; Osborne, 2000). Hierarchical linear modeling provides a method to more accurately model the effects of the variable on the outcomes and addresses independence issues in the sample population. Data were determined to be missing completely at random, with pairwise deletion used for analysis.

Mindfulness Results

An assumption was made that the mindfulness breathing intervention increased mindfulness that in turn reduced their stress and risk for depression because it increased their clinical efficacy. Hence, this mediator of the effectiveness of the intervention needed to be tested. Research Question 1 examined whether differences exist on mindfulness by group (intervention compared with control), as measured by the Mindfulness Attention Awareness Scale (Brown & Ryan, 2003), while participants are nested in teachers. The hierarchical linear mixed model analyses of variance did not reach statistical significance as expected, but Cohen's *d* did show an increasing difference between groups (see Table 4.1). The means and standard deviations suggest a greater increase of mindfulness in the intervention group (see Table 4.2).

Self-Efficacy Results

Research Question 2 examined whether differences exist on self-efficacy, as measured by the Student Clinical Completion Appraisal form, by group (intervention

compared with control) while participants are nested in teachers. The hierarchical linear mixed model analyses of variance did not demonstrate an increase in confidence

Table 4.1

Effects of Mindfulness Breathing on Mindfulness Attention Awareness Scale (Analyses of Variance by Group): Intervention Compared With Control by Four Repeated Measures

MAAS (research variables)	<i>df</i>	<i>F</i>	Sig.	Cohen's <i>d</i>
<u>Mindfulness, pretest</u>				
Between group	1	.027	.871	0.04
Within group	83			
Total	84			
<u>Mindfulness, posttest</u>				
Between group	1	.342	.560	0.13
Within group	79			
Total	80			
<u>Mindfulness, 2-month follow-up test</u>				
Between group	1	2.111	.150	0.32
Within group	83			
Total	84			
<u>Mindfulness, 4-month follow-up test</u>				
Between group	1	1.344	.250	0.27
Within group	82			
Total	83			

Note. MAAS = Mindfulness Attention Awareness Scale.

Table 4.2

Means and Standard Deviations on Research Variables by Group (Intervention Compared With Control): Mindfulness Attention Awareness Scale

	Intervention ($n = 42$)		Control ($n = 43$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Mindfulness, pretest	3.67	.75	3.70	.83
Mindfulness, posttest	3.98	.81	3.88	.81
Mindfulness, 2-month follow-up test	4.17	.72	3.90	.95
Mindfulness, 4-month follow-up test	4.23	.68	4.02	.95

as had been predicted. Although not significant, Cohen's d indicated a difference in groups for medication administration and wound care for the posttest and at the 2-month follow-up test for catheter insertion (see Table 4.3 and Table 4.4).

Student Clinical Skills Rating Results

Research Question 3 examined whether differences exist on skills performance, as measured by individual performance grading sheets, by group (intervention compared with control) controlling for skills performance at pretest while participants are nested in teachers. A hierarchical linear mixed model was conducted. The analysis of variance was not statistically significant as expected (see Table 4.5), but the intervention group did demonstrate a greater change from pretest to posttest. The between-group effect size was of medium size ($d = .40$), suggesting that the intervention did have a reasonably large effect on improving the students' skills Table 4.3

Analyses of Variance on Research Variables by Group: Intervention Compared With Control

Student Clinical Completion Appraisal form (research variables)	<i>df</i>	<i>F</i>	Sig.	Cohen's <i>d</i>
<u>Medication administration, pretest</u>				
Between group	1	.061	.805	0.05
Within group	83			
Total	84			
<u>Medication administration, posttest</u>				
Between group	1	.270	.605	0.12
Within group	82			
Total	83			
<u>Medication administration, 2-month follow-up test</u>				
Between group	1	.149	.701	0.08
Within group	83			
Total	84			
<u>Medication administration, 4-month follow-up test</u>				
Between group	1	.127	.723	0.08
Within group	82			
Total	83			
<u>Wound care, pretest</u>				
Between group	1	.000	.998	0.00
Within group	83			
Total	84			
<u>Wound care, posttest</u>				
Between group	1	1.040	.311	0.23
Within group	82			
Total	83			

Table 4.3 (continued)

<u>Wound care, 2-month follow-up test</u>				
Between group	1	.148	.701	0.08
Within group	83			
Total	84			
<u>Wound care, 4-month follow-up test</u>				
Between group	1	.083	.775	0.06
Within group	82			
Total	83			
<u>Catheter insertion, pretest</u>				
Between group	1	.419	.519	0.14
Within group	83			
Total	84			
<u>Catheter insertion, posttest</u>				
Between group	1	.000	.985	0.00
Within group	82			
Total	83			
<u>Catheter insertion, 2-month follow-up test</u>				
Between group	1	2.056	.155	0.31
Within group	83			
Total	84			
<u>Catheter insertion, 4-month follow-up test</u>				
Between group	1	.851	.359	0.20
Within group	82			
Total	83			

Table 4.4

Means and Standard Deviations on Research Variables by Group (Intervention Compared With Control): Student Clinical Completion Appraisal Form

	Intervention (<i>n</i> = 42)		Control (<i>n</i> = 43)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Medication administration, pretest	76.05	12.36	75.40	11.92
Medication administration, posttest	81.71	11.73	80.56	8.35
Medication administration, 2-month follow-up test	83.55	9.72	82.77	8.93
Medication administration, 4-month follow-up test	86.90	7.87	86.30	7.58
Wound care, pretest	76.62	13.39	76.63	13.79
Wound care, posttest	86.00	11.26	83.44	11.71
Wound care, 2-month follow-up test	85.31	10.70	84.42	10.64
Wound care, 4-month follow-up test	88.20	9.62	87.65	7.66
Catheter insertion, pretest	81.76	12.54	79.95	13.20
Catheter insertion, posttest	87.41	10.87	87.37	9.24
Catheter insertion, 2-month follow-up test	88.33	9.82	84.56	14.04
Catheter insertion, 4-month follow-up test	90.46	8.91	88.60	9.53

Table 4.5

Analyses of Variance on Research Variables by Group: Intervention Compared With Control

Research variables	<i>df</i>	<i>F</i>	Sig.	Cohen's <i>d</i>
<u>Skills performance, pretest</u>				
Between group	1	2.482	.119	0.35
Within group	83			
Total	84			
<u>Skills performance, posttest</u>				
Between group	1	3.060	.084	0.40
Within group	83			
Total	84			

performance. With a slightly larger sample size or a 2-month posttest and a 4-month posttest, statistically significant improvements in skills performance may have been seen. The intervention group was rated lower in clinical skills than the no-treatment control group, but this difference was not statistically significant. However, the intervention group improved more than the control group (see Table 4.6).

Correlations of Mindfulness to Self-Efficacy and Skills Performance

To further explore the relationship of the mediator of mindfulness on the other measured outcomes, correlations conducted on the variables demonstrated numerous statistically significant correlations (see Table 4.7). For example, a positive correlation

Table 4.6

Means and Standard Deviations on Research Variables by Group: Intervention Compared With Control

	Intervention ($n = 42$)		Control ($n = 43$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Skills performance, pretest	92.50	5.45	94.28	4.95
Skills performance, posttest	96.14	3.01	94.74	4.24

Table 4.7

Pearson Correlations on Research Variables

	1	2	3	4	5	6	7
<u>Mindfulness</u>							
<i>r</i>	-	.443**	.386**	.281*	-.019	-.001	-.097
<i>N</i>		80	80	80	80	80	76
<u>Self-efficacy, pretest</u>							
<i>r</i>		-	.819**	.703**	.091	.314**	-.052
<i>N</i>			83	83	83	83	83
<u>Self-efficacy, posttest</u>							
<i>r</i>			-	.800**	-.004	.293**	.051
<i>N</i>				83	83	83	83
<u>Self-efficacy, 2-month follow-up test</u>							
<i>r</i>				-	.013	.274*	-.097
<i>N</i>					83	83	83
<u>Skills performance, pretest</u>							
<i>r</i>					-	.348**	-.013
<i>N</i>						85	85
<u>Skills performance, posttest</u>							
<i>r</i>						-	.063
<i>N</i>							85

* $p < .05$.** $p < .01$.

was found between mindfulness and self-efficacy ($r = .443, p < .01$), indicating that as mindfulness increases, self-efficacy increases. Although not all correlations were statistically significant, there is cautious optimism in the positive trend for mindfulness as it relates to self-efficacy and skills performance.

Discussion

The current study suggests the ability of mindfulness as a method of increasing self-efficacy and skills performance in this population of nursing students. Previous studies have examined incorporated mindfulness learning sessions of 2 to 4 hours daily for 8 weeks (Beddoe & Murphy, 2004; Brown & Ryan, 2003; Kabat-Zinn, 2003; Poulin, Mackenzie, Soloway, & Karayolas, 2008; Shapiro, Astin, Bishop, & Cordova, 2005; Shapiro et al., 2008), which can be daunting to students already burdened with multiple responsibilities. Several studies were able to condense the time to four shorter sessions and still maintain positive benefits (Jain et al., 2007; Mackenzie, Poulin, & Seidman-Carlson, 2006; Poulin et al.). This intervention consisted of one 60- to 90-minute session repeated for 3 weeks, with students reporting an average of 3 days practice during each week. The results of this study suggest an ability of the students to learn and utilize mindfulness in a brief time frame, thus contributing to increased self-efficacy.

Although not reaching statistical significance as expected, correlations established a relationship between self-efficacy and skills: As self-efficacy increased, the scores for skills also increased ($r = .314, p < .01$; $r = .293, p < .01$; $r = .274, p < .05$). This finding is encouraging, considering the emphasis on skills performance for nursing students, which can contribute to further declines in a belief of personal abilities. The lack of dramatic improvements in self-efficacy could be attributed to the timing of the procedures learned earlier in the semester with multiple opportunities for practice. The study did not

commence until the 11th week of a 15-week semester and continued into the 2nd semester, during which the students had time to practice procedures and gain more confidence in personal abilities.

Stress begins early during the educational process, with students listing stressors that include a gap between theory and practice when participating with procedures in the clinical area (Beddoe & Murphy, 2004; Billingsley et al., 2007; Evans & Kelly, 2004; Moscaritolo, 2009), fear of failure or mistakes, questioning of ability to perform or complete tasks, rapidly changing circumstances, finances, lack of personal time, and lack of timely feedback from instructors (Billingsley et al.; Jones & Johnston, 1997, 2000; Levett-Jones et al., 2009; Locken & Norberg, 2005; Moscaritolo; Stephens, 1992; Watson et al., 2009). Results of this study suggest that interventions to manage stress early in the nursing education can contribute to positive outcomes for students.

The continued exposure to circumstances that create stress decreases learning, leads to physiological health changes, and decreases self-efficacy (Anderson et al., 2004; Bandura, 1997; Beddoe & Murphy, 2004; Hains et al., 2009; Locken & Norberg, 2005; McVicar, 2003; Moscaritolo, 2009; Palumbo et al., 2007; Tanaka et al., 2006). Students in the current study demonstrated an ability to learn mindfulness breathing in a short time frame and then apply this in a variety of situations. As mindfulness increased, self-efficacy also increased, which positively affected skills performance.

Students who have a positive mental attitude with increased self-efficacy will be in a better situation for learning as they progress through the educational process (Bandura, 1997). Those with positive experiences will be more likely to carry a positive attitude into the workplace following graduation, thus leading to improved performance and decreased burnout during employment and also contributing to greater satisfaction in the workplace. The majority of students (91%) in the intervention group stated feeling

satisfied with the program (K. Kumpfer, personal communication, December 1, 2002), would continue the practice, and would recommend the mindfulness breathing to other students. Some students, commenting on the use of mindfulness breathing, believed it had contributed to lower blood pressure, decreased number of headaches, and better sleeping.

Limitations

Although the design was a randomized class design, there were threats to the validity of the results such as inadvertent diffusion of the intervention to the control group. In addition, the sample size was actually the number of classes, which reduces the power to detect significant differences. The hierarchical linear modeling design helped to control for nesting effects of students within randomized classes, but it also reduced the ability to detect statistical differences. Hence, the effect sizes were of greater interest and were reasonably large. The control group probably improved because they were not a true no-treatment control group but, in fact, were receiving the nursing skills training class, which would have increased self-efficacy with clinical skills that helped to reduce their stress by the end of the class. However, only those with the mindfulness breathing intervention maintained these gains over time.

The current study was limited to one geographical area with little ethnic diversity in the sample, which can affect generalization to other populations. The sample size was smaller than expected. Students at the end of the 1st semester may have already felt burdened with school requirements; consequently, only 71% of the available population participated. Timing of data gathering may have affected the results, with some students completing a clinical rotation prior to answering questions while others were at the beginning of a clinical experience. The students were also at the end of the semester for the pretest and posttest, with a 3-week vacation from school responsibilities before

gathering data at 2-month follow-up, which could have resulted in a more relaxed state of mind. Despite instructing students not to communicate any information with regard to the intervention, some inadvertent comments may have been made among students as they entered the 2nd semester in new clinical groups, which contained both control and intervention participants, thus leading to a contamination of final results.

Recommendations

The current study commenced at the end of the 1st semester when students may have already felt increased stress. Students would be more willing to participate if approached at the beginning of the semester, which would also avoid the break between semesters when stress levels may naturally decrease. Increased willingness to participate would also increase the number of participants. Documenting and managing the timing for completion of questionnaires would provide more accuracy in the measures. Increasing diversity and locations would enhance the probability of generalization to other populations. Comparing number of days practiced with scores would assist in identifying the benefits of practice.

Conclusion

These results show that mindfulness may have a positive effect for increasing self-efficacy and skills performance, which are an integral part of the nursing profession. By increasing awareness in student nurses, learning can be enhanced in various educational settings that can transfer into personal life and employment.

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CHAPTER 5

SUMMARY AND CONCLUSIONS

The purpose of this study was to investigate the effectiveness of a brief stress reduction intervention of mindfulness as a method of decreasing stress and ultimately the risk for depression while increasing self-efficacy with clinical skill performance in a 1st-year associate degree student nurse population. Health care and the educational process to obtain a license as a nurse have been identified as areas of increased stress (Beddoe & Murphy, 2004; Evans & Kelly, 2004; Geiger-Brown, Muntaner, & Trinkoff, 2004; Jones & Johnston, 1997; Marine, Routsalainen, Serra, & Verbeek, 2009; Tveito & Eriksen, 2009; Watson et al., 2009; Young, Bruce, & Turner, 2001) and decreased self-efficacy (Bandura, 1997). Few studies examine mindfulness interventions as a way to reduce stress in nursing students or the mediators of the connection among stress, risk for depression, and self-efficacy in skills performance.

Research Questions

Research was conducted to answer the following research questions:

1. Compared with the no-treatment group, is there a decrease in depression scores after participating in the brief stress reduction intervention as measured by the Center for Epidemiologic Studies Depression Scale (Radloff, 1977)?

2. Compared with the no-treatment control group, are the participants' physiological measures of stress (i.e., blood pressure and pulse) lower at later measurements than at baseline following participation in the mindfulness breathing?
3. Is there greater improvement in higher-risk students for relative risk of depression, as determined by the Center for Epidemiologic Studies Depression Scale (Radloff, 1977) scores of 16 or greater, in measures of stress, as determined by physiological measures of blood pressure and pulse, than lower-risk students at baseline?
4. Compared with the no-treatment control group, is there an increase in mindfulness scores for the brief stress reduction intervention participants after completing the mindfulness breathing as measured by the Mindfulness Attention Awareness Scale (Brown & Ryan, 2003)?
5. Compared with the no-treatment control group, is there an increase in self-efficacy after completing the mindfulness breathing stress reduction intervention as measured by the Student Clinical Completion Appraisal form (see Appendix B)?
6. Compared with the no-treatment control group, is there an increase in clinical performance skills following participation in the mindfulness breathing as demonstrated by individual performance grading sheets?

This study was conducted utilizing a two-group, randomized, control trial design with four repeated measures with 1st-year nursing students in the 1st semester of a 2-year associate degree nursing program at a college in northern Utah. The sample was predominately Caucasian (89.4%) and female (87.1%), with ages ranging from 19 to 45 years. The participants were recruited from 120 nursing students enrolled in 1 of 12 fall

classes referred to as Foundations of Nursing Practice Clinical. Of the 120 students, 89 returned the consent form, with 4 of those individuals withdrawing following the first meeting. Eighty-five students completed the research.

Outcomes were measured using standardized instruments commonly employed in research (i.e., Center for Epidemiologic Studies Depression Scale, Mindfulness Attention Awareness Scale, and physiological measures). One instrument was developed for this study (i.e., Student Clinical Completion Appraisal form) following Bandura's (2006) guidelines for self-efficacy scale development. Reliability for the self-efficacy scale was .91. Clinical skills were measured with standardized grading sheets used throughout the nursing program in the university.

Data collection commenced in November 2009 during the 11th week of a 15-week semester, with the final data collection ending in March 2010. Analysis was conducted with SPSS, Version 18, for Windows.

Results

The current study, examining the effects of mindfulness breathing on risk for depression, self-efficacy, and skills performance in a 1st-year student nurse sample, presented important information with regard to stress management in a student nurse population. The dependent variables investigated include stress (i.e., blood pressure and pulse), risk for depression (i.e., Center for Epidemiologic Studies Depression Scale), mindfulness (i.e., Mindfulness Attention Awareness Scale), and self-efficacy (i.e., Student Clinical Completion Appraisal form and clinical skill grading sheets).

The results suggested that mindfulness may benefit students as they progress through the educational experience. In the intervention group, the Center for

Epidemiologic Studies Depression Scale measures demonstrated a greater decrease in scores, thus the risk for depression. Initial scores were lower in the intervention group, which could be related to participants altering their behavior due to awareness of being in the study, referred to as the *Hawthorne Effect* (Norwood, 2000).

With regard to physiological measures, blood pressure demonstrated a greater decrease in the intervention group. Of interest is the pattern for physiological measures, with a large decrease in both groups between pretest and posttest. This decrease could be related to the timing of the measures. Data collection began at the end of the semester at a time when students may have been feeling increased stress. Posttest collection occurred during a 3-week holiday break between semesters. This rest from school could have resulted in a state of normal relaxation for the participants that was unrelated to the intervention.

Mindfulness, self-efficacy, and clinical skills performance did not reach statistical significance as expected, although correlations indicated that mindfulness may have contributed to improvements in self-efficacy and skills performance. As mindfulness increased, self-efficacy and skills performance also increased. The lack of greater improvements in these areas could be attributed to the timing of the study. Students were completing the 1st semester, during which time new skills had been taught and practiced frequently. At the time of pretest, students had completed the majority of learning with regard to skills and had been practicing or performing those skills in the clinical setting, thus gaining more confidence. Students were required to pay attention to details in the procedures. In addition, they may have gained the ability to pay attention to greater detail in multiple areas. It was encouraging to note the positive correlations among mindfulness, self-efficacy, and skills performance, suggesting that mindfulness can contribute to learning and performing skills in a clinical or educational setting.

The development of a positive mental attitude and confidence in students early in the educational process may have contributed to an improved learning environment, which can further enhance the experiences of students. Positive experiences will further contribute to a positive attitude, which can carry over into the workplace, thus leading to decreased burnout and risk for depression during employment while enhancing satisfaction in the workplace. A program evaluation found that the majority of students (91%) in the intervention group felt satisfied with the program, would continue the practice, and would recommend the mindfulness breathing to other students. Some students commenting on the use of mindfulness breathing believed that it had contributed to lower blood pressure, decreased number of headaches, and better sleeping. Others stated the ability to focus on the tasks at hand and to decrease anxiety when faced with a new situation.

Study Limitations

Study limitations observed during the research included external threats to validity such as the external threat of inadvertent diffusion of the intervention to the control group. The randomized class design was selected to reduce all internal threats to the validity of the data because the experimental and control students were both maturing at the same rate and they were both experiencing local and national history and the repeated tests. The external threat of diffusion of the intervention to the no-treatment control group could not be controlled for by the experimental design. The student nurses had other classes together and could have shared mindfulness techniques despite the instruction to refrain from discussion of the intervention. In addition, the follow-up posttesting could have been contaminated by this diffusion because the students were placed in different

clinical groups that included both intervention and control participants after the posttest, leading to greater interaction among the participants. This diffusion of the intervention at follow-up testing would have only reduced the statistically significant differences in the groups; rather, the outcomes increased over time.

Maturation is a less likely possible threat to the internal validity of the outcomes in terms of statistically significant differences in improvements of the experimental group compared with the control group because both the experimental and control student groups were maturing equally and becoming more familiar with procedures, clinical situations, and the learning process by 4-month follow-up. However, the within-group analysis of variance decreased in stress and depression, and improvements in clinical self-efficacy in both groups could be explained by maturation.

By employing a randomized class design, the sample size was the number of classes, which reduced the power to detect significant differences. The hierarchical linear modeling design helped to control for nesting effects of students within randomized classes, but it also reduced the ability to detect statistical differences. Hence, the effect sizes were of greater interest and were reasonably large. The control group probably improved because they were not a true no-treatment control group but were a treatment-as-usual control group receiving the nursing skills training class. Their involvement in this nursing skills class would have increased self-efficacy with clinical skills that helped to reduce their depression and stress by the end of class. However, only those with the mindfulness breathing intervention maintained these gains over time.

Applications

Recommendations for Future Research

Recommendations for future research should consider obtaining a larger sample size. The larger size would assist in detecting differences in measures that may not have been evident in this sample. Earlier recruiting to enroll student participants before the stresses of school could possibly increase the number of students willing to participate. Earlier recruitment may also lead to a greater willingness on the part of participants in the intervention group to continue practicing the intervention more frequently during the study, as the number of days practiced has been found to lead to greater benefits (Carmody & Baer, 2008; Mason & Hargreaves, 2001). Participants in the current study reported practicing an average of 3 days. A comparison of the days practiced with the results of the study would assist in the identification of those obtaining greater benefits. Another consideration is the maintenance of groups as intervention or control. In the current study, participants were placed in new groups following the semester break, which could have affected the results from the interaction of the participants.

Timing of the data gathering was not part of the research design. Control for data gathering should be considered to ensure that participants are completing the questionnaires with approximately the same level of stress. For example, students would complete the questionnaires prior to a clinical laboratory experience rather than prior to or following a clinical rotation in a health-care facility when stress levels are increased. Including greater diversity with a wider geographical area could contribute to an increased ability to generalize to a wider population. The current study included only one school, in one geographical area, with limited diversity. It is important to note that nursing tends to attract more female students than male students; consequently, increased

gender diversity may be limited.

Recommendations for Health Promotion and Education

The education of nursing students to care for themselves in order to be a better provider of care is an important aspect of training. By learning and participating in mindfulness, students will have a method of stress management to utilize in a variety of stress-producing situations that can contribute to more positive outcomes. Students who have positive outcomes and experiences will be an asset to the profession as they encourage and support those around them. Managing stress for positive outcomes is especially important, as the health-care industry faces the impact of increasing numbers in an aging population utilizing the health-care industry.

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APPENDIX A

CONSENT AND AUTHORIZATION

Background

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether you want to volunteer to take part in this study.

The purpose of this research is to identify any benefits from the use of a brief stress reduction method in nursing students. The demands of school and clinical requirements lead to increased stress, which can induce physical and mental health problems. Identification and management of stress early in the educational process contribute to learning and educational success.

Study Procedure

If you agree to be in this study, your clinical group will be randomly assigned (an equal probability of being in any of the groups) to one of two of the following groups:

1. Participants will engage in a stress management technique (60 minutes of instruction) with the clinical skills practice for 3 weeks and be asked to keep a daily log checklist (which should take fewer than 5 minutes to complete each day).
2. Participants will be following the regular clinical skills practice.

Both groups will be asked to complete three questionnaires at the beginning of the study, 5 weeks after the study begins, and then again at 2 months and 4 months. These questionnaires will take approximately 20 minutes of your time to complete.

Risks

The risks of this study are minimal. Possible risks may include physical discomfort when participating in the breathing exercises or emotional discomfort when completing the three questionnaires. These risks are similar to those you experience when discussing personal information with others. If you feel upset from this experience, you can tell the researcher, and she will tell you about resources available to help.

Benefits

There are no guaranteed direct benefits. The potential benefits include helping us to learn if the stress reduction is effective in helping nursing students to decrease stress and increase learning.

Alternative Procedures

If you do not wish to take part in this research study, you do not have to participate. You can still participate in your clinical group activities.

Confidentiality

Your data will be kept confidential. Questionnaires, daily log practice sheets, and personal data will be identifiable by number only. Data and records will be stored in a locked filing cabinet as well as on a password-protected computer located in the researcher's work space. Only the researcher will have access to this information. All materials will be handled in a confidential manner; no names will be used in any of the information entered into the database, data analysis, or publications. Everything possible will be done to keep information gathered in the group confidential. We ask that you and other participants keep all information confidential. There is a chance that a group member might mention your name in a conversation. Consequently, we cannot guarantee that no one will share your comments at a later time.

Person to Contact

If you have questions, complaints, or concerns about this study, you can contact Diane Leggett, MSN, RN, at (435)237-4448, or if you feel you have been harmed as a result of participation, please call Karol Kumpfer, PhD, afternoons and evenings at the University of Utah at (801)581-7718 or at home mornings (801)583-4601. Dr. Kumpfer can be reached at these numbers from 7:00 a.m. to 10:00 p.m.

Institutional Review Board

Contact the Institutional Review Board if you have questions regarding your rights as a research participant. Also, contact the Institutional Review Board if you have questions, complaints, or concerns that you do not feel you can discuss with the investigator. The University of Utah Institutional Review Board may be reached by phone at (801)581-3655 or by e-mail at irb@hsc.utah.edu.

Research Participant Advocate

You may also contact the research participant advocate by phone at (801)581-3803 or by e-mail at participant.advocate@hsc.utah.edu.

Voluntary Participation

It is up to you to decide whether to take part in this study. Refusal to participate or the decision to withdraw from this research will involve no penalty or loss of benefits to which you are otherwise entitled. This will not affect your relationship with the investigator.

Costs and Compensation to Participants

For compensation as a participant of this study, you will be entered in a drawing to win one of two automatic blood pressure cuffs or one of two \$40.00 gift certificates from the Weber State University bookstore.

Consent

By signing this consent form, I confirm I have read the information in this consent form and have had the opportunity to ask questions. I will be given a signed copy of this consent form. I voluntarily agree to take part in this study.

Printed Name of Participant

Signature of Participant

Date

Printed Name of Researcher or Staff

Signature of Researcher or Staff

Date

APPENDIX B

STUDENT CLINICAL COMPLETION APPRAISAL FORM

Entering a new clinical situation can be stressful for the student nurse. Skills are no longer performed on mannequins but on real people. Nurses care for multiple patients with multiple needs, have limited time, and may not always appreciate working with a student. Students are expected to be ready to perform nursing duties. Situations listed may make it difficult to complete required tasks. As you answer each question, please respond as you feel at this time, not what you think you should feel.

Use the scale below to indicate the number that best represents your present level of confidence.

Scale										
0	10	20	30	40	50	60	70	80	90	100
Cannot do at all		Probably cannot do		Moderately certain can do			Probably can do		Highly certain can do	

How confident are you that you can:

1. Ask the clinical instructor or mentoring nurse for help?

0 10 20 30 40 50 60 70 80 90 100

2. Complete required reading prior to clinical/laboratory experience?

0 10 20 30 40 50 60 70 80 90 100

3. Recall medication effects and side effects when questioned?

0 10 20 30 40 50 60 70 80 90 100

4. Keep a sterile field when required?

0 10 20 30 40 50 60 70 80 90 100

5. Remember the steps of the procedure prior to and while performing?

0 10 20 30 40 50 60 70 80 90 100

6. Manage the needs of two or more patients at a time when multiple procedures are ordered?

0 10 20 30 40 50 60 70 80 90 100

How confident are you that you can complete tasks when:

7. The mentoring nurse asks for the names of and reasons for giving medications prior to administration?

0 10 20 30 40 50 60 70 80 90 100

8. The sterile bandage rolls off the sterile field you are preparing?

0 10 20 30 40 50 60 70 80 90 100

9. The patient wants to know how many times you have catheterized before letting you perform the procedure?

0 10 20 30 40 50 60 70 80 90 100

10. The patient refuses to change position or assist in any way for the dressing change until the pain is gone?

0 10 20 30 40 50 60 70 80 90 100

11. During the final steps of inserting a urinary catheter, the patient jumps and complains of pain?

0 10 20 30 40 50 60 70 80 90 100

APPENDIX C

DEMOGRAPHIC SURVEY

ID: _____

Questionnaire instructions: You have agreed to participate in a research study with the purpose of determining the effectiveness of a brief stress reduction intervention with 1st-year nursing students. This study is being conducted to fill the gap in knowledge between stress and clinical performance. The results of this study will assist clinical instructors and future students to develop more effective stress management methods. The following questions are asked in order to gather information relevant to the study. There is no right or wrong answer, just the best answer as it relates to you. You don't have to answer any questions you don't want to. Just be sure to answer each question as accurately as you can. If you have any questions, please ask. Your answers will be kept confidential and will not be shared with anyone. Please do not write any name on this survey and put only your identification number.

This questionnaire contains demographic questions about you, followed by a satisfaction survey, the Mindfulness Attention Awareness Scale, the Nursing Skills Self-Efficacy Scale, and the Center for Epidemiologic Studies Depression Scale.

Thank you! We appreciate all of your efforts!

Please answer some general questions about yourself.

1. What is your age? _____
2. What is your gender?
 Male
 Female
3. What is your race?
 African American
 Asian or Pacific Islander
 Caucasian
 Hispanic/Latino
 Native American
 Other (specify): _____
4. What is your marital status?
 Married/partnered
 Single (never been married)
 Divorced or separated
 Widowed

5. Ages of children living at home:
- None
 - 0 to 5 years of age
 - 6 to 12 years of age
 - 13 to 18 years of age
 - 19 to 25 years of age
 - > 25 years of age
6. Highest grade of school you have completed:
- Some college
 - Associate's degree
 - Bachelor's degree
 - Master's degree
7. Do you consider yourself competent in managing personal stress?
- Yes
 - No
8. Have you ever participated in any of the following:
- Meditation
 - Stress management
 - Time management
9. How many hours per week do you work in paid employment?
_____ (hours/week)

APPENDIX D

MINDFUL BREATHING SCRIPT

Welcome and Introduction

Welcome to this program of mindful breathing. Breathing is a universal phenomenon that occurs regularly without attention on our part. Our purpose in these three sessions in this class on stress management through mindful breathing is to pay attention to our breath from moment-to-moment. Research suggests that deep breathing actually induces stress-releasing neurotransmitters. Hence, being more mindful of deep breathing can reduce your stress in a difficult clinical situation.

Step 1: Preparation

Before proceeding, please make sure your physical needs such as thirst, hunger, or toileting are managed. Find a quiet place with comfortable seating.

Step 2: Noticing But Not Changing Your Breathing

Make yourself comfortable and notice your breathing. Pay attention to the breath as it comes in and as it goes out. Do not force your breathing, just observe each breath as it moves in and as it moves out. Trace the air and observe the sensation of the breath for the full duration of breathing in. Become aware of the full duration of your *in breath*. Now become aware of the full duration of your *out breath*. Observe the act of breathing from moment-to-moment as the air slowly moves in and out. As the air is moving in, notice where it is felt—within your nose and beyond—as the air progressively enters. As the inhalation reaches the end, notice the brief pause that occurs before exhalation. Again, pay attention to where you feel the air moving as it is exhaled. There will be another brief pause before inhalation begins again. These pauses occur with each inhalation and with each exhalation. They are so brief that you may not be aware of them, but by paying attention and being mindful of the breathing, you can notice them.

Continue observing each breath as it comes in and as it goes out, predictable and constant. Be mindful of the movements in the chest with each inhalation and with each exhalation. Notice any movement in the abdomen as you observe each breath moment-to-moment with mindfulness. Does the chest expand? Does the chest contract? Is the abdomen expanding with the inhalation? Is the abdomen contracting with the exhalation?

Notice the pattern of the breath. Is it a short breath or a long breath? In the beginning, as you observe the breath, it may be short. As the calm begins to settle in, observe the lengthening of the breath with each inhalation and each exhalation. Observe the long breath's ability to calm and compose the body. Continuation of the short breath is rough and can lead to uneasiness and discomfort.

Step 3: Practice the Long Breath

Practice making the breath long.

Step 4: Being Present

While you are observing the breath, you may find your mind wandering to another task. Do not chastise yourself, simply turn your attention to the complete breathing cycle from moment-to-moment. The mind is marvelous and will perform the task for which it has been trained, which is thinking. Thinking is not bad, but it can lead you away from the task of mindful breathing. Return to the awareness of the breath and the act of breathing, letting your body relax and be supported as you again become aware of the breathing, slowly breathing in and breathing out. When thoughts enter, let them pass and simply return to the breath. There is no need to dwell on thoughts, simply accept their presence but let them pass and return to awareness to the breathing.

Step 5: Clinical and Home Practice

This practice enables you to be present in the here-and-now by being aware of your breathing cycle moment-to-moment. Notice the relaxed feeling you achieve with mindful breathing. You should practice mindful breathing for approximately 10 to 15 minutes each day. As you continue each day with this, you will find yourself becoming more aware of things surrounding you moment-to-moment. Congratulations on your growing experience of mindfulness!

APPENDIX E

DEBRIEFING SCRIPT

The students will be asked the following debriefing questions as part of the curriculum protocol to help them internalize and generalize their learning to other clinical and personal stressful situations. These questions will be presented verbally in group and discussed but are not part of the data collection. These sessions will be audiotaped for consistency. The debriefing questions are listed below:

1. What was your experience with mindfulness breathing?
2. How did mindfulness breathing work?
3. What happened as you were participating in the mindfulness breathing?
4. How do you feel about mindfulness breathing?
5. How do you feel about the possibility of using this as a stress reduction technique during stressful clinical experiences?
6. How could you apply this mindfulness breathing to stressful clinical and personal experiences?
7. What is it about mindfulness breathing that allows you to focus on specific nursing tasks or skills such as dressing changes or catheter insertions?
8. What insights did you gain during the mindfulness breathing?
9. How can mindfulness breathing help you in your skills during clinical laboratories such as medication administration, dressing changes, or catheter insertions?
10. Is mindfulness breathing something that can help you in other areas in your life?

APPENDIX F

DAILY PRACTICE LOG AND PHYSIOLOGICAL MEASURES

Mindfulness Breathing

Please put a check on each day that you participate in 20 minutes of mindfulness breathing. Bring this to your clinical laboratory and give to your clinical instructor each week. The logs are color coded and labeled for each week: Week 1 = yellow, Week 2 = green, Week 3 = orange, Week 4 = pink, and Week 5 = lavender.

Week 1

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

If you have any comments with regard to the experience this week such as any changes you notice, difficulty with practice, and so on, please include here:

Physiological Measures

Blood pressure / R or L / Time	Pulse

Mindfulness Breathing

Please put a check on each day that you participate in 20 minutes of mindfulness breathing. Bring this to your clinical laboratory and give to your clinical instructor each week. The logs are color coded and labeled for each week: Week 1 = yellow, Week 2 = green, Week 3 = orange, Week 4 = pink, and Week 5 = lavender.

Week 2

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

If you have any comments with regard to the experience this week such as any changes you notice, difficulty with practice, and so on, please include here:

Physiological Measures

Blood pressure / R or L / Time	Pulse

Mindfulness Breathing

Please put a check on each day that you participate in 20 minutes of mindfulness breathing. Bring this to your clinical laboratory and give to your clinical instructor each week. The logs are color coded and labeled for each week: Week 1 = yellow, Week 2 = green, Week 3 = orange, Week 4 = pink, and Week 5 = lavender.

Week 3

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

If you have any comments with regard to the experience this week such as any changes you notice, difficulty with practice, and so on, please include here:

Physiological Measures

Blood pressure / R or L / Time	Pulse

Mindfulness Breathing

Please put a check on each day that you participate in 20 minutes of mindfulness breathing. Bring this to your clinical laboratory and give to your clinical instructor each week. The logs are color coded and labeled for each week: Week 1 = yellow, Week 2 = green, Week 3 = orange, Week 4 = pink, and Week 5 = lavender.

Week 4

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

If you have any comments with regard to the experience this week such as any changes you notice, difficulty with practice, and so on, please include here:

Physiological Measures

Blood pressure / R or L / Time	Pulse

Mindfulness Breathing

Please put a check on each day that you participate in 20 minutes of mindfulness breathing. Bring this to your clinical laboratory and give to your clinical instructor each week. The logs are color coded and labeled for each week: Week 1 = yellow, Week 2 = green, Week 3 = orange, Week 4 = pink, and Week 5 = lavender.

Week 5

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

If you have any comments with regard to the experience this week such as any changes you notice, difficulty with practice, and so on, please include here:

Physiological Measures

Blood pressure / R or L / Time	Pulse