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The Effect of Coloring on Perceived Stress Levels of Hospital Nurses: A Quasi-Experimental Pilot Study

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Abstract

Hospital nurses experience stress specific to their occupation, due to shift work, intense workload, and unsupportive management. Current literature suggests coloring offers a holistic approach to stress management, but most workplace wellness programs focus primarily on physical health. The purpose of our research is to describe the effect of coloring on perceived stress levels of hospital nurses. In this empirical, quasi-experimental pilot study, four female participants completed Perceived Stress Scale surveys (PSS-10), stress meter ratings (using visual analog scales) and responded to a brief journal prompt following individual coloring sessions over the course of two weeks. Through quantitative and qualitative data analysis, we discovered coloring has short-term stress management benefits; however, we could not confirm long-term stress reduction over the study period. We conclude coloring is an easy and cost-effective short-term stress management intervention for hospital nurses that needs more research. Future research should include a longitudinal study to investigate long-term effects of coloring as a holistic stress management technique for workplace wellness.

Keywords: Holistic, coloring, workplace wellness, hospital nurses, stress management

Introduction

Hospital nurses have an astounding level of work-related stress (McIntosh & Sheppy, 2013). A common expectation of nurses is that they are always compassionate and focused, but administrative demands diminish relationships and positive outcomes between nurses and patients (Kane, Shamliyan, Mueller, Duval, & Wilt, 2007; Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002). Due to shift work, intense workload, and unsupportive management, nurses are more likely than other healthcare professionals to be affected by both occupational and interpersonal stress at work and at home (Happell et al., 2013; Wright, 2014). Identifying holistic, accessible, and cost-effective stress reduction strategies is essential, as nurses are often unaware of the extent of their daily stress (Repar & Patton, 2007).

The National Institute of Mental Health (2016) defines stress as the brain's response to any demand. Stress can last a short time, as in healthy exercise, or a long time, as in chronic pain. Short-term stress is called acute, and long-term stress is called chronic (McIntosh & Sheppy, 2013). Stress can be positive or negative and have both physical and mental effects (McIntosh & Sheppy, 2013). Acute stress initiates the fight or flight response, which is an evolutionarily beneficial process in humans; whereas, chronic stress results in distress and results in adverse mental and physical symptoms (Wright, 2014). Nursing as an occupation involves acute and chronic stress (Shandor, 2012).

Kinnunen-Amoroso (2011) suggests that stress within the nursing profession results in negative mental health symptoms. Nursing has a larger number of insurance claims related to mental disorders due to stress when compared to other occupations (Happell et al., 2013). When negative mental health symptoms result from workplace stress, it proves difficult for nurses to provide comprehensive care to patients—the major role of the profession (Kinnunen-Amoroso,

2011). Increased demands for teamwork, flexibility, and concerns of job security place nurses at high risk for acute mental and physical symptoms and chronic diseases (Abebe, 2015). Despite the source of stress and continual modification of response, the nursing field significantly affects mental and physical health and the likelihood of disease among practicing hospital nurses (Olds & Clarke, 2010).

The increasing demands on nurses have significantly influenced work performance (Rugulies, 2012), and have created a need for a comprehensive focus on health and wellness for those in the profession. Changing societal perceptions of disease and illness have helped move health and wellness toward a more holistic perspective (de Simone, 2014). This new outlook has led to further research on the effect of employees' physical and mental well-being on work performance (Sparks, Cooper, Fried, & Shirom, 1997). More recent studies reveal that nurses suffering from chronic illness continue to demonstrate poor job performance (Blake & Lee, 2007; Fiabane, Giorgi, Sguazzin & Argentero, 2013; Kane et al., 2007). Researchers also suggest that targeting risk factors for chronic disease through worksite prevention or wellness programs could assist nurses in identifying health-promoting behaviors (Sorenson et al., 2011). Corporate and government expansion of wellness programs places increasing emphasis on improving employee awareness and knowledge while equipping employees with the skills to shift toward healthier behaviors (Center for Disease Control [CDC], 2015). The CDC (2015) defines workplace wellness programs as methods for establishing healthy activities and organizational policies that encourage healthier behaviors and improvement of company-wide health.

While the CDC now promotes company-wide health activities and policies, the early focus of worksite wellness programs was on primarily workplace safety. Since the 1990s, these programs have expanded towards on-site safety and overall physical health (Anderko et al.,

2012). By developing a work culture that encourages health, employees are more likely to take individual actions to improve their health. This enhancement in workers' health improves productivity while reducing absenteeism and insurance costs for the employer (Abebe, 2015). Currently, "industry standard" workplace wellness programs target specific physical concerns, such as employee obesity, diabetes, or cardiovascular disease (Abebe, 2015). Although well-designed programs bring organizations an improved culture of health and reduction in total insurance costs, barriers to employee participation can reduce their overall effectiveness (Churchill, Gillespie, & Herbold, 2014).

The Affordable Care Act of 2010 has encouraged the majority of wellness programs to focus primarily on physical health within corporate settings (CDC, 2015; The Patient Protection and Affordable Care Act, 2010). Only 6.9% of corporate employers in the United States offer workplace wellness programs that are supportive of integrative health practices (Pronk, 2014). Such programs are more effective at addressing employee wellness, which indicates that a more holistic approach is needed (Pronk, 2014). Hettler (2016) states that wellness programs should have a holistic approach, incorporating social, emotional, occupational, spiritual and intellectual, and physical well-being. A holistic approach utilizes a wider range of methodologies, including art therapy. Art therapy shows promise of being an extraordinary form of psychological therapy that facilitates personal growth and self-awareness to better manage perceived stress (Curl, 2008; Seward, 2015). Art therapists use writing, dancing, painting, coloring, or pottery-making as interventions (Curl, 2008). With the focus on physical health, most workplace wellness programs are unlikely to include paid art therapists. However, while art therapy and coloring are not interchangeable, according to Fitzpatrick (2016), coloring has the potential to mediate stress with therapeutic benefits, such as reduction of anxiety, the creation of focus, and bringing about

mindfulness. Based on the literature, we decided to evaluate coloring as an accessible form of stress relief for hospital nurses.

Research Purpose

Stress negatively affects those in the nursing profession because it requires intense shift work, extensive training, and intense focus that can include a variety of patients and diagnoses (Shandor, 2012). The majority of current workplace wellness programs specifically target one's physical well-being (Churchill et al., 2014), yet hospital nurses need programs to focus on managing stress for improved mental health (CDC, 2015; Cohen, Janicki-Deverts, & Miller, 2007; Kinnunen-Amoroso, 2011; McIntosh & Sheppy 2013; Smith, 2014; Young, 2006). The use of art therapy is a holistic modality to increase self-awareness to manage perceived stress better, yet research is beginning to show the benefits of coloring as a stress relief technique (Seward, 2015; Sonke et al., 2015; Repar & Patton, 2007). Therefore, the purpose of our research is to describe the effect of coloring on perceived stress levels of hospital nurses.

This research project begins with a review of the literature about forms of stress, stress in hospital nursing, workplace wellness programs for nurses, and coloring as a stress relief technique. In the lenses chapter, we define the theoretical lenses that influenced the research. Each member of our research group then presents the personal and professional lenses she brings to our research and how these lenses contribute to our group lens. We continue by describing our research method and the rationale for its use in this research study. Finally, we share the results of our research and discuss the implications of our findings.

Literature Review

The purpose of this chapter is to review the available research on using coloring as a stress management technique to relieve workplace stress for hospital nurses. We include current understandings of stress levels and the mental and physical consequences of stress. Building on that foundation, we explore research about known sources of stress in nursing, including the categories of environmental and resource-based stress. Next, we provide a brief history of corporate workplace wellness programs and their status, including the lack of accessibility to wellness programs in the hospital setting. In the last section, we shift to examine coloring as a potential stress management technique and identify the gaps in available literature.

Stress

Stress often starts as a mental state and then generates physical symptoms, but it can also start physically and manifest with mental symptoms. Stress is rooted in the autonomic nervous system of the human body, which has two separate parts: parasympathetic and sympathetic (Low, 2016). We discuss only the sympathetic in this review because it is the branch associated with stress. The sympathetic nervous system is associated with the fight or flight mechanism and activates when a perceived threat is present (McEwen, 2007). During the fight or flight response, the stress hormones, adrenaline and cortisol, are released into the bloodstream (Low, 2016). These hormones prepare the body to react to a stressor (Wright, 2014). The sympathetic nervous system is natural and advantageous for humans to survive. McIntosh and Sheppy (2013) concur with Wright (2014) who explains that when the body is in fight or flight for an abnormally extended period, eustress (or healthy stress) becomes distress. Stressors fatigue the sympathetic nervous system and result in stress with mental and physical symptoms. Next, we discuss the specific levels of stress and the resulting mental and physical manifestations.

From acute to chronic stress. According to the American Psychological Association (APA) (2016) and Wright (2014), stress has three distinct levels and can manifest mentally, physically, or as a combination of mental and physical. The three levels of stress are acute, episodic acute, and chronic (APA, 2016; Wright, 2014). Symptoms can range from mild fatigue and headaches to depression, high blood pressure, and stomach ulcers. All of the physical and mental symptoms of acute and episodic acute stress can lead to chronic stress, especially if the stress is not identified or reduced in a healthy way (Wright, 2014). The results of chronic stress are both physical and mental, manifesting as chronic pain, hypertension, acid reflux, and colitis (Kinnunen-Amoroso, 2011; National Institute of Mental Health, 2016; Wright, 2014).

Consequences of Stress on the Nursing Profession

Stress is present in nursing when professional demands outweigh one's ability to cope (Wright, 2014). Cohen et al. (2007) reveal that most studies on stress "focus either on the occurrence of environmental events...or on individual responses to events that are indicative of this overload, such as perceived stress and event-elicited negative affect" (p. 1685). When nurses experience a loss of control over a particular stressor, their stress levels increase which affects balancing patient care (Wright, 2014). Patient outcomes are directly correlated with the stress of nurses and decreased staffing levels (Kane et al., 2007; Needleman et al., 2002).

The stress of nursing results in physical and mental consequences, and nurses are more likely than other healthcare professionals to be affected physically due to stress from the physical demands of their job (Wright, 2014). According to Kinnunen-Amoroso (2011), stress in nursing is associated with both mental and physical symptoms. Happell et al. (2013) support this claim of stress as a creator of physical and mental side effects. Nursing has a higher rate of insurance claims related to stress as compared to other occupations, such as corporate employees (Happell

et al., 2013). Caring for multiple hospital patients is difficult, but sources of stress in nursing are also related to workplace environment and resources (Kinnunen-Amoroso, 2011; McIntosh & Sheppy, 2013). We discuss sources of stress in nursing and present reduction techniques in the following section.

Sources of stress and stress reduction in nursing. Edwards et al. (2003) noted numerous sources of mental stress for nurses, including heavy workload, maintenance of standards, and poor staffing levels compared to the acuity of patients. McIntosh and Sheppy (2013) and Edwards et al. (2003) present related ideas that environmental and resource-based stress occurs when inadequate supervisory and social support accompany intense workload and limited resources. The physical and mental demands of care and efficiency expected in hospital work environments create stress for nurses that can lead to poor decision making (McIntosh & Sheppy, 2013). Environmental and resource-based mental stress is present within all working environments, but distinct among hospital nurses' work environments, as we describe in the following section.

Charting, a fundamental aspect of the nursing occupation, is an example of environmental stress within the profession (McIntosh & Sheppy, 2013). According to Brown (2014), the information contained in patient medical charts should be objective, concise, accurate, and timely. All information within the chart is also considered a legal document and can be used to verify or negate care given to a patient during their hospital stay (Brown, 2014). The nursing part of the chart contains all assessments, interventions, medications, and important events that have taken place while a patient is in hospital care (Brown, 2014). Nurses are one of the main contributors to patient charts. Because of the chart always having the potential to be used in court, stress increases with time constraints and potentially difficult aspects of an individual

patient's care (Brown, 2014; Ferrell, 2007).

Resource-based stress occurs when the stress exceeds the coping ability of the individual (McIntosh & Sheppy, 2013). Nurses are commonly exposed to excess mental and physical stress when responsible for extremely ill patients while maintaining a total patient overload. Patient acuity has increased over time, meaning only the sickest patients are in the hospital, but staff to patient ratios have not adjusted (Kane et al., 2007; Needleman et al., 2002). Resource-based stress could also involve a trauma or a situation that personally resonates with the nurse (e.g. caring for a child that is the same age as that nurse's child). However, interviews conducted with nurses by Kinnunen-Amoroso (2011) reveal that stress was rarely evaluated in their workplace, making resource-based stress a predominant but unassessed issue in nursing. Nurses gain beneficial stress relief from coping skills and organizational interventions (e.g. reduction of workloads, increased resources) (Happell et al., 2013; Kinnunen-Amoroso, 2011; Wright, 2014). Stress relief can come through physical activity, debriefing, yoga, meditation, or other mindfulness techniques (Wright, 2014), but until recently counseling was the only supported response to addressing stress (Kinnunen-Amoroso, 2011). The lack of stress assessment in hospital nursing reveals a gap in industry standard workplace wellness programs and the need for a holistic approach for nurses.

Workplace Wellness for Nurses

According to the American Nurses Association (ANA), a healthy nurse prioritizes a holistic model of health with a balance of one's personal and professional lives (ANA, 2016). As founder of the National Wellness Institute (NWI), Hettler (2016) developed a six-dimension holistic model for healthy living, including: occupational, emotional, physical, spiritual, intellectual, and social wellness. This holistic model of health correlates to improved overall

health in a variety of human service and health promotion professions, including nursing (Hettler, 2016). Olds and Clarke (2010) suggest the limited time and organizational resources of a nurse's working environment prevent appropriate use of stress reduction techniques, which are detrimental to nurse health and wellness. According to de Simone (2014), wellness is a multidimensional term with three factors significantly affecting wellness: work settings, personality traits, and occupational stressors. Through recent refocus on physical and mental wellness, the accepted definition of wellness for research includes all parts of the self: physical, emotional, and social (de Simone, 2014).

In this next section, we first provide research on the history of health and wellness programs, and the status of these programs today. We then identify workplace wellness needs for nurses based on a holistic model.

History of corporate workplace wellness programs. Employers continually evaluate the risk factors and stressors associated with the nursing profession to appropriately identify health-promoting behaviors and design wellness programs (Kane et al., 2007; Needleman et al., 2002; Sorrell, 2015). The emphasis on public health in the 1970s led to health promotion programs asserting worksite safety and injury prevention. Young (2006) suggests the increasing cost of medical care for employees since the 1980s concerns most employers. As a result, employers sought methods to save money by promoting healthy behavior in the workforce (Young, 2006). In the 1990s, overall physical health, beyond worksite safety, led to the expansion of health promotion programs, particularly in healthcare professions. Companies began to recognize long-term corporate savings by supporting those in moderately good health through wellness programs (Berry, Mirabito & Baun, 2010; Guo, Coberley, Pope & Wells, 2015). According to Young (2006), government guidelines affected corporate health

improvement programs to reduce health risks that affected productivity, attendance, and job safety. This led to implementation of government policies to assist corporations (Young, 2006).

The corporate effort to combat increasing healthcare costs led to the governmental proposal and approval of The Patient Protection and Affordable Care Act, (2010), often called the Affordable Care Act (ACA). The ACA includes new provisions representing a national commitment to wellness and prevention in all working environments, including nursing. This important bill supports workplace wellness programs through grant funding to companies and small businesses (The Patient Protection and Affordable Care Act, 2010). Anderko et al. (2012) reviewed the workplace wellness provisions of the ACA concluding that incorporation of worker wellness incentives into public health policy has the potential to significantly improve the health of our citizens and our economy. While the political environment has changed since the ACA was adopted into law, at the time of this study the provisions within remain in place.

Current workplace wellness programs. Workplace wellness programs are organizational activities or policies encouraging both individual and corporate health (CDC, 2015). Methodology for wellness programs can include health coaching and education, weight management, medical screenings, and worksite fitness programs. Programming must also include policies to facilitate health through increased time for exercise on shift, offering healthier food options in cafeterias or vending machines, promotion of community health improvement, and incorporation of financial incentives for participation (CDC, 2015). The growing number of corporate workplace wellness programs is due in large part to research demonstrating the link between increased stress and fatigue among employees because of increased hours, workload, and pressure to perform (Ryu, 2016; Sparks et al., 1997). Coinciding with the implementation of the ACA in 2010, recent corporate efforts for expansion of wellness programs have encouraged

employees to improve awareness, knowledge, and skills for practicing healthier behaviors.

The government support for programming incentivizes companies to target either primary or secondary means for prevention to foster behavioral change and improve health status (Mattke et al., 2013). Mattke et al. (2013) cite areas for primary prevention to include health-related behaviors and work-associated risk factors. Secondary prevention programs seek to improve employee management of disease. Similarly, Baicker, Cutler, and Song (2010) identify both the focus of intervention and method of delivery as key characteristics for the formation of a workplace wellness program. Corporations offer wellness programs stemming from employers directly, outside vendors, group health plans, or a combination of these factors (Mattke et al., 2013).

By offering a wide variety of workplace wellness program designs, employers promote improvements to employee health by meeting employees where they are in their personal wellness journey. Employers can design programs offering either a penalty or reward to participants (Baicker et al., 2010). Programs promoting stress reduction, increased activity, or improved nutrition through a reward system are most appropriate for nurses because these positive changes in nurses' lives impact their patients' outcomes (Kane et al., 2007; Needleman et al., 2002; Sorrell, 2015). These programs are offered by employers at minimal or no cost to nurses for the adoption of healthier lifestyle choices. Sorrell (2015) notes recent employee concerns surrounding motivation and privacy in employer-based wellness programs. For example, as health coaches gather private information about employees as part of these programs, concerns about data breaches or potential discrimination against unhealthy employees increase. Additionally, Sorrell (2015) suggests reward-based wellness programs encourage personal responsibility of one's health and foster a culture of wellness for nurses.

Workplace wellness needs for nurses. Review of current literature yields a lack of studies concerning workplace wellness programs for nurses. According to Olds and Clarke (2010), the United Kingdom's Labour Research provides yearly evidence to support that increased work hours pose a health risk to employees and organizations. Working Americans, including nurses, spend over one-third of waking hours within the workplace (Boyd, 1997). As a result, Danna and Griffin (1999) suggest poor worker health as a detrimental factor to individual and organizational loss of productivity, absenteeism, and lower quality decision making.

Employers show increasing concern regarding job performance and productivity at an individual and organizational level (Boyd, 1997; Danna & Griffin, 1999; Olds & Clarke, 2010). Berney, Needleman, and Kovner (2005) note a progressive increase in work hours and overtime as means to fit hospital staffing needs due to a shortage of employees and influx of patients. Lockley, Landrigan, Barger, and Czeisler (2006) found this increase in hours caused fatigue and sleep deprivation and related to decreased task performance and alertness. Work shifts lasting longer than 12 hours and work weeks extending beyond the standard 40 hours per week have revealed a two to three times greater likelihood for error (Rogers, Hwang, Scott, Aiken, & Dinges, 2004; Scott, Rogers, Hwang, & Zhang, 2006). Similarly, Olds and Clarke (2010) found a 14 to 28 % increase in patient adverse events such as falls, medication errors, needle stick injuries, and hospital-acquired infections during extended shifts.

While patient care suffers because of increased work hours, a nurse's physical health also suffers due to job requirements (Maruyama, Kohno, & Morimoto, 1995; Spurgeon, Gompertz, & Harrington, 1996; Trinkoff, Le, Geiger-Brown, Lipscomb, & Lang, 2006). Researchers suggest a longer work schedule increases the likelihood for poor lifestyle habits such as heavy smoking, poor diet, and inactivity (Maruyama et al., 1995). Trinkoff et al. (2006) linked the prevalence of

musculoskeletal disorders to hours and days spent at work and found these to be most significant in healthcare employees. Similarly, headaches, backaches, eye irritations, nasal congestion, and other nonspecific symptoms show an increase in prevalence in combination with increased work hours (Spurgeon et al., 1996).

Aside from an increased risk of chronic disease and musculoskeletal conditions, nurses face acute health risks when caring for patients. The Harvard Work Hours, Health, and Safety Group find medical interns and nurses at greater risk for injury during an extended work schedule due to fatigue in comparison to those on a standard schedule (Ayas et al., 2006). Dembe, Erickson, Delbos, and Banks (2005) identify jobs associated with extended hours and overtime, such as nursing, posed a 61 % higher risk for injury than the standard eight hour day or 40-hours per week schedule. Nurses face a 4.3 % increase in needlestick or sharps injuries with every additional three hours worked, and a 16 % increase with every ten additional hours worked (Clarke, 2007; Olds & Clarke, 2010). Olds and Clarke (2010) also claim nurses report more on-site acute and chronic injuries with longer work hours.

Extended work hours put nurses at an increased risk for on-site acute and chronic physical ailments. Additionally, the increased demands for teamwork, flexibility, job security, and competition significantly influence psychosocial working conditions (Rugulies, 2012). Dewa and Lin (2000) suggest a negative psychosocial and strenuous physical environment detract from worker productivity. Mental stress in the workplace can be evaluated through individual roles, workplace relationships, career development, organizational structure, and personal life influence (Danna & Griffin, 1999). The detrimental effects of mental stress in the workplace unique to nursing make addressing these concerns in the workplace especially important.

Edwards et al. (2003) note numerous sources of mental stress for nurses, including heavy

workload, maintaining high standards-of-care, and poor staffing levels. Blake and Lee (2007)

recognize the importance of promoting employee strategies to cope with daily stressors.

Traditional wellness programs may not be effective workplace interventions for nurses, because they are formatted around conventional workplace schedules (not shift work) and sedentary

stressors. While nurses spend much of their time promoting health to others, they frequently cite lack of time as a barrier to maintaining healthy behaviors for themselves (Blake & Lloyd, 2008).

For this reason, Blake and Lloyd (2008) suggest making health-promoting behavior convenient at the workplace will increase the likelihood of nurses being able to implement healthy

behaviors. With the risk to both patient care and individual nurses' health, it is important to find accessible and less time-consuming stress relief techniques, such as coloring as a coping

strategy.

Coloring as a Stress Management Technique

In this final section, we discuss the benefits of art therapy, and how that may influence coloring as a potential method of mental stress relief. Curl (2008) describes art therapy as a principle psychological therapy because art encourages therapeutic growth. Art therapy allows for a wide range of media including writing, dancing, music, painting, woodworking, pottery, and collage making (Curl, 2008). The use of art allows a creative process to provide the opportunity for a non-verbal expression and communication in which to reconcile and foster self-awareness and personal growth; essential first steps to resolve stress. For these reasons, proponents consider art to be effective as a coping technique to alleviate stress (Seward, 2015). In the following section, we review literature from researchers that investigate the effectiveness of art as a stress relief technique.

Art and stress reduction. Our search of the literature reveals numerous references to art

as an effective intervention for mental health concerns (Curl, 2008; Henderson, Rosen, & Mascaro, 2005; Italia, Favaro-Scacco, Cataldo, & Russo, 2007; van der Klink, Blonk, Schene, & van Dijk, 2001; Repar & Patton, 2007; Rodski, 2012; Sandmire, Gorham, Rankin, & Grimm, 2012; Sonke et al., 2015; Visnola, Sprudza, Bake, & Pike, 2010). When relaxation techniques (e.g., deep breathing, guided imagery or mindful practices such as uninterrupted coloring) are included, van der Klink et al. (2001) found interventions to be effective in reducing mental stress. Similarly, researchers have used art techniques, including coloring mandalas, to evaluate the effects on anxiety (Henderson et al., 2007; Sandmire et al., 2012). However, in similar studies using coloring for anxiety reduction, it is unclear whether the short-term effects will become long-lasting (Curry & Kasser, 2005; Sandmire et al., 2012; van der Venet & Serice, 2012).

Healthcare providers may also avoid burnout through art interventions. Italia et al. (2007) found that art can reduce burnout levels in oncology healthcare workers by decreasing emotional exhaustion and increasing a sense of personal achievement. According to Slayton, D'Archer, and Kaplan (2010), a group of oncology doctors and nurses experienced significantly decreased burnout after creative art interventions such as play therapy and psychodrama compared to their counterparts who did not receive art therapy.

Art can reduce stress in physical, emotional and environmental ways. Sonke et al. (2015) incorporated art into the medical-surgical unit's environment by hiring an artist to facilitate art activities such as painting and drawing. Nurses reported positive effects on their nursing practice and quality of care for patients. The Arts-In-Medicine (AIM) program, located in New Mexico, has been effective in helping nurses reach an understanding of the need to be self-aware and practice self-care (Repar & Patton, 2007). Based on post-retreat comments from nurses, art as a

stress relief technique is effective in not only learning to care for themselves but also in supporting colleagues and improving their sense of community (Repar & Patton, 2007). Similarly, Visnola et al. (2010) determined the effect of art on cortisol levels in healthcare workers were significantly lower compared to the control group. Art improved communication and collaboration, increased self-esteem and confidence, which subsequently decreased stress and anxiety (Visnola et al., 2010). Findings from Curl (2008) suggest art activity can aid in emotional purification, which helps facilitate stress reduction. While these few studies illustrate the positive effects of art therapy as a holistic form of coping with stress for nurses, a search for literature specific to coloring for stress-relief garnered limited results. We explain the lack of relevant studies in our next section.

Gaps and limitations in the literature. According to Schwedel (2015), some art therapists believe that any creative effort can help one discover something about oneself. Similarly, Barrett (2015) indicates that when someone makes art, including coloring, it balances emotions and normalizes physical symptoms of stress. Despite the lack of peer-reviewed studies to support coloring as a treatment, the president of the American Art Therapy Association agrees coloring can be a beneficial addition to a plan for coping with uncomfortable feelings such as stress (Schwedel, 2015). While studies are still required to determine the connection between coloring and changes in the brain, looking at shapes and sizes and picking colors engages the same parts of the brain that inhibits anxiety-related thought processes (Gillan, 2015). In a non-peer-reviewed study, Rodski (2012) found that coloring as a meditative mindfulness technique resulted in a greater improvement in participant stress levels when compared with simple breathing or mindfulness techniques alone. However, this research has not been documented outside of the author's own website. The gaps in peer-reviewed research about coloring as a

stress relief method bring us to limitations of all art research.

As a recent area of research, literature documenting coloring as a stress reduction technique in a workplace wellness program is limited. A search of available literature provides a limited amount of information about the effect of art, specific to health professionals in a work setting. Studies can be found addressing art as a therapeutic technique, or the effect of the arts on patients in hospital settings (Gillan, 2015; Italia et al., 2007; Schwedel, 2015; Slayton et al., 2010). While the integration of arts programs can reduce nurses' stress (Repar & Patton, 2007), most programs studied integrative arts programming into the unit environment or into patient care specifically, not as a mental stress reduction technique for the nurses. Popular opinion is that coloring serves as an effective means of relieving mental stress (Rodski, 2012). This can be seen through the growing popularity of adult coloring books and websites devoted to the practice (Barrett, 2015; Fitzpatrick, 2016). However, a search for empirically reviewed studies demonstrates a lack of available research on the topic.

Due to the subjective nature of art, it is difficult to offer standardized and precise studies that can be replicated (Slayton et al., 2010). Additionally, sample sizes of art studies are small and comprised of mainly females (Henderson et al., 2007). The lack of long-term follow-up does not allow an appropriate assessment in changes in mental stress levels. Lastly, it is difficult to assign participants to a form of art intervention. While this is preferred during research, participants may not resonate with the intervention to which they were assigned (Curl, 2008).

Summary

Searches of the literature garner a wealth of information about stress, its effect on nursing, and generalized workplace wellness programs. We began with a review of literature on stress and its effect on the hospital nursing population. Then, we continued with literature about

workplace wellness programs that centers largely on issues related to physical health and specific health conditions (Guo, et al., 2015). Little research exists about workplace wellness for nurses and their unique work setting. This, along with our new understanding that art can reduce stress holistically (Visnola et al., 2010), led us to investigate whether coloring can significantly reduce stress among hospital nurses (Slayton et al., 2010). Therefore, our research question is: How does coloring affect perceived stress of hospital nurses?

Lenses

Lenses are important to create a deep understanding into our topic as well as biases in the way we set up and execute our research. In this chapter, we describe the lenses that guide each of us in our research. We begin with the theoretical lenses that affect this research. Next, each researcher explores the personal and professional influences that led to their interest in the topic, the project's design, implementation, and interpretation including individual research paradigms.

Theoretical Lenses

Our research is based on three foundational theories that encompass holistic health and nursing values as well as how mental and physical stress are interrelated. First, the guiding theory of Holism provides a foundational basis for our work. Second, is the Hypothalamic-pituitary-adrenal axis (HPA) theory. The final theory that grounds our research is Watson's Nurse Caring Theory.

Holism theory. Our research is grounded in holism. The term holism, as attributed to Smuts in 1926, is based on the observation that nature produces wholes, which equates to much more than the sum of the parts (Freeman, 2005). As it relates to health, wellness is a goal that is reached by consideration and observation of the system as a whole (Micozzi, 2011). We developed our research design from the standard of holistic health, placing emphasis on the way individuals assume responsibility and control of their own health, including in the workplace (Lowenberg & Davis, 1994). From this theory of holism, we developed this pilot study using coloring as an intervention for nurses to take responsibility for their stress management.

HPA theory. According to Daruna (2012), activation of the pituitary-adrenal axis is a defining characteristic of stress. The HPA axis, in which the hypothalamus signals the pituitary, which in turn signals adrenal glands, is a secondary stress response that takes several minutes to

affect the body. Once adrenals are activated by the anterior pituitary, adrenalin (the same substance released in the fight or flight response) is released. At the same time, the medulla releases cortisol. Cortisol is a stress hormone that stays in the bloodstream for hours, acting as an inflammatory response, reducing blood sugar and increasing metabolism. With chronic stress, cortisol puts the body at risk of diabetes, impaired learning and over-activation of the hippocampus. Ultimately, all stress becomes physical (Daruna, 2012). This theory provides the basis for our understanding of stress and its long-term effects. Using this foundation, we designed this study with a goal of finding a simple means of stress relief that nurses can utilize in the workplace.

Watson's Nurse Caring theory. Watson's Nurse Caring Theory details holistic care of nurses for their patients. In Watson's theory, nurses should use listening, loving-kindness, spirituality, being present, and creativity to care for all aspects of a patient in order for them to heal holistically (Watson, 1999). Each of these aspects relates to the holistic values of mind, body, and spirit for each patient. Watson (1999) emphasizes that holistic care starts with self-care in nursing. Our project focuses on the need for self-care in nursing which then reflects on the patients under their care. We chose Watson's Theory because of our focus on nursing, self-care, and holistic views of stress reduction in the design and implementation of this study.

Research Paradigm

In the post-positivist paradigm, we acknowledge that we as researchers have bias, or individual lenses through which we view the world. In epistemological terms, we identify with the objectivist mindset, understanding that one can be objective to a point but cannot separate to the point of complete objectivity. This differs from positivism which endorses researchers to conduct their studies at a distance in order to remain completely objective. Einstein's theory of

relativity, Heisenberg's theory of uncertainty, and Freud's work around the unconscious mind challenged the ideals of objectivity in positivism. We implemented our study with as little direct interaction with the participants as possible, in an effort to remain as objective as possible.

Post-positivism answers to the contention from positivism that knowledge can encompass intuition and other thought processes outside of sensual experience alone (Grbich, 2007; Guba & Lincoln, 1994). There is always some level of subjective reality that comes into play in the relationship between the researcher and the source of information (or subjects); it is not a question of how to be objective because there is no such thing (Richards & Morse, 2007). Ontologically, post-positivism sits in critical realism, through which we as researchers can apprehend reality as closely as possible, but never perfectly. In other words, while there may be a set reality, it is not humanly possible to fully know and understand which affects our interpretation of the study results (Guba & Lincoln, 1994). Therefore, we designed the study using quantitative and qualitative data to make a clearer and more holistic picture of our data. The result is an ontology that reality is not absolute or generalizable, so we find post-positivism an appropriate fit for our group and, therefore, this study.

Personal and Professional Lenses

Next we share the personal and professional lenses of each researcher. Each researcher explores her individual interest in this project, providing context to its development, implementation and interpretation.

Kate Berg Hanson. My approach to this research comes from the subjective ontology of the post-positivist paradigm, although I also lean towards aspects of the critical paradigm. I believe that while a set reality may exist, I generally find reality to be dependent on context. While professional distance is important, as a researcher, complete objectivity is impossible, an

epistemology that also comes from post-positivism. This influenced our implementation, as we sought to limit direct interaction with our participants. I have found that gaining knowledge for the simple purpose of having that knowledge is an important reason for research. However, I also believe that with knowledge comes change. In other words, I love learning and the way that learning continues to change who I am. While I appreciate the order and control of post-positivism, I believe that research ultimately brings about a raised consciousness and important change, essentially a critical axiology. My interpretation of our results is affected by the expectation that this research will fundamentally uncover the reality of stress and coloring as a potential stress relief technique, seating my approach to the study in post-positivism.

My personal health evolution has been a major influence on all aspects of my life over the past decade. After years of being overweight, I found support through my chiropractor to rethink nutrition and exercise, losing a significant amount of weight. As my physical health improved, I began addressing other aspects of my life that needed my attention, leading to a stronger, healthier me. I now believe that true healing can only take place when approached in a multidimensional way, including social, intellectual and creative pursuits. This belief influenced the design of our study. My interest in this research draws from my belief that holistic approaches, like coloring, meditation, acupuncture, herbalism and other integrative practices are the best way to address workplace wellness. I influenced this project by initially exploring literature about holistic approaches to stress relief in the workplace.

Creatively, I have interest in the calming and centering effects of coloring. As a child, I enjoyed coloring and that interest continued into adulthood. In my adult life, coloring has been a means of creativity, social connection, entertainment, and stress relief. I find coloring repetitive patterns and geometric shapes to be particularly calming and meditative in times of stress. This

personal experience had an affect on the interpretation of our results, as I was predisposed to expect stress reduction because of coloring.

As a Licensed Social Worker in a religious non-profit, I have witnessed all levels of health and disease in both clientele and colleague groups. I see many individuals who lack understanding of healthy behavior, and its effect on work productivity and stress. In recent years, I have discovered an increased interest in guiding colleagues towards healthy responses to work stress. While my job description has nothing to do with holistic health or workplace wellness, I have a goal to share the knowledge I have gained personally and as a graduate student. In the process of creating and distributing a wellness newsletter for employees, I have found many others who crave information to help them make healthy choices throughout the various areas of their lives. I make consistent efforts to incorporate holistic concepts and techniques into the information I share. As co-chair of an employee-driven committee focused on whole life wellness, I have seen first-hand the high level of interest in alternative therapies. People want information about a variety of resources as they seek wellness. Getting that support from their workplace can often make it more meaningful. The experiences with this committee and newsletter have motivated me to understand how a simple practice, like coloring, could provide benefits in the workplace. I am also aware of how difficult it is to fit extra activities into a workday. This guided group decisions around the amount of time expected from participants, and incorporating coloring into any point of the workday (not only on shift).

Dee Lukas. Several lenses, both personally and professionally, influence this research project. Personally, I recently underwent my seventh knee surgery. While I should know exactly how to recover, this surgery was the hardest. Not only did my mobility and physical activity drastically decrease, but my mentality, confidence, and self-appreciation also plummeted. My

internal tank of motivation was dry. During recovery from prior knee surgeries, I used the down time to get caught up on work, reading and watching documentaries. This surgery created a mental fog that did not allow me to do any of those things. Coloring was the only activity that offered solace—it kept my mind busy while allowing me to sort through the difficult emotions of another knee surgery. Therefore, my experience inspired me to studying coloring and its benefits for emotional and stress relief.

Aside from coloring, having horrible knees creates mandatory self-care practices. A couple years ago, I came to a realization that relying on daily doses of 800+ MG of ibuprofen and routine invasive knee surgeries was not a long-term option. I began to seek out alternative forms of therapy to support me physically and mentally. Physically, the obvious solutions were ice and Epsom salt baths. Other more holistic solutions included yoga, essential oils, and working with a chiropractor and acupuncturist. Yoga helped me physically and mentally, but reflecting, coloring and journaling have kept my mind in a healthy place. Since the combination of coloring and journaling has helped me survive the emotional stress of recovery and rehabilitation, I became curious to see how this could translate into the workplace as well as within the general public.

Professionally, I work as a Well-being Client Manager with a local health insurance company. A consistent concern of our clientele is high stress and support to build resiliency skills. In reviewing data from self-reported health assessments, I see stress illustrated in several health indicators such as high blood pressure, low life satisfaction and emotional concerns. To support employees' well-being, programs and coaching sessions are offered; however, many workplaces need inexpensive, easily-deployed interventions. The design of this study allows employers to consider coloring books as a low cost and low administrative demand intervention.

The more data that is available to support coloring as a stress management tool, the more likely employers will be to offer coloring to their population. I wanted our research to add to the conversation.

With my education and professional background, my initial approach to this project was from a positivist paradigm. However, my personal approach offers a critical paradigm. With the nature of our research, having both qualitative and quantitative findings as well as perspective from both a positivist paradigm and critical paradigm will be beneficial.

Colleen Merchlewitz. Through my professional training and career as a Registered Nurse, I fit into the positivist paradigm with realist ontology and an objective epistemology (Guba & Lincoln, 1994). Nursing is largely based on evidence-based practice and research using the “gold standard” of research with double blinds and controls. Every note I write or assessment I chart in my job is supposed to be as objective as possible. I recall the idea from nursing school that “anything documented in a patient’s chart can be used in a court of law.” There is a lot of pressure to be objective and positivist in nursing. This part of my lens relates to the interpretation of this project and how I advocated for statistical analysis of stress levels to see if there was any significance to be proven in stress reduction.

While professionally I function in a positivist paradigm, personally, I am most comfortable in the post-positivist and critical paradigms (Guba & Lincoln, 1994). My educational background in Nursing and Spanish offers a holistic lens based in the liberal arts. Nursing practice itself has subjective, social, and artistic aspects that do not fit into the positivist paradigm. My degree in Spanish gives me a larger scope of art, society, language, and culture. Partaking in society as a whole, as well as cultural influence, relate more to the critical paradigm. The critical part of my lens relates to the interpretation of the qualitative journal data we

collected. It was important to me that we had more than one way of understanding the stress of the nurses in our study.

For this project, nursing delivers unparalleled care to patients in times of vulnerability and I wanted to take care of them like they care for others. The design of the study was rooted in the advocacy that I learned through social justice in my undergraduate studies. My critical paradigm offers an axiology of social justice, dialogue, and conflict while I maintain the understanding of order, prediction, and control in a positivist lens. I have a personal interest in the implementation of this project because it focuses on stress in nursing which I deal with every day. My personal philosophy is that self-care is of the utmost importance for caregivers. Well-being and balance are critical while taking care of several patients at a time. I witness the fight within myself and other nurses; the struggle to balance genuine care for human beings with the pull in directions of laws, ideas, and expectations from administration. I have brainstormed short stress relief techniques that I can use in the breakroom while eating my lunch or supper; and coloring offers just that: a short, engaging technique that can reduce stress. The implementation of coloring for nurses is just a small idea that could have a large effect on holistic stress management.

Jordan Rice. Throughout my life, spirituality, athletics, academics, and social aspects have shaped my personality. My experience as an athlete taught me numerous life skills, but none as important as balancing each aspect that makes me whole. The physicality of sports was of primary interest during my training, for the physical skills were most apparent in a competition. I developed an unhealthy obsession with maintaining my physical advantage and neglected my emotional, mental, and spiritual needs. Amidst my intense training, I found myself faced with a potential career-ending overuse injury; however, it was at this time I relied on

family, priests, and coaches to assist in finding a holistic approach to life. During this time, I reconnected to my faith and found that softball strengthened my connection to God. Through the improvement of stress management skills, I found myself feeling stronger mentally and more able to spend time with family and friends. During my period of imbalance, I was convinced my stress levels were unmanageable thus making wholeness unachievable. Through my experience of personal healing, this research project offered an opportunity to create a similar experience for others through identification of methods fostering healing and wholeness in the lives of others.

While a transition toward a holistic lifestyle proved key in my undergraduate career, I am finding a less dramatic transition in my lenses as a young adult moving into the professional world. My athletic and academic careers have formed my objective epistemology and realist ontology, fitting me squarely within the positivist paradigm. My background in Exercise Science and Psychology molded my objective approach toward research through its reliance on the rules and teachings of evidence-based research. Now into my professional career, I find myself shifting toward the post-positivist realm. The objective nature of post-positivist research does not support all of my personal health strategies as a student-athlete; however, some strategies stemmed from subjective or anecdotal experiences that I empirically found to promote personal wellness and success. This experience translated into a desire to identify personal wellness strategies regarding an individual's interest and need for health. I recognize the standards and recommendations for wellness, yet understand effectiveness of a wellness practice is highly variable due to individuality and level of interest.

As I continue to move forward professionally and academically, I enjoy observing areas where my paradigm influences my life. My experience as a student-researcher has furthered my understanding of my post-positivist paradigm. I recognize the influence my paradigm has on the

lens and resulting bias through which I review and conduct research. In my professional realm of caring for and assisting others, I continually search for ways to provide the best service for the specific needs of my clients. My ontological belief that reality is dependent upon context significantly influences our topic selection and my approach to the literature and data analysis. Similar to my professional approach, I recognize the current wellness programs support the needs of certain individuals but not others; therefore, I felt inclined to select a topic investigating methods for bridging the gap and allowing flexibility based upon needs of the individual. Due to the corporate emphasis on promoting physical wellness through physical activity, our research suggests coloring (a unique and minimally physical activity) as a workplace strategy to promote wellness through stress relief. This offers a wellness strategy for individuals uninterested in the physical wellness plans and a desire to minimize stress within the workplace. During the review of the literature and data analysis, I cautiously approach findings and results with an awareness of the characteristics of the post-positivist paradigm which heavily influence the presentation and understanding of information.

While our quasi-experiment emphasizes both researcher and participant confidentiality, my epistemological base as an objectivist knows that no precaution to eliminate the researcher's influence can completely eliminate the objective nature of researchers. My personal feelings and beliefs to conduct research from a distance in order to reduce bias and retain the anonymity of researchers and participants as much as possible influenced the research study design and purpose. However, the feelings and beliefs that shape my paradigm play a larger influence in my interpretation of results. Despite every effort to eliminate personal beliefs and biases, it is not possible or desirable to completely eliminate them.

When evaluating why nurses elected whether or not to participate and during thematic

analysis of journals, it is important to make note of and minimize the influence of personal beliefs and biases. In the review of data as a critical realist, I believe that while the context may alter the meaning or significance of data by confirming or disproving a hypothesis. Therefore, my belief in no set reality translated to analysis of the source of stress and effectiveness of coloring among participants. The knowledge we obtain through research is important; however, my axiological basis suggests the purpose of gaining knowledge in research is to utilize the scientific method to discover causal relationships, create separation between researchers and participants, and be conscious of the change in the level and management of stress.

Glenda Robicheau. Prior to starting the Holistic Health Studies Program at St. Catherine University, I worked for a health insurance company that started offering meditation twice a week during the lunch hour. As my meditation practice began to grow through this workplace opportunity, I noticed that I could balance the stress of my workload better. Stress in the workplace is real, and doesn't only exist at the corporate level. This had a major influence on the design of our study, as experiencing meditation as part of the workday definitely helped me.

As a graduate student, I am interested in holistic modalities that can help bring balance to people's lives. A modality that is gaining more traction in research and the media is coloring for stress relief. Coloring is something that I have loved to do since I was a child. The thought of researching coloring and its effects on perceived stress is exciting, and I am hopeful that our research will have a direct effect on the nursing community. I feel passionate about helping those who devote their lives to care for others, and helping them find a simple and non-stressful way to self-care. While visiting family in the hospital many times in recent years, I have observed nurses in action and can only imagine the weight their profession bears on their personal health and wellness. It is crucial for those that care for others, especially in nursing, to remember to take

self-care seriously. What if it could be as simple as incorporating coloring into their routine?

My professional lens comes from the majority of my career working in the corporate world. Recently I left the corporate world to initiate my new passion of empowering others in their health and wellness. I received training as a Reiki Master in 2013, and have also been studying essential oils since 2011. I continue to be fascinated by the natural ways of healing with plants from the earth. This research project developed from my hope to help others find balance in their life by incorporating holistic techniques and healing modalities as a preventative measure and coping technique for stress.

Past experiences in my personal and professional life have fueled my passion for natural and alternative solutions in my health and well-being, as well as shaped my paradigm. I view this project through the lens of a post-positivist, trying to remain as objective as possible with regards to our study. Much of my work experience has been in analytical positions that were driven by statistics and results. I believe our personal experiences shape how we view the world around us; therefore, it is not possible to separate my reality from that of our research. For this reason, I view our research project through the lens of a realist ontology, as I am interested in the natural order and how things work. My epistemology falls in line with the post-positivist paradigm which states that we are only human and can not completely separate ourselves from our bias. This influenced the design of our research by incorporating qualitative data along with the quantitative data for a depth of understanding. Collecting qualitative data also gave us more insight into the reality of our participants, offering an analytical interpretation of the results.

Whitney Ulvestad. As an undergraduate student, I received my bachelor's degree in Spanish language and Latin American studies. This choice of study and what I drew from it revealed that while my axiology is post-positivist, both my ontology and epistemology are rooted

in the critical paradigm (Guba & Lincoln, 1994). After graduation, I guided outdoor adventure trips throughout Central America, served as a bilingual educator in Spain, worked with seasonal farm-workers in California, assisted a female oenologist in Chile and represented an artisanal cooperative in rural Ecuador. This work experience demonstrates my critical paradigm and effort to “raise consciousness of those who are oppressed so that they can act to transform the world and become empowered” (Graham & Geisler, 2016).

As a graduate student, my paradigm is apparent within this research project. For me, formatted coloring within the lines, like our study asked participants to do, is not an effective form of stress reduction as it limits my personal creativity. While I was aware of this going into our project, my critical perspective led to me advocating for specificities regarding the configuration of our study. For example, I was adamant about using geometric shapes and not incorporating images with distinct themes or motifs.

As this demonstrates, it is necessary for contrasting perspectives to see the value in different approaches. The purpose of our pilot study is to describe the effect of coloring on perceived stress levels of hospital nurses. I appreciate that our initial goals will lead to further research within this field; and further research will affect our overall health and well-being.

Method

The purpose of this chapter is to provide an overview of the quasi-experimental method we used to answer our research question, “How does coloring affect perceived stress levels of hospital nurses?” Based on our post-positivist paradigm, knowledge is collected by researchers through testing and retesting of hypotheses which allow those researchers to make generalizations while knowing that full objectivity is not possible (Grbich, 2007). In congruence with our paradigm, we operated from the empirical culture of inquiry. The empirical research attempts to take a significant body of knowledge and generalize it to similar situations (Patten, 2014). First, we explain the rationale for why the quasi-experimental design is the best fit for our research. The chapter continues with a detailed description of sampling procedures, followed by the survey and journal instrumentation. We then provide an explanation of the data collection and analysis procedures, including the associated reliability and validity. Next, we provide a description of the ethical considerations involved in this human subjects research. We conclude with a description of the limitations of our research.

Rationale for Quasi-Experimental Method

Through our literature review, we understand that stress requires an intervention; therefore, we used coloring as the intervention for this quasi-experiment. Our collective post-positivist stance on research resulted in our culture of inquiry. According to Patten (2014), empirical research is designed by researchers to look at a topic as a whole, with a large body of knowledge, and through planned observations, generalized to predict and control research. Using empirical research, we piloted a workplace wellness program targeting stress in hospital nurses to generalize the effectiveness of coloring on stress levels of all nurses.

We briefly considered Phenomenology as the culture of inquiry for this study.

Phenomenology explores the lived experiences of participants and is rooted in a constructivist paradigm (Bentz & Shapiro, 1998). While a phenomenological approach would have allowed us to explore an area that is not entirely understood, it was not an appropriate culture of inquiry for this research for several reasons. First, we came from a post-positivist paradigm, in which objectivity is a major factor (Mertens, 2003). Second, phenomenology results in data that is hard to generalize to a broader population (Bentz & Shapiro, 1998). Finally, the constructivist paradigm was not a comfortable fit from the standpoint of each of our individual lenses.

The post-positivist paradigm uses quantitative and qualitative data through generalized answers and context (Bell, 2010; Hesse-Biber, 2010). In this study, we used a quasi-experimental design to collect both quantitative and qualitative data. The quasi-experimental design is one of few research methods that fit our post-positivist paradigm because of its use of multiple data analysis techniques to create a clearer picture and reduce researcher bias. Therefore, we did not consider other methods. The ontological belief of the post-positivist paradigm is that reality is not absolute or generalizable which means there should be more than one view to create a complete picture of reality (Grbich, 2007). A strength of our design was the utilization of qualitative data that allowed participants to provide context and meaning to their responses, which a strict experiment often lacks (Guba & Lincoln, 1994). Due to this study not containing a control group, or a random sample, it did not meet criteria for an experimental design; therefore, it is a quasi-experiment (Creswell, 2014). Through planned and detailed procedures, we expected results of our quasi-experiment on coloring and stress to be generalizable to the hospital nursing population (Grbich, 2007; Patten, 2014).

Sampling

We used convenience sampling, which gathers a sample population based on accessibility

and availability of participants (Creswell, 2014). We accepted all nurses who volunteered for participation and met the criteria as an employed nurse at a specific urban Midwestern hospital. We considered sampling through multiple hospitals by obtaining a mailing list of all nurses in Minnesota. We eliminated the use of a statewide mailing list as an option due to the costs and the inconsistency of work environments throughout the state. We chose a single hospital due to time constraints and to eliminate variation between institutional research board requirements. We decided not to limit our sample by age, years of experience, or hospital unit. By doing so, we anticipated having enough participants to reach statistically significant results.

One of the co-researchers works in the same healthcare system, so we selected a different hospital site to avoid bias and coercion. With the permission of the Chief Nursing Officer, we contacted all nursing managers at a particular urban Midwestern hospital via email addresses retrieved by our co-researcher from the system's internal website with research study information. We requested that nursing managers assist in participant recruitment by posting recruitment flyers (Appendix A) in nursing break rooms. Then, we provided nursing managers a script, via email, to read during unit huddle meetings for the duration of the recruitment period. The script included research study details, contact information, and steps for participation. If a nurse wanted to participate in the study, that nurse contacted us via the email address on the recruitment flyer. We responded to emails with details outlining the inclusion criteria, expectations of participants (Appendix B), and an electronic version of the informed consent form (Appendix C).

The strength of convenience sampling was that participants could be selected based on ease of access and participant availability (Creswell, 2014). We also chose this method for its relatively small cost (Kemper, Stringfield, & Teddlie, 2003). We identified a potential limitation

of this convenience sample, in that participants could have been predisposed to a preference for coloring. Furthermore, Kemper et al. (2003) suggest that a convenience sample could result in the inability to apply findings to a broader nursing population, outside of hospital nurses involved in the study.

Overall interest in the study was much lower than expected by both researchers and relevant hospital staff. From the smaller pool of interested individuals, additional challenges further reduced the level of participation. Electronically signing and returning the informed consent form was difficult for one potential participant, resulting in elimination from the study. Two nurses who had expressed initial interest replied via email that they were too stressed or too busy to participate. The other nurses who expressed interest, but did not complete a consent form, did not communicate their reasons for not moving forward with the study.

In addition to the recruitment issues described above, others had difficulty completing the full study requirements in the two-week intervention period. One participant had technical difficulties while completing the pre-intervention PSS-10 online, requiring additional support via email. While all participants completed the work required by the researchers within the two-week intervention, it proved challenging for them to return the materials promptly. We initially proposed to send one reminder e-mail to participants, but due to lack of participation and communication, we sent a total of four reminder e-mails. Our final sample size was four participants.

Instrumentation

In this quasi-experimental study, we used instruments to measure perceived levels of stress. We utilized both quantitative and qualitative methods to collect data for a greater holistic understanding of stress levels. We used three instruments for data collection:

1. Pre- and post-intervention surveys using Perceived Stress Scales (PSS-10) (Appendix D).
2. Pre- and post-session Karl Rollison's Stress Meter (VAS) (Appendix E).
3. Participant journal entries following each coloring session (Appendix E).

Next, we describe each of these instruments along with their reliability and validity.

Perceived Stress Scale. The PSS-10 is one of the most widely used psychological assessment tools to measure stress. It consists of a series of ten questions, asking participants to rate how often they have felt a certain way on a scale of 0 to 4 (0 = never, 4 = very often). Researchers designed the PSS-10 for community populations with a minimum of a junior high education. On average, the PSS-10 takes about 15 minutes to complete. We used the PSS-10 because it is short, easy to use, and we could administer it electronically. Even though Dr. Cohen has copyrighted the PSS-10, permission of use of the scale is not necessary when used in academic research (Cohen, 2015). We conducted the pre- and post-intervention survey through Qualtrics software. The pre- and post-intervention PSS-10 surveys allowed us to collect data to compare for statistical analysis. The continuous, ordinal quantitative data that the researchers collected with the PSS-10 enabled us to analyze our hypothesis of coloring effects on perceived stress in hospital nurses (Grbich, 2007; Patten, 2014).

The researchers conducted this study in a short time period; therefore, we used a standardized survey to assure a quick turnaround for participants. As per Fowler (1988), using a survey as the data collection instrument, we obtained information not systematically available through another source. Survey data collection provided a standardized measurement that was consistent across all respondents, ensuring quantifiable and comparable information for analysis (Fowler, 1988).

As a self-report survey, answers were completed by participants without knowledge of

other respondents (Fowler, 1988); therefore, we expected to reduce the effect of social desirability in individual responses. According to Johnson and Turner (2003), participant perception of confidentiality increases through the use of standardized survey instruments. A limiting factor of surveys is the potential for missing data due to unanswered questions (Fowler, 1988, Johnson & Turner, 2003). In the online PSS-10 survey, we used the Qualtrics software to address this limitation by requiring answers to all questions. The purpose of the survey was to apply findings from our sample to the larger population of nurses to stay within our empirical culture of inquiry and be true to the post-positivist paradigm (Patten, 2014).

A high degree of reliability and validity was essential to our post-positivist paradigm (Guba & Lincoln, 1994). According to Johnson and Turner (2003), using a standardized instrument provides moderately high validity. Recent studies in Greece and Brazil concluded that the PSS-10 showed an adequate reliability and validity with reliability coefficients of ($r=0.87$) and ($r=0.82$) respectively (Andreou et al., 2011; Siqueira, Ferreira Hino, & Romélio Rodriguez Añez, 2010).

Stress Meter. We chose a stress meter (a Visual Analog Scale) (Appendix E) to use before and after each coloring session for its relative ease of administration. The scale we used was developed by Rollison (2016) through his life-coaching website, and we use the entire image.

We asked participants to rate their current level of stress on a scale from zero, being minimally stressed, to ten, the maximum level of stress. We used the continuous, ordinal data of the stress meter for statistical analysis. As with the PSS-10, the continuous, ordinal quantitative data collected with the VAS, in theory, would allow us to draw conclusions about the greater population beyond our sample of hospital nurses (Grbich, 2007; Patten, 2014).

A potential limitation of the stress meter was that respondents could see their pre-coloring session rating when using the scale to rate their stress again after the coloring session. This visual cue could have resulted in skewed responses from the participants at any given session. For this reason, we used the Stress Meter as the secondary source of data analysis, after the PSS-10. An additional limitation with the Stress Meter was that participants completed the scale before and after each coloring session. Participants could have perceived this as extraneous and elected not to answer. To alleviate this limitation, we limited the survey to one question before and after each coloring session.

We expected the Stress Meter to be easy for participants to use, and the reliability and validity coefficients are similar to other sophisticated instruments (Waltz, Strickland, & Lenz, 2010). In a recent pain study using a similar visual analog type of scale, Sindhu, Schechtman, and Tuckey (2011) found test-retest reliability to be excellent ($r=0.96$) and high validity coefficients ($r=0.84-0.97$). These results echo findings from Johnson and Turner (2003) who state that strengths of standard rating scales include moderately high efficacy, along with increased participant perception of confidentiality.

Journal responses. We asked participants to describe their perceived level of stress and emotional status following the coloring session through documentation and reflection on their individual experiences. We developed an open-ended question and limited it to one per coloring session with the prompt: “In 1-3 phrases, please use the space below to describe your perceived level of stress and emotional status following this coloring session.” The objective of this prompt was to reduce vague and lengthy responses. The responses served as a personal narrative of participants’ stress ratings, which we used for data analysis (Bell, 2010; Nicholls, 2009). Participants provided insight with a rich description of their Stress Meter ratings (Hayman,

Wilkes, & Jackson, 2012; Johnson & Turner, 2003; Richards & Morse, 2007). By using a question we developed, there is no previously-established reliability and validity of this instrument. However, we address interrater reliability in Data Analysis later in this chapter.

Tools. The packet we sent participants (Appendix F) contained a visual image of the VAS, journal question, eighteen coloring images and a box of ten colored pencils (Tölge, 2017). In the packet, we also included a pre-paid return envelope to assist in ease of returning the journal.

Data Collection

Upon receiving a signed consent form, we then sent an email with a link for the Pre-PSS-10 survey. We allowed two weeks for review and completion of the informed consent form and sent reminder emails as needed. When the participant and researcher signed the informed consent form, nurses returned the signed form via email and included a preferred mailing address for shipment of research study materials. After our four participants had submitted their signed informed consent form, we mailed research study materials as described in the previous section to their preferred mailing address. The data collection period began January 10, 2017, and was originally scheduled to end February 15, 2017. Due to a small response to recruitment, we extended the study, completing data collection on March 8, 2017.

We emailed a link to the pre-intervention PSS-10 to participants, which they completed online. We directed participants to complete their coloring sessions for a minimum of six 15 to 20-minute sessions over the course of two weeks. Each session required participants to color for a minimum of ten minutes and provide Stress Meter stress ratings before and after coloring. Each session concluded with a short response to the prompt “In 1-3 phrases, please use the space below to describe your perceived level of stress and emotional status following this coloring

session.” Participants were not required by the researchers to complete coloring sessions on consecutive days, but we used only sessions with a completed pre-color session VAS, a coloring session, a post-color session VAS, and a journal activity in data analysis.

At the end of the two-week intervention, participants returned their journals to researchers via the prepaid envelope the researchers provided. One week before the end of the data collection period (March 1, 2017) we sent a reminder email requesting submission of any unreturned journals. At the end of the two-week intervention period, we emailed participants a link for the post-intervention PSS-10 survey.

One participant colored when they did not work; the researchers did not include the Stress Meter and journal entries for non-work days. One participant completed five coloring sessions instead of the required six, but we chose to include this participant due to the small sample size. The other three participants completed the minimum of six or more coloring sessions.

In total, we asked study participants for 120 to 200 minutes of their time over two weeks to complete the scale ratings, coloring and journal entries. After finishing the study, the four participants had the opportunity to sign up for a drawing to receive one of three \$100 Amazon gift cards by emailing our study email after completing the post-intervention PSS-10 survey.

In the effort to recruit more participants to reliably draw conclusions about the effect of coloring on stress levels of nurses (Bell, 2010), we contacted the hospital system IRB to file an amendment for a date extension of February 15, 2017, from our previous date of January 31, 2017. We followed up with reminder emails to managers. We also reached out through the hospital Holistic Council’s newsletter (Appendix G). A Registered Nurse who is affiliated with St. Catherine University and the hospital also posted the flyer (Appendix A) on the internal

website within the hospital to aid recruitment.

Due to lack of participation in our study, data collection continued with an attempt to understand possible barriers to participation. We left a one question survey with seven answer choices in break rooms at the study hospital on seven medical-surgical/ICU units. Of the fourteen responses to the follow-up survey, six responded that they were too busy to participate. Three stated they did not meet selection criteria (they were not RNs). Two respondents had not heard of the study. One individual stated she was too stressed to participate, while another said he was not interested.

After we had collected the surveys from the break rooms at the study hospital, we contacted three nurse managers in short five to ten-minute in-person interviews conducted by two of the researchers to give their personal observations regarding the lack of study participation. Two of the nurse managers reported that the high patient census and new educational initiatives for RNs were constraining factors. One shared the unit is short staffed, and several new initiatives (e.g., new computer scheduling, new communication methods) prevented participation. One manager stated that a study was being conducted by an RN within their unit and may have conflicted with participation, as the timelines overlapped. Finally, managers mentioned the high acuity of patients as a factor limiting nurse participation in the study.

Data Analysis

In this section, we discuss the data analysis. First, we review quantitative data analysis of the PSS-10 and VAS. We then discuss the qualitative data analysis of the open-ended journal entries.

Quantitative data analysis. Quantitative data analysis was an integral part of our empirical culture of inquiry and post-positivist paradigm, with a high value placed on

measurement and generalizable data (Bell, 2010; Hesse-Biber, 2010). Post-positivism places emphasis on measurement, design, and quantitative methods (Guba & Lincoln, 1994). For primary analysis of the PSS-10 data, we conducted a comparative analysis through a repeated measures t-test, evaluating the participants' stress levels across the span of the study.

Primary data analysis focused on the continuous, ordinal quantitative data collected from the PSS-10 (Guba & Lincoln, 1994). We ran a two-tailed t-test to determine statistical significance between the pre- and post-intervention PSS-10 responses. Secondly, we analyzed the Stress Meter responses to assess the differences in stress levels before and after each session. We ran a two-tailed t-test to determine statistical significance between Stress Meter ratings before and after each coloring session for each participant.

Qualitative data analysis. We used thematic analysis for deepening insights into aspects of stress in the sample population, thus gaining a holistic understanding of the rich data (Sandelowski, 2000). We created a codebook for qualitative data from each journal response. We entered the journal responses into a spreadsheet, with responses from each participant given its own entry. In a group, each researcher visually analyzed the open-ended journal questions to avoid reducing the richness of the qualitative work (Hesse-Biber, 2010). We then discussed themes as identified by each researcher. Since we all analyzed the entries together, we provided interrater reliability, a “consistency of judgment among multiple observers” (Boyatzis, 1998, p. 147).

There are limitations to thematic data analysis: projection, researcher state of mind, and nonspecific findings. Projection, which is defined by Boyatzis (1998) as assigning meaning to responses based on researcher beliefs and inappropriate sampling, could have skewed results making thematic analysis inaccurate and not reflective of our population. Researchers' state of

mind, including mood and style, can affect appropriate coding of the resulting information (i.e. a researcher undergoing high levels of personal stress may analyze the data differently than one in a calm state of mind) (Boyatzis, 1998). It was also possible that thematic analysis would not result in any specific findings of coloring as stress relief, making the development of any meaning ambiguous (Boyatzis, 1998). The large volume of data the researchers potentially gathered through open-ended journal questions may have led to a long time for analysis (Boyatzis, 1998; Patten, 2014). We addressed all of these limitations by gathering together as a group to analyze the data, staying aware of our states of mind and personal levels of stress, as well as thoroughly discussing nonspecific findings to form themes.

Ethical Considerations

We conducted this research with human subjects, and as such there were potential risks to the participants. To mitigate the potential risk, each researcher involved in this study took part in Collaborative Institutional Training Initiative (CITI) and completed the requirements for Social and Behavioral Research. Risks of harm that we considered for this study included three main categories: invasion of privacy, participant confidentiality, and risk associated with the study procedures themselves. We addressed the potential risks by obtaining permission, consent, and providing the highest possible level of anonymity, by what Richards and Morse (2007) describe as ethical considerations in research. Next, we outline how we addressed each of these risks.

Invasion of privacy. Invasion of privacy is a low probability for this study. Recruitment took place with nurses signing up on a voluntary basis through our study email address. Another consideration for the invasion of privacy is the PSS-10 pre- and post-surveys. Our survey questions may be considered personal or of sensitive nature by our participants. We addressed this risk in the informed consent form by stating that participation may create or bring out

increased stress or personal feelings. We asked participants to complete all of the questions. We provided information to all participants about the Employee Assistance Program. Participants could also stop participation in the study at any time without any penalty.

Confidentiality. We addressed the potential for breach of confidentiality in several ways. By providing our study email address, we offered more ambiguity to sign up for the study. Individual participant information was de-identified and then destroyed by the researchers. Aside from the researchers, no additional individuals viewed the original information in the journal or surveys (Boyatzis, 1998).

Coercion. One of our co-researchers is an employee at another hospital in the same healthcare system. We selected a different urban Midwestern hospital, though within the same health care system, to avoid personal influence on participants in the study. We recruited participants through nurse managers for each unit of the hospital. Nurses were asked to contact us by using our study email address provided on an informational flyer we created (Appendix A). The study e-mail ensured a level of confidentiality, so managers are not privy to nurses interested in the study. Once the participant and researcher signed the informed consent form, we asked participants to provide a preferred mailing address for distribution of research study materials. For privacy, we asked nurses for their preferred address, allowing them to choose whether to use personal, workplace or other mailing address.

Risks of the study procedures. Participation itself was a potential stressor due to the time commitment or the potential to reveal personal thoughts and feelings during the journal portion. To address this risk, we included the following statement in the informed consent form and instructional document:

Please be aware that this study may create/bring about increased stress or personal

feelings. If at any time you feel as though stress is overwhelming or you would like to speak to a professional, HealthEast Human Resources website has information regarding the Employee Assistance Program (EAP) through LifeWorks Counseling. To access the program enter the HealthEast Infonet and click on MyHR-->Benefits-->EAP for more information. Employees of HealthEast can call Ceridian LifeWorks at 1-888-267-8126 or visit www.lifeworks.com to access counseling services as part of their benefits package.

The following section covers limitations of our study.

Limitations

Limitations for this research relate to the following: research study design, the culture of inquiry, instrumentation, and data analysis. We conducted this study within a post-positivist paradigm and were unable to identify coloring as the sole source of stress reduction due to the lack of a control group or randomized sample. Also, our empirical culture of inquiry limits our ability to generalize results due to the use of convenience sampling. Within our research program at St. Catherine University, the timeline for data collection spanned the months of January and February, but we chose to contact the IRB for an extension into March due to an initially low response rate from nurses. We were unable to get a significant number of participants. For this reason, data was also not generalizable to the hospital nursing population. Despite the extension into March, we faced a brief data collection period. Therefore, we were unable to make generalizations related to the long-term effects of coloring on stress levels.

Within the empirical culture of inquiry, our quasi-experimental design also provided limitations using both quantitative and qualitative data. Our reliance on self-report data did not require participants to report any information relating to physical indicators of stress. The use of journals relied on participants to be articulate and honest in their responses; however, accuracy relating to the effect of coloring may result due to fear of exposure and an inaccurate self-report (Bell, 2010; Hayman et al., 2012; Creswell, 2014; Patten, 2014). The closed-ended format of questions, as well as researcher bias within the questions, limits the accuracy of both journal and

survey responses (Patten, 2014).

Moreover, while the use of surveys and journals created limitations, this research study was limited by the data analysis process. According to Creswell (2014), while both quantitative and qualitative data provides added richness for the researchers, it could lead to conflicting findings. In the journal, we asked participants to share one to three phrases to describe their perceived stress after coloring. Our use of journals required a thematic analysis process, which is limited by researcher bias and the potential of researchers to assign meaning to participant responses (Boyatzis, 1998). Therefore, after the data analysis that we completed, the journal entries may not match the data in their ranking of stress after coloring (Creswell, 2014). In the next section, we discuss the results of our study.

Results

The purpose of this chapter is to report the findings describing the effect of coloring on perceived stress levels of hospital nurses. We begin with a description of our participants, observational data, and quantitative results of the statistical analyses. We conclude with a report of the qualitative data results.

Description of the participants. All participants are nurses at a specific urban Midwestern hospital, which employs more than 289 nurses in 11 units (two units did not provide their current number of nurses). All four participants were female. We also observed several effects that were unexpected during our data collection. We include these observations in the next section of our results.

Observational Data

Next, we share our observations made during and after the data collection portion of our research study. Some participants noted non-work stressors in the journal comments, which were not included in qualitative analysis. We noted a trend in the journal responses that participants expressed improved stress management capacity during later sessions when compared to earlier sessions over the course of the study. Of the 30 total coloring sessions of all participants, one took place during the nurse's work shift, four were completed by participants before the work shift and 25 were completed by participants after the work shift. The coloring sessions before the work shift had Stress Meter ratings that remained even or decreased by only one rating point. The sessions that took place during the work shift resulted in a Stress Meter score increase from 3.5 to 4.5, and a journal statement about feeling more anxious as a result.

Quantitative Results

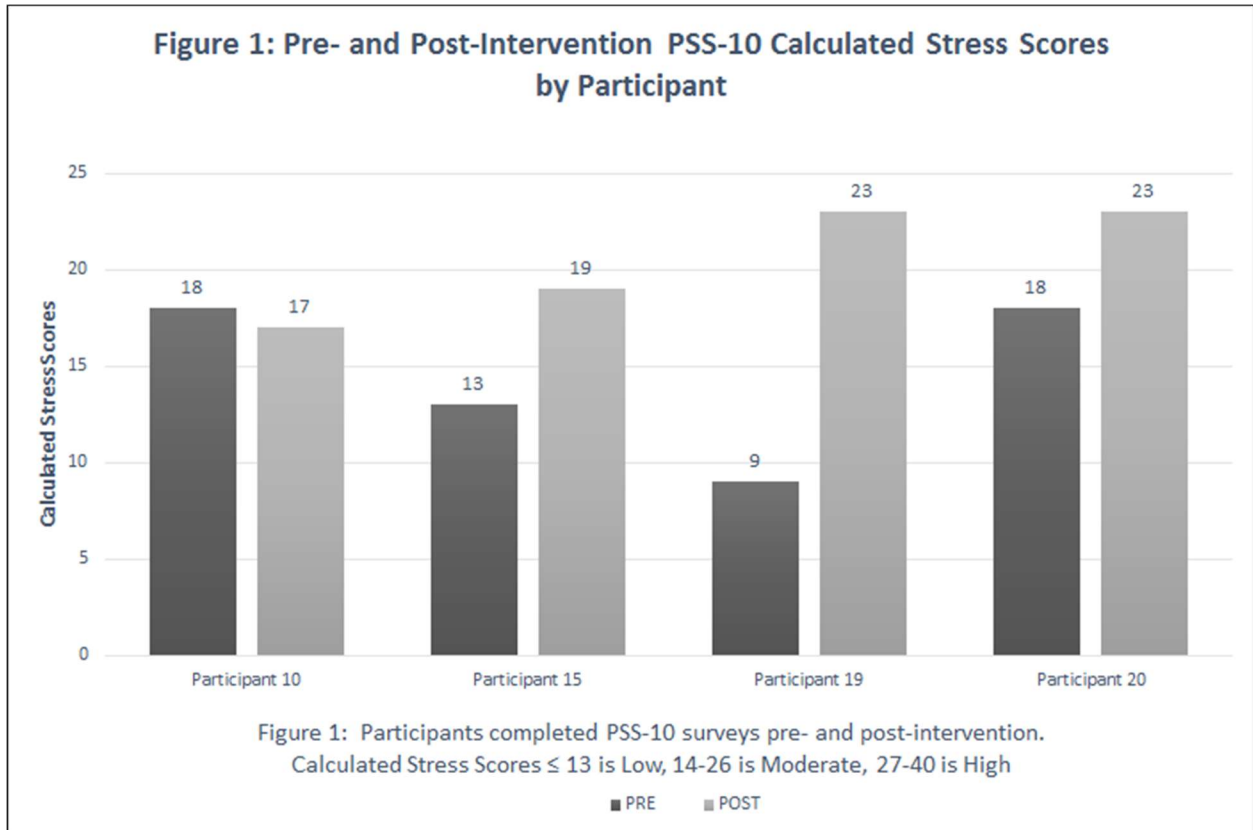
In this section, we report the results of the quantitative data analysis. First, we provide

our quantitative hypotheses. We then report the t-test results pertaining to the Qualtrics PSS-10, followed by t-test results for the VAS.

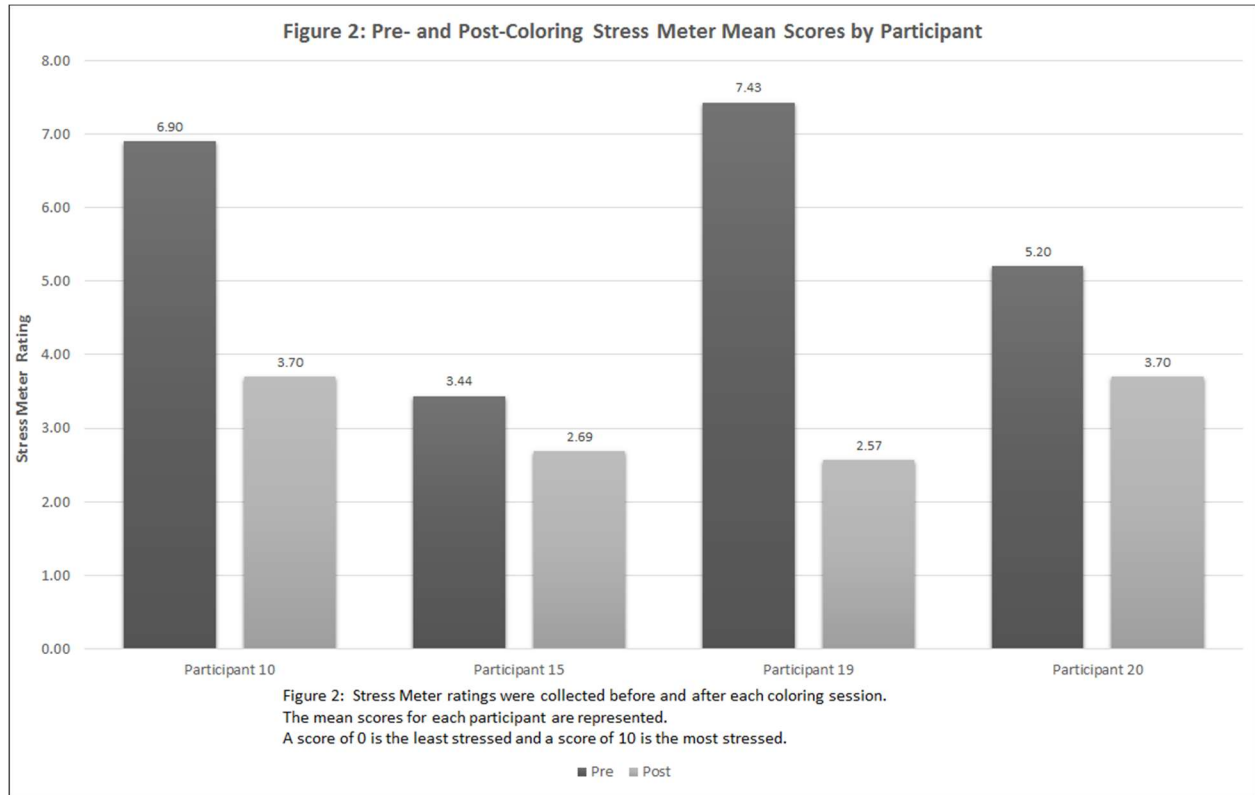
Quantitative hypotheses. Our primary hypothesis is that participants report reduced stress levels due to coloring across the two-week study period, as measured by the Perceived Stress Scales (PSS-10). Our second quantitative hypothesis is that the participants report a decreased level of stress after each coloring session. Our null hypothesis is that coloring makes no difference on stress levels.

Perceived stress scale-10 t-test results. The pre- and post-intervention combined mean stress scores ($M=12.75$, $SD=4.50$ and $M=14.00$, $SD=3.46$, respectively) and show increased stress levels over the two-week intervention period. There was not a significant difference in the scores between pre-intervention and post-intervention: $t(-.837)$, Sig. (2-tailed) = 0.464.

Therefore, a direct inference cannot be made about the stress ratings because of the coloring intervention. Figure 1 shows the Calculated Stress Scores for each participant, as calculated with the PSS-10 survey. In opposition to our primary hypothesis, it shows an increase for three-quarters of the participants.



Stress Meter t-test results. The overall combined mean Stress Meter ratings between pre- and post-coloring sessions show a decrease in perceived stress levels ($M=6.90$, $SD=1.45$ and $M=3.70$, $SD=.95$, respectively). There was a significant difference in the scores for pre-coloring and post-coloring: $t(7.69)$, Sig. (2-tailed) = .000. The results suggest that participants perceived a reduction in their stress level as a result of the individual coloring session, as suggested by our secondary hypothesis. Figure 2 below shows the mean pre- and post-coloring Stress Meter scores of participants detailed above.



Qualitative Results

In this section, we describe the themes that emerged from the qualitative data. The primary theme is a calming effect and the secondary theme is stress management.

Calming effect. A calming effect emerges as a theme from all four participants. The participants state they feel a reduction in stress and anxiety, resulting in feeling relaxed and calm. The participants talk about feeling calmer directly after the coloring intervention. One of the participants shares: *I do not feel as panicky as I had...definitely feeling calmer.*

The next participant expresses calming and a reduction in stress level after coloring:

I feel more calm and have thoughts in perspective. Stress level has dropped significantly.

This next example acknowledges the difficulty of this participant's work shift, and how coloring moves her into a calmer state:

EXTREMELY busy and frustrating shift - seemed like there were constant problems/roadblocks. Coloring helped to calm me down a little...

Another participant comments on the calming effect after a stressful beginning of the day:

Almost got into an accident before work! My feathers were a little ruffled, but I feel like this helped. I was able to calm down a little and focus on starting the shift on the right foot.

These examples demonstrate the calming effect coloring has on the participants after feeling stressed at work. Next, the secondary theme of stress management emerges from the journal entries demonstrating the action of coping that these nurses find in coloring.

Stress management. Participants expressed feeling more capable of managing their stress through the coloring sessions and thus, the theme of stress management emerged. An example of one participant's entry regarding this theme is an explicit example of stress management: *Stressors are "in check" and seem manageable.*

The next example verifies how coloring allows one participant to manage the stress of work:

Very stressful shift. Coloring did take my mind off work & concentrated on the color. Taking my mind off work. Off to sleep.

A third participant shares a specific example of a work stressor and how coloring helps her manage her stress before she goes to bed:

Code blue (not my patient) 10 min prior to end of shift. Responded to & helped with code, which was unsuccessful. Colored more "complex" picture 20 minutes. Came down several notches after coloring. Now I can go to bed.

In this final example, the participant shares how she feels coloring helps her stress management enough to continue this technique beyond this study:

Finding I'm actually looking forward to coloring after work. I think I'll go buy an adult coloring book. This helps.

Next, we will interpret our results in our discussion chapter.

Discussion

The purpose of this chapter is to interpret our research findings. We conducted this pilot study to describe the effect of coloring on perceived stress levels of hospital nurses. We first discuss findings that are supported by our review of the current literature. This is followed by a discussion of our unexpected findings. Finally, we discuss several implications indicated by this pilot study. These include implications for holistic health, for the nursing community, and implications for further research. This chapter ends with a brief conclusion.

Findings Supported by the Literature

A number of our findings are consistent with findings in the literature. Consistent with previous researchers' findings (Curl, 2008; Henderson et al., 2005; Italia et al., 2007; van der Klink et al., 2001; Repar & Patton, 2007; Rodski, 2012; Sandmire et al., 2012; Seward, 2015; Sonke et al., 2015; Visnola et al., 2010), our qualitative findings suggest that coloring for ten minutes before or after their work shift allowed participants to reduce their individual stress. In conflict with the same findings, our PSS-10 t-test findings could not confirm a statistically significant decrease in stress for the nurses during our two-week intervention. This result was most likely due to small sample size in this study. With four participants, quantitative data collection did not yield significant results; there needs to be a much larger sample to draw any generalizable conclusions about coloring as stress relief for nurses (Bell, 2010; Hesse-Biber, 2010).

Nurse participants expressed moderate to high stress levels in our PSS-10 results. Hospital nurses have tremendous levels of work-related stress due to acuity of patients, interpersonal and occupational stress, and administrative demands (Abede, 2015; Happell et al., 2013; Kane et al., 2007; McIntosh & Sheppy, 2013; Needleman et al., 2002; Wright, 2014). The

short-term nature of this project made it difficult to identify strategies to address long-term stress relief among nurses (Repar & Patton, 2007). Nurses are key caregivers in the hospital model. However, they are inundated with an endless list of over-reaching expectations from administration, staffing, and patients. Nursing is a unique occupation, which necessitates a unique focus on stress management. Coloring introduces a more holistic stress reduction technique that does not take much time (ten minutes on the day of a shift) to deliver results. As one participant stated:

Feeling much less stress and anxiety after coloring. It felt good to concentrate on something other than current life stressors for some time (I set a timer for 10 minutes - I can color longer, but at least have 10).

Unexpected Findings

In this section, we discuss unexpected findings we discovered in this pilot study and review the PSS-10 findings.

We expected to find participants' stress levels, as shown through the PSS-10 scores, to be lower post-intervention compared to pre-intervention. While statistically insignificant, our results actually showed an increased stress level. One possibility is that participants were simply more aware of their overall stress by participating in the study. The results may also imply that coloring is effective as a short-term intervention, but not long-term (Curry & Kasser, 2005; Sandmire et al., 2012; van der Venet & Serice, 2012). Long-term benefits may require an expanded intervention period. We address this further in implications for future research.

Additional stressors such as an intense workload and unsupportive management cause nurses to hesitate in participating in workplace wellness initiatives could also explain the lack of interested nurses (Happell et al., 2013; Wright, 2014). In our initiative to explore low participation, we reached out to the hospital research associate and asked if other research studies

were occurring at the same time as ours. Our contact confirmed that two other studies were taking place, and mentioned the implementation of a high-priority lean initiative around value-based improvement (VBI). VBI is an initiative that challenges nurses to become better problem solvers and brainstorm process improvements. With these additional factors drawing their attention, it is likely nurses were reluctant to add participation in this study to their busy days. Another possible explanation includes the passivity of the researchers for our manner of recruitment. In the following section, we discuss the implications of coloring for stress reduction.

Implications for Holistic Health

While the nursing profession is rooted in western medicine, it is important for nurses to incorporate a holistic approach to their self-care due to the stress of their work (McIntosh & Sheppy, 2013). Next, we discuss how stress reduction is currently not prioritized in nurses' work days, and lastly, how easy and inexpensive coloring may be to incorporate into workplace settings for stress reduction.

White (2013) suggests that mindfulness concepts are misunderstood in much of the nursing community. Perhaps with more research, holistic stress relief techniques will help to cultivate holistic health for both the nursing community and patients. Our qualitative data supports the idea that coloring may be a way for nurses to *unwind* and *relax* from the stress of their workday. However, as stated previously with an increase from 3.5 to 4.5 in Stress Meter score, one participant who attempted to color during her regular break states, "I thought coloring on break would lower my stress, but it actually made me more anxious." This participant goes on to express her anxiety as rooted in the lack of time in her work schedule to focus on self-care and stress management.

Coloring is an inexpensive, simple tool that nurses can practice before and after work to

disconnect from the stress. In fact, all of the participants at some point in their journal included how this helped them to disconnect and relax or feel a sense of calmness. Curl's (2008) findings represent that an emotional release occurs after art therapy resulting in better stress management. Coloring could be a cost-effective stress management tool for nurses. The availability of coloring books and colored pencils in break rooms or offering it as a coping technique for stress management is beneficial.

Based on the current literature, the high levels of stress reported in the PSS-10 scale, and the short-term benefits found in the results from the Stress Meter ratings in this study, we conclude that there is still a need for holistic stress relief techniques for hospital nurses. The demands of their work take a toll not only on their physical health but also their mental and emotional health (Clarke, 2007; Olds & Clarke, 2010). Coloring offers an opportunity for the nurses to relax, reset their minds, and is an easy and cost-effective approach.

Implications for the Community

The findings of this study reveal several implications for community and workplace policy. From a holistic perspective, the mental component of workplace wellness programs is crucial and deserves more attention. The findings of our study confirmed the high level of demand and stress in nurses through the increased stress results in our PSS-10 surveys. Nurses need more time during the workday to decompress and practice stress management. The literature suggests that coloring can reduce mental stress (Curl, 2008). Yet implementing simple stress-reduction techniques during the workday can cause stress levels to increase, as the participant who tried to fit it into her break time demonstrated. By implementing protected and required stress management time during the workday, nurses can take time for interventions such as coloring. This also allows for reduced burnout and increased employee retention, as nurses

will feel more valued (Italia et al., 2007).

Furthermore, workplace wellness programs need to be simple, easily accessible and well communicated in order to reach employee populations such as nurses. Due to shift work and intense workload, nurses are more likely than other healthcare professionals to be affected by both occupational and interpersonal stress (Happell et al., 2013; Wright, 2014). Therefore, workplace wellness programs need to offer resources that are readily available and communicated often to be beneficial for nurses (Happell et al., 2013; Wright, 2014).

Lastly, the findings of this study indicate that coloring can have short-term benefits in hospital nurses. Our qualitative results indicated nurses achieve a sense of calmness and release from coloring. With the astounding levels of work-related stress, supervisors should educate nurses about the potential stress management benefits of coloring. This education should come from the workplace wellness program as well as individual unit management. In the following section, we discuss the implications for future research related to coloring as a stress management skill, based on the findings of this pilot study.

Implications for Research

There are several implications for future research. Our post-positivist paradigm determined the research culture of inquiry and methodology; therefore, we first consider how another paradigm could affect the results. Next, we consider the impact of a larger sample size using multiple hospital systems or a statewide mailing list of Registered Nurses. Then, we discuss how the short data collection period contributed to PSS-10 results and our recommendation of a longitudinal study. We then discuss the specific time span for each coloring session and its impact on both recruitment and results. Finally, we provide information on the effect of simplification and specification during participant recruitment and data collection

for future research.

We designed the participant recruitment and data collection strategies in alignment with our post-positivist paradigm. This paradigm acknowledges a degree of researcher bias in a reality that is not absolute (Patten, 2014). Using a quasi-experimental method, we aimed to conduct research from a distance in order to reduce researcher bias. Future research operating within the post-positivist paradigm could benefit by reducing the number of exchanges between researchers and participants to improve objectivity. In the post-positivist paradigm, we chose to use a flyer to recruit nurses in order to reduce researcher interaction with participants.

We recognize the potential benefits of another paradigm to alter the culture of inquiry, methodology, and understanding of coloring as a stress management skill. For example, within the critical paradigm, researchers could use a phenomenological culture of inquiry to explore the lived experience of coloring.

Regardless of the paradigm for our study, we recommend the use of a larger sample size. A larger sample size improves the probability for complete random sampling in support of the validity of our study (Creswell, 2014). In an attempt to adhere to our paradigm, we emphasized minimal interaction during the brief data collection period; therefore, our sample consisted of nurses from multiple units at one hospital (Kemper et al., 2003). We recommend future researchers sample from a variety of units and multiple hospitals or use the statewide mailing list of registered nurses to contact potential participants.

In addition to the larger sample size, we recommend future research models use a longitudinal design. This pilot study collected data over a two-week period for each participant, yet this is a brief time period to determine the effect on an individual's perceived level of stress. In our collective opinion, a longitudinal study conducted over a six-month period or longer

allows participants more coloring sessions, incorporation of it as a daily stress management technique, and the long-term evaluation of perceived stress levels.

Although we recommend researchers further evaluate the impact of coloring on stress levels through a longitudinal study, we also recommend longer individual coloring sessions. This pilot study called for 10 to 15 minutes of coloring during the data collection period to assure participants we were not asking them to commit too much time thus causing additional stress. Unfortunately, this is a short period of time, and we suspect it is not enough time to significantly reduce perceived stress on both a daily and extended scale.

While we believe the use of a longitudinal study is important for future research, we recommend simplification and specification during the recruitment and data collection period. Our research paradigm calls for as much researcher objectivity as possible; therefore, we recruited nurses via flyers posted within the study hospital. We recommend recruiting participants in person versus relying on posters to increase the likelihood of participation. We also recommend a reduction in steps for interested participants, as our research design required nurses undergo a number of steps for us to accept them for participation.

In addition to simplifying recruitment, we suggest the simplification of data collection processes. Participants in our pilot study completed the two-week intervention at any point during the data collection period. We recommend a specification in the start and end date for the intervention as well as the time period for coloring. This would improve consistency and potentially provide statistically significant results. Upon completion of the two-week intervention period, nurses had no specific time frame in which to take the post-test PSS-10 survey. In order to enhance validity, we recommend completing the post-test within 24 hours after the final coloring session to assure that it is measuring stress as result of the coloring

intervention.

Conclusion

We conducted this research to describe the effect of coloring on the perceived stress levels of hospital nurses. We wanted to know if a short-term coloring intervention would reduce self-assessed stress ratings for hospital nurses. The literature is clear that stress carries negative impacts (Happell et al., 2013; Kinnunen-Amoroso, 2011; Wright, 2014). It is also clear that nurses experience a high level of workplace stress, but that workplace wellness programs rarely address concerns beyond physical health (Churchill et al., 2014; Pronk, 2014). We hypothesized that coloring would result in nurses reporting reduced perceived stress levels.

A holistic approach is necessary for nurses' self-care, due to the stress of their work (Watson, 1999). With an empirical approach, our quasi-experimental pilot study verified nurses' high level of stress and sought to identify an easy and cost-effective intervention. We discovered, through quantitative and qualitative data analysis, that coloring has short-term stress management benefits. However, our PSS-10 results do not indicate stress reduction over the two-week study period. While this study did not yield statistically significant results related to nurses' perceived stress levels, one implication for future research is to complete a longitudinal study of six months or longer. We recommend protected time during the workday for stress management as well as using interventions before and after shifts. Our hope, as a result of this pilot study, is that further research is conducted by researchers on holistic stress management techniques for hospital nurses.

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Appendix A

Flyer

Research Study: Nurses Needed

Do you have **STRESS** related to your job?

- Interested in a chance to win a \$100 gift card to Amazon?
- 6-8 coloring sessions & pre/post stress rating (outside of work hours)
- Approximately 15-20 minutes/session
- Study will track your stress levels before & after coloring
- Eligible participants will receive all coloring materials as part of the study



Contact by January 30, 2017 - Email: colorfulstudy6@gmail.com

St. Catherine University Graduate Students in the Masters of Holistic Health Studies:
Kate Berg Hanson, Dee Lukas, Colleen Merchlewitz, Jordan Rice, Glenda Robicheau & Whitney Ulvestad

Appendix B

Response Email with Details

Email Response to Nurses Interested in Participating in the Study

To: (Interested Nurses)

From: colorfulstudy6@gmail.com

Subject: Information Regarding: Effect of Coloring on Perceived Stress Levels for Hospital Nurses

Thank you for your interest in being a part of our research study. To be included in this study, we ask that you review the Informed Consent (see attachment), and if you agree to the consent form, please return with your electronic signature. Also, include your preferred mailing address, this will be kept confidential and destroyed after we have sent your packet out to you.

The total duration of this study is a commitment of 120 - 200 minutes over a two-week period, once you have received the research materials. This time will consist of the following:

- 15 minutes session - Pre-Survey of the Perceived Stress Scale (completed online)
- Six to Eight Sessions that will be 15-20 minutes long including pre Visual Analog Scale, followed by a minimum of 10 minutes of coloring, followed by post Visual Analog Scale, and lastly one to three phrases regarding your experience for that session. This will need to be completed a minimum of six times in two weeks. Sessions do not need to be done in consecutive days, but should be completed before, during or after a work shift. The Visual Analog Scale, coloring and one to three phrases will all be completed in the journal.
- 15 minute session - Post Survey of the Perceived Stress Scale (completed online)

Once your consent form is received, we will mail out a packet to you that includes the following:

- Journal, in which coloring and pre and post survey will be included.
- Coloring pencils to use for coloring
- Pre-paid envelope to return the journal when the study is complete

Once you receive the packet, it will also contain a link for the Perceived Stress Scale. This is to be completed prior to any coloring sessions and again after you complete six to eight sessions.

Please feel free to reach out if you have any questions regarding this study. We thank you for your time and your willingness to participate in this study.

Sincerely,

Kate Hanson

Dee Lukas

Colleen Merchlewitz

Jordan Rice

Glenda Robicheau

Whitney Ulvestad

Appendix C
Informed Consent Form



INFORMED CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Study Title: Effect of Coloring on Perceived Stress Levels for Hospital Nurses

P.I. Names:

Kate Berg Hanson, BA, LSW

Dee Lukas BA, CWWPM (Certified Worksite Wellness Program Manager)

Colleen Merchlewitz, RN, BSN, CPHN (Certified Public Health Nurse), BA

Jordan Rice, BS, CSCS (Certified Strength & Conditioning Specialist)

Glenda Robicheau, BA, RM (Reiki Master)

Whitney Ulvestad, BA, RYT-200 (Registered Yoga Teacher)

Study Location: St. Joseph's Hospital

Address: 45 W 10th St, St Paul, MN 55102

Telephone: (612) 710-1570

Email contact: colorfulstudy6@gmail.com

Sponsor's Name (if applicable): St. Catherine University

Research Advisor: Carol Geisler, Ph.D., R.N., Associate Professor, Master of Arts in Holistic Health Studies

INTRODUCTION

The purpose of this form is to invite you to participate in a research study developed by Kate Berg Hanson, Dee Lukas, Colleen Merchlewitz, Jordan Rice, Glenda Robicheau, and Whitney Ulvestad, graduate students in the Master of Arts in Holistic Health Studies at St. Catherine University, and to inform you of the possible benefits and risks that may be associated with your experience if you decide to participate. Please read this form carefully and ask any questions that you may have before agreeing to participate.

PURPOSE OF THIS RESEARCH

The primary purpose of this research is to describe the effect of coloring on perceived stress levels of hospital nurses.

DESCRIPTION OF THE RESEARCH

If you agree to participate in this research, you will be asked to:

- Complete a pre-intervention online Perceived Stress Scale survey regarding stress (approximately 15 minutes).

- Obtain your coloring packet and journal via mail and keep possession of it throughout the two-week intervention period, and return as instructed.
- Intervention: complete a minimum of six 15 - 20-minute sessions over the course of two weeks; each session is inclusive of a pre-coloring Visual Analog Scale to rate your current stress level, coloring for ten minutes, post-coloring Visual Analog Scale to rate your current stress level, and a short response to the prompt “In 1-3 phrases, please use the space below to describe your perceived level of stress and emotional status following this coloring session.”
- Each session should be completed on the same day as a work shift, and may be completed before, during or after your shift.
- Complete a post-intervention online Perceived Stress Scale survey (approximately fifteen minutes).
- At the end of the two-week study period, return the coloring/journal booklet to researchers in the pre-paid envelope provided.
- In total, study participation will take approximately 120 - 200 minutes over a minimum of eight sessions.
- After completing the study according to the steps outlined above, you will have the option to sign up for a drawing to receive one of three \$100 Amazon gift cards.

Approximately 150 participants are needed for this study.

BENEFITS AND RISKS

There are no direct benefits to you for participating in this research. The study is expected to contribute to the literature about mental and emotional stress in the workplace aimed at reducing employee stress levels.

Risks to participants of this study are minimal. Measures will be taken to de-identify participant data by assignment of a numerical code in accordance with entry into Microsoft Excel; therefore, we will eliminate any identifying characteristics of participants prior to data analysis. As a result, there is a low probability of a breach of confidentiality. In addition, if a breach were to occur, the severity of harm is low.

Please be aware that this study may create/bring about increased stress or personal feelings. If at any time you feel as though stress is overwhelming or you would like to speak to a professional, HealthEast’s Human Resources website has information regarding Employee Assistance Program (EAP) through LifeWorks Counseling. To access the program enter the HealthEast Infonet and click on MyHR-->Benefits-->EAP for more information. Employees of HealthEast can call Ceridian LifeWorks at 1-888-267-8126 or visit www.lifeworks.com to access counseling services as part of their benefits package.

CONFIDENTIALITY

By signing this form, you agree to:

- Complete a pre-intervention online Perceived Stress Scale survey (approximately 15 minutes).

- Obtain your coloring packet and journal via mail and keep possession of it throughout the intervention period, and return as instructed.
- Complete a minimum of six 15 - 20-minute sessions over the course of two weeks; each session is inclusive of a pre-coloring Visual Analog Scale to rate your current stress level, coloring for ten minutes, post-coloring Visual Analog Scale to rate your current stress level, and a short response to the prompt “In 1-3 phrases, please use the space below to describe your perceived level of stress and emotional status following this coloring session.”
- Complete a post-intervention online Perceived Stress Scale survey (approximately fifteen minutes).
- At the end of the two-week study period, return the coloring/journal booklet to researchers in the pre-paid envelope provided.
- In total, study participation will take approximately 120 - 200 minutes in a minimum of eight sessions.
- After completing the study according to the steps outlined above, you will have the option to sign up for a drawing to receive one of three \$100 Amazon gift cards.

The information that you provide in this study will be kept confidential with the following measures: Research study materials provided to you will contain a numerical code to de-identify your data during analysis. Once packets and final surveys are collected, only numerical data and small samples of writing with no identifiable information will be reported in the final thesis and presentation. We will keep the research results in a locked filing cabinet in a secure location accessible only to this research team and our research advisor while we work on this project. We will finish analyzing the data by May 17, 2017. We will then destroy all original reports and identifying information that can be linked back to you. Any information that you provide will be kept confidential, which means that you will not be identified or identifiable in any written reports or publications. The study data will be kept confidential by the researchers. No information that can identify you will be released or published.

COMPENSATION/COST

There is a financial incentive for participation. Upon completion of the study, all participants will have the opportunity to participate in a drawing for one of three \$100 Amazon gift cards.

COMPENSATION FOR INJURY

We will not provide compensation for injuries related to this research.

ALTERNATIVES TO PARTICIPATION

You are not required in any way to participate in this study. You may stop participation at any time without any harm.

NEW INFORMATION

Any significant, new information that is learned while this study is in progress that may

influence your willingness to continue to participate will be provided to you.

CONTACT PERSONS

The persons conducting this study can answer any questions that you may have. You can also reach Carol Geisler, Ph.D, our research advisor and Associate Professor in the Masters of Arts in Holistic Health Studies at St. Catherine University at ccgeisler@stkate.edu with questions about the study. In addition, you may contact Dean Huska, Chairperson of HealthEast Institutional Review Board at (651) 232-3234 or dhuska@healtheast.org with questions about your rights as a participant in a research study.

VOLUNTARY PARTICIPATION

Participation in this study is entirely voluntary. You may choose not to participate or you may participate and then decide to stop at any time. Your refusal to participate in this study will not affect your relationship with HealthEast or St. Catherine University.

CONSENT

I have read all of the above information, asked questions, and received answers to things I did not understand. I willingly give my consent to participate in this study. Upon signing, I will receive a copy of this consent form.

Name of Participant or Representative

Signature of Participant or Representative

Date

I confirm that I have personally explained the nature, purpose, duration, and foreseeable benefits and risks of the study to the participant (or if applicable, the participant's legal representative) named above.

Name of person who administered consent

Signature

Date

Appendix D

PSS-10 Survey

Note: We will be using Dr. Cohen's Perceived Stress Scale for the pre/post study stress test online (2015). We will be asking the questions via Qualtrics. The original source is listed below.

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

3. In the last month, how often have you felt nervous and "stressed"?

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

5. In the last month, how often have you felt that things were going your way?

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

7. In the last month, how often have you been able to control irritations in your life?

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

8. In the last month, how often have you felt that you were on top of things?

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

9. In the last month, how often have you been angered because of things that were outside of your control?

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

Appendix E

Stress Meter and Journal

Coloring Session Survey

Hello! Thank you for taking the time to participate in this study. Please use the images we have provided for you. There is no need to use them all or go in any particular order, simply choose the images you prefer on the days that work for your schedule.

Every day you will be asked to measure your stress level both pre and post coloring sessions. Use the following Stress Meter scale to rate your stress levels at both times:



[the following six items will be copied onto every page alongside the images to be colored]

Please follow these steps for each coloring session:

1. Note Date and Time of session:

Date of session: _____ Time of session: _____

2. Note Date and Time of last work shift ending:

Date of last shift: _____ Time of shift ending: _____

3. Numerically state your pre-coloring session stress level: _____

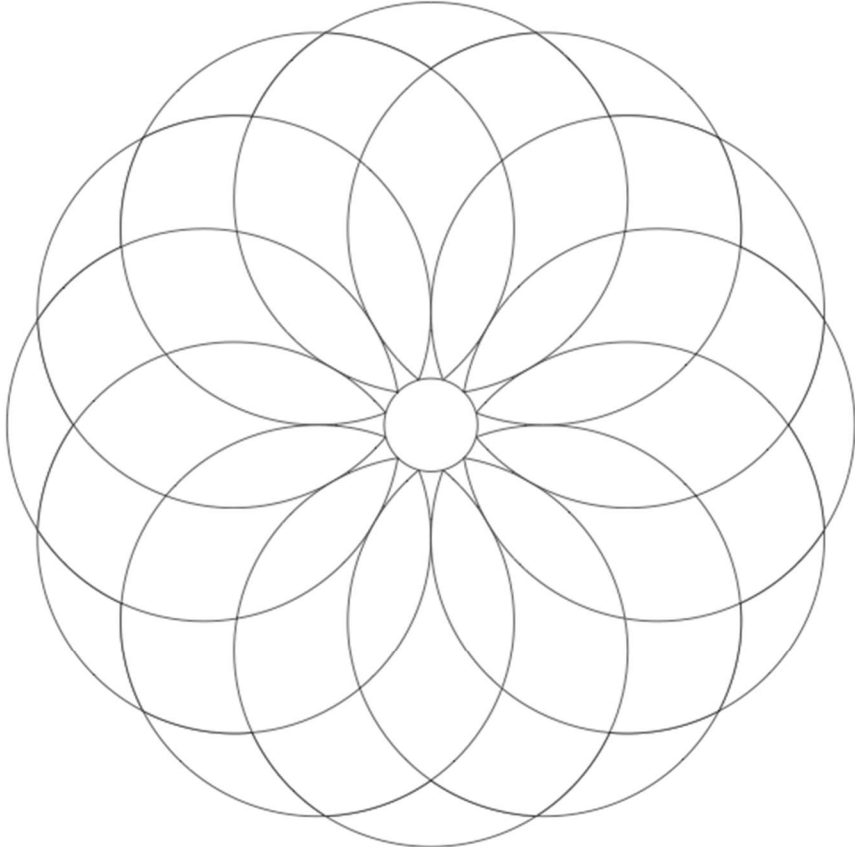
4. Color an image for a minimum of 10 minutes and then return to this page for the final questions below.

5. Numerically state your post-coloring session stress level: _____

6. Journal:

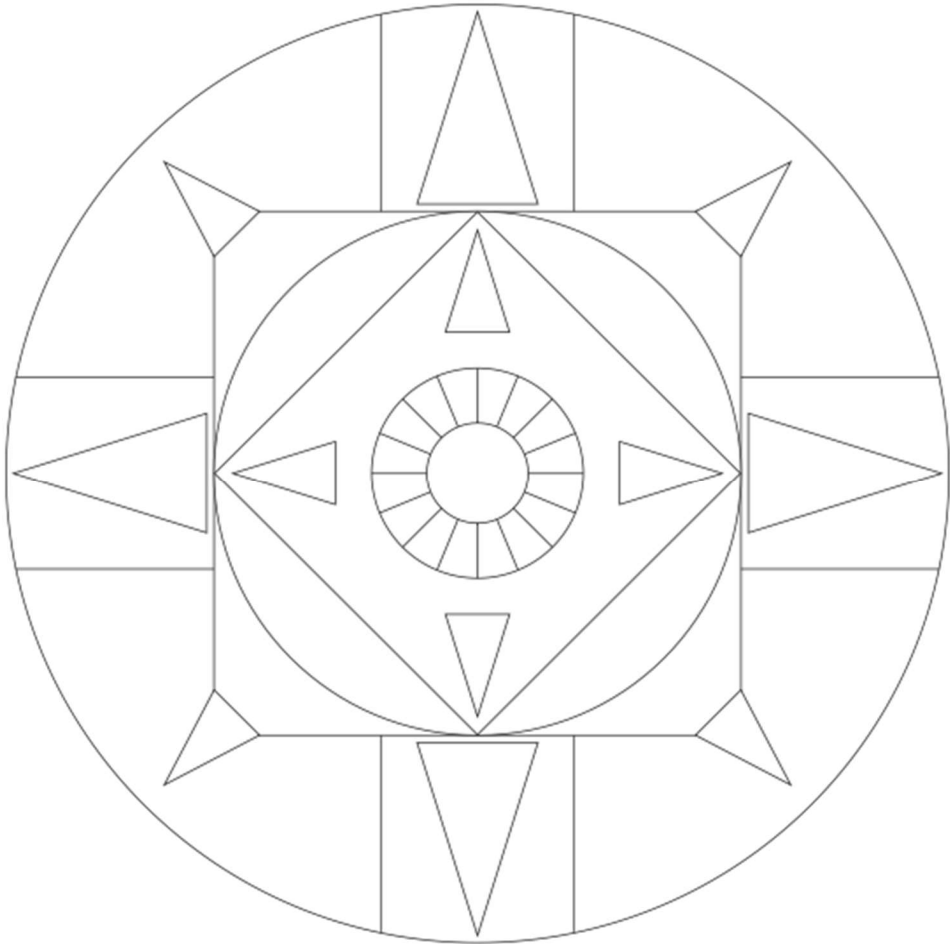
In 1-3 phrases, please use the space below to describe your perceived level of stress and emotional status following this coloring session:

Appendix F
Sample of Coloring Images






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Appendix G

HealthEast Newsletter

Page 7



Just for you

Holistic Nursing Practice Newsletter

5 Mantras to Help You Become Calm and Confident

TIME magazine Rosie McCall / Health.com Jan 25, 2017

To achieve inner peace...
"My breath is deep; my eyes are soft; I am at peace."


To beat anxiety...
"It's got to be better than I think."

To attract success...
"I have the confidence and knowledge to take action."

To find happiness...
"I give myself permission to prioritize the things that bring me joy, creativity, and connection."

To find the confidence to start afresh...
"I am evolving and changing for the better."

Shared by Woodwinds Spiritual Care

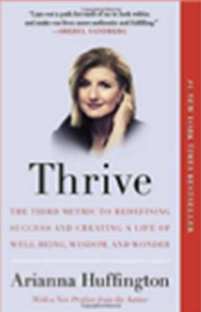


Research Study: St. Joe's Nurses Needed

- Do you have stress related to your job?
- Interested in a chance to win a \$100 gift card to Amazon?
- 6-8 coloring sessions and pre-post stress rating (outside of working hours)
- Approximately 15-20 minutes/session
- Study will track your stress levels before and after coloring
- Eligible participants will receive all coloring materials as part of the study

Email colorfulstudy@gmail.com by February 15th 2017 to participate.

St. Catherine Graduate students in the Masters of Holistic Health Studies:
Kate Berg Hanson, Dee Lukas, Colleen Merchlewitz, Jordan Rice,
Glenda Robicheau and Whitney Ulvestad.



Reflections from Reading: *Thrive* by Arianna Huffington

The Holistic Practice Council is reading *Thrive* by Arianna Huffington as a group to enhance our own ability for self-care and engage in deeper discussion about self-care and the definition of success. Arianna begins this book with an account of her personal "wake up call": fainting from overwork and exhaustion. She goes on to explain that this experience gave her the opportunity to step back and re-define success, in terms that meant for her- a more balanced life full of well-being, wisdom, and wonder. Look for more reflections from reading on this book in the future newsletters.